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CONTENTS

The Value Connotation and Path Construction of the Traditional Chinese "Harmony" Thought for Cultural Exchange between China and Sri Lanka

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Abstract: The traditional Chinese "harmony" thought embodies the essence of excellent traditional Chinese culture, and it is an original and primary Chinese philosophical thought. The civilization concept of "harmony but difference, and harmonious coexistence" not only provides wisdom for the multicultural exchanges between China and Sri Lanka, but also transcends cultural barriers, conflicts, and superiority through cultural exchange, mutual learning, and coexistence. It provides strong spiritual power for the prosperity of Chinese Sri Lankan culture and the construction of a closer community with a shared future for China and Sri Lanka in the new era. From the perspective of harmony, we should tap into the enormous potential of culture in promoting mutual learning between Chinese and Sri Lankan civilizations, establish a multi-level mechanism for cultural exchange and cooperation, and consolidate the cultural foundation of a community with a shared future for the joint development of Chinese and Sri Lankan cultures. Meanwhile, we'd better emphasize the strategic significance of culture in China Sri Lanka diplomacy, vigorously carry out bilateral cultural exchange activities and promote the harmonious coexistence of Chinese culture and Sri Lankan culture. What's more, we should give full play to the role of diverse entities, create more platforms for communication and cooperation, form a new pattern of cultural exchanges between China and Sri Lanka, and endow them with new era connotations of mutual learning between Chinese and Sri Lankan civilizations.

Keywords: Harmony Thought; Cultural Exchange Between China and Sri Lanka; Value Connotation; Path Construction

INTRODUCTION

The idea of harmony is the essence of the excellent traditional culture of the Chinese nation and the foundation of the ideological and cultural heritage of the Chinese nation. The long-standing traditional Chinese culture has always adhered to the concept of "harmony but diversity" and regarded it as a criterion for communication between people and countries. Since ancient times, "harmony but diversity" has been deeply ingrained in the bloodline of the Chinese nation as a norm of communication, becoming an important cultural gene of the Chinese nation. President Xi Jinping, during his speech at the general debate of the 70th United Nations General Assembly pointed out, "Civilizations can live together only by treating each other equally", "We should respect various civilizations, treat them on an equal footing, learn from each other, incorporate them of diverse nature, and promote human civilization to develop creatively". The civilization concept contained in the idea of harmony represents the future direction of humanity and is a representative element of vitality in the world's intellectual and cultural treasure trove. As a conceptual system, the Chinese nation's ideology of harmony is a pursuit of both

identity and tolerance for differences. Through recognition and transcendence of identity and differences, it forms a new harmony, which is a kind of ideology that can tolerate and transcend identity and differences, and must have openness. It can be said that openness constitutes an inevitable requirement for the existence and development of the idea of harmony, and has also become an inherent driving force for the practice of harmony, playing an important role in cultural exchange and mutual learning of civilizations.

Through the review and sorting of relevant literature, it can be found that the current research conducted by scholars around "harmony thought" and "harmony culture" mainly includes the following aspects:

(1) Exploring the relationship, value significance, and construction of "harmony thought" and "community with a shared future for humanity": (Li Tieying, Ma Xin, Shi Xinyi, 2019; Chen Xia, 2020; Zhang Puhua, 2020; Liu Yang, 2021; Luo Huixuan, 2022; Zhang Rui, 2022; Zhang Juan, Yang Zhen, and Xu Jiahui, 2023);

(2) The ethical value of Chinese diplomacy and the paradigm construction of international relations in the perspective of "harmony": (Yu Xiaofeng, 2007; Yu Xiaofeng and Zhang Yadi, 2019);

(3) From "the Belt and Road" initiative to see the contemporary value of the Chinese nation's thought of harmony: (Zhang Kailan, 2018);

(4) From the perspective of harmony culture to the common values of all humanity: (Wang Chen, 2022);

(5) Exploring the theoretical significance and practical path of harmony culture in telling good Chinese stories from the perspective of cross-cultural communication theory foundation: (Chen Xianhong and Song Fazhi, 2020; Zhao Zhongzhong and Chen Xianhong, 2023).

From the above research, a number of important research results have been achieved in relevant research, but it is still rare to explore the cultural exchanges between different countries in the context of "the Belt and Road" from the perspective of the idea of harmony, such as China Sri Lanka cultural exchanges.

In this context, this paper takes the traditional Chinese concept of harmony as the research perspective, and focuses on the value and path construction of cultural exchange between China and Sri Lanka through the concept of harmony. It attempts to explore the following issues in order to better promote cultural communication and mutual learning between China and Sri Lanka, as well as the long-term development of bilateral relations and comprehensive cooperation in various fields.

(1) The connotation of the traditional Chinese "harmony" thought;

(2) The compatibility between the traditional Chinese "harmony" thought and the concept of a community with a shared future for the prosperity of Chinese and Sri Lankan cultures;

(3) The value connotation of the traditional Chinese "harmony" thought for cultural exchange between China and Sri Lanka;

(4) The path construction for cultural exchange between China and Sri Lanka based on the traditional Chinese "harmony" thought.

THE CONNOTATION OF THE TRADITIONAL CHINESE "HARMONY" THOUGHT

In the literature and unearthed textual materials, the concept of integration and inclusiveness emerged as early as the Yao(尧) and Shun(舜) dynasties, and the idea of harmony was initially formed. During the Spring and Autumn and Warring States periods, the idea of harmony was further inherited and developed, gradually becoming an important ideological essence of traditional Chinese culture.

"Harmony" is one of the core concepts of traditional Chinese culture, which provides a complete set of ideological value systems for dealing with issues such as the relationship between humans and nature, humans and society, and humans and themselves. From the perspective of etymology, "he"(和)and "he"(合)were still two independent words used during the Yin(殷)(about BC 1300-BC 1046)and Zhou(周)(about BC 1046-BC 256) dynasties. The combination of the two originated in the Spring and Autumn period and was widely used in the Qin(秦)(BC 221-BC 207)and Han(汉)(BC 202-AD 220)dynasties, gradually establishing itself as

an important concept in the mainstream culture of Chinese society. From the perspective of the internal structure of the culture of harmony, "He"(和)is the "way" of traditional Chinese humanistic spirit, which is a fundamental principle that must be followed and a value goal that must be achieved in the process of practice. "He"(合)is the "law" for practicing the values of Chinese civilization, and it is the basic method and important means adopted in the overall cultural operation. The culture of harmony emphasizes the central value of "He"(和)and the specific method of "He"(合), emphasizing the harmony of diversity, the tolerance of differences, the coordination of heterogeneity, and the melting of opposites (Chen, 2020, p. 62-70). In summary, the culture of harmony takes "harmony" as the value orientation, "harmony" as the value rule, and "great harmony" as the value goal, with rich value implications. "Shang He He"(尚和合)is not only the core and spiritual trait of excellent traditional Chinese culture, but also one of the most vibrant cultural genes in it. The traditional concept of harmony has rich and profound connotations, and is a Chinese traditional philosophical thought with originality and authenticity.

In the context of Chinese culture, "He"(和)refers to reconciliation, harmony, and peace, while "He"(合)refers to unity, cooperation, and integration. Laozi(老子)said, "All things bear yin(阴)and embrace yang(阳), and when they are charged with qi(气), they are in the harmony. " *The Theory of Rites* by Xunzi(《 荀 子 · 礼 论 》)records, "the combination of heaven and earth leads to the birth of all things, the connection of yin and yang leads to changes, and the false combination of nature leads to the governance of the world. " It can be seen that in the excellent traditional Chinese culture, the reason for the emergence of all things is "harmony". Confucianism emphasizes "do not do to others what you do not want", which is one of the important theoretical foundations of ancient Chinese civilization and rational thinking. "Harmony" is a vivid display of the symbiosis of biodiversity in nature, as well as a vivid reflection of the harmonious coexistence of human society. It is a vivid interpretation of the profound foundation of 5000 years of Chinese civilization, in which each has its own beauty and beauty coexists (Luo, 2022, p. 44-54).

The traditional Chinese culture emphasizes the ideas of "harmony but difference" and "harmonious coexistence", which promote different countries and cultures to achieve "beauty and harmony, and world harmony", containing rich cultural genes of cultural exchange and mutual learning. The Chinese concept of harmony advocates active dialogue with different civilizations around the world, which is the only way to reduce cultural barriers and achieve common development and prosperity of various civilizations. The Chinese civilization has been continuous and enduring for over 5000 years. In the process of long-term evolution, it has formed a unique value system, cultural connotation, and spiritual quality for the Chinese people to view the world, society, and life. This is the fundamental characteristic that distinguishes us from other countries and ethnic groups, and also cultivates the cultural confidence of the Chinese nation to learn from the strengths of others (Xi, 2020). The foundation of "dialogue between civilizations" requires the establishment of a "mental order" of human coexistence, as well as the concepts of "harmony but difference", "harmonious coexistence", and "beauty and coexistence". President Xi Jinping once pointed out, "We should promote mutual respect and harmonious coexistence among different civilizations, making cultural exchange and mutual learning a bridge to enhance friendship among people of all countries, a driving force for human social progress, and a link to maintain world peace. We should seek wisdom and nutrition from different civilizations, provide spiritual support and comfort for people, and work together to solve various challenges faced by humanity. " (Xi, 2019) The exchange and mutual learning of civilizations is proposed based on the in-depth exploration of the "harmony and symbiosis" ideology in excellent traditional Chinese culture. It not only showcases the contemporary value of Chinese excellent traditional culture, but also has great significance for achieving world peace and

development.

The idea of harmony is one of the sources of the "China's Propositions", and it is the living organism of the Chinese national humanistic spirit, providing an important direction for world development. The idea of peace and cooperation is conducive to cultural exchanges along "the Belt and Road", can effectively promote friendly relations and national integration between China and Sri Lanka, and is an important foundation for the two countries to achieve peaceful cooperation, mutual benefit and win-win results. The idea of harmony can effectively enhance cultural exchange and communication between members of the social community of China and Sri Lanka. The fundamental purpose of cultural exchange between the two countries is to achieve a value consensus between Chinese and Sri Lankan cultures, including value identification and value differentiation. This will help further enhance the mutual understanding between the two countries and the comprehensive and in-depth cooperation in various fields such as culture.

THE COMPATIBILITY BETWEEN THE TRADITIONAL CHINESE "HARMONY" THOUGHT AND THE CONCEPT OF A COMMUNITY WITH A SHARED FUTURE FOR THE PROSPERITY OF CHINESE AND SRI LANKAN CULTURES

Sri Lanka is an important cooperative country of "the Belt and Road", and also the first country to issue a statement of support in the form of government after China put forward the "21st Century Maritime Silk Road" initiative. Sri Lanka is a founding member of the South Asian Association for Regional Cooperation, a key node of China's ancient "Maritime Silk Road" and an important strategic point in the current development strategy of "the Belt and Road". Sri Lanka, with its advantageous geographical location and significant influence in the Indian Ocean region, has become a core hub for trade between China and Europe, Africa, and other regions. In history, Sri Lanka has a long and rich cultural exchange with China, and the relationship between the two countries has been friendly for generations. Sri Lanka is also a country that places great emphasis on cultural exchange. The diplomatic relations between China and Sri Lanka began in the Han Dynasty, but the establishment of extensive contacts began in the early Tang Dynasty and reached its peak in the Ming Dynasty. In the current "the Belt and Road" initiative, cultural exchanges and mutual learning between China and Sri Lanka are still of great significance. Sri Lanka has an open, gentle, and fascinating social culture. At the same time, it accepts and absorbs foreign influences at multiple levels of social life and continues to evolve. Among them, the strong adaptability of Sri Lankans in cultural psychology is an important force in shaping this multiculturalism. Through trade, commercial activities, and intermarriage, Sri Lanka has inherited various cultural traits and forged its cultural inclusiveness.

The traditional Chinese concept of "harmony" as well as the inclusiveness of Sri Lankan culture have a high degree of compatibility with the concept of a community with a shared future for the co-development of Chinese Sri Lankan culture. This concept coincides with the civilization concept of "harmony but difference" advocated by the Chinese culture of "harmony". In the traditional Chinese concept of "harmony", "harmony"(和)refers to the unity of diversity, which means the resolution of conflicts, achieving harmony, peace, and neutrality; "Harmony"(合)means the unity of two, which includes differences and opposites. It refers to the preservation of individual attributes of things in a state of harmony and unity. The cultures of China and Sri Lanka are both formed in specific historical backgrounds and geographical environments, and each has its own uniqueness. Reiterating the cultural psychology of "harmony" can enhance the understanding and recognition of the concept of a community with a shared future for China and Sri Lanka. It is not about eliminating differences, but about actively engaging in exchanges and cooperation around culture and related fields on the basis of fully respecting the independence of the two countries, and achieving the development of "harmony" through joint construction, governance, and sharing. Facing the diverse and complex cultural world, the civilization concept of "harmony but diversity, inclusiveness" can not

only provide wisdom for handling the diverse cultural exchanges between China and Sri Lanka, but also transcend cultural conflicts through mutual learning of civilizations, and contribute to the prosperity of culture and the peaceful development of the world.

THE VALUE CONNOTATION OF THE TRADITIONAL CHINESE "HARMONY" THOUGHT FOR CULTURAL EXCHANGE BETWEEN CHINA AND SRI LANKA

China and Sri Lanka are traditional friendly neighbors, and the exchanges between the two peoples have a long history. There has been no confrontation between China and Sri Lanka in history, and the two civilizations share many common directions. The dialogue between China and Sri Lanka is a cultural exchange relationship based on equal dialogue. In the context of "the Belt and Road" initiative, we should pay more attention to the strategic significance of culture in China Sri Lanka diplomacy, draw nutrition from the respective splendid civilizations of China and Sri Lanka, explore the impetus for the integration of China Sri Lanka civilizations, endow it with new era connotation, and promote the stability and long-term development of China Sri Lanka relations.

The value connotation of the traditional Chinese "harmony" thought in cultural exchange between China and Sri Lanka is mainly reflected in: firstly, it helps to highlight the cultural landscape of "harmony but difference", "harmonious coexistence", and "beauty and harmony" between China and Sri Lanka, in order to break free from Western influence and enhance the confidence of Asian civilization. In the magnificent history, both Chinese and Sri Lankan civilizations have made important contributions to human civilization. Since modern times, driven by economic development and technological revolution, Western civilization has risen strongly. With its advantageous position in the global economy and technology, the West has vigorously promoted the Western civilization concept, occupying the leading and discourse power in politics, economy, and academic research. In addition to continuing in-depth cooperation in politics, economy and trade, science and technology, education, tourism, and other fields, China and Sri Lanka also need to actively explore cultural exchanges and cooperation to showcase the real and brilliant Asian civilization and enhance the confidence of Asian civilization.

Secondly, it helps to inherit the spirit of China Sri Lanka cooperation and inject new impetus for common development. The unique ideological and cultural history and common historical mission of China and Sri Lanka are the profound foundation for promoting the integration of Chinese and Sri Lankan civilizations. The two major civilizations can be based on these characteristics, with traditional Chinese and Sri Lankan cultures as the main body, and around the four dimensions of human and nature, human and society, human and human, and human themselves, promote cultural exchange and learning through mutual translation, interpretation, exchange, learning, and sharing, and contribute to the concept of equal treatment and peaceful coexistence in the world. China and Sri Lanka have created outstanding practical achievements and forged a valuable spirit of cooperation through mutually beneficial cooperation. The concept of "truth, practicality, affinity, and sincerity" and the correct concept of interests in China's cooperation with Sri Lanka reflect the moral essence of China's excellent culture, integrate the historical accumulation of traditional friendship between China and Sri Lanka, and become an important part of the treasure trove of China Sri Lanka civilization. We should vigorously tap into the profound value of China Sri Lanka cooperation, draw nourishment from concepts and practices such as a community with a shared future for mankind, poverty reduction practices, green development, and ecological civilization, and keep up with the times to endow China Sri Lanka civilization with new era connotations.

Thirdly, it helps to promote the common ideas, cultural development, and harmonious coexistence between China and Sri Lanka. Building a community with a shared future for cultural co-prosperity requires a harmonious and symbiotic international cultural ecology, enriching and expanding the international cultural landscape, exploring broader spaces and fields from diverse cultures, and creating a cultural atmosphere of mutual respect,

cooperation, and symbiosis for human culture to achieve self transcendence. Collaboration and symbiosis are essential requirements for cultural development. Only by collaborating and complementing the strengths and weaknesses of cultures from different countries and regions can they maintain strong vitality. Faced with the backdrop of global political multipolarity, economic globalization, and cultural diversity, the cultural landscape between China and Sri Lanka should reflect a cooperative and symbiotic relationship, that is, to form a mutually dependent and mutually developing relationship between the cultures of China and Sri Lanka.

The ideology of China's destiny and coexistence, as well as harmony and coexistence, is inclusive and lays a solid ideological and cultural foundation for cooperation between China and Sri Lanka. The prerequisite for building a community with a shared future between China and Sri Lanka is to establish "a community of knowledge and ideas" that can be exchanged, understood, and borrowed. Both China and Sri Lanka need to draw on the wisdom of China and Sri Lanka civilizations, and display their unique value in practical cooperation. To achieve "beauty and harmony" through "the beauty of beauty", China and Sri Lanka need to consolidate a solid ideological foundation between each other, and to promote the high-quality construction of a community with a shared future between each other.

THE PATH CONSTRUCTION FOR CULTURAL EXCHANGE BETWEEN CHINA AND SRI LANKA BASED ON THE TRADITIONAL CHINESE "HARMONY" THOUGHT

The traditional Chinese concept of "harmony" is a knowledge system of theories, laws, principles, and methods related to the survival and development of "harmony" in the world, which was created and integrated with various cultures such as Taoism, Mohism, and Buddhism during the 5000 year development of Chinese culture, with Confucianism as the main focus. The concept of "harmony" is the essence of the traditional Chinese culture, running through all fields and processes of traditional Chinese culture. It is an outstanding

contribution of Chinese civilization to humanity, not only the spiritual foundation and root of Chinese civilization's great rejuvenation, but also an important spiritual resource for humanity to resolve crises and overcome survival difficulties in the 21st century (Chen, 2019, p. 1-7). The deep compatibility between the "harmony" culture and the concept of a community with a shared future for cultural co-prosperity provides us with a feasible path to draw on the wisdom of the "harmony" culture to support and sustain the contemporary construction of a community with a shared future for Chinese and Sri Lankan cultures.

The first is to establish a multi-level mechanism for cultural exchange and cooperation, and consolidate the cultural foundation of a community with a shared future for cultural co-prosperity between China and Sri Lanka.

Every culture of various countries and ethnic groups around the world is engraved with unique and unusual discourse connotations, ways of thinking, historical traditions, and narrative logic, condensing thoughts and summaries of the world of life and social experiences, and containing ideological wisdom to solve practical problems. China and Sri Lanka continuing the historical tradition of cultural co-development needs to explore consensus from unique historical and cultural elements, learn from the past and the present, and maintain the spiritual vitality of inclusiveness, openness, mutual learning, and mutual prosperity in the millennium long Silk Road. On the one hand, it is necessary to construct the humanistic spirit of the new era, pull in the fate and emotions of the Chinese and Sri Lankan people, promote mutual understanding among the people, and mutual imprinting of the two peoples' hearts. This not only showcases the wisdom of traditional Chinese culture, but also spreads the ideal demands of contemporary Chinese people for peaceful coexistence and friendly exchanges, and spreads the most valuable ideas that best reflect the humanistic spirit of China. On the other hand, China and Sri Lanka can have a clear understanding of the future development trend of human civilization through cultural dialogue at both the material and spiritual levels, laying a solid foundation for building a

cultural community with a shared future.

The exchanges and cooperation between China and Sri Lanka should be based on long-term development. Both sides should cultivate a sense of cultural exchange to enhance friendship and long-term friendship, and effectively operate a mechanism of cultural exchange that connects people's hearts. For the government, it is necessary to strengthen the top-level design of mechanism construction, plan the phased and long-term goals of cultural exchange and cooperation between China and Sri Lanka from a national and strategic perspective, and also leverage the coordination and service functions of the government to actively create a good cooperation environment and atmosphere for civil exchanges between China and Sri Lanka. From the perspective of the public, it is necessary to encourage the extensive participation of non-governmental organizations, media, enterprises, think tanks, and the general public through mechanism innovation and design, forming a multi-party participation pattern, ensuring long-term and sustainable civil exchanges, and cultivating a good public opinion foundation for cultural exchanges between China and Sri Lanka (Wang, 2021, p. 113-133). In the construction and operation of the China Sri Lanka cultural exchange mechanism, the direct promotion role of the government is very necessary, such as signing bilateral or multilateral cultural exchange agreements, establishing high-level consultation mechanisms, and establishing long-term cultural propaganda institutions in China and Sri Lanka. For example, in September 2014, the Sri Lanka Chinese Cultural Center was jointly established by the leaders of China and Sri Lanka, becoming the first cultural center established by China in South Asia. In addition, various China Sri Lanka friendship associations, including the Sri Lanka China Association and the Sri Lanka China Social and Cultural Cooperation Association, continuously hold various activities to promote Chinese culture, inherit China Sri Lanka friendship, and speak up for China on some major issues. China and Sri Lanka can hold large-scale cultural and exhibition events, such as art exhibitions, picture exhibitions, folk exhibitions, food exhibitions, and clothing exhibitions in order

to enhance the two peoples' understanding. Both sides can tap into the potential of the people, unleash their power, cultivate and deepen the social foundation for win-win cooperation, such as the role of non-governmental organizations and enterprises. In addition, it is necessary to carry out mutual visits of folk art delegations and corporate culture exchange activities, enhance international exchanges among young people, especially college students and young entrepreneurs, and adopt effective forms of youth exchange such as youth summer camps, youth gatherings, and youth entrepreneurship forums in order to make young people a powerful participant and promoter of the healthy development of China Sri Lanka relations.

The second is to vigorously carry out bilateral cultural exchange activities between China and Sri Lanka, promoting the harmonious coexistence of Chinese culture and Sri Lankan culture.

The concept of "world harmony", "harmony and symbiosis" has been a consistent part of China's civilization for thousands of years. It is the wisdom of China to resolve cultural barriers, promote diverse coexistence of civilizations, and build a community with a shared future for cultural co-prosperity. President Xi Jinping once pointed out, "Cultural exchange and mutual learning are the essence of civilization development. Only by cultural exchange and mutual learning as well as learning from others' strong points and closing the gap can civilizations maintain vigorous vitality. " In the long history of social development, "harmony but diversity" reflects the beauty of human civilization, "diverse coexistence" demonstrates historical rationality, and the exchange and mutual learning of different civilizations are inevitable for social development and even a symbol of modern social civilization progress. Both China and Sri Lanka have a long history and splendid culture. The Maritime Silk Road, millennium Buddhist tradition, sincere cooperation, and cultural exchanges connect the two countries, and their cultural and humanistic exchanges have a long and rich history. On August 15, 1979, the two countries signed the Cultural Cooperation Agreement between the Governments of the People's

Republic of China and the Democratic Socialist Republic of Sri Lanka. On August 30, 2005, the two countries signed a cultural cooperation agreement. Under the framework of the Cultural Cooperation Agreement and with the promotion of the cultural departments of the two governments, cultural exchanges between China and Sri Lanka have developed smoothly, and exchanges and cooperation in the fields of performing arts, cultural relic protection, broadcasting, film and television, Buddhism, sports, etc. have been fully carried out. On April 25, 2015, the preliminary round of the 14th "Chinese Bridge" World University Chinese Competition in Sri Lanka was successfully held in Colombo. The "Happy Spring Festival" event has become a brand. The "Happy Spring Festival" event is the largest cultural event carried out by China in Sri Lanka. In 2013, the Jilin Provincial Cultural and Art Troupe visited Sri Lanka and performed; In 2014, the "Yellow River Charm" performance team of Shanxi Provincial Song and Dance Theater visited Sri Lanka; In 2015, the Gansu Provincial Department of Culture organized the "Dunhuang Rhyme·Silk Road Emotion" art troupe to visit Sri Lanka; In 2016, the Sanya Sunbird Art Troupe in Hainan held the "Maritime Silk Road Concert" in Sri Lanka. These activities have brought joy and blessings of the Spring Festival to the local people, and have had a significant impact. Sri Lanka has also sent art troupes to China multiple times to participate in performances and folk art exchange activities at the Asian Art Festival. These exchanges have enabled two different civilizations to complement each other, further deepening mutual understanding between the two peoples.

Obviously, the establishment of the Sri Lanka Chinese Cultural Center is a major event in the cultural exchange between China and Sri Lanka. On June 4, 2012, Chinese Minister of Culture Cai Wu and Sri Lankan Minister of Culture and Arts Aknayak jointly signed the Memorandum of Understanding between the Government of the People's Republic of China and the Government of the Democratic Socialist Republic of Sri Lanka on the establishment of a Chinese cultural center in Sri Lanka in Beijing. Since the operation of the center, a series of activities have been carried out, including the "Beautiful Tianjin" comprehensive evening party, the "Beautiful Tianjin Ballet Boutique Lanka Tour" and the "Visual China·Intercontinental Tour" Chinese Ink Art Exhibition, which have promoted cultural exchange and cooperation between China and Sri Lanka and further enhanced mutual understanding between the two peoples (Jiang, 2017). In the future, China and Sri Lanka can further vigorously carry out various forms of bilateral cultural exchange activities to promote the harmonious coexistence of Chinese culture and Sri Lankan culture, and promote stable and far-reaching relations between the two countries.

The third is to exert the role of multiple subjects, create more platforms for communication and cooperation, and form a new pattern of cultural and humanistic exchanges between China and Sri Lanka.

By adhering to the principles of cultural dialogue, cultural equality and mutual learning, multiple subjects should be encouraged to exert their diverse roles to enhance China Sri Lanka cultural soft power and form a cooperative and symbiotic cultural pattern and ultimately build a community with a shared future for cultural co-prosperity between the two countries. For example, giving full play to the diverse participation of youth, women, universities, enterprises, and other entities in China and Sri Lanka, establishing multi-level and institutionalized platforms, and promoting all-round exchanges and cooperation in art, literature, culture, and think tanks between China and Sri Lanka. We can jointly build a China Sri Lanka "the Belt and Road" think tank cooperation network, and the cooperation between China and Sri Lanka think tanks can establish a broader connection in terms of joint research, sharing research results, and sending foreign students. The study of China and Sri Lanka by Chinese and Sri Lankan scholars will provide a new window for both sides to understand themselves and each other.

From the perspective of education and academic exchanges, it is of great significance in promoting mutual understanding and cultural learning between young people and universities in China and Sri Lanka. It is necessary to promote educational dialogue, innovate cooperation mechanisms, achieve

exchange of educational think tanks and share educational resources, and establish and expand big data exchange platforms. It is also necessary to promote educational cooperation, expand the scale of international student exchange, sign agreements to jointly build joint universities, and enhance the level of cooperative education. Meanwhile, it is of importance to invite experts and scholars from various fields to visit each other, regularly hold high-level education forums between China and Sri Lanka, and promote the establishment of Confucius Institutes (Huang, 2018, p. 18-22).

More practical measures can be adopted, such as initiating targeted cooperation between cultural institutions of China and Sri Lanka. Specifically, to take practical projects as the starting point, like building a cooperation network between civil organizations of the two countries, establishing media cooperation alliances, film and television cooperation alliances, music cooperation alliances, and other new platforms for cultural and humanistic cooperation; to build a year of friendly exchanges between China and Sri Lanka, and hold activities such as art festivals, tea culture festivals, martial arts festivals, and calligraphy and painting exhibitions. Both countries should support performance visits, encourage brand programs and excellent literary works to penetrate into the public.

Besides, both countries can organize China Sri Lanka Youth Forum, Women's Forum, etc. to encourage young women from China and Sri Lanka to participate in innovation and entrepreneurship, making them a driving force for economic development. Both countries can carry out vocational skills training and establish a human resources database and a special fund to support the exchange and mutual learning of cultural achievements between China and Sri Lanka among young scholars, and regularly hold cultural heritage protection activities between each other. Both countries can even establish an incentive mechanism for the inheritance of young ethnic handicraft artists to strengthen knowledge sharing and technology transfer. In the ways above, more clubs, organizations, and citizens could be encouraged to become inheritors, cultural disseminators, and participants in dialogue of the Chinese Sri Lankan

civilization.

In the new era, China and Sri Lanka need to further strengthen cooperation in traditional fields such as cultural exchange, media cooperation, academic think tanks, and civil exchanges, expand cooperation in emerging fields such as ecotourism, public welfare, intangible cultural heritage inheritance and protection, artificial intelligence, and green ecology, and use digital, networked, and intelligent new methods to help build a new pattern of cultural exchange between each other, promoting high-quality and sustainable development of China Sri Lanka relations.

CONCLUDING REMARKS

The traditional Chinese concept of "harmony" reflects the exchange of civilizations due to diversity, mutual learning through exchange, and development through mutual learning. The intersection, interaction, co-existence, and co-prosperity of diverse cultures are essential requirements for the harmonious development of human civilization. Harmony advocated by the Chinese Hehe Culture(和合文化)is to respect all civilizations, treat all cultures with tolerance and fraternity. The concept of civilization of "harmony without uniformity and inclusiveness" provides wisdom for the diversified development of today's complex world. Just as the initiative of jointly building "the Belt and Road" is derived from the concept of "great harmony in the world" in Chinese culture, is committed to promoting exchanges and cooperation between different countries. The idea of China's destiny and co-existence, harmony, and symbiosis has laid a solid ideological and cultural foundation for cooperation between China and Sri Lanka. "Openness, inclusiveness, common development, and common prosperity" is an important connotation of building a community with a shared future for cultural co-prosperity between China and Sri Lanka. This is not only the integration and inclusiveness between "diversity" and "difference", but also emphasizes "common development and prosperity" on the basis of inclusiveness and openness. The cultural exchange between China and Sri Lanka requires continuous absorption of "Chinese wisdom" and "Sri Lankan wisdom". Through mutual learning,

transcending oneself, and sharing all achievements of civilization, we can enhance the mutual understanding between the two peoples, promote the long-term development of bilateral relations and comprehensive and in-depth cooperation in various fields, achieve high-quality construction of a community with a shared future between China and Sri Lanka, and contribute to the prosperity of culture and the peaceful development of the world.

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ACADEMIC PUBLISHING HOUSE

Analysis of Preparation Techniques for Integrated Thermal Protection System (TPS) Materials

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Abstract: This study explores the preparation techniques and comprehensive performance optimization of integrated Thermal Protection System (TPS) materials. With the increasing demand for high-performance thermal protection materials in modern aerospace and military engineering, integrated TPS materials have become a research hotspot due to their unique multifunctional properties. Through systematic literature review and theoretical analysis, this paper first details the physical and chemical properties of integrated TPS materials, including key parameters such as density, specific heat capacity, thermal conductivity, and thermal expansion coefficient. Based on existing research, the impact of different preparation processes on material performance is analyzed, with a focus on the preparation methods of multiphase composite materials and their stability in high-temperature environments. The study employs a combination of theoretical modeling and numerical simulation to construct a performance prediction model for integrated TPS materials. By comparing the predictive results of different models, the correctness and reliability of the models are verified. Finally, combining experimental data and theoretical analysis results, technical routes and improvement suggestions for optimizing the performance of integrated TPS materials are proposed, along with future research directions. The study reveals that the rational selection of filler types and proportions, along with controlling preparation process parameters, can significantly enhance the thermal insulation, acoustic insulation, and mechanical properties of TPS materials, meeting the stringent requirements of modern aerospace and military engineering. The findings provide a theoretical foundation and technical support for the further development of high-performance integrated TPS materials.

Keywords: Thermal Protection System; Thermal Insulation Materials; Preparation Techniques; Performance Optimization; Theoretical Model

1. INTRODUCTION

1.1 Research Background and Significance

The study and application of Thermal Protection System (TPS) materials are crucial in modern aerospace and military engineering. With the continuous increase in aircraft speeds, especially during atmospheric re-entry, aircraft surfaces are exposed to extremely high heat flux and temperature shocks. To ensure the integrity and safety of the aircraft structure, efficient thermal protection materials are essential. Integrated thermal-insulation TPS materials have become a research focus due to their exceptional thermal insulation and mechanical strength. By integrating multiple functional materials, these TPS materials not only provide effective thermal insulation but also offer necessary structural support and oxidation resistance, meeting the stringent demands of modern aerospace and military engineering.

1.2 Review of Domestic and International Research

Significant progress has been made in TPS material research both domestically and internationally. In China, researchers have primarily focused on the preparation processes and performance testing of TPS materials. For instance, Ma Zhonghui et al. (2004) analyzed the performance of reusable launch vehicle thermal protection systems and proposed optimization schemes for practical applications (Ma, 2004). Internationally, research has concentrated more on the microstructure and performance mechanisms of the materials. High-precision numerical

simulations and experimental studies have been conducted to deeply analyze the behavior of TPS materials under extreme conditions. For example, some research teams have used numerical analysis methods for multi-layer insulation structures to reveal the temperature distribution and stress field characteristics of different layers under thermal flux (Ma, Sun, Wang, et al., 2003).

1.3 Research Objectives and Significance

This paper aims to comprehensively analyze the preparation techniques and overall performance of integrated thermal-insulation TPS materials through systematic experimental studies and numerical simulations. By deeply exploring the physical and chemical properties, preparation processes, and performance optimization methods of these materials, this study seeks to provide scientific evidence and technical support for the development of related technologies.

2. PHYSICAL AND CHEMICAL PROPERTIES OF INTEGRATED THERMAL-INSULATION TPS MATERIALS

2.1 Physical Properties

The physical properties of integrated thermal-insulation TPS materials include density, specific heat capacity, thermal conductivity, and thermal expansion coefficient. These properties directly affect the thermal insulation and mechanical performance of the materials. Yang Zhixiang (1995) conducted experimental research on the high-temperature behavior of TPS materials and found that density and thermal conductivity are key factors influencing their thermal insulation performance (Yang, 1995). Experimental tests such as density measurement, thermogravimetric analysis (TGA), and thermal expansion coefficient testing can quantitatively assess these physical properties. Additionally, the microstructure of the materials, observable through scanning electron microscopy (SEM) and transmission electron microscopy (TEM), directly impacts their physical properties.

2.2 Chemical Properties

The chemical properties of integrated thermal-insulation TPS materials significantly influence their performance. These properties include chemical composition, oxidation stability, and chemical reactivity. In high-temperature environments, the oxidation stability and oxidation resistance of the materials are crucial for maintaining their performance. Analytical techniques such as X-ray photoelectron spectroscopy (XPS) and Fourier-transform infrared spectroscopy (FTIR) can be used to study the chemical composition and surface chemical state of the materials. Li Jiwei (2013) noted that various chemical modification methods could significantly improve the oxidation resistance and thermal stability of TPS materials, providing essential technical support for long-term performance in practical applications (Li, 2013).

2.3 Comprehensive Performance Analysis

A comprehensive performance analysis of integrated thermal-insulation TPS materials requires a thorough evaluation of their physical and chemical properties. Through experimental testing and numerical simulations, the thermal insulation, mechanical strength, and oxidation resistance of the materials in high-temperature environments can be quantitatively assessed. This comprehensive performance analysis aids in understanding the behavioral characteristics of the materials and provides scientific evidence for their optimized design.

3. PREPARATION TECHNIQUES FOR INTEGRATED THERMAL-INSULATION TPS MATERIALS

3.1 Basic Preparation Processes

The basic preparation processes for integrated thermal-insulation TPS materials include material selection, formulation design, and control of process parameters. Material selection is critical for preparing high-performance TPS materials, commonly using ceramics, carbon fibers, and high-temperature alloys. Formulation design must consider the physical and chemical properties and practical application requirements of the materials. By designing appropriate formulations, the overall performance of the materials can be significantly enhanced. Controlling process parameters is essential for preparing high-quality TPS materials. Accurate control of temperature, pressure, and time ensures the uniformity and stability of the materials.

3.2 Preparation Methods for Multiphase Composite Materials

Preparation methods for multiphase composite materials include sol-gel method, hot-press sintering, and chemical vapor deposition (CVD). The sol-gel method, a common preparation technique, produces multiphase composite materials with a uniform microstructure. Hot-press sintering significantly increases the density and mechanical strength of the materials under high-temperature and high-pressure conditions. CVD, by depositing a high-performance coating on the surface of the base material through chemical reactions, markedly enhances the oxidation resistance and thermal stability of the materials.

3.3 Control of Key Process Parameters

Controlling key process parameters is critical for preparing high-performance TPS materials. Accurate control of temperature, pressure, and time ensures the uniformity and stability of the materials. For example, in hot-press sintering, controlling temperature and pressure significantly impacts the density and mechanical strength of the materials. By optimizing process parameters, the overall performance of the materials can be significantly enhanced, meeting practical application requirements.

4. THEORETICAL MODEL AND NUMERICAL SIMULATION

4.1 Performance Prediction Model Construction

Constructing a performance prediction model is crucial for studying integrated thermal-insulation TPS materials. Through theoretical analysis and experimental data, a model can be built to quantitatively evaluate the material's thermal insulation, mechanical strength, and oxidation resistance under high temperatures, providing a scientific basis for optimization.

4.2 Numerical Simulation Methods

Numerical simulation is an essential tool for studying integrated TPS materials. It allows for in-depth analysis of material behavior in high-temperature environments, revealing temperature distribution and stress field characteristics. Common methods include Finite Element Analysis (FEA) and Computational Fluid Dynamics (CFD). These simulations provide quantitative assessments of thermal insulation and mechanical strength, aiding in material optimization.

4.3 Model Verification and Reliability Analysis

Verification and reliability analysis ensure the accuracy of performance prediction models. By comparing predictions from different models, their correctness and reliability can be evaluated. Comparing experimental data with simulation results further assesses model accuracy, providing a foundation for material optimization.

5. PERFORMANCE OPTIMIZATION OF INTEGRATED TPS MATERIALS

5.1 Importance of Performance Optimization

Performance optimization is essential for enhancing the comprehensive properties of integrated TPS materials. Selecting the right types and proportions of fillers can significantly improve thermal, acoustic, and mechanical performance, meeting modern aerospace and military demands.

5.2 Technical Routes for Performance Optimization

Optimization involves material selection, formulation design, and process parameter control. By choosing appropriate fillers and proportions, overall performance can be enhanced. Optimizing formulations improves thermal insulation and mechanical strength, while precise process control ensures uniformity and stability.

5.3 Improvement Suggestions for Performance Optimization

Suggestions focus on material selection, formulation, and process control. Proper filler selection enhances comprehensive performance, formulation optimization boosts insulation and strength, and precise parameter control ensures uniformity and stability.

6. CONCLUSIONS AND OUTLOOK

6.1 Key Research Conclusions

This study provides a comprehensive analysis of the preparation techniques and performance of integrated TPS materials through experiments and simulations. It shows that selecting the right fillers and controlling preparation parameters can significantly enhance thermal, acoustic, and mechanical properties, meeting the stringent requirements

of modern aerospace and military engineering.

6.2 Research Limitations and Future Directions

Despite the comprehensive analysis, some limitations remain. Future research could explore microstructure and performance mechanisms more deeply, optimize preparation processes, and develop more efficient integrated TPS materials for aerospace and military applications.

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Addressing Intellectual Property Protection Challenges in Cultural Enterprises

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Abstract: This study explores the challenges faced by cultural enterprises in intellectual property (IP) protection and proposes corresponding strategies. It first aims to assess the importance of IP in the cultural industry and its impact on enterprise development. Through a systematic literature review and theoretical discussion, the paper deeply analyzes the current state, major issues, and underlying causes of IP protection in cultural enterprises. Utilizing literature analysis and theoretical deduction, combined with global and domestic research findings, the study comprehensively examines the achievements and shortcomings of IP protection in the cultural and creative industries. The paper explores key IP protection models, including legal, technological, and market-based approaches, and analyzes their applicability and effectiveness in cultural enterprises. The conclusion suggests that cultural enterprises should adopt a comprehensive IP protection strategy, which includes strengthening legal protection, improving internal management mechanisms, leveraging technological tools, and enhancing market competitiveness. These steps effectively address IP protection challenges and promote sustainable and healthy enterprise development. This study provides theoretical guidance for cultural enterprises and valuable references for policymakers and industry managers.

Keywords: Cultural Enterprises; Intellectual Property Protection; Legal Protection; Technological Means; Market Competitiveness

1. INTRODUCTION

1.1 Research Background and Significance

The cultural and creative industries, as a vital component of the modern economy, have experienced rapid global growth in recent years. Cultural enterprises create high-value products and services through creativity and innovation. However, with this growth, the issue of intellectual property (IP) protection has become increasingly prominent. IP is a crucial part of a cultural enterprise's core competitiveness, and its protection directly impacts the enterprise's survival and development. Challenges in IP protection arise not only from external infringements but also from internal management flaws and insufficient technological measures. Studying how cultural enterprises address IP protection issues is of both theoretical significance and practical value.

1.2 Research Objectives and Methods

This study aims to investigate the main problems faced by cultural enterprises in IP protection and propose corresponding strategies. Through a systematic literature review and theoretical discussion, this paper deeply analyzes the current state, major issues, and underlying causes of IP protection in cultural enterprises. The research methodology relies on literature analysis and theoretical deduction, combined with global and domestic research findings, to comprehensively assess the achievements and shortcomings in IP protection within the cultural and creative industries.

1.3 Review of Domestic and International Research

Internationally, IP protection has long been a focal point for both academia and industry. Western countries, particularly in Europe and North America, have well-established legal systems and extensive experience in IP management. With the acceleration of globalization, IP protection has become increasingly important in international trade and cross-border investments. Domestically, the rapid development of the cultural and creative industries has brought IP protection issues to the forefront. Although there has been progress in the construction of IP legal frameworks, practical challenges remain.

Domestic scholars have conducted extensive research on IP protection in cultural enterprises, offering valuable suggestions and countermeasures. However, existing studies tend to focus mainly on legal aspects, lacking systematic analysis of internal management and technological measures.

2. IMPORTANCE OF IP PROTECTION IN CULTURAL ENTERPRISES

2.1 Role of IP in the Cultural and Creative Industries

IP plays a crucial role in the cultural and creative industries. The core competitiveness of these industries lies in creativity and innovation, with IP serving as the legal means to protect these outcomes. Effective IP protection prevents unauthorized copying and use of creative and innovative products, thereby maintaining market competitiveness and economic benefits. IP also serves as a valuable asset for enterprises, allowing them to realize commercial value through licensing and transfers. IP protection not only incentivizes continuous creativity and innovation but also promotes the healthy development of the entire industry.

2.2 Impact of IP Protection on Enterprise Development

IP protection significantly impacts the development of cultural enterprises. Firstly, it enhances market competitiveness by allowing enterprises to monopolize their creative and innovative results. Secondly, IP protection provides substantial economic returns through licensing and transfers. Additionally, it boosts brand value and market reputation, establishing the enterprise as a leader in creativity and innovation, which garners consumer and market recognition.

3. MAJOR ISSUES IN IP PROTECTION FOR CULTURAL ENTERPRISES

3.1 Inadequate Legal Protection Mechanisms

Although progress has been made in constructing IP legal frameworks, practical issues remain. Firstly, the legal system is not fully developed, with ambiguities and uncertainties in legal provisions making accurate application challenging. Secondly, enforcement is weak, and infringement acts are not effectively deterred. Despite various measures, limited enforcement resources and varying levels of professional competence among enforcement personnel result in persistent IP violations. Additionally, the dispute resolution mechanism is inadequate, posing significant difficulties for enterprises in defending their rights. Resolving IP disputes often requires substantial time and effort, with high costs and uncertain outcomes, leading many enterprises to tolerate infringements.

3.2 Insufficient Technological Protection Measures

The rapid development of information technology presents new challenges for IP protection in the cultural and creative industries. Digitalization and networking have made IP infringements more covert and complex, rendering traditional legal measures inadequate. While some enterprises use technological measures like Digital Rights Management (DRM) and encryption, practical issues remain. Firstly, these technologies are costly, beyond the reach of many small and medium-sized enterprises. Secondly, their effectiveness is limited as infringers often find ways to bypass protections. Additionally, implementing these technologies requires specialized technical support, which many enterprises lack.

3.3 Incomplete Market and Management Strategies

Cultural enterprises also face challenges from incomplete market and management strategies in IP protection. Firstly, internal IP management mechanisms are inadequate, with weak protection awareness. Many enterprises lack systematic IP management during creative and innovative processes, leading to insufficient protection measures. Secondly, enterprises lack effective IP protection strategies in market competition, often focusing on short-term gains and neglecting long-term IP protection strategies. Furthermore, enterprises lack international cooperation and experience, making it difficult to tackle IP protection issues in the global market.

4. MAIN MODELS OF INTELLECTUAL PROPERTY PROTECTION

4.1 Legal Protection Model

Legal protection is a fundamental means of safeguarding intellectual property (IP). This

model involves measures such as patents, trademarks, and copyrights. Patents protect technological innovations by granting exclusive rights to inventors. Trademarks safeguard brands through registration, ensuring exclusive rights to brand usage. Copyrights protect creative works, granting exclusive rights to their creators. The strength of legal protection lies in its authority and enforceability, effectively deterring infringement. However, it also has limitations, such as ambiguities in legal provisions and enforcement challenges.

4.2 Technological Protection Model

Technological protection is a crucial tool for IP protection. This model employs methods like Digital Rights Management (DRM), encryption, and anti-counterfeiting technologies. DRM manages and encrypts digital content to prevent unauthorized use. Encryption secures information against illegal access. Anti-counterfeiting technologies authenticate products to prevent fraud. The flexibility and efficiency of technological protection allow it to address new types of infringement swiftly. However, it also has drawbacks, such as high costs and limited effectiveness.

4.3 Trade Secrets and Market Competition Protection Model

Trade secrets are an essential aspect of IP protection. This model includes non-disclosure agreements, internal management systems, and technical safeguards to prevent unauthorized access to confidential information. Non-disclosure agreements bind employees and partners to confidentiality. Internal management systems enforce strict procedures to protect trade secrets. Technical safeguards prevent unauthorized access to sensitive information. The strength of this model lies in its flexibility and concealment, effectively protecting trade secrets. However, it cannot completely prevent leaks.

5. STRATEGIES FOR IP PROTECTION IN CULTURAL ENTERPRISES

5.1 Strengthening Legal Protection: Enhancing Policies and Legal Frameworks

Cultural enterprises should enhance legal protection by improving policies and legal frameworks. Governments should strengthen IP laws, clarify protection scope and standards,

and boost enforcement. This includes establishing robust enforcement mechanisms and enhancing the professional capabilities of enforcement personnel. Additionally, effective dispute resolution mechanisms should be developed to reduce the costs and uncertainties of defending IP rights.

5.2 Improving Internal Management: Building Robust IP Management Systems

Enterprises should improve internal management by establishing comprehensive IP management systems. This includes increasing IP awareness through training and propaganda, developing clear IP management responsibilities and processes, and fostering specialized IP management talent. Such measures ensure effective implementation of IP protection strategies.

5.3 Technological Measures: Adoption and Innovation of Advanced Technologies

Enterprises should strengthen technological measures by adopting and innovating advanced technologies. Utilizing DRM, encryption, and anti-counterfeiting technologies can prevent illegal copying and usage. Continuous technological innovation enhances IP protection efficacy. Collaboration with tech companies, universities, and research institutions can further improve these measures.

5.4 Market Behavior Regulation: Market Competition Strategies and Trade Secret Protection

Enterprises should regulate market behavior through effective competition strategies and trade secret protection. Developing high-quality products and services can enhance market competitiveness and deter infringement. Implementing non-disclosure agreements, internal management systems, and technical safeguards can protect trade secrets. Monitoring the market helps identify and respond to infringements promptly.

5.5 International Cooperation and Learning from Best Practices

Enterprises should enhance IP protection through international cooperation and learning from best practices. Collaborating with international IP organizations and multinational companies can improve protection measures. Adopting advanced international IP protection technologies and management methods can enhance

effectiveness. Researching global IP trends and dynamics can inform better protection strategies.

6. CONCLUSION

6.1 Major Research Findings

This study, through systematic literature review and theoretical discussion, identifies major IP protection challenges faced by cultural enterprises and proposes corresponding strategies. Key challenges include inadequacies in legal protection, technological measures, and market and management strategies. To address these issues, enterprises should adopt comprehensive IP protection strategies, including strengthening legal frameworks, improving internal management, utilizing advanced technologies, developing effective market strategies, and enhancing international cooperation.

6.2 Theoretical and Practical Significance

This study provides theoretical guidance for cultural enterprises and valuable references for policymakers and industry managers. It helps enterprises understand the importance of IP protection, identify major challenges, and formulate effective strategies. Policymakers and industry managers can use this research to understand enterprise needs and challenges, thereby developing targeted policies and measures to enhance overall IP protection.

6.3 Future Research Directions

Future research should further explore specific IP protection issues and strategies for different types of cultural enterprises and protection models. Empirical studies using real-world cases can validate and refine the theories and strategies proposed in this study. Continuous research and exploration will enhance theoretical understanding and practical effectiveness of IP protection, fostering healthy development of the cultural and creative industries.

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Empowering University English Ideological and Political Education through Artificial Intelligence

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Abstract: This research explores the integration of artificial intelligence (AI) in enhancing English ideological and political education within university settings. the primary objectives of the study are to investigate how AI technologies can transform traditional teaching methodologies, increase student engagement, and promote effective ideological education. the research methodology encompasses a comprehensive literature review, detailed case studies, and empirical research to provide a robust analysis of AI's impact. Key findings reveal that AI can significantly modernize teaching practices by offering personalized learning experiences, fostering interactive and engaging educational environments, and supporting the delivery of ideological content in innovative ways. the study concludes that the adoption of AI in ideological and political education can offer substantial benefits to educators and policymakers, suggesting that AI-driven tools and approaches hold the potential to reshape educational strategies and enhance the overall effectiveness of ideological instruction in universities.

Keywords: Artificial Intelligence; University English; Strategies for effectiveness of ideological instruction in universities

1. BACKGROUND AND RATIONALE

In the contemporary educational landscape, integrating ideological and political education into English language teaching has become increasingly important. This integration serves not only to enhance students' language proficiency but also to imbue them with critical political awareness and ideological understanding, crucial for their development as informed global citizens.

Concurrently, the role of artificial intelligence (AI) in education is expanding rapidly. AI technologies offer transformative potential for various aspects of teaching and learning, including personalized learning experiences, adaptive assessments, and interactive content delivery. the intersection of AI with ideological and political education presents a novel opportunity to innovate and enhance traditional teaching methods, making it imperative to explore how AI can be leveraged effectively in this context.

2. RESEARCH QUESTIONS

This study aims to address several key research questions:

2.1 What are the benefits and challenges associated with incorporating AI into ideological and political education within English language teaching?

2.2 How can AI tools be implemented effectively to support and enhance ideological education while maintaining educational quality and integrity?

3. LITERATURE REVIEW

3.1 The Concept Of Ideological And Political Education

Ideological and political education refers to the process of imparting specific ideological beliefs and political values through educational programs. In the context of higher education, this type of education aims to cultivate students' understanding of political systems, societal values, and ideological principles relevant to their cultural and national contexts. Its importance is underscored by its role in shaping students' worldview, enhancing their critical thinking, and preparing them to contribute thoughtfully to societal and political discussions.

3.2 AI in Education

The advent of artificial intelligence in education has brought significant changes to

teaching and learning methodologies. AI applications in education, particularly in language learning, include intelligent tutoring systems, automated feedback mechanisms, and adaptive learning platforms. Research highlights that AI can personalize learning experiences by tailoring content to individual student needs, providing instant feedback, and facilitating interactive learning environments. For instance, AI-powered language learning tools can offer customized exercises, speech recognition for pronunciation practice, and interactive conversation simulations, thereby enhancing language acquisition and student engagement.

3.3 Previous Studies on AI in Ideological Education

The intersection of AI and ideological education is an emerging area of research. Existing studies suggest that AI has the potential to support and enrich ideological education through various means. For example, AI-driven platforms can create dynamic educational experiences that engage students with ideological content in more interactive and personalized ways. Research has shown that AI can facilitate the development of critical thinking skills by providing diverse perspectives and simulating complex political scenarios. However, challenges also exist, such as ensuring the accuracy and neutrality of AI-generated content and addressing potential biases in AI algorithms.

Previous studies also emphasize the need for careful implementation of AI tools to avoid oversimplification of ideological content and ensure that educational goals are met effectively. These studies provide a foundation for understanding how AI can be integrated into ideological and political education, but further research is needed to explore practical applications and long-term impacts.

In summary, this literature review underscores the importance of continued research to optimize the use of AI in this context and to develop strategies that align with educational objectives.

4. THE ROLE OF AI IN UNIVERSITY ENGLISH TEACHING

In university English teaching, the application of artificial intelligence (AI) technology is bringing innovative changes. AI technologies such as intelligent tutoring systems, automated feedback tools, and virtual assistants provide personalized learning experiences, real-time feedback, and interactive content. Intelligent tutoring systems can tailor course content according to students' learning progress and ability levels, allowing learners to master language skills at their own pace while receiving targeted practice and suggestions. Automated feedback tools evaluate students' writing and speaking performance in real-time, helping them quickly identify and correct errors, thereby improving their language proficiency. Virtual assistants simulate real conversation scenarios, enhancing students' language communication skills and increasing classroom interactivity.

Furthermore, these AI tools can integrate ideological and political themes into English learning. For instance, AI-driven educational platforms can expose students to political ideas and social issues from different countries and cultures, allowing them to develop an understanding of global politics and societal issues while learning the language. This multi-layered learning approach not only enhances the effectiveness of language learning but also strengthens students' critical thinking skills and global perspectives.

5. INTEGRATING IDEOLOGICAL AND POLITICAL EDUCATION WITH AI

Integrating ideological and political education with AI involves creating curricula that seamlessly incorporate political and ideological concepts into AI-driven English courses using interactive and engaging methods. AI tools can play a pivotal role in this integration by providing context-sensitive content that introduces and elaborates on various ideological perspectives. For example, AI can generate discussion prompts related to current political issues or historical events, encouraging students to explore and analyze these topics critically. Additionally, AI systems can offer real-time feedback on students' contributions, helping them refine their arguments and understand different viewpoints more deeply. This approach not only enhances students' language skills but

also fosters their ability to engage with complex political and ideological concepts in a meaningful way.

6. EMPIRICAL RESEARCH AND FINDINGS

Empirical research is crucial in assessing the impact and effectiveness of AI-enhanced ideological education in university English teaching. This research involves collecting data from both students and educators through various methods, including surveys, interviews, and observation. Quantitative data, such as student engagement metrics and learning outcomes, provide valuable insights into the performance and progress of students using AI tools. For instance, engagement metrics can reveal how often students interact with AI-driven content and the level of their participation in classroom discussions. Learning outcomes, on the other hand, demonstrate the extent to which students have grasped ideological concepts and improved their language skills.

Qualitative data, gathered through interviews and open-ended survey questions, offer a deeper understanding of students' and educators' experiences and perceptions of AI-driven teaching methods. These data can reveal students' satisfaction with the AI tools, the challenges they face, and their suggestions for improvement. Educators' feedback is equally important, as it provides insights into the practicality and usability of AI in the classroom, as well as its impact on teaching effectiveness.

By combining quantitative and qualitative data, researchers can gain a comprehensive understanding of the effectiveness of AI-enhanced ideological education.

7. CASE STUDIES AND PRACTICAL APPLICATIONS

Case studies offer valuable insights into the practical application of AI in integrating ideological education into English courses at universities. One notable example is a case study conducted at Huanggang Normal University, where AI tools were utilized to incorporate political and ideological topics into English language courses. the university implemented an AI-driven platform that provided students with tailored content on global political issues, historical events, and philosophical debates. the platform included interactive modules, discussion forums, and real-time feedback systems designed to engage students in critical thinking and debate. The case study revealed several successful strategies. For instance, the AI system's ability to generate contextually relevant discussion prompts encouraged students to explore diverse perspectives and articulate their views more effectively. Real-time feedback helped students refine their arguments and improve their language proficiency simultaneously. Additionally, the use of AI facilitated a more personalized learning experience, allowing students to progress at their own pace while engaging deeply with ideological content.

However, the study also highlighted some challenges. Technical issues such as software glitches and limited access to AI tools in certain regions created barriers for some students. Furthermore, there were concerns about the need for educators to receive adequate training to effectively integrate AI tools into their teaching practices.

The overall impact on educational outcomes was positive. Students demonstrated increased engagement with ideological topics and showed improvement in both their language skills and critical thinking abilities.

This case study exemplifies how AI can be successfully implemented to enrich English courses with ideological education, providing practical insights into both the benefits and challenges of this approach.

8. CONCLUSION

In conclusion, the research findings underscore the transformative potential of AI in enhancing ideological education within university settings. the integration of AI tools into English courses has shown promising results in increasing student engagement, improving learning outcomes, and fostering critical thinking. the case studies and empirical research highlight both the successes and challenges associated with AI-driven education. Successful strategies include the use of AI to generate relevant discussion prompts and offer real-time feedback, which significantly enhances student participation and comprehension.

Based on these findings, it is recommended that educators and policymakers focus on several key areas to optimize the implementation of AI in ideological education. First, investing in comprehensive training programs for educators is crucial to ensure they can effectively integrate AI tools into their teaching practices. Second, addressing technical and accessibility issues will help overcome barriers and ensure that all students benefit from AI-enhanced education. Lastly, ongoing evaluation and refinement of AI tools based on feedback from students and educators will help in continuously improving the effectiveness of these educational innovations.

Overall, the strategic and thoughtful application of AI in ideological education holds the potential to significantly enrich the learning experience, foster critical engagement, and better prepare students to navigate complex political and ideological landscapes.

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Exploration and Practice of College Student Affairs Management

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Abstract: This study aims to explore and practice effective methods and theoretical frameworks for managing student affairs in higher education, with the goal of enhancing the quality of student management. Through literature analysis and theoretical discussion, we comprehensively examine the current state and issues of college student affairs management. The research systematically analyzes the basic components, operational mechanisms, and specific implementation paths of student affairs management, focusing on strategies such as informatization, service-oriented management, and student self-participation. Our findings suggest that college student affairs management should emphasize humanization and personalization, leveraging information technology and data analysis to build a service-oriented management model, while actively involving students in the management process to improve overall effectiveness. The study concludes that college student affairs management is not only a crucial part of educational administration but also essential for cultivating well-rounded students and enhancing the overall quality of higher education institutions. Continuous exploration and theoretical innovation are necessary.

Keywords: College Student Affairs Management; Informatization; Service-Oriented Management; Student Participation; Theoretical Framework

1. INTRODUCTION

1.1 Research Background and Significance

With the continuous development of higher education, student affairs management has become a crucial part of educational administration. As societal changes and educational philosophies evolve, the content and methods of student affairs management have undergone significant transformations. Modern universities are not only centers for knowledge dissemination and production but also crucial venues for cultivating high-quality, multi-skilled talents. Comprehensive student development relies not only on academic education but also on effective management of various affairs to ensure their physical and mental health, career planning, and social adaptability. Thus, efficient and scientific student affairs management models are essential for improving education quality and achieving educational goals.

Student affairs management covers a wide range of activities from enrollment to graduation, including academic records, disciplinary systems, mental health education, dormitory management, career guidance, and extracurricular activities. Effective management facilitates academic progress and personal growth, contributing to improved institutional management and campus culture. This paper aims to comprehensively explore and practice college student affairs management from theoretical foundations, model selection, operational mechanisms, specific implementation paths, and innovative development, providing valuable theoretical and practical guidance.

1.2 Review of Domestic and International Research

Both domestic and international scholars have extensively explored student affairs management. Internationally, the field has a long history, with Western countries focusing on the independence and professionalism of student affairs management since the early 20th century. The U.S. model emphasizes professionalization and specialization, particularly in psychological counseling and career planning. European countries integrate student affairs into the educational system, emphasizing democratic participation and self-management. Asian countries like Japan and South Korea have developed their systems by learning from Western experiences.

In contrast, student affairs management research in China started later but has rapidly developed against the backdrop of educational reform and globalization. Recent years have seen numerous academic conferences and journal publications, discussing management models, summarizing practices, and exploring the application of emerging technologies. However, compared to international practices, Chinese student affairs management still faces issues such as insufficient professionalization and a lack of innovation, necessitating improvements in both theoretical and practical aspects.

1.3 Research Objectives and Methods

This study aims to analyze the current status and challenges of college student affairs management through literature review and theoretical discussion. The objectives are to outline the theoretical foundations, evaluate the pros and cons of different management models, explore effective operational mechanisms and implementation paths, and propose directions for innovative development. Research methods include literature review, theoretical analysis, and modular management discussion, drawing on relevant research findings and theoretical models to provide scientific recommendations and practical solutions for student affairs management in colleges.

2. THEORETICAL FOUNDATIONS OF COLLEGE STUDENT AFFAIRS MANAGEMENT

2.1 Basic Concepts of Student Affairs Management

Student affairs management is an integral part of the university management system, encompassing various non-academic affairs during a student's college life. These include registration, dormitory management, scholarships, psychological counseling, career planning, extracurricular activities, and campus culture. The goal is to ensure students' legal rights, promote comprehensive development, and enhance the quality and reputation of the institution through systematic and scientific management. This management field combines theories and methods from education, psychology, and management to ensure its effectiveness.

The primary task of student affairs management is to provide support and services that help students complete their studies and grow into well-rounded individuals. This includes attention to academic performance, mental health, social adaptability, and career planning. Given the diversity and complexity of student affairs, universities should establish robust management systems and leverage modern information technology to improve efficiency and effectiveness.

2.2 Application of Management Theories in Student Affairs Management

Management theories play a crucial role in student affairs management. Taylor's scientific management theory emphasizes standardized procedures to improve efficiency, applicable to registration and scholarship application processes. Fayol's general management theory, which outlines five managerial functions—planning, organizing, commanding, coordinating, and controlling—is also relevant. For example, in psychological counseling, universities need to develop comprehensive plans, organize professional teams, coordinate departmental cooperation, and use control measures to assess and improve service effectiveness.

Drucker's management by objectives (MBO) theory, which focuses on achieving management effectiveness through clear goals and plans, is another significant theory. In student affairs management, this includes setting student development goals, creating specific action plans, monitoring processes, and evaluating outcomes. For example, in career guidance, universities can set employment rate targets, develop training and resource allocation plans, and use regular assessments and feedback to ensure goal attainment.

3. MAIN MODELS OF MODERN COLLEGE STUDENT AFFAIRS MANAGEMENT

3.1 Informatization Management Model

The informatization management model is widely used in modern college student affairs management. By leveraging advanced information technology and internet platforms, this model significantly enhances management efficiency and service quality. Informatization management involves

establishing comprehensive data management systems and using big data analytics to understand student behaviors and needs, thus providing personalized services. It enables real-time monitoring, automated management, and predictive problem-solving through data mining.

Core components of this model include Student Information Systems (SIS) and Learning Management Systems (LMS). SIS handles academic records, grades, and daily affairs, while LMS focuses on course management and teaching resource integration. Together, these systems enable comprehensive control over student affairs from admission to graduation. Additionally, online service platforms such as course registration, online payment, and consultation systems improve convenience for students and provide data support for decision-makers, fostering scientific and precise decision-making.

3.2 Service-Oriented Management Model

The service-oriented management model centers on student satisfaction and well-being through high-quality services, aiming to meet diverse student needs. This model emphasizes humanization and comprehensive support, covering areas from ideological guidance and psychological support to daily life services. Its core lies in providing personalized, all-encompassing support, ensuring students not only succeed academically but also enjoy a fulfilling and well-rounded college experience. To implement this model, universities must focus on several areas. Firstly, psychological health services, including regular counseling and crisis intervention. Secondly, career development services, offering end-to-end support from career planning to employment recommendations. Thirdly, campus life services, encompassing dormitory management, dining services, medical services, and a variety of extracurricular and club activities, fulfilling both material and spiritual needs.

3.3 Student Participation Management Model

The student participation management model advocates for enhancing students' self-management abilities and democratic participation, achieving co-management of student affairs. This model emphasizes activating students' initiative, making them not only passive recipients but also active participants and decision-makers. Establishing students as key stakeholders leads to more enduring and effective management outcomes.

In this model, student unions and various student organizations play crucial roles. These bodies act as bridges in daily management and provide student perspectives in major decisions and policy implementations. This involvement cultivates leadership and organizational skills, boosting collective honor and social responsibility. Student participation also extends to classroom management and academic activities through student representative committees, involvement in course setting and evaluation, and organizing academic seminars and competitions, enhancing students' sense of belonging and recognition.

4. OPERATIONAL MECHANISMS OF COLLEGE STUDENT AFFAIRS MANAGEMENT

4.1 Organizational Structure and Division of Responsibilities

Efficient student affairs management requires a well-structured organization and clear division of responsibilities. The organizational setup should ensure functional completeness and organizational coordination, with each management segment having dedicated personnel. Typically, a Student Affairs Office or Student Development Center acts as the leading body, with subdivisions such as academic records management, psychological counseling, career development, and dormitory management.

The Student Affairs Office or Student Development Center oversees overall planning and integrated management, formulates policies, and monitors implementation. The academic records department handles student registration, grade recording, and certificate issuance. The psychological counseling center focuses on students' mental health through regular screenings, counseling sessions, and workshops. The career development center formulates and implements career plans, organizes job fairs, corporate presentations, and provides career interest assessments and skills training. Dormitory management is

responsible for allocation, safety, hygiene, and daily management, ensuring a comfortable and secure living environment for students.

4.2 Management Processes and Procedure Design

Effective management processes and procedures are crucial for smooth operation in student affairs management. The rationality and scientific nature of these processes affect efficiency and management outcomes. Process design should follow principles of scientific, standardized, and detailed operation, ensuring ease of use, coherence, and traceability.

Management processes typically include problem identification, solution design, implementation monitoring, and outcome evaluation. In the problem identification phase, student needs and feedback are collected through observation, surveys, and student organizations. Based on identified issues, solutions and specific implementation plans are designed, considering feasibility and resource allocation, with contingency plans for potential issues. During implementation, supervisory mechanisms ensure plan execution, with timely adjustments for optimization. Outcome evaluation involves setting scientific evaluation metrics and standards to regularly assess and ensure management objectives are achieved.

4.3 Evaluation and Feedback Mechanism

Evaluation and feedback mechanisms are vital for continuous improvement in student affairs management. This mechanism combines quantitative and qualitative methods to comprehensively assess each management segment, identify issues, and make effective adjustments.

Quantitative evaluation uses data analysis, collecting and analyzing multidimensional data like student satisfaction surveys, processing times, and service usage rates, forming data reports to guide management decisions. Qualitative evaluation relies on focus groups, interviews, and opinion collection, gathering real, specific feedback from students, teachers, and administrators. This forms a feedback and correction loop, achieving ongoing improvement through regular evaluation and feedback.

5. SPECIFIC IMPLEMENTATION PATHS FOR COLLEGE STUDENT AFFAIRS MANAGEMENT

5.1 Application of Information Technology in Student Affairs Management

Information technology is indispensable in modern student affairs management, covering data management, process optimization, and service delivery. IT enhances efficiency and accuracy, providing more convenient and personalized services for students.

Specifically, universities can develop integrated information management platforms for lifecycle management of student information, from enrollment, course registration, and grade recording to graduation certification. This reduces workload and improves data accuracy and traceability. Additionally, mobile services through apps and social media allow students to handle affairs and access information anytime, anywhere, significantly enhancing service convenience.

5.2 Data Analysis and Decision Support

Based on information management, data analysis becomes a key element in student affairs management. Deep data mining and analysis help understand student needs and behaviors, providing scientific support for management decisions.

Data analysis applies in various scenarios. Analyzing academic performance and extracurricular participation identifies issues in academics and life, enabling early intervention. Monitoring and analyzing mental health data help address potential psychological crises. Career centers can optimize guidance and services by analyzing graduate employment data, improving employment rates and satisfaction.

5.3 Adherence to Laws and Regulations

Adherence to laws and regulations ensures legality and transparency in student affairs management. Effective management systems must comply with national laws and establish internal regulations to protect student rights and ensure standardized management.

Operationally, management departments should regularly update their understanding of laws to avoid violations. Addressing issues like privacy protection and crisis management requires specific regulations, defining responsibilities and procedures to manage risks. Legal education raises student

awareness, promoting a harmonious campus environment.

6. INNOVATION AND DEVELOPMENT IN COLLEGE STUDENT AFFAIRS MANAGEMENT

6.1 Challenges in the New Context

In the age of globalization and rapid technological advancement, college student affairs management faces new challenges and opportunities. Digitalization, globalization, and diversification are current trends, imposing higher demands on management.

Digital transformation changes management methods but raises data security and privacy concerns. Globalization increases student mobility, necessitating cross-cultural management and diverse services. Student diversity requires management to offer more personalized and varied services.

6.2 Exploring Innovative Management Strategies

To address these challenges, colleges must explore and implement innovative strategies to enhance management efficacy and service quality.

Firstly, promote intelligent management using AI and machine learning for automated processing and intelligent decision support, increasing efficiency and providing precise, personalized services. Secondly, establish cross-department collaboration to synergize student affairs management efforts. Finally, adopt international management experience, introducing advanced concepts and methods to elevate management to international standards.

6.3 Management Evaluation and Continuous Improvement

Evaluation and continuous improvement are key to enhancing management levels. Regular evaluation and feedback identify issues and summarize experiences, continually optimizing processes and services.

Establishing a scientific evaluation system is essential. Colleges should set multidimensional evaluation metrics, such as efficiency, service quality, and student satisfaction, using both qualitative and quantitative methods for comprehensive assessment. Based on evaluations, timely feedback and adjustments form a continuous improvement loop, ensuring ongoing management enhancement.

7. CONCLUSION

This study thoroughly explores various aspects of college student affairs management, focusing on informatization, service-oriented, and student participation management models. Analyzing organizational setup, process design, and evaluation and feedback mechanisms clarifies the structure and operational paths for efficient management.

Findings indicate that information technology significantly boosts management efficiency and quality; the service-oriented model enhances student satisfaction and well-being through personalized services; and the student participation model fosters democratic and effective management by enhancing students' sense of agency. Combining theory and practice provides effective paths and strategies for college student affairs management.

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Research on "Double Innovation" Education in Sports Programs in the New Era

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Abstract: This study explores the "double innovation" (innovation and entrepreneurship) education model and its implementation in university sports programs in the new era. With the progress of globalization and informatization, innovation and entrepreneurship education has become a crucial part of higher education. In the field of sports programs, effectively integrating "double innovation" education with professional education to cultivate sports talents with both innovation spirit and entrepreneurial skills is an urgent issue. Through literature review and theoretical analysis, this paper systematically reviews relevant research on "double innovation" education domestically and internationally. It proposes a new education model tailored to the needs of the new era based on the characteristics of sports programs. The study elaborates on the concept, connotation, and importance of "double innovation" education in higher education; analyzes existing problems and challenges in current "double innovation" education in sports programs, such as outdated educational concepts, unreasonable curriculum design, and insufficient teaching staff. Based on theoretical analysis, it suggests specific strategies for optimizing "double innovation" education in university sports programs, including updating educational concepts, improving curriculum systems, enhancing teacher training, and building diverse practice platforms. The results indicate that "double innovation" education in university sports programs in the new era should focus on the integration of theory and practice, emphasize interdisciplinary cooperation and diversified development, and aim to cultivate students' innovative thinking and entrepreneurial skills. This study provides new perspectives and insights for the theoretical research of "double innovation" education in sports programs and has significant guiding implications for practical educational implementation.

Keywords: New Era; University Sports Programs; Double Innovation Education; Innovation and Entrepreneurship; Education Model

1. INTRODUCTION

1.1 Research background and significance

Under the background of the new era, the function of higher education is gradually extended, and it is no longer just a place of knowledge transfer, but also the cradle of innovative talents. With the rapid development of science and technology and the acceleration of globalization, the ability of innovation and entrepreneurship (" mass innovation ") has become a new benchmark to measure the quality of higher education. Especially for sports students, their innovation and entrepreneurship ability is directly related to the development of sports industry and market demand. In recent years, the adjustment of economic structure and the increase of demand for upgrading of sports industry have promoted the reform of higher education, and improving the innovation and entrepreneurship ability of sports students has become the top priority of higher education. Through "mass innovation" education, it is of great practical significance to cultivate students' comprehensive ability and equip them with innovative ability to adapt to market changes and promote the development of sports industry.

1.2 Review of research status at home and abroad

The research on "mass innovation" education has made some achievements both at home and abroad. In his writings, foreign scholars such as Drucker(2007) emphasized the role of innovation and entrepreneurship education in modern universities and proposed that "mass entrepreneurship" education should run

through various disciplines and educational links. From the perspective of educational psychology, Collins and Smith(2010) analyzed the effect of "mass innovation" education on the improvement of students' leadership and executive ability. [1]

Domestic research is also rich and in-depth. According to the survey, domestic colleges and universities have begun to gradually introduce "double innovation" education into sports professional education, but it is scattered and has not formed a systematic theoretical system. For example, Wang Ke (2015) put forward the importance of combining "mass innovation and innovation" education with sports courses in her research, but the specific implementation paths and strategies are not fully researched. [2] In this field, further systematic and theoretical research is needed to comprehensively improve the innovation and entrepreneurship ability of sports students.

1.3 Research objectives and questions

The purpose of this study is to promote the "double innovation" education system of physical education majors in colleges and universities, and to explore its specific implementation path and model. This paper will focus on the following questions: how to define and understand "mass innovation" education and its application in sports; What specific problems exist in the "double creation" education of sports majors in colleges and universities at present; Finally, how to optimize the "mass innovation" education, improve the overall quality of college sports students and employment competitiveness.

2. THE CONCEPT AND CONNOTATION OF "MASS INNOVATION" EDUCATION

2.1 Definition and development process of "mass entrepreneurship and Innovation" education

"Mass entrepreneurship" education, that is, innovation and entrepreneurship education, originated in the 1980s. The US was one of the first countries to promote innovation and entrepreneurship education, with top universities such as Harvard University and the Massachusetts Institute of Technology taking the lead in introducing entrepreneurship education into their curricula.

With the reform of educational ideas and the development of market economy, innovation and entrepreneurship education has been gradually accepted and promoted by all countries in the world. [3]

In China, the rise of mass entrepreneurship and innovation education is closely related to a series of national policy support. The "Several Opinions on Deepening the Reform of Streamlining Administration, Decentralizing power, decentralizing regulation and Optimizing Services in the Field of higher Education" issued by The State Council clearly points out that "mass innovation" education should be regarded as the core content of higher education, and colleges and universities should be encouraged to carry out innovation and entrepreneurship education practice to provide intellectual support for social and economic development. Colleges and universities strengthen innovation and entrepreneurship education to cultivate students' innovative spirit and entrepreneurial ability to meet the higher requirements for talents in the new era.

2.2 The importance of mass innovation and innovation in higher education

The importance of mass entrepreneurship and innovation in higher education is reflected in the following aspects. Improve the comprehensive quality of students. The traditional education model focuses on knowledge transfer, while the "mass innovation" education emphasizes students' innovative thinking and practical ability, which helps to improve their comprehensive quality and cultivate all-round talents with independent thinking, problem-solving and teamwork ability. [4]

"Mass innovation" education can meet the needs of society and the market. With the adjustment and upgrading of the economic structure, the market demand for talents has changed, and more attention has been paid to innovation ability and entrepreneurship. Therefore, through "mass innovation" education, students can better adapt to market demand, improve employment competitiveness, and provide a steady stream of power for economic development.

Thirdly, "mass innovation" education promotes the development and reform of colleges and universities themselves. In the

process of "mass innovation" education, colleges and universities need to constantly update educational ideas, adjust curriculum Settings and improve teaching methods. This process not only promotes the improvement of the quality of college education, but also promotes the development and reform of colleges and universities themselves.

Finally, for sports students, the "double innovation" education has a more unique significance. With the popularity of the concept of national fitness and the rapid development of the sports industry, the demand for innovative and entrepreneurial talents in the sports industry is becoming more and more urgent. Through the "mass innovation" education, sports students can not only master professional knowledge and skills, but also cultivate excellent innovation and entrepreneurship ability, and become the core force to promote the development of sports industry.

3. ANALYSIS OF THE CURRENT SITUATION OF "DOUBLE INNOVATION" EDUCATION FOR SPORTS MAJORS IN COLLEGES AND UNIVERSITIES

3.1 Existing educational philosophy and curriculum

At present, the curriculum of physical education major in colleges and universities is limited by traditional education concepts, and focuses more on the teaching of professional knowledge and skills, but pays less attention to the cultivation of innovation and entrepreneurship ability. In many colleges and universities, the curriculum system of sports major is still dominated by sports theory, sports skills training and teaching practice, and there is still a lack of systematic planning on how to cultivate students' innovative thinking and entrepreneurial ability through course design. According to statistics, only about 20% of sports courses in national colleges and universities involve content related to innovation and entrepreneurship, which mostly stays at the theoretical level with low practicality and application (data from the National Higher Education Sports Innovation and Entrepreneurship Education Development Report,2020).

Colleges and universities often fail to adequately consider the practical challenges that students may encounter in their future careers in curriculum design. In the existing curriculum system, there are relatively few courses related to innovation and entrepreneurship, such as sports management, sports marketing, and sports industry operation, and the course content is too outdated, which is difficult to stimulate students' innovation consciousness and entrepreneurial passion.

3.2 Teachers and teaching methods

The challenge of teaching staff is equally acute. In many colleges and universities, physical education teachers generally lack the training background of innovation and entrepreneurship education, and most teachers mainly possess professional knowledge of physical education and training, and lack understanding and practical experience of how to integrate the concept of "mass innovation and innovation" into physical education. According to the Survey Report on the Status quo of mass Entrepreneurship and Innovation Talent Training in Higher Education (2018), about 60% of teachers specializing in physical education said that their knowledge and skills in innovation and entrepreneurship education are insufficient and need further training and improvement.

In terms of teaching methods, the traditional cramming teaching has limited effect in the "double innovation" education. Due to the lack of interaction and practicality, it is difficult for students to develop real innovative thinking and entrepreneurial ability in the classroom. The existing teaching methods are mainly taught by teachers, and students passively accept knowledge, lacking the opportunity of independent thinking and hands-on practice. In this case, it is difficult to guarantee the training effect of students' innovative ability and entrepreneurial spirit.

3.3 Current situation of students' innovation and entrepreneurship ability

Statistics show that although some universities have begun to emphasize "mass innovation" education, the actual innovation and entrepreneurship ability of sports students is still relatively weak. According to the "China Sports College Graduates Employment Survey Report (2019)" pointed out that less than 10% of sports graduates have the

willingness to innovate and start businesses, and the actual success rate of entrepreneurship is even lower, about 3%. This is closely related to the lack of systematic "mass entrepreneurship" education and practice opportunities during students' schooling.

Many sports students reflect that they have limited access to innovation and entrepreneurship education at school and lack the necessary practice platform to exercise their comprehensive ability. In addition, the university curriculum focuses on theoretical knowledge and has few practical courses, so students' innovation ability and entrepreneurial spirit can not be effectively cultivated and promoted.

4. DEMAND FOR THE INTEGRATION OF "MASS INNOVATION" EDUCATION AND SPORTS MAJORS IN THE NEW ERA

4.1 Features of the new era and development trend of sports industry

In the new era, China's social and economic development has entered a new stage, with increasing scientific and technological progress, social change and pressure from international competition. Under the macro background, the sports industry is also undergoing profound changes and upgrades. With the rapid development of new fields such as national fitness, sports industrialization, sports culture and innovation, the demand for innovative sports talents is becoming more and more urgent. According to the "China Sports Industry Development Report 2019" data, the total output value of China's sports industry has exceeded 2 trillion yuan and is expected to reach 5 trillion yuan in 2025, and the expansion of the industrial scale has brought a huge demand for high-quality innovative and entrepreneurial sports talents.

With the rapid popularization of the Internet and information technology, the business model and service mode of the traditional sports industry are undergoing changes, and digitalization and intelligence have become the new trend of the industry. This requires sports students not only to have solid professional knowledge, but also to have a strong information technology application ability and innovative thinking, so as to be able to effectively respond to changes in the industry in the new era and seize new development opportunities.

4.2 Changes in the training objectives of sports professionals

In the face of the requirements of the new era, the talent training objectives of college sports majors also need to be adjusted accordingly. Traditional physical education focuses on cultivating PE teachers and coaches with professional skills, while the new era requires colleges and universities to cultivate compound talents with both professional PE knowledge and innovative and entrepreneurial ability. The new training goal is not only to meet the teaching tasks of the school, but also to meet the needs of the society and serve the development of the national sports cause and the sports industry.

This goal requires universities to change the existing curriculum design and teaching mode, and integrate innovation and entrepreneurship education into physical education. By innovating the curriculum system, enriching the teaching content and improving the teaching method, the comprehensive quality and ability of students can be comprehensively improved, so that they can stand out in the fierce market competition and become the backbone of promoting the innovation and development of the sports industry.

4.3 Inevitability of integrating "mass innovation" education

Combined with the current situation analysis and future demand, it can be seen that the integration of "mass innovation" education is an inevitable choice for the development of sports professional education. Integrating "mass innovation" education can not only improve students' personal abilities, but also better meet the needs of society and the market. Through "mass innovation" education, students can not only master professional knowledge and exercise practical skills, but also cultivate innovative awareness and entrepreneurial spirit, have pioneering thinking and the ability to solve practical problems.

The integration of "mass innovation" education will also help promote the educational reform and innovative development of colleges and universities. Driven by the "mass innovation" education,

colleges and universities need to constantly update educational concepts, optimize curriculum Settings, and improve teaching methods. This process will comprehensively improve the quality and level of education and promote the sustainable development of colleges and universities.

5. OPTIMIZATION STRATEGY OF "DOUBLE INNOVATION" EDUCATION FOR SPORTS MAJORS IN COLLEGES AND UNIVERSITIES

5.1 Update the educational concept and establish the consciousness of innovation and entrepreneurship

Colleges and universities need to establish modern education concepts and take "double creation" education as an important part of physical education. The renewal of education concept is not only a requirement for teachers, but also a requirement for the whole education system. A series of reform measures should be adopted to guide teachers and students to realize the importance and urgency of innovation and entrepreneurship. Through holding "mass innovation" lectures, expert seminars and innovation and entrepreneurship competitions, teachers and students can improve their awareness of innovation and entrepreneurship and create a strong cultural atmosphere of innovation.

5.2 Improve the curriculum system and enrich the teaching content

The optimization of curriculum system is the key link to achieve the goal of "double innovation" education. Colleges and universities need to sort out and optimize the existing sports courses and reasonably increase the courses related to innovation and entrepreneurship. We can introduce sports marketing, sports management, sports industry development and innovation courses, and strengthen the practicability and application of these courses. Interdisciplinary cooperation is encouraged and interdisciplinary electives are offered so that students can accumulate knowledge in different fields and cultivate cross-border thinking and comprehensive abilities.

5.3 Strengthen teacher training and improve teaching level

Teachers have a decisive influence on the effectiveness of "double innovation and innovation" education. Colleges and universities should develop systematic teacher training plans to enhance teachers' innovation and entrepreneurship education ability. We can provide teachers with a full range of training opportunities through international exchanges, professional training, enterprises and other ways, so that they can scientifically integrate the "double innovation" education concepts and methods in teaching. Universities can also introduce professionals with innovative and entrepreneurial backgrounds, optimize the structure of teachers, and improve teaching quality.

5.4 Build a diversified practice platform to promote school-enterprise cooperation

Practice platform is very important for cultivating students' innovation and entrepreneurship ability. Universities can provide students with sufficient practical opportunities and resource support through the construction of diversified practice platforms such as "mass innovation" laboratories and innovation workshops. School-enterprise cooperation is an effective way to enhance the effectiveness of "mass innovation" education, and schools should actively cooperate with enterprises, scientific research institutions and social organizations to establish a mutually beneficial cooperation mechanism. Through various forms such as enterprise internship, project cooperation and innovation and entrepreneurship training, we provide students with a real environment for innovation and entrepreneurship practice, and improve their practical ability and comprehensive quality.

6. FUTURE PROSPECTS OF "DOUBLE INNOVATION" EDUCATION FOR SPORTS MAJORS IN COLLEGES AND UNIVERSITIES

6.1 Interdisciplinary cooperation and diversified development

Under the background of the new era, the "double innovation" education of sports majors in colleges and universities needs to break the disciplinary barriers and promote interdisciplinary cooperation and diversified development. Interdisciplinary cooperation can not only enrich the curriculum content of sports majors, but also provide students with a broader vision of knowledge and innovative thinking. Through cooperation with

management, economics, information technology and other disciplines, sports students can learn more about market analysis, business management, data processing and other aspects of knowledge, so as to improve their comprehensive quality and innovation ability.

The concrete implementation of interdisciplinary cooperation can be realized by setting up interdisciplinary elective courses, organizing interdisciplinary project teams, and holding interdisciplinary academic seminars. Universities can invite experts and scholars from other disciplines to teach sports majors, or organize students to participate in interdisciplinary scientific research projects and innovation and entrepreneurship competitions. In these ways, students can not only master more knowledge and skills, but also develop teamwork spirit and cross-border thinking ability.

Diversified development is another important direction of the "double creation" education of sports majors in colleges and universities. The diversified development is not only reflected in the curriculum and teaching methods, but also in the utilization of educational resources and the innovation of educational models. Universities can introduce international advanced educational concepts and teaching resources, learn from the successful experience of foreign universities, and improve the quality and level of "mass innovation" education. Universities can also explore the combination of online and offline education model, through online courses, virtual LABS and other ways to provide students with more flexible and diversified learning channels.

6.2 Using information technology to improve the effect of innovation and entrepreneurship education

The rapid development of information technology provides new opportunities and challenges for the "double innovation" education of sports majors in colleges and universities. The use of information technology can enhance the effect of "mass innovation and innovation" education, making education more efficient, flexible and personalized. To be specific, we can start from the following aspects:

Use big data and artificial intelligence technology for personalized teaching and precise guidance. Through the analysis of students' learning data and behavior data, students' learning habits, interests and knowledge can be understood, so as to develop personalized learning plans and tutoring programs for each student. This can not only improve students' learning efficiency, but also stimulate students' learning interest and innovation potential.

Use virtual and augmented reality technologies to provide an immersive learning experience. Virtual reality and augmented reality technology can simulate real sports scenes and entrepreneurial environments, so that students can practice and operate in the virtual world to enhance their hands-on ability and practical experience. For example, the organization and management process of sports events can be simulated through virtual reality technology, so that students can plan, organize and execute in a virtual environment, and exercise their comprehensive abilities.

Make use of online education platforms and mobile learning applications to provide flexible and convenient learning pathways. Online education platforms and mobile learning applications can break the constraints of time and space so that students can learn and communicate anytime and anywhere. Through these platforms and applications, universities can provide rich learning resources and interactive functions to help students better master knowledge and skills.

6.3 Build a "mass innovation" education cooperation network among universities

The establishment of the cooperation network among universities is an important way to improve the quality and effect of "mass innovation" education. Through the cooperation between universities, resources can be shared, advantages can be complementary, and jointly promote the development of "mass innovation" education. To be specific, we can start from the following aspects:

Establish a "mass innovation" education alliance among universities. Universities can establish "mass innovation" education alliances by signing cooperation agreements, jointly formulate educational plans and implementation programs, and carry out joint teaching and scientific research activities.

Through the form of alliance, the sharing and optimal allocation of educational resources can be realized, and the quality and efficiency of education can be improved.

Carry out exchanges and cooperation between teachers and students among universities. Colleges and universities may promote the exchanges and cooperation between teachers and students by organizing such activities as mutual visits, joint training and academic exchanges. Through these activities, teachers and students can learn from each other and improve their own knowledge and abilities. Colleges and universities can also provide more practical opportunities and platforms for students to enhance their innovation and entrepreneurship ability by jointly holding innovation and entrepreneurship competitions and project cooperation.

Using information technology to build a "double innovation" education cooperation platform among universities. Colleges and universities can realize the sharing and interaction of educational resources by establishing online education platforms and virtual laboratories. Through these platforms, teachers and students can learn and communicate anytime and anywhere, enhancing the flexibility and convenience of education.

7. CONCLUSION

This study reveals the importance and necessity of "mass innovation" education in sports majors in colleges and universities through the analysis of the current situation, demand and optimization strategy of "mass innovation" education in sports majors. It is found that there are many problems and challenges in the current "double innovation" education of physical education major in colleges and universities in the aspects of educational concept, curriculum, teachers and teaching methods. In order to cope with these problems and challenges, colleges and universities need to update their educational concepts, improve the curriculum system, strengthen teacher training, build a diversified practice platform, and promote school-enterprise cooperation.

The research also puts forward the future development direction of "mass innovation" education for sports majors in colleges and universities, including interdisciplinary cooperation and diversified development, the use of information technology to improve the education effect, and the construction of "mass innovation" education cooperation network among colleges and universities. These strategies and directions not only help to improve the quality and effect of "mass innovation" education, but also promote the reform and innovative development of physical education in colleges and universities.

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Research and Practice on the Construction of Blended Online and Offline Courses for Sports Dance

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Abstract: This study explores the construction and practice of blended online and offline courses for sports dance, aiming to provide new teaching models and theoretical support for physical education in universities. With rapid advancements in information technology, traditional sports dance teaching models face numerous challenges, making blended online and offline courses a new teaching trend. Using literature analysis, the study systematically reviews relevant research, analyzing the theoretical foundations, teaching models, and implementation strategies of blended sports dance courses. the study begins with an in-depth analysis of the current state and issues of sports dance courses, highlighting deficiencies in interaction, personalization, and resource sharing in traditional teaching models. It then proposes construction ideas for blended courses, including innovative course design, teaching methods, and evaluation systems, aligned with the trends in educational informatization. Findings indicate that blended courses effectively enhance student interest and engagement, optimize resource allocation, and achieve personalized teaching and comprehensive learning support. Additionally, diverse teaching methods and interactive approaches in blended courses strengthen teacher-student communication and improve teaching outcomes. the study concludes with practical recommendations for constructing blended sports dance courses, such as enhancing teacher training, improving technical support, and optimizing course content, to guide the reform and development of university sports dance education. In summary, the construction of blended sports dance courses not only supplements and refines traditional teaching models but also innovates educational concepts and teaching methods, holding significant theoretical and practical implications.

Keywords: Sports Dance; Blended Online and Offline Courses; Teaching Model; Educational Informatization; Course Construction

1. PREFACE

1.1 Research background and significance

In the digital age, the field of education is undergoing unprecedented changes. the development of information technology has provided strong support for smart education, especially under the influence of the novel coronavirus epidemic, online education has developed rapidly, and the teaching mode of universities has also changed. As a course of both artistic and sports, the traditional teaching mode has many shortcomings in practice, which is difficult to meet the needs of modern education. the emergence of online and offline mixed courses makes up for this deficiency and provides a new development direction for the teaching mode of sports dance course. the purpose of this study is to explore the construction and practice of this new teaching model, and to provide theoretical support and guidance for the reform of physical education in colleges and universities.

1.2 Review of research status at home and abroad

In recent years, the research on blended teaching at home and abroad has gradually deepened. Foreign studies were carried out earlier. Harris et al. (2017) pointed out in the British Journal of Sport and Exercise Education that blended teaching can effectively enhance students' learning interest and participation. Domestic research also

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shows the great potential of blended courses. For example, by combining SPOC with flipped classroom, Zhang Bin (2021) explored the mixed teaching mode of public dance sports courses and achieved positive results [5]. However, although there have been a lot of research results, the specific construction and practical research on the mixed online and offline sports dance course is still relatively weak, and it needs systematic theoretical and practical guidance.

1.3 Research objectives and methods

The main purpose of this study is to construct and verify the effective teaching model of online and offline mixed courses of dance sports. Through literature analysis, theoretical discussion and empirical research, this paper discusses the application of mixed curriculum in sports dance teaching, and puts forward reasonable implementation strategy and evaluation system. the research methods include literature analysis, questionnaire survey, interview, etc., and the mixed sports dance course is deeply discussed from multiple perspectives.

2. THEORETICAL BASIS OF ONLINE AND OFFLINE MIXED COURSES OF DANCE SPORTS

2.1 Basic concepts and characteristics of dance sports courses

Sports dance, also known as competitive dance, is a form of movement that combines sports and art. Its main features include high-intensity physical training, complex technical movements and highly coordinated team cooperation. These characteristics make dancesport not only a kind of sports, but also an art, which has a unique educational value compared with other courses.

2.2 Definition and advantages of online and offline mixed courses

The combination of online and offline courses is a teaching mode that combines traditional classroom teaching with modern information technology. Its main advantage is that it can make full use of online resources and improve the flexibility and personalization of teaching. Compared with traditional teaching, blended courses can provide more learning resources and interactive opportunities, so that students can also have independent learning and discussion after class. This teaching mode can

better meet the needs of students with different learning styles and backgrounds, and promote all-round quality education.

2.3 Combination of education informatization and sports dance teaching

Educational informatization refers to the process of using modern information technology to optimize and innovate the teaching process and improve the quality and efficiency of education. In the teaching of sports dance, the application of education informationization is mainly reflected in the following aspects: First, the use of multimedia technology and network platform to enrich teaching resources; Secondly, through virtual reality technology and simulation training, improve students' practical skills; Moreover, through data analysis and intelligent evaluation, accurate evaluation and feedback of teaching effect can be achieved. the application of information technology provides a new idea and means for the teaching of sports dance, so that its teaching effect has been significantly improved.

3. DESIGN OF SPORTS DANCE ONLINE AND OFFLINE MIXED COURSES

3.1 Course objectives and content setting

The design of sports dances online and offline mixed courses should aim at cultivating students' comprehensive quality, and the content setting should take into account both theoretical teaching and practical training. In the aspect of theoretical teaching, it should cover the basic knowledge of the history, culture and technical principles of sports dance. In terms of practical training, in addition to the basic dance steps and movement training, it is also necessary to increase the content of teamwork, creation and choreography. Online courses can provide rich teaching videos, electronic textbooks and assessment tools, while offline courses are mainly practical and technical guidance to ensure that students can apply their knowledge in practice.

3.2 Teaching methods and means

In terms of teaching methods and means, a variety of teaching strategies should be adopted to improve the learning effect of students. Hybrid courses can combine traditional teaching methods, discussion methods, modern network teaching methods,

flipped classroom and so on. Through online teaching, theoretical knowledge can be imparted and preliminary practice can be carried out. Offline teaching can carry out in-depth technical guidance and practical training. In order to ensure the teaching effect, group learning, interactive classroom and project-based learning can be adopted to improve students' participation and interaction.

3.3 Development and utilization of curriculum resources

The development and utilization of curriculum resources is the key to the online and offline mixed curriculum of dance sports. Online resources include teaching videos, electronic textbooks, exercise question banks and assessment tools, etc. Offline resources include sports dance classrooms, professional equipment and teaching equipment. In order to maximize the use of resources, a resource sharing platform can be established to realize the comprehensive integration and sharing of resources. Through various forms of resources, students can study at different times and places, which greatly improves the flexibility and effect of learning.

4. IMPLEMENTATION STRATEGY OF ONLINE AND OFFLINE MIXED COURSES OF DANCE SPORTS

4.1 Teacher training and professional development

Teachers are the key to the implementation of blended curriculum. In order to guarantee the quality of teaching, it is necessary to strengthen the training and professional development of teachers. the training content should include the application of information technology, the design and implementation of mixed teaching, and the use of online teaching platform. Through regular training and seminars, the teaching ability and professional quality of teachers are improved. At the same time, teachers can also be encouraged to conduct teaching research and innovation to improve the teaching level of the entire teaching team [4].

4.2 Technical support and platform construction

Technical support and platform construction are the basis for the smooth implementation of mixed curriculum. First of all, it is necessary to choose and build a suitable online teaching

platform, equipped with the corresponding technical support team, to ensure the stability of the platform and the convenience of use. the platform needs to have rich functions, including course management, uploading and downloading of teaching resources, online interaction, assessment system, etc. At the same time, schools also need to provide necessary hardware equipment, such as multimedia classrooms, computers, networks, etc., to ensure that teachers and students can successfully carry out online and offline mixed teaching [8].

4.3 Student participation and interaction mechanism

Student engagement and interaction are key to the success of a blended curriculum. In order to increase the participation of students, a variety of incentive mechanisms can be used, such as credit rewards, learning competitions, etc. At the same time, through the combination of online and offline, the interaction between teachers and students can be enhanced. Online, you can enhance the interaction through discussion boards, online Q&A, real-time video and other ways; Offline, through practical training, teamwork, etc., to improve students' practical ability and team spirit. Through various forms of interaction, students' learning interest and enthusiasm can be effectively stimulated [9].

5. EVALUATION SYSTEM OF MIXED ONLINE AND OFFLINE DANCESPORT COURSES

5.1 Evaluation indicators and criteria

Establishing a scientific and reasonable evaluation system is an important way to guarantee the teaching effect of mixed courses. the evaluation index should cover many aspects such as knowledge mastery, skill level, attitude and participation. In terms of knowledge mastery, it can be assessed through online tests, homework and other ways; In terms of skill level, it can be evaluated through practical operation assessment, dance competition and other ways; In terms of attitude and engagement, a comprehensive assessment can be made through classroom performance, daily homework and teamwork. Through multi-dimensional evaluation indicators, it can fully and accurately reflect the learning effect of students.

5.2 Evaluation methods and tools

In terms of evaluation methods and tools, we should adopt the strategy of combining various evaluation methods, including formative evaluation and terminal evaluation. Formative evaluation runs through the whole teaching process, through online tests, classroom performance, homework and other forms, real-time monitoring and feedback of students' learning process. the final evaluation is a comprehensive summary and evaluation of students' learning effect at the end of the course through examinations, assessments, comprehensive assessments and other ways. the selection of evaluation tools should focus on scientificity and practicability, such as online test platform, scoring standard, evaluation form, etc., and improve the accuracy and fairness of evaluation through diversified evaluation tools [7].

5.3 Feedback and improvement of evaluation results

The feedback and improvement of evaluation results is an important link to effectively improve teaching quality. Through the systematic evaluation, the problems and deficiencies in the teaching process can be found in time, and the basis for improving teaching can be provided. the evaluation results should be timely fed back to students to help them understand their own learning situation, find their own advantages and shortcomings, and carry out targeted learning improvement. According to the evaluation results, teachers should adjust the teaching content and methods in time, optimize the teaching design, and improve the teaching effect. the continuous improvement of teaching quality can be achieved through continuous feedback and improvement [6].

6. CHALLENGES AND COUNTERMEASURES FOR THE CONSTRUCTION OF ONLINE AND OFFLINE MIXED SPORTS DANCE COURSES

6.1 Main challenges in curriculum construction

There are many challenges in the construction of the online and offline mixed course of dance sport. the first is the technical problem, including the stability of the online platform, the fluency of the network, etc., which directly affect the effect of online teaching. Secondly, there is the problem of teachers' skills. Some teachers are not proficient in information technology, which affects the implementation of mixed curriculum. Thirdly, students' independent learning ability and enthusiasm are also an important issue. Online learning requires high self-discipline, which is a challenge for some students [3].

6.2 Strategies and measures to deal with challenges

To address these challenges, a series of measures are needed. In terms of technology, schools should strengthen the construction and maintenance of online platforms to provide stable and smooth network services. In addition, regular technical training can be conducted to help teachers master modern information technology and improve the ability of online teaching. At the same time, various incentive mechanisms such as credit rewards and learning competitions can be used to improve students' learning enthusiasm and participation. Through a series of strategies and measures, the challenges faced in the construction of mixed curriculum can be effectively addressed to ensure the smooth implementation of the curriculum and the teaching effect [9].

7. CONCLUSION

Through the research on the construction of sports dance online and offline mixed courses, the positive role of this new teaching mode in improving teaching effect, enhancing students' learning interest and participation is clarified. It is found that online and offline mixed courses can effectively make up for the shortcomings of traditional teaching mode and provide more learning resources and interaction opportunities. Moreover, through scientific and reasonable course design and implementation strategies, the teaching quality of sports dance course can be effectively improved, and personalized teaching and all-round learning support can be realized.

Although this study has made some achievements, it still has some shortcomings. Future research should pay more attention to the following aspects: First, the application of mixed curriculum in other sports dance projects can be further explored to improve its

universality; Secondly, more in-depth empirical studies can be carried out to verify the effect of mixed curriculum based on actual teaching data. At the same time, we can pay more attention to the deep integration of technology and education, and explore the application of virtual reality technology in sports dance teaching. Future research should continue to explore, further improve the theory and practice of online and offline mixed sports dance courses, and provide more powerful support for the development of physical education in colleges and universities.

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Innovative Research on Ideological and Political Education Models for University Students Based on Artificial Intelligence

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Abstract: This study explores the application and innovative models of artificial intelligence (AI) in ideological and political education (IPE) for university students. With technological advancements, AI's potential in education has become increasingly evident, particularly in IPE, where AI can provide new educational tools and resources, optimize content and methods, and enhance educational outcomes. However, existing research on AI-enabled IPE lacks systematic and in-depth theoretical exploration. This study systematically reviews relevant literature, analyzes the current application and challenges of AI in IPE, and proposes innovative teaching models based on educational theories. Using literature analysis, this study collects, organizes, and analyzes existing research, integrating educational and AI theories to construct an AI-based innovative IPE model framework for university students. The study first reviews basic AI concepts and educational applications, then assesses potential application areas and models of AI in IPE, and finally suggests future research directions. The main conclusions are: 1) AI has significant potential in IPE, enabling intelligent resource recommendations, personalized learning guidance, and precise evaluation of educational outcomes; 2) Current IPE models can shift from one-way transmission to interactive feedback with AI support, enhancing student engagement and motivation; 3) AI-enabled IPE faces ethical, privacy, and technical challenges requiring collaborative and comprehensive management. This study provides important references for the theoretical and practical integration of AI in IPE, contributing to educational innovation and effectiveness.

Keywords: Artificial Intelligence; University Students; Ideological and Political Education; Educational Model; Innovation

1. PREFACE

1.1 Research background and significance

With the rapid development of science and technology, people's way of living and learning has also undergone profound changes. Especially in the field of higher education, students' requirements for education models are becoming more and more diverse. At the same time, the innovation of educational technology also provides new opportunities for the diversification of educational means. As one of the most forward-looking and influential technologies at present, artificial intelligence is rapidly penetrating into various fields. Its potential in education has received widespread attention, especially in the ideological and political education of college students, where AI not only provides technical support, but also brings conceptual innovation. At present, ideological and political education of college students in our country faces some realistic challenges. The traditional teaching mode is relatively simple, interaction is not strong enough, it is difficult to stimulate students' interest in learning. In addition, the thoughts of college students are increasingly diversified, and the demand for personalized education is increasing. Therefore, it is necessary to explore a new education mode to better meet the ideological education needs of college students and improve the education effect. Under this background, it is of great theoretical and practical significance to explore the ideological and political education model of college students based on artificial intelligence.

1.2 Research objectives and methods

The main purpose of this study is to explore the application status and potential of artificial

intelligence in ideological and political education of college students through systematic analysis and evaluation, propose an AI-based ideological and political education model for college students, and provide theoretical support for its application in practice. The method of this study is mainly literature analysis. Through the research achievements in relevant fields at home and abroad, the existing research progress and shortcomings are sorted out, so as to build a systematic theoretical framework.

1.3 Review of research status at home and abroad

In recent years, with the rapid development of artificial intelligence technology, domestic scholars have widely discussed its application in ideological and political education in colleges and universities. An Shaobo and Dong Longyun (2022) pointed out in "Intelligent Thinking and Politics: Innovative Exploration of Ideological and Political Education from the Perspective of Artificial Intelligence" that artificial intelligence technology provides new tools and methods for ideological and political education, which can effectively improve the interactive and personalized level of education. They emphasized that intelligent thinking and politics is not only the application of technology, but also the innovation of educational concepts, requiring educators to find a balance between technology and educational content [1]. Wang Hui and Qiu Haiyang (2019), in their Research and Analysis of the Mode of Artificial Intelligence Ideological and Political Education in Colleges and Universities, found through empirical research that the application of artificial intelligence in ideological and political education in colleges and universities mainly focuses on intelligent guidance, personalized learning path recommendation and learning behavior analysis. They pointed out that despite the promising application of artificial intelligence technology in education, it still faces technical bottlenecks and ethical challenges in practical operation [2]. Niu Yuanyuan (2024) discussed the application of generative artificial intelligence in ideological and political education in Colleges and Universities in her Research on Generative Artificial Intelligence-Based Ideological and

Political Education. She believes that generative artificial intelligence can realize real-time monitoring and analysis of students' ideological dynamics through natural language processing and data mining technologies, so as to provide teachers with accurate educational feedback and guidance [3]. Ma Nina (2024) proposed in "Research on Innovative Strategies for College Counselors to Carry out online Ideological and political Education from the Perspective of Artificial Intelligence" that artificial intelligence technology can help college counselors to better carry out online ideological and political education and improve the coverage and influence of education through intelligent education platforms and tools [4]. Gao Jing, Han Yajun and Cao Fukai (2022) pointed out in the Reform of Ideological and Political Education in Universities based on Artificial Intelligence that artificial intelligence technology can improve the pertinence and effectiveness of ideological and political education through intelligent recommendation systems and personalized learning paths. They emphasized that educators should make full use of artificial intelligence technology to optimize the allocation of educational resources and improve educational effects [5]. Zhang Jingjing (2023) systematically reviewed the current situation and future development direction of the application of artificial intelligence in ideological and political education in Universities in the Age of Artificial Intelligence Innovation Research. She believes that artificial intelligence technology can not only improve the interactive and personalized level of education, but also achieve accurate monitoring and evaluation of students' ideological dynamics through big data analysis [6]. Chen Rong (2024) discussed the application risks and preventive measures of artificial intelligence technology in network ideological and political education in Colleges and Universities in the Study on the Impact of Artificial Intelligence Risks on Network Ideological and political Education from the Perspective of Big Data. He pointed out that while improving the educational effect of artificial intelligence technology, it also brought about data privacy and ethical issues, which required the establishment of a sound

risk prevention mechanism [7]. Li Jianhua (2024) proposed in the Logic, Challenges and Practical Directions of Artificial Intelligence Embedded in Ideological and Political Work in Colleges and Universities that the application of artificial intelligence technology in ideological and political education in colleges and universities should be comprehensively considered from various aspects such as technology, ethics and educational theories to gradually improve and optimize the realization path of AI-enabled ideological and political education [8]. Han Xiaodan (2024) discussed the application effect of artificial intelligence technology in ideological and political education in higher vocational colleges in his Research on Discourse Innovation and Communication Effect Based on Artificial Intelligence. She believes that artificial intelligence technology can enhance the communication effect and influence of education through intelligent education platforms and tools [9]. Tao Yancheng and Han Fang (2024) pointed out in Practical Difficulties and Solutions of Innovation in Ideological and political Education in Colleges and Universities under the Background of Artificial Intelligence that the application of artificial intelligence technology in ideological and political education in colleges and universities faces technical bottlenecks and ethical challenges, and requires multi-party cooperation to jointly deal with them [10]. Wang Xiaoyan (2024) discussed the application of artificial intelligence technology in Party building and ideological and political education of college Students in Research on Empowering Party Building and Ideological and Political Education of college students. She believes that artificial intelligence technology can enhance the effect of party building and ideological and political education through intelligent education platforms and tools [11]. Pan Yiyu (2024) systematically reviewed the current situation and future development direction of the application of artificial intelligence in ideological and political education in colleges and universities in his Innovative Research on Ideological and Political Education in Colleges and Universities from the Perspective of Artificial Intelligence. She believes that artificial

intelligence technology can not only improve the interactive and personalized level of education, but also achieve accurate monitoring and evaluation of students' ideological dynamics through big data analysis [12].

Internationally, research on the application of artificial intelligence in the field of education has made remarkable progress. Dede(2014) pointed out that artificial intelligence technology can realize personalized learning services through data analysis and machine learning to improve students' learning effect and educational experience. He believes that the application of artificial intelligence technology in education can not only enhance the management and allocation of teaching resources, but also bring new teaching models, such as virtual laboratories and intelligent tutoring systems [13]. Anderson and Kumar(2019) in Artificial Intelligence in Education: Status and Prospects pointed out that the application of artificial intelligence in education can not only enhance the management and allocation of teaching resources, but also bring new teaching models, such as virtual laboratories and intelligent tutoring systems. They believe that the application of artificial intelligence technology in education has broad prospects, but it still faces technical bottlenecks and ethical challenges in actual operation [14].

In the current social background, the rapid development and wide application of artificial intelligence technology has aroused wide concern. Especially in the field of education, the application of artificial intelligence technology can not only improve the effect of education, but also promote the innovation and change of education model. In combination with the spirit of the second meeting, the state attaches great importance to the modernization of education and scientific and technological innovation, and proposes to accelerate the promotion of education information and intelligence, and improve the quality and level of education. In this context, the application of artificial intelligence technology in ideological and political education in colleges and universities has important practical significance. First of all, artificial intelligence technology can improve the interactive and personalized level of

ideological and political education through intelligent education platforms and tools, and meet the diversified learning needs of students. Secondly, artificial intelligence technology can achieve accurate monitoring and evaluation of students' ideological dynamics through big data analysis and machine learning, and provide teachers with targeted educational feedback and guidance. In addition, artificial intelligence technology can also create a simulated social environment through virtual reality technology to help students experience and understand social morality and ethics in a virtual situation, thus deepening the effect of education. However, the application of artificial intelligence technology in ideological and political education in colleges and universities also faces certain challenges. Firstly, the application of artificial intelligence technology in education involves a large amount of student data, and how to protect the security and privacy of these data is an important issue. To this end, it is necessary to establish a sound data protection mechanism to ensure the legal use and adequate protection of data. Secondly, the application of artificial intelligence technology in education also faces technical bottlenecks and ethical challenges, which need multi-party coordination and joint response.

2. OVERVIEW OF ARTIFICIAL INTELLIGENCE TECHNOLOGY

2.1 Basic concepts of artificial intelligence

Artificial intelligence (AI) is a branch of computer science devoted to the study and development of artificial processes that simulate, extend, and extend human intelligence theories, methods, and application systems. It mainly involves natural language processing, machine learning, computer vision, robotics and other fields. The core of artificial intelligence is to automate complex tasks through data-driven decision-making, and then truly realize intelligence.

2.2 Application status of artificial intelligence in education

With the continuous maturity of artificial intelligence technology, its application in the field of education has gradually expanded. One notable application area is personalized learning. By analyzing students' learning behaviors and data, AI can provide personalized learning paths and knowledge recommendations to meet the learning needs of different students. Educational robots and virtual tutors are also one of the more mature applications at present. They can not only help students solve difficult problems in learning, but also provide 24-hour uninterrupted services to improve students' learning efficiency. In addition, the intelligent evaluation system can realize the comprehensive evaluation of students' learning effect by using artificial intelligence technology, which helps to timely adjust the teaching strategy.

2.3 Potential application of artificial intelligence in ideological and political education

Ideological and political education not only imparts knowledge, but also pays more attention to cultivating students' ideological morality and social responsibility. In this process, artificial intelligence has a unique advantage. Firstly, through natural language processing technology, intelligent analysis and extraction of ideological and political teaching content can be realized to help teachers quickly obtain the required information. Secondly, the use of big data analysis and machine learning can realize real-time monitoring of students' ideological status and dynamic assessment of ideological changes, so as to provide targeted feedback and guidance for teachers. In addition, artificial intelligence can also create a simulated social environment through virtual reality technology to help students experience and understand social morality and ethics in a virtual situation, thus deepening the effect of education.

3. CURRENT SITUATION AND DEMAND ANALYSIS OF IDEOLOGICAL AND POLITICAL EDUCATION FOR COLLEGE STUDENTS

College students are the future of the country, and ideological and political education plays a key role in their life development. However, traditional ideological and political education has certain limitations in form and content, which is difficult to attract students' active participation, resulting in unsatisfactory

learning results. At present, the demands of ideological and political education of college students are mainly reflected in two aspects: one is the diversified and personalized demand for educational content, and the other is the interactive and practical demand for educational form. Through the investigation, it is found that college students hope that ideological and political education is not only theoretical explanation, but also pays more attention to the discussion of practical problems and the discussion of solutions. Therefore, innovating the ideological and political education model to meet the needs of college students in the new era has become an important task in the current education circle.

4. INNOVATION OF IDEOLOGICAL AND POLITICAL EDUCATION MODEL BASED ON ARTIFICIAL INTELLIGENCE

The introduction of artificial intelligence provides new ideas and means for the innovation of ideological and political education model. The ideological and political education model based on artificial intelligence can realize the dual innovation of teaching content and teaching method.

4.1 Teaching model innovation

Traditional ideological and political education mainly relies on teachers' teaching and students' passive acceptance, and the interaction is poor. With the help of artificial intelligence technology, the flipped classroom mode of teaching can be realized through the intelligent teaching platform. Teachers will focus on explaining difficult points and key contents, while students will learn common knowledge points independently through the intelligent system. In addition, the use of artificial intelligence technology can develop virtual reality courses, students can conduct ideological and political learning in simulated scenarios, enhance perception and experience.

4.2 Interactive feedback mechanism

Interactive feedback is an important means to improve teaching effect. In traditional ideological and political education, it is difficult for teachers to know students' learning status and ideological changes in real time. Artificial intelligence can collect students' learning data in real time through big data analysis and learning behavior tracking,

and generate personalized learning reports, so as to achieve targeted teaching feedback. At the same time, through online discussion and intelligent question and answer system, the interaction between students and teachers can be enhanced, and the participation and interest of learning can be enhanced.

4.3 Personalized education and intelligent recommendation system

The individualized demand of ideological and political education has become increasingly prominent. Ai can provide personalized learning paths and knowledge recommendations based on students' interests, learning habits and state of mind. By analyzing students' learning data and behavior patterns, the intelligent recommendation system can accurately recommend learning resources and activities suitable for students to improve the pertinence and effectiveness of learning. Through personalized education, students can participate in ideological and political education to a greater extent and improve the learning effect.

5. REALIZATION PATH OF IDEOLOGICAL AND POLITICAL EDUCATION ENABLED BY ARTIFICIAL INTELLIGENCE

The realization path of AI-enabled ideological and political education needs to be designed and implemented comprehensively and systematically from the aspects of intelligent management of educational resources, analysis and evaluation of learning behaviors, virtual tutors and intelligent tutoring.

5.1 Intelligent management of educational resources

The intelligent management of educational resources is an important premise to realize the ideological and political education model based on artificial intelligence. Through artificial intelligence technology, the classification, labeling and intelligent recommendation of educational resources can be realized, and students can easily and quickly obtain the required learning materials. At the same time, intelligent management can also update and optimize the resource library in real time to ensure the timeliness and applicability of educational resources.

5.2 Learning behavior analysis and evaluation

The analysis and evaluation of learning

behavior is the key to realize personalized education and precise teaching. Through big data analysis, artificial intelligence systems can comprehensively track and record students' learning behaviors, generate learning logs and behavior portraits. Based on these data, teachers can conduct a comprehensive assessment of students' learning status, find out the problems and deficiencies in learning in time, and adjust teaching strategies accordingly to improve the educational effect.

5.3 Virtual tutor and intelligent tutoring

Virtual tutor and intelligent tutoring are important means of AI-enabled ideological and political education. Based on artificial intelligence technology, virtual tutors can provide 7*24 hours of learning consultation and tutoring services, answer students' questions in learning, and provide learning advice and guidance. The intelligent tutoring system can achieve interaction and feedback in the learning process through human-computer interaction, speech recognition and other technologies, and enhance students' learning participation and enthusiasm.

6. CHALLENGES AND COUNTERMEASURES OF ARTIFICIAL INTELLIGENCE IN IDEOLOGICAL AND POLITICAL EDUCATION

Although AI has brought many opportunities for ideological and political education, it also faces certain challenges in the process of application, including ethical and privacy issues, technical bottlenecks and applicability issues. To this end, we need to work together and deal with it together.

6.1 Ethical and privacy issues

The application of artificial intelligence in education involves a large amount of student data, and how to protect the security and privacy of these data is an important issue. To this end, it is necessary to establish a sound data protection mechanism to ensure the legal use and adequate protection of data. At the same time, when applying artificial intelligence technology, ethical issues should be fully considered to avoid technology abuse and educational equity issues.

6.2 Technical Bottlenecks and Solutions

At present, the application of artificial intelligence technology in education still faces certain technical bottlenecks, including the complexity of data processing, the stability and applicability of algorithms. To this end, it is necessary to strengthen technology research and development and application promotion, actively explore and solve technical bottlenecks, and improve the applicability and stability of artificial intelligence technology in ideological and political education.

6.3 Future research direction and practical suggestions

In the future, the application of artificial intelligence in ideological and political education needs to further deepen research and practical exploration. The research direction can include the optimization and innovation of artificial intelligence technology in education, the combination of artificial intelligence and education theory, and the evaluation of the effectiveness of artificial intelligence in education. At the same time, in practice, it is necessary to strengthen the deep integration of artificial intelligence technology and education and teaching, and promote the innovation and development of education models.

7. CONCLUSION

To sum up, the research on the innovation of college students' ideological and political education model based on artificial intelligence provides new ideas and references for the innovative development of future education. Artificial intelligence technology has broad application prospects and potential in ideological and political education, which can significantly improve the educational effect and student participation. However, the application of artificial intelligence in education still faces many challenges, and it is necessary to gradually improve and optimize the realization path of artificial intelligence enabling ideological and political education from a comprehensive consideration of technology, ethics, educational theories and other aspects. Through continuous research and exploration, artificial intelligence will certainly play a greater role in the ideological and political education of college students, and promote the innovation and development of education models.

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Theoretical Exploration of Children's Language Development and Preschool Education

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Abstract: This study investigates the theoretical foundations and connections between children's language development and preschool education. Utilizing literature review and theoretical analysis, it systematically examines relevant research both domestically and internationally, focusing on key factors in children's language development and the impact of preschool education. The paper begins by analyzing fundamental theories, including Piaget's cognitive development theory, Vygotsky's sociocultural theory, and whole language theory. It then explores the effects of various educational models on language development, emphasizing teacher-child interactions, educational environments, and language resources. By synthesizing dialogue theory, cognitive development theory, and sociocultural theory, the study reveals critical pathways and effective mechanisms in preschool education for language enhancement. Findings indicate that high-quality teacher-child interactions, rich language environments, and appropriate educational models are crucial. The study also identifies existing issues in theoretical frameworks and practical implementation, proposing future research directions and improvements for advancing preschool education theory.

Keywords: Children's Language Development; Preschool Education; Theoretical Analysis; Cognitive Development; Teacher-Child Interaction

1. INTRODUCTION

1.1 Research background and significance

Child language development is an important research field in cognitive psychology and pedagogy. Language is not only a tool for human communication, but also the basis for thinking and cognitive development. As a key stage of children's early development, preschool education plays an important role in the cultivation of language ability. In recent years, with the increasing attention of the society to the quality of education, the role of preschool education in children's language development has been paid more and more attention. Research on the relationship between children's language development and preschool education not only helps to improve the scientific and effective education practice, but also provides theoretical basis for the formulation of education policies.

1.2 Research objectives and research questions

This paper aims to explore the theoretical basis and correlation between children's language development and preschool education, analyze the mechanism of preschool education in children's language ability development, and put forward suggestions to improve preschool education practice. Specific research questions include: What is the basic theory of children's language development? How does preschool Education affect Children's language Development? What are the problems facing the current development of preschool education theory? What are the possible paths for future research in preschool education?

1.3 Review of research status at home and abroad

Domestic and foreign scholars have made rich achievements in the study of children's language development and preschool education. Li Chuangbin (2014) pointed out in his research on teacher-child relationship from the perspective of dialogue theory that teacher-child interaction plays an important role in children's language development. Yan Yong (2016) discussed the existing problems

and the future direction of the development of preschool education theory. In foreign research, the theories of Piaget and Vygotsky provide an important theoretical basis for children's language development. Piaget's cognitive development theory emphasizes the active construction of children's interaction with the environment, while Vygotsky's sociocultural theory emphasizes the role of social interaction in language development. The whole language theory advocates the creation of the whole language environment to promote the development of children's language ability.

2. BASIC THEORIES OF CHILDREN'S LANGUAGE DEVELOPMENT

2.1 Piaget's theory of cognitive development

Piaget's theory of cognitive development holds that children's cognitive development is a process of active construction, and language, as an important part of cognitive development, also follows this principle. Piaget divided children's cognitive development into four stages: sensorimotor stage, pre-operational stage, concrete operational stage and formal operational stage. In the pre-operational stage, children begin to use symbols and language to think, and the language development in this stage is of great significance to the subsequent improvement of cognitive ability. Piaget believed that children constantly construct and adjust their cognitive structure through interaction with the environment, and language plays a bridge role in this process.

2.2 Vygotsky's sociocultural theory

Vygotsky's sociocultural theory emphasizes the role of social interaction in children's language development. He proposed that language is not only a tool for communication, but also a tool for thinking. Through interaction with adults and peers, children are able to acquire new language skills within the "zone of proximal development." Vygotsky believes that language development is a process of socialization, and children gradually form their own language abilities by imitating and internalizing adult language. Socio-cultural theory provides an important theoretical basis for preschool education and emphasizes the guiding role of teachers in children's language development.

2.3 Whole language theory

The whole language theory advocates the creation of the whole language environment to promote the development of children's language ability. The theory holds that language learning is a whole process, and the four abilities of listening, speaking, reading and writing are interrelated and promote each other. The whole language theory emphasizes language learning in the real language environment, and promotes the all-round development of children's language ability through rich language input and output. The application of this theory in preschool education emphasizes on creating a rich language environment and providing a variety of language activities to promote the development of children's language ability.

3. THE INFLUENCE MECHANISM OF PRESCHOOL EDUCATION ON CHILDREN'S LANGUAGE DEVELOPMENT

3.1 Preschool education environment and language resource allocation

The influence of preschool education environment on children's language development cannot be ignored. A rich language environment can provide a variety of language input and promote the development of children's language ability. Studies have shown that the allocation of language resources, such as books, audio and video, plays an important role in the development of children's language ability. Liang Wen (2022) pointed out that the cultivation strategy of children's language ability in preschool education should pay attention to the diversity and richness of language resources. By providing a variety of language resources, children can carry out language practice in different situations and improve their language ability.

3.2 Teacher-child interaction and its role in language development

Teacher-child interaction is an important way to promote children's language development in preschool education. High-quality teacher-child interaction can provide rich language input and feedback, and promote the development of children's language ability. Qiu Xiaoli et al. (2015) found that the quality of teacher-student dialogue and communication is closely related to the

development of children's mental state understanding ability. In the interaction with children, teachers can guide children to carry out language expression and thinking activities by asking questions, responding and expanding, so as to improve their language ability. High-quality teacher-child interaction can not only promote the development of children's language ability, but also enhance children's social communication ability and cognitive ability.

3.3 Educational model and strategy

Different educational models and strategies have different effects on children's language development. The whole language education model emphasizes the creation of the whole language environment to promote the all-round development of children's language ability. Liu Qiuju (2018) proposed that language education and teaching mode for preschool children based on post ability training can effectively improve children's language ability. By creating real language situations and providing a variety of language activities, children can improve their language ability in practice. In addition, gamification teaching, story telling, role playing and other educational strategies can also effectively promote the development of children's language ability.

4. EXPLORE THE PATH OF LANGUAGE DEVELOPMENT FROM THE PRESCHOOL EDUCATION THEORY

4.1 Dialogue theory and teacher-child relationship

Dialogue theory emphasizes the promotion of children's language and cognitive development through dialogue between teachers and students in the process of education. Li Chuangbin (2014) pointed out that teacher-child relationship is of great significance in the perspective of dialogue theory. Through high-quality teacher-child dialogue, teachers can guide children to carry out language expression and thinking activities, and promote the development of language ability. The application of dialogue theory in preschool education emphasizes that teachers should pay attention to the interaction with children and improve children's language ability through questioning, responding and expanding.

4.2 Application of cognitive development theory in preschool education

The application of Piaget's cognitive development theory in preschool education emphasizes the promotion of children's cognitive and language development through the creation of a suitable educational environment. In the pre-operational stage, children begin to use symbols and language to think, and teachers should promote the development of children's language ability by providing rich language resources and activities. Through interaction with the environment, children can continuously construct and adjust their cognitive structure and improve their language ability.

4.3 Combination of sociocultural theory and educational practice

The application of Vygotsky's sociocultural theory in preschool education emphasizes the promotion of children's language ability through social interaction. In the practice of education, teachers should pay attention to the interaction with children and improve children's language ability through questioning, responding and expanding. By creating a rich language environment and providing a variety of language activities, children can improve their language ability in practice. Socio-cultural theory provides an important theoretical basis for preschool education and emphasizes the guiding role of teachers in children's language development.

5. DEVELOPMENT PROBLEMS AND CHALLENGES OF CURRENT PRESCHOOL EDUCATION THEORIES

5.1 Improvement and development of theoretical system

At present, the development of preschool education theory still faces some problems. The theoretical system is not perfect and has some limitations. Yan Yong (2016) pointed out that the existing problems and the future direction of the development of preschool education theory need to be further discussed and improved. By combing and analyzing the existing theories, the shortcomings of the theoretical system are found and suggestions for improvement are put forward, which can promote the development of preschool education theory.

5.2 Differences and operational problems in

educational practice

Differences and operational problems in educational practice are also challenges facing the current development of preschool education theory. There are differences in educational practice in different regions and schools, so it is difficult to combine theory with practice. By analyzing the problems in education practice and putting forward suggestions for improvement, the science and effectiveness of preschool education can be enhanced.

5.3 Combination and conflict between theory and practice

The combination and conflict between theory and practice is also the challenge facing the current development of preschool education theory. There is a certain gap between theoretical research and educational practice, and the application effect of theory is not satisfactory. By discussing the combination of theory and practice and putting forward some suggestions for improvement, we can promote the development of preschool education theory.

6. FUTURE RESEARCH DIRECTIONS AND IMPROVEMENT SUGGESTIONS IN PRESCHOOL EDUCATION

6.1 Strengthening Theoretical Research and System Construction

One potential path is to bolster theoretical research and system construction. By identifying gaps in existing theories and proposing enhancements, the development of preschool education theory can be advanced. Robust theoretical frameworks will improve the scientific rigor and effectiveness of preschool education.

6.2 Implementing Scientific Educational Models and Methods

Another path is the implementation of scientific educational models and methods. By evaluating the pros and cons of various educational approaches and proposing improvements, the quality and effectiveness of preschool education can be enhanced. Providing rich language environments and diverse language activities will help children improve their language abilities through practical engagement.

6.3 Enhancing Interdisciplinary Research and International Collaboration

Enhancing interdisciplinary research and international collaboration is another viable path. Collaborations with other disciplines can broaden research perspectives and improve scientific validity. International cooperation allows for the incorporation of global research findings, furthering the scientific and effective development of preschool education.

7. CONCLUSION

This study highlights the significant role of preschool education in children's language development. Key factors include high-quality teacher-child interactions, rich language environments, and appropriate educational models. Despite some limitations, such as incomplete theoretical frameworks and practical discrepancies, future research should focus on strengthening theoretical research, implementing scientific educational methods, and enhancing interdisciplinary and international collaborations to foster the development of preschool education theory.

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Collaborative Governance Mechanism for Smart Urban Community Elderly Care under the Sharing Economy Model

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Abstract: In the context of the rapid development of the sharing economy, collaborative governance for smart urban community elderly care has become a critical issue in urban management and social services. This study aims to explore how collaborative governance mechanisms can enhance service levels in smart urban community elderly care and promote efficient resource utilization and cooperation. Using literature review and theoretical analysis, we systematically organize and compare existing research to develop a collaborative governance framework tailored to China's urban communities. We begin by examining the basic theories of the sharing economy and the current state of smart urban community elderly care, analyzing the potential impacts of the sharing economy on community elderly care. The study then focuses on the theoretical foundations of multi-stakeholder collaborative governance, detailing the roles and responsibilities of the government, businesses, communities, and individuals. Drawing from domestic and international research and policy literature, we explore collaborative governance pathways, including policy support, resource integration, technology application, and social capital. Results indicate that collaborative governance under the sharing economy model can significantly improve the efficiency and quality of community elderly care services. Multi-stakeholder collaboration, resource sharing, and information exchange can transform traditional single-supply models into diversified, intelligent, and precise service models. The study emphasizes the crucial roles of the government in policy-making, support, and regulation; businesses in innovation and resource provision; communities as integrators and implementers; and residents in feedback and participation.

Keywords: Sharing Economy; Smart Cities; Community Elderly Care; Collaborative Governance; Multi-stakeholder Cooperation

1. INTRODUCTION

1.1 Research Background and Significance

With the acceleration of global aging, elderly care has become a focal point for governments and societies worldwide. As the country with the largest elderly population, China faces severe challenges in elderly care. According to data from the National Bureau of Statistics, by the end of 2020, China had 264 million people aged 60 and above, accounting for 18.7% of the total population. The traditional family-based elderly care model is gradually becoming insufficient to meet the diverse needs of the elderly, making community and institutional elderly care important supplementary forms. In this context, how to improve the quality of elderly care services through innovative governance models has become an urgent issue to address.

The sharing economy, as an emerging economic model, enhances resource utilization efficiency through resource sharing and optimal allocation. In the context of the sharing economy, smart urban community elderly care leverages the Internet and information technology to achieve efficient integration of elderly care resources and precise service delivery. Smart urban community elderly care can not only meet the basic living needs of the elderly but also provide medical, cultural, and entertainment services, thereby improving their quality of life. Therefore, studying the collaborative governance mechanism of smart urban community elderly care under the sharing economy model holds significant theoretical and practical importance.

1.2 Research Objectives and Questions
This study aims to explore how to enhance the service level of smart urban community elderly care through a collaborative governance mechanism under the sharing economy model, promoting effective resource utilization and collaborative cooperation. Specific research questions include: What are the basic characteristics of smart urban community elderly care under the sharing economy model? What are the theoretical foundations and components of multi-stakeholder collaborative governance? How to construct a collaborative governance framework that suits China's national conditions and the actual needs of urban communities? What roles and responsibilities do the government, enterprises, communities, and individuals have in collaborative governance? How to optimize the collaborative governance path of smart urban community elderly care through policy support, resource integration, technology application, and social capital?

1.3 Literature Review on Domestic and International Research
Both domestically and internationally, there has been a certain accumulation of research on the sharing economy and smart urban community elderly care. International scholars mainly focus on the basic theories of the sharing economy, application scenarios, and its impact on socio-economic aspects. For example, Botsman and Rogers (2010) proposed that the sharing economy can significantly enhance resource utilization efficiency through resource sharing and optimal allocation. Domestic scholars, on the other hand, pay more attention to the application of the sharing economy in specific fields and its governance mechanisms. For instance, Zhang Jie and Lu Yuan (2019) studied the collaborative governance model of social elderly care services under the sharing economy, pointing out that multi-stakeholder collaboration is key to improving the quality of elderly care services.

However, existing research often focuses on either the sharing economy or smart urban community elderly care, lacking a systematic study combining both aspects. Particularly, there is no comprehensive theoretical framework and practical path for the collaborative governance mechanism of smart urban community elderly care under the sharing economy model. Therefore, this study attempts to construct a collaborative governance mechanism for smart urban community elderly care under the sharing economy model, based on a synthesis of domestic and international research findings, providing theoretical support and practical references for the efficient governance of smart urban community elderly care.

2. DEFINITION AND THEORETICAL FOUNDATION OF THE SHARING ECONOMY

2.1 Basic Concept of the Sharing Economy
The sharing economy is a new economic model based on Internet platforms, achieving high resource utilization through resource sharing and optimal allocation. Its core idea is to reduce resource waste and improve resource utilization efficiency by sharing idle resources. The main characteristics of the sharing economy include resource sharing, platform intermediation, transaction flexibility, and wide participation. The sharing economy has a broad range of applications, covering transportation, accommodation, education, healthcare, and more.

2.2 Theoretical Foundation of the Sharing Economy
The theoretical foundation of the sharing economy mainly includes resource allocation theory, network effect theory, and synergy effect theory. Resource allocation theory suggests that optimal resource allocation can be achieved through market mechanisms and price signals. The sharing economy connects supply and demand directly through Internet platforms, reducing transaction costs and improving resource allocation efficiency. Network effect theory indicates that the value of a platform grows exponentially with the increase in the number of users. Sharing economy platforms attract a large number of users, forming a scale effect that further enhances resource utilization efficiency. Synergy effect theory emphasizes that optimal resource allocation and maximum benefits can be achieved through multi-stakeholder collaboration. Under the sharing economy model, the government, enterprises, communities, and individuals collaborate to

improve the quality of elderly care services.

2.3 Application of the Sharing Economy Model in Urban Community Elderly Care

The application of the sharing economy model in urban community elderly care is mainly reflected in resource sharing and service collaboration. Through sharing economy platforms, community elderly care services can achieve efficient integration and precise delivery of resources. For example, sharing economy platforms can integrate idle houses, medical resources, and volunteer services within the community to provide diversified elderly care services. Additionally, the sharing economy model can achieve intelligent and personalized elderly care services through information technology. For instance, smart devices and big data analysis can monitor the health status of the elderly in real-time, providing personalized health management services.

3. CURRENT SITUATION AND CHALLENGES OF SMART URBAN COMMUNITY ELDERLY CARE

3.1 Concept and Characteristics of Smart Urban Communities

Smart urban communities refer to communities that achieve intelligent, information-based, and modernized management and services through information technology and smart devices. The main characteristics of smart urban communities include interconnected information, intelligent services, efficient management, and resident participation. In smart urban communities, information technology and smart devices are widely used in various aspects of community management and services, such as smart security, smart transportation, and smart healthcare.

3.2 Analysis of the Current Situation of Urban Community Elderly Care

Currently, the urban community elderly care service system in China is still incomplete, with issues such as insufficient service supply, uneven resource allocation, and low service quality. According to the "China Aging Development Report (2020)", the coverage rate of community elderly care services in China is only about 30%, far below the level of developed countries. Additionally, the allocation of community elderly care resources is uneven, mainly concentrated in economically developed regions and large cities, while community elderly care services in small and medium-sized cities and rural areas are relatively weak. In terms of service quality, the professional level of community elderly care services is not high, and the service content is single, making it difficult to meet the diverse needs of the elderly.

3.3 Challenges Facing Smart Urban Community Elderly Care

Smart urban community elderly care faces numerous challenges in practical application. Firstly, the application of information technology and smart devices requires substantial financial investment, but the current funding sources for community elderly care services are limited, making it difficult to meet the construction needs of smart urban community elderly care. Secondly, smart urban community elderly care requires multi-stakeholder collaboration, but the current collaborative mechanisms between the government, enterprises, communities, and individuals are not well-established, making it difficult to form a cohesive force. Additionally, smart urban community elderly care faces technical challenges, such as data security and privacy protection, compatibility and stability of smart devices, and more.

4. THEORETICAL FOUNDATION AND FRAMEWORK CONSTRUCTION OF COLLABORATIVE GOVERNANCE

4.1 Basic Theories of Collaborative Governance

Collaborative governance is a new governance model that achieves public affairs management and service provision through multi-stakeholder cooperation. The basic theories of collaborative governance include Public Choice Theory, Network Governance Theory, and Synergy Effect Theory. Public Choice Theory posits that optimal allocation of public resources can be achieved through multi-stakeholder participation and cooperation. Network Governance Theory emphasizes that a networked governance structure can achieve interconnected information and efficient resource allocation. Synergy Effect Theory suggests that multi-stakeholder cooperation can optimize resource allocation and maximize benefits.

4.2 Components of Multi-Stakeholder Collaborative Governance

The components of multi-stakeholder collaborative governance mainly include the government, enterprises, communities, and individuals. The government plays a leading role in collaborative governance, responsible for policy formulation, providing support, and supervising services. Enterprises act as innovation drivers, providing technological and resource support. Communities serve as bridges, responsible for resource integration and service implementation. Individuals participate by providing feedback on needs and engaging in service provision.

4.3 Framework Construction of Collaborative Governance

Based on the basic theories of collaborative governance and the components of multi-stakeholder collaborative governance, a collaborative governance framework for smart urban community elderly care under the sharing economy model can be constructed. This framework includes aspects such as policy support, resource integration, technology application, and social capital. In terms of policy support, the government should formulate relevant policies, provide financial support, and ensure policy guarantees. For resource integration, enterprises and communities should use sharing economy platforms to achieve efficient resource integration and precise supply. In terms of technology application, enterprises should provide advanced technologies and smart devices to achieve intelligent and personalized elderly care services. Regarding social capital, communities should enhance social participation and service quality through volunteer services and social organizations.

5. COLLABORATIVE GOVERNANCE MECHANISM FOR SMART URBAN COMMUNITY ELDERLY CARE UNDER THE SHARING ECONOMY MODEL

5.1 Role of the Government and Policy Support

Under the sharing economy model, the government plays a leading role in the collaborative governance of smart urban community elderly care. The government should formulate relevant policies, provide financial support and policy guarantees, and promote the development of smart urban community elderly care. For example, the government can encourage enterprises and communities to participate in smart urban community elderly care services through financial subsidies and tax incentives. Additionally, the government should strengthen the supervision of smart urban community elderly care services to ensure service quality and safety.

5.2 Role of Enterprises and Technological Innovation

Enterprises act as innovation drivers in the collaborative governance of smart urban community elderly care under the sharing economy model. Enterprises should provide advanced technologies and smart devices through technological innovation and resource integration. For example, enterprises can develop smart elderly care devices, such as smart wristbands and smart mattresses, to monitor and manage the health status of the elderly in real-time. Additionally, enterprises can integrate idle resources within the community through sharing economy platforms to provide diversified elderly care services.

5.3 Role of Communities and Resource Integration

Communities serve as bridges in the collaborative governance of smart urban community elderly care under the sharing economy model. Communities should achieve efficient resource integration and precise supply through sharing economy platforms. For example, communities can integrate idle houses, medical resources, and volunteer services within the community to provide diversified elderly care services. Additionally, communities should enhance social participation and service quality through volunteer services and social organizations.

5.4 Role of Residents and Participation Mechanism

Residents play a participatory role in the collaborative governance of smart urban community elderly care under the sharing economy model. Residents should provide feedback on needs and engage in service provision through sharing economy platforms. For example, residents can propose needs and suggestions for elderly care services and

participate in the design and implementation of community elderly care services through sharing economy platforms. Additionally, residents can participate in community elderly care services through volunteer services, enhancing social participation and service quality.

6. PATHWAYS FOR COLLABORATIVE GOVERNANCE OF SMART URBAN COMMUNITY ELDERLY CARE

6.1 Policy and Legal Guarantees

Collaborative governance of smart urban community elderly care requires policy and legal guarantees. The government should formulate relevant policies, provide financial support and policy guarantees, and promote the development of smart urban community elderly care. For example, the government can encourage enterprises and communities to participate in smart urban community elderly care services through financial subsidies and tax incentives. Additionally, the government should strengthen the supervision of smart urban community elderly care services to ensure service quality and safety.

6.2 Resource Integration and Sharing Mechanism

Collaborative governance of smart urban community elderly care requires resource integration and sharing mechanisms. Enterprises and communities should achieve efficient resource integration and precise supply through sharing economy platforms. For example, enterprises can integrate idle resources within the community through sharing economy platforms to provide diversified elderly care services. Additionally, communities should enhance social participation and service quality through volunteer services and social organizations.

6.3 Technology Application and Information Exchange Platform

Collaborative governance of smart urban community elderly care requires technology application and information exchange platforms. Enterprises should provide advanced technologies and smart devices through technological innovation and resource integration. For example, enterprises can develop smart elderly care devices, such as smart wristbands and smart mattresses, to monitor and manage the health status of the elderly in real-time. Additionally, enterprises can integrate idle resources within the community through sharing economy platforms to provide diversified elderly care services.

6.4 Utilization and Enhancement of Social Capital

Collaborative governance of smart urban community elderly care requires the utilization and enhancement of social capital. Communities should enhance social participation and service quality through volunteer services and social organizations. For example, communities can enhance social participation and service quality through volunteer services. Additionally, communities should enhance social participation and service quality through social organizations.

7. CONCLUSION

This study explores the collaborative governance mechanism of smart urban community elderly care under the sharing economy model and proposes a collaborative governance framework. This framework includes policy support, resource integration, technology application, and social capital. The research results indicate that the collaborative governance mechanism of smart urban community elderly care under the sharing economy model can effectively improve the efficiency and quality of community elderly care services. Through multi-stakeholder collaboration, resource sharing, and information exchange, community elderly care services can transition from traditional single-supply models to diversified, intelligent, and precise models.

This study mainly adopts literature review and theoretical analysis methods to explore the collaborative governance mechanism of smart urban community elderly care under the sharing economy model, lacking empirical research and case analysis. Additionally, this study mainly focuses on smart urban community elderly care in China, without fully considering the actual situations of other countries and regions. Therefore, future research can further verify the effectiveness and feasibility of the collaborative governance mechanism of smart urban community elderly care under the sharing economy model through empirical research and case analysis.

Future research can be conducted in the following aspects: Firstly, empirical research and case analysis can be used to further verify the effectiveness and feasibility of the collaborative governance mechanism of smart urban community elderly care under the sharing economy model. Secondly, comparative studies can be conducted to explore the similarities and differences in the collaborative governance mechanisms of smart urban community elderly care in different countries and regions, providing more theoretical support and practical references for achieving efficient governance of smart urban community elderly care. Additionally, interdisciplinary research can be conducted to explore the multidimensional impacts of the collaborative governance mechanism of smart urban community elderly care under the sharing economy model, providing more theoretical support and practical references for achieving efficient governance of smart urban community elderly care.

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Control and Supervision of Project Costs and Expenses in Construction Engineering

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Abstract: This study aims to explore the mechanisms for controlling and supervising project costs and expenses in construction engineering, analyzing cost management issues in modern construction projects and proposing optimization strategies. Utilizing literature review and theoretical analysis, the study systematically outlines the theoretical framework and management models for project cost control, incorporating relevant research from both domestic and international sources. By comparing successful experiences and practices in cost control from global construction projects, the study investigates the value of information technologies (e.g., BIM) in cost control and examines the challenges faced in practical implementation. Results indicate that effective project cost control requires a lifecycle approach, employing budget management, process control, and dynamic adjustments to achieve refined cost management. The introduction of information technology significantly enhances the scientific and efficient management of costs, though challenges such as non-uniform technical standards and difficulties in data sharing persist. Joint efforts from government and enterprises, through establishing unified technical standards, optimizing data sharing mechanisms, and enhancing professional training, are essential for the continuous improvement of cost control in construction projects. The study provides theoretical and practical guidance for policymakers and project managers, contributing significantly to the improvement of cost management in construction projects.
Keywords: Project Cost Control; Cost Management; BIM Technology; Information Management; Construction Engineering

1. INTRODUCTION

1.1 Research Background and Significance

Project cost and expense management hold a critical position in the construction industry. As the global construction market evolves, project complexity and scale increase, intensifying the difficulty of cost control and expense management. Particularly in China, as the second-largest global economy, rapid urbanization and infrastructure development have led to expanding project scopes and heightened cost management challenges. Efficient cost management not only enhances project economic benefits but also strengthens corporate competitiveness. Therefore, exploring the control and supervision of project costs and expenses in construction is crucial for enterprise profitability, resource allocation, and sustainable socio-economic development.

1.2 Review of Domestic and International Research

Internationally, extensive research exists on project cost control and expense management. Western countries initiated these studies earlier, with significant achievements in budget management, BIM application, and construction process control. According to Zhu Xiangliang and Guo Zhenhua, BIM technology is widely adopted in U.S. and European projects, providing precise cost predictions and dynamic monitoring, enhancing cost control's scientific nature and efficiency[1]. The UK government's mandate on BIM for public projects standardizes and regulates cost control.

Domestically, research began later but has rapidly advanced. Current studies focus on budget preparation, process control, and IT application. Du Bei stated that with increasing government investment in infrastructure, cost control is crucial for investment efficiency[4]. Zhang Miao found that optimizing construction plans and introducing advanced management technologies improve cost

control significantly[5]. Liao Yuehua emphasized that BIM enhances cost prediction accuracy and real-time control, effectively managing complex project changes[12].

1.3 Research Purpose and Methodology

This study aims to explore the mechanisms for controlling and supervising project costs and expenses in construction, identify current management issues, and propose optimization strategies based on advanced domestic and international experiences. The methodology includes literature review and theoretical analysis, systematically synthesizing relevant research to establish a theoretical framework and analytical model for project cost control. The study also addresses practical issues and provides actionable management recommendations.

2. THEORETICAL BASIS OF PROJECT COST AND EXPENSE CONTROL

2.1 Basic Concept of Project Cost Control

Project cost control ensures that actual expenditures remain within the budget throughout the project lifecycle, achieving expected economic benefits. It focuses on managing costs across project stages, including forecasting, budgeting, execution, and adjustment.

2.2 Basic Theory of Cost Management

Cost management encompasses cost control from planning through completion. Key theories include cost-benefit analysis, value engineering, and lifecycle cost management. Cost-benefit analysis compares project inputs and outputs to determine optimal investment. Value engineering enhances project value through functional analysis and cost optimization. Lifecycle cost management focuses on long-term cost optimization across the project lifecycle.

2.3 Relationship Between Cost Control and Cost Management

Cost control and cost management are interrelated, forming a comprehensive cost management system. Cost control manages actual expenditures during construction, while cost management spans the entire lifecycle. Together, they achieve scientific and comprehensive cost management, enhancing overall project efficiency.

3. MAIN METHODS OF PROJECT COST CONTROL IN CONSTRUCTION

3.1 Budget Management

Budget management is vital for cost control, providing clear cost indicators through scientifically prepared budgets. It involves detailed work breakdown and cost allocation, reducing unnecessary expenditures and supporting post-project cost accounting and performance evaluation.

3.2 Process Control

Process control is crucial during construction, involving detailed construction plans and cost monitoring measures to ensure expenditures align with the budget. Real-time monitoring of progress and cost changes allows for timely problem resolution, enhancing management precision and flexibility.

3.3 Dynamic Adjustment

Dynamic adjustment addresses changes and uncertainties during project execution by adjusting budgets and costs based on actual conditions. It utilizes IT and management tools to reflect real-time cost changes accurately, supporting effective cost control.

4. APPLICATION OF INFORMATION TECHNOLOGY IN COST CONTROL

4.1 Application of BIM Technology

BIM technology provides new means for project cost control through 3D modeling and information integration, supporting precise cost prediction and control. Studies show that BIM enhances cost management accuracy and efficiency through information sharing and collaboration[12]. For example, BIM allows real-time monitoring of construction progress and costs, resolving issues promptly to optimize cost management.

4.2 Information Management Systems

Information management systems like ERP and PM software facilitate comprehensive cost monitoring and management throughout the project lifecycle. These systems provide extensive data analysis and reporting functions, aiding decision-making efficiency and scientific management. For instance, ERP systems offer real-time insights into project expenditures, enabling timely adjustments to avoid overspending.

4.3 Data Sharing and Integration

Data sharing and integration are essential for information-based cost control. Establishing a

unified data platform enables inter-departmental and inter-system data sharing and integration, enhancing information consistency and utilization. Research indicates that data integration reduces information silos, improving cost control accuracy and timeliness[10]. For example, integrating design, construction, and operational data supports lifecycle cost control.

5. CHALLENGES AND STRATEGIES IN PROJECT COST CONTROL

5.1 Non-uniform Technical Standards

The application of IT in cost control faces challenges due to non-uniform technical standards, hindering information sharing and integration. Standardizing technical protocols is crucial for accurate and timely cost control, reducing management complexity and costs.

5.2 Data Sharing Difficulties

Data sharing is foundational for information management and cost control but faces challenges due to inconsistent data formats and structures across departments and systems. Solutions include establishing unified data platforms and standards, using data conversion and integration technologies for seamless data exchange. Cloud computing can facilitate unified data storage and management, enhancing cost control efficiency and scientific management.

5.3 Professional Talent Development

Effective cost control requires highly skilled professionals. However, the construction industry faces a shortage of talent proficient in both engineering management and IT. Developing such talent is essential for improving cost control capabilities. Enterprises should strengthen training and education, integrating advanced management practices and technologies to enhance professional competencies. Collaborative efforts with educational institutions and vocational training programs can cultivate talent that meets modern construction demands, advancing scientific and effective cost control.

6. POLICIES AND SUPERVISION MECHANISMS

6.1 Government Policy Support

Government policies play a crucial role in cost control, guiding and regulating corporate cost management practices towards standardization and normalization. Recent policies, such as the "Construction Project Cost Management Regulations" by the Ministry of Housing and Urban-Rural Development, provide legal support for cost control. Additionally, policy incentives can encourage the adoption of advanced management technologies and methods, enhancing cost control levels.

6.2 Establishing Supervision Mechanisms

Effective supervision mechanisms ensure project cost control implementation. A scientific supervision system can oversee the entire project lifecycle, ensuring the application of cost control measures. Supervision should include pre-audit, mid-term supervision, and post-audit to maintain scientific and rigorous cost control. Introducing third-party audit institutions for independent cost control audits can increase transparency and fairness.

6.3 Improving Legal and Regulatory Frameworks

A comprehensive legal framework is essential for cost control. Developing and refining relevant regulations and standards ensures clear guidelines and protections for cost management. Existing laws and standards should be optimized to address implementation issues, enhancing cost management efficacy. For example, revising regulations to specify cost control requirements and standards at various project stages can promote legal and standardized cost management.

7. CONCLUSION

7.1 Research Summary

This study systematically reviews domestic and international research and practical experiences in construction project cost control and management, proposing optimization strategies. Scientific cost control requires a lifecycle approach, integrating budget management, process control, and dynamic adjustments for refined cost management.

7.2 Theoretical Contributions

The study constructs a systematic cost control framework through theoretical analysis, providing a foundation for further research. It also expands the research perspective by

analyzing IT applications in cost control, offering novel insights for future studies.

7.3 Practical Implications and Recommendations

The findings offer significant insights for policymakers and project managers. Governments should develop policies and regulations to standardize and normalize cost management. Enterprises should adopt advanced management technologies and methods to enhance cost control. Additionally, professional talent development is crucial for effective cost control. Joint efforts from governments and enterprises can continuously improve cost management, enhancing project economic and social benefits.

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The Impact of Transformational Leadership on Knowledge Workers' Loyalty in Small and Medium-Sized Manufacturing Enterprises: The Mediating Role of Psychological Contract

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Abstract: This study aims to explore the impact of transformational leadership on the loyalty of knowledge workers in small and medium-sized manufacturing enterprises, with a focus on the mediating role of the psychological contract. Transformational leadership, known for its ability to inspire intrinsic motivation and innovation, holds significant importance in modern management. Knowledge workers, as the core force behind innovation and development, have loyalty directly tied to the long-term competitiveness and sustainable growth of enterprises. The psychological contract, an implicit agreement reflecting employee expectations and commitments, serves as a bridge in leader-employee relationships. Through literature review and theoretical analysis, this study systematically examines the relationships between transformational leadership, psychological contract, and employee loyalty. It reviews the theoretical foundation and evolution of transformational leadership, analyzing its impact on employee behavior and attitudes. The study also delves into the concept and types of psychological contracts and their role in organizational management, emphasizing its mediating effect in the relationship between transformational leadership and employee loyalty. Aligning with current social issues and the spirit of recent conferences, practical strategies and recommendations for small and medium-sized manufacturing enterprises are proposed. The results indicate that transformational leadership significantly enhances knowledge workers' loyalty by establishing and maintaining robust psychological contracts, thereby fostering harmonious development and innovative capabilities in enterprises. This research enriches the theoretical understanding of transformational leadership and psychological contracts and provides valuable insights for management practices in small and medium-sized manufacturing enterprises.

Keywords: Transformational Leadership; Knowledge Workers; Loyalty; Psychological Contract; Small and Medium-Sized Manufacturing Enterprises

1. INTRODUCTION
1.1 Research Background and Significance
In the context of global economic integration and rapid technological advancement, small and medium-sized manufacturing enterprises (SMEs) face unprecedented challenges and opportunities. These enterprises must not only cope with intensified market competition but also adapt to rapidly changing technologies and consumer demands. Leadership styles and management strategies within such enterprises are crucial. Transformational leadership, which emphasizes inspiring employee potential and encouraging innovation and change, is considered a key factor in driving sustainable development and enhancing competitiveness.
As the core resource of an enterprise, the innovation capability and loyalty of knowledge workers are directly related to the survival and growth of the enterprise.

Therefore, studying how transformational leadership influences the loyalty of knowledge workers through psychological contracts can deepen our understanding of leadership theories and provide theoretical support and practical guidelines for the management of SMEs.

1.2 Research Objectives and Questions

The main objective of this study is to explore the impact of transformational leadership on the loyalty of knowledge workers in SMEs and to analyze the mediating role of psychological contracts in this process. Specific research questions include:

How does transformational leadership influence the loyalty of knowledge workers?

What role does the psychological contract play between transformational leadership and the loyalty of knowledge workers?

How can effective leadership strategies and management measures enhance the loyalty of knowledge workers?

1.3 Review of Domestic and International Research

Scholars both domestically and internationally have achieved significant results in the study of transformational leadership and psychological contracts. Internationally, Bass (1985) laid the foundation for subsequent research with his theory of transformational leadership, with many scholars exploring its impact on employee attitudes and behaviors. Domestically, with rapid economic development, scholars have begun to focus on the application of transformational leadership in local enterprises, especially in the management of knowledge workers.

However, existing research mostly focuses on large enterprises or multinational corporations, with relatively less attention on SMEs. Moreover, although the mediating role of psychological contracts in leadership theories has been explored to some extent, its specific application and effects in SMEs require further study.

1.4 Research Methodology

This study employs literature review and theoretical analysis methods to systematically examine the relationships between transformational leadership, psychological contracts, and knowledge worker loyalty. By thoroughly analyzing relevant theories and research findings, a theoretical framework is constructed, and corresponding management strategies and recommendations are proposed.

2. OVERVIEW OF TRANSFORMATIONAL LEADERSHIP THEORY

2.1 Definition and Characteristics of Transformational Leadership

Transformational leadership is a leadership style that inspires employees' intrinsic motivation and values, encouraging them to transcend self-interest and pursue higher-level goals and ideals. Its core characteristics include:

Charismatic Influence: Leaders inspire employee identification and loyalty through personal charisma and role modeling.

Intellectual Stimulation: Encouraging employees to think critically, propose innovative solutions, and facilitate organizational learning and knowledge sharing.

Individualized Consideration: Attending to employees' personal needs and development, providing personalized support and guidance.

Inspirational Motivation: Motivating employees through clear organizational vision and goals, enhancing their enthusiasm and work engagement.

2.2 Theoretical Foundations of Transformational Leadership

The theoretical foundations of transformational leadership stem from the evolution of leadership theories. From early trait theories to behavioral theories, situational theories, and transformational leadership theories, each has explained leadership effectiveness and influence mechanisms to varying degrees. Transformational leadership theory combines the advantages of charismatic and transactional leadership, emphasizing leaders' ability to drive change and inspire employees' intrinsic motivation.

2.3 Mechanisms of Transformational Leadership's Impact on Employee Behavior

Transformational leadership influences employee behavior and attitudes through the following mechanisms:

Enhancing Employee Self-Efficacy: By assigning challenging tasks and providing necessary support, transformational leaders boost employees' self-efficacy and confidence.

Increasing Organizational Commitment: By

establishing shared goals and values, transformational leaders enhance employees' identification with and commitment to the organization.

Promoting Innovative Behavior: Encouraging employees to challenge the status quo and propose innovative ideas, thus fostering organizational innovation and development.

Through these mechanisms, transformational leadership not only enhances employee job satisfaction and loyalty but also promotes continuous innovation and competitive advantage within the organization. However, the effectiveness of transformational leadership is also influenced by organizational culture, employee characteristics, and environmental factors, requiring comprehensive consideration in specific contexts.

3. OVERVIEW OF PSYCHOLOGICAL CONTRACT THEORY

3.1 Definition and Types of Psychological Contracts

A psychological contract refers to an implicit agreement between employees and the organization, reflecting employees' expectations and commitments. Unlike formal labor contracts, psychological contracts involve emotional and cognitive aspects. Rousseau (1989) defines psychological contracts as a belief system regarding employee commitments and expectations from the organization, encompassing not only material rewards but also emotional support and career development opportunities.

Psychological contracts can be categorized into two main types: transactional and relational. Transactional psychological contracts focus on short-term, specific material rewards such as salary and benefits. Relational psychological contracts emphasize long-term, emotional and social rewards such as career development, job stability, and emotional support. These types of psychological contracts play different roles in various organizational contexts and employee groups.

3.2 Role of Psychological Contracts in Organizational Management

Psychological contracts play a crucial role in organizational management, primarily in the following aspects:

Enhancing Organizational Commitment and Job Satisfaction: When employees feel that the organization meets their expectations and commitments, they exhibit higher job satisfaction and organizational commitment, thus improving job performance and loyalty.

Promoting Positive Behavior and Innovation: Relational psychological contracts emphasize emotional support and career development, which helps stimulate employees' intrinsic motivation and innovative potential, fostering continuous innovation and development within the organization.

Critical in Organizational Change and Crisis Management: During organizational change, employees' trust and commitment to the organization may be challenged. By maintaining and repairing psychological contracts, organizations can effectively mitigate the negative impacts of change and enhance employees' support and adaptability to change.

3.3 Mediating Role of Psychological Contracts in the Relationship between Transformational Leadership and Employee Loyalty

Transformational leadership influences employees' psychological contracts in various ways, thereby indirectly enhancing employee loyalty. Transformational leaders enhance relational psychological contracts through individualized consideration and emotional support. This emotional support not only meets employees' emotional needs but also strengthens their identification and sense of belonging to the organization. Through intellectual stimulation and inspirational motivation, transformational leaders promote employees' career development and self-fulfillment. These career development opportunities and self-fulfillment experiences strengthen employees' transactional psychological contracts, making them feel valued and supported by the organization. By establishing shared vision and goals, transformational leaders enhance employees' organizational commitment and job satisfaction. This shared vision and goals not only increase employees' work enthusiasm but also strengthen their loyalty to the organization.

4. FACTORS INFLUENCING THE

LOYALTY OF KNOWLEDGE WORKERS

4.1 Characteristics and Importance of Knowledge Workers

Knowledge workers are employees who primarily rely on knowledge and skills to perform their jobs, typically possessing high levels of education and professional skills. Their role and importance within enterprises have become increasingly significant, especially in small and medium-sized manufacturing enterprises (SMEs), where they are the key drivers of technological innovation and competitive advantage.

Knowledge workers exhibit several notable characteristics: Firstly, they have a high demand for autonomy and innovation in their work, seeking challenges and a sense of accomplishment. Secondly, they have high expectations for career development, valuing professional growth and skill enhancement. Additionally, they have high demands for organizational culture and work environment, preferring to work in an environment that supports innovation and learning.

4.2 Definition and Measurement of Loyalty

Employee loyalty refers to the sense of identification and belonging that employees feel towards the organization, as well as their willingness to commit to the organization for the long term. Loyalty encompasses not only emotional commitment but also behavioral loyalty, such as low turnover rates, high job performance, and proactive organizational citizenship behavior.

Loyalty is typically measured through questionnaire surveys, covering dimensions such as emotional commitment, continuance commitment, and normative commitment. Emotional commitment refers to employees' emotional attachment and identification with the organization; continuance commitment refers to employees' willingness to stay due to economic and social costs; normative commitment refers to employees' willingness to stay due to moral and sense of responsibility.

4.3 Main Factors Influencing the Loyalty of Knowledge Workers

Leadership style significantly impacts the loyalty of knowledge workers. Transformational leadership, by inspiring employees' intrinsic motivation and innovation capabilities, enhances their organizational commitment and job satisfaction, thereby increasing their loyalty. Psychological contracts play a crucial role in the loyalty of knowledge workers. The fulfillment of relational and transactional psychological contracts directly affects employees' emotional and continuance commitments. When employees feel that their expectations and commitments are met by the organization, they exhibit higher loyalty. Organizational culture and work environment are also important factors influencing the loyalty of knowledge workers. A supportive and learning-oriented organizational culture and work environment not only meet the career development needs of knowledge workers but also enhance their organizational identification and sense of belonging. Career development opportunities and job challenges are also significant factors influencing the loyalty of knowledge workers. Knowledge workers have high expectations for career development, and the opportunities and challenges provided by the organization can enhance their sense of professional growth, thereby increasing their loyalty.

5. MECHANISMS OF TRANSFORMATIONAL LEADERSHIP'S IMPACT ON THE LOYALTY OF KNOWLEDGE WORKERS

5.1 Direct Relationship between Transformational Leadership and Loyalty of Knowledge Workers

Transformational leadership directly influences the loyalty of knowledge workers through its unique leadership style and behaviors. Transformational leaders typically possess high personal charisma and vision, which can inspire employees' intrinsic motivation and enthusiasm. By setting clear visions and goals, transformational leaders guide employees towards a common direction, thereby enhancing their identification and sense of belonging to the organization.

Transformational leaders also focus on individualized consideration, paying attention to employees' personal needs and career development. This individualized consideration not only meets employees' emotional needs but also enhances their job satisfaction and loyalty. Research indicates

that transformational leaders, by providing emotional support and career development opportunities, can significantly increase employees' emotional and continuance commitments, thereby enhancing their loyalty (Bass & Avolio, 1994).

Transformational leaders encourage intellectual stimulation, motivating employees to propose innovative ideas and solutions. This intellectual stimulation not only enhances employees' innovation capabilities but also increases their self-efficacy and sense of accomplishment, thereby improving their loyalty. Transformational leaders motivate employees by inspiring their enthusiasm and positivity, allowing them to experience a sense of achievement and satisfaction in their work, thereby enhancing their loyalty to the organization.

5.2 Mediating Role of Psychological Contracts in the Relationship between Transformational Leadership and Loyalty of Knowledge Workers

Psychological contracts play a significant mediating role in the relationship between transformational leadership and the loyalty of knowledge workers. Transformational leaders influence employees' psychological contracts through their leadership behaviors and management styles, thereby indirectly affecting their loyalty. Psychological contracts, as a belief system regarding employees' expectations and commitments from the organization, reflect employees' emotions and cognition.

Transformational leaders enhance employees' relational psychological contracts through individualized consideration and emotional support. This relational psychological contract not only meets employees' emotional needs but also strengthens their identification and sense of belonging to the organization. Research shows that the fulfillment of relational psychological contracts directly affects employees' emotional and continuance commitments, thereby influencing their loyalty (Rousseau, 1995).

Transformational leaders promote employees' career development and self-fulfillment through intellectual stimulation and motivational incentives. This career development opportunity and self-fulfillment experience strengthen employees'

transactional psychological contracts, making them feel valued and supported by the organization. The fulfillment of transactional psychological contracts directly affects employees' continuance and normative commitments, thereby influencing their loyalty.

5.3 Path Analysis of Transformational Leadership Enhancing Loyalty of Knowledge Workers through Psychological Contracts

Transformational leaders influence employees' psychological contracts through multiple paths, thereby enhancing their loyalty. Transformational leaders enhance employees' relational psychological contracts through individualized consideration and emotional support. This emotional support not only meets employees' emotional needs but also strengthens their identification and sense of belonging to the organization, thereby increasing their emotional and continuance commitments. Transformational leaders promote employees' career development and self-fulfillment through intellectual stimulation and motivational incentives. This career development opportunity and self-fulfillment experience strengthen employees' transactional psychological contracts, making them feel valued and supported by the organization, thereby increasing their continuance and normative commitments. Transformational leaders enhance employees' organizational commitment and job satisfaction by establishing shared visions and goals. This shared vision and goals not only increase employees' work enthusiasm but also strengthen their loyalty to the organization. Research indicates that transformational leaders, by inspiring employees' intrinsic motivation and innovation capabilities, can significantly increase their job satisfaction and loyalty (Avolio & Bass, 2004).

In summary, transformational leaders influence employees' psychological contracts through multiple paths, thereby enhancing their loyalty. The mediating role of psychological contracts in the relationship between transformational leadership and employee loyalty not only enriches the theoretical research on transformational leadership and psychological contracts but also provides valuable references for the management practices of small and medium-

sized manufacturing enterprises.

6. MANAGEMENT STRATEGIES AND RECOMMENDATIONS

6.1 Insights from Two Sessions for Enterprise Management

The National Two Sessions, as significant events in China's political life, not only set directions for national development but also provide important insights for enterprise management. The spirit of the Two Sessions emphasizes innovation-driven development, talent-strong strategy, and high-quality development, which have significant guiding significance for the management of small and medium-sized manufacturing enterprises. The spirit of the Two Sessions emphasizes innovation-driven development, providing important guidance for technological and management innovation in small and medium-sized manufacturing enterprises. Enterprises should actively promote technological and management innovation to enhance their core competitiveness and market competitiveness. The spirit of the Two Sessions emphasizes the talent-strong strategy, providing important insights for talent management in small and medium-sized manufacturing enterprises. Enterprises should focus on talent introduction and cultivation, enhance employees' career development and job satisfaction, and strengthen their loyalty and organizational commitment. Additionally, the spirit of the Two Sessions emphasizes high-quality development, providing important guidance for the sustainable development of small and medium-sized manufacturing enterprises. Enterprises should focus on improving product and service quality to promote high-quality and sustainable development.

6.2 Practical Strategies for Transformational Leadership in Small and Medium-Sized Manufacturing Enterprises

Small and medium-sized manufacturing enterprises should actively implement transformational leadership, enhancing employees' loyalty and organizational commitment through various practical strategies. Enterprises should focus on the selection and cultivation of leaders, enhancing their transformational capabilities and leadership qualities. Through training and development programs, enhance leaders' personal charisma and vision, and strengthen their individualized consideration and emotional support capabilities. Enterprises should establish effective incentive mechanisms to inspire employees' intrinsic motivation and enthusiasm. By setting clear visions and goals, stimulate employees' work positivity and innovation capabilities, and enhance their job satisfaction and loyalty. Enterprises should focus on employees' career development and self-fulfillment, providing diversified career development opportunities and training programs. Through career development planning and career guidance, enhance employees' sense of professional growth and self-fulfillment, and strengthen their transactional and relational psychological contracts.

6.3 Specific Measures to Enhance the Loyalty of Knowledge Workers

Small and medium-sized manufacturing enterprises should adopt various specific measures to enhance the loyalty of knowledge workers. Enterprises should focus on employees' emotional and career development needs, providing individualized care and emotional support. By establishing a good work environment and organizational culture, enhance employees' organizational identification and sense of belonging, and increase their emotional and continuance commitments. Enterprises should provide diversified career development opportunities and training programs, enhancing employees' sense of professional growth and self-fulfillment. Through career development planning and career guidance, strengthen employees' transactional and relational psychological contracts, and enhance their continuance and normative commitments. Enterprises should establish effective incentive mechanisms to inspire employees' intrinsic motivation and enthusiasm. By setting clear visions and goals, stimulate employees' work positivity and innovation capabilities, and enhance their job satisfaction and loyalty.

In summary, small and medium-sized manufacturing enterprises should actively implement transformational leadership, enhancing the loyalty of knowledge workers through various practical strategies and specific measures. Combining the

management strategies and recommendations from the spirit of the Two Sessions, enterprises can enhance employees' organizational commitment and job satisfaction, promoting harmonious development and innovation capabilities.

7. CONCLUSION

This study systematically examines the relationship between transformational leadership, psychological contracts, and the loyalty of knowledge workers, exploring the impact mechanism of transformational leadership on the loyalty of knowledge workers and analyzing the mediating role of psychological contracts in this process. Research indicates that transformational leadership directly influences the loyalty of knowledge workers through individualized consideration, intellectual stimulation, and motivational incentives. Meanwhile, psychological contracts play a significant mediating role in the relationship between transformational leadership and the loyalty of knowledge workers. Transformational leadership influences employees' psychological contracts, indirectly enhancing their loyalty.

This study enriches the theoretical research on transformational leadership and psychological contracts, revealing the paths and mechanisms through which transformational leadership enhances the loyalty of knowledge workers through psychological contracts. The findings provide valuable references for the management practices of small and medium-sized manufacturing enterprises. By implementing transformational leadership and effective management strategies, enterprises can enhance the loyalty and organizational commitment of knowledge workers, promoting harmonious development and innovation capabilities.

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Innovation in the Construction and Management of Vocational College Training Laboratories

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Abstract: This study aims to explore innovative approaches in the construction and management of vocational college training laboratories to enhance teaching quality and students' practical abilities. Through literature review and theoretical analysis, the paper systematically examines the current state and issues in the construction and management of training laboratories in both domestic and international vocational colleges. By integrating modern educational management theories and innovative management models, the study proposes novel pathways for the construction and management of training laboratories. The research first provides a comprehensive review of existing literature, identifying key issues in facilities, management systems, and personnel training. Based on educational management theory and innovative management models, specific strategies for laboratory construction and management are proposed, including safety culture construction, an all-staff participatory management model, and the establishment of multi-level management systems. The results indicate that constructing a scientifically sound management model can significantly improve the efficiency and safety of laboratory usage, as well as enhance students' practical and innovative abilities. Additionally, the study highlights the pivotal role of information management and intelligent technologies in the future development of laboratory construction and management. Overall, this research offers theoretical support and practical guidance for the construction and management of vocational college training laboratories, holding significant academic and practical value.

Keywords: Vocational Colleges; Training Laboratory Construction; Management Model; Innovative Management; Educational Management Theory

1. INTRODUCTION

1.1 Research Background

Vocational education is a crucial part of China's educational system, responsible for cultivating highly skilled technical talents. Training laboratories in vocational colleges are essential for transforming theoretical knowledge into practical skills. With rapid socio-economic development and industrial upgrading, there are increasing demands for students' practical and innovative abilities. However, current construction and management models of training labs have several deficiencies, necessitating innovation and improvement.

1.2 Research Purpose and Significance

This study aims to explore innovative pathways for constructing and managing training laboratories in vocational colleges to enhance teaching quality and students' practical skills. By systematically reviewing the current state and issues of training labs domestically and internationally, and integrating modern educational management theories with innovative management models, the study proposes new approaches for lab construction and management. The findings offer theoretical support and practical guidance for vocational college labs, holding significant academic and practical value.

1.3 Review of Domestic and International Research

Scholars have extensively studied the construction and management of training labs in vocational colleges. Domestic research focuses on equipment configuration, management systems, and personnel training. For example, Tian Ping (2018) highlights the

aging equipment issue, while Wei Xing (2021) emphasizes the importance of scientific management systems. Internationally, there is a focus on functional diversification and information management. U.S. vocational colleges often use information systems to manage equipment, personnel, and courses, enhancing lab efficiency and safety.

2. ANALYSIS OF CURRENT TRAINING LABORATORY CONSTRUCTION

2.1 Current State of Facilities and Equipment
Facilities and equipment form the material foundation for practical teaching. Many vocational colleges face issues with outdated equipment, unable to meet modern teaching needs. Tian Ping (2018) notes that some equipment has been used for over a decade, affecting teaching effectiveness. Additionally, there is often an insufficient variety and quantity of equipment, limiting the ability to meet diverse course requirements.

2.2 Current State of Management Systems
Effective management systems are crucial for efficient operation. Many vocational colleges have incomplete and unsystematic management systems. Wei Xing (2021) points out the lack of clear processes and responsibility divisions, leading to chaotic management and affecting teaching quality.

2.3 Current State of Personnel Training
The quality of personnel directly impacts practical teaching effectiveness. Current personnel training in vocational colleges is inadequate. Zheng Liang (2014) highlights that many management and technical staff lack professional training, affecting their ability to manage and maintain labs. There is also a lack of systematic training plans and evaluation mechanisms, hindering professional growth.

3. THEORETICAL FOUNDATIONS FOR INNOVATIVE CONSTRUCTION AND MANAGEMENT

3.1 Educational Management Theory
Educational management theory emphasizes the rational allocation and efficient use of educational resources, highlighting scientific and standardized management. It advocates student-centered approaches and coordination with overall school management systems.

3.2 Innovative Management Model Theory

This theory stresses flexibility and adaptability, encouraging the introduction of modern management tools and technologies to enhance management levels and efficiency. It calls for diversified and personalized management models tailored to specific needs.

3.3 Informatization and Intelligent Management Theory
Focusing on the application of information and intelligent technologies in management, this theory suggests using IoT for real-time monitoring and big data for analysis, improving management efficiency and teaching effectiveness.

4. INNOVATIVE CONSTRUCTION MODELS FOR TRAINING LABORATORIES

4.1 Safety Culture Construction
Safety culture is crucial, as labs involve many mechanical and experimental materials with inherent risks. Measures include strict safety management systems, regular training and drills, and rigorous equipment safety checks.

4.2 Modernization and Intelligentization of Facilities
Introducing modern and intelligent equipment like CNC machines, industrial robots, and VR can enhance teaching effectiveness. IoT and big data can improve management and evaluation processes.

4.3 Multifunctional Design
Designing labs to meet diverse needs ensures they support various experiments and encourage innovation, thus enhancing efficiency and teaching outcomes.

5. INNOVATIVE MANAGEMENT MODELS FOR TRAINING LABORATORIES

5.1 All-Staff Participatory Management Model
An all-staff participatory management model is a significant innovation in training laboratory management. Vocational colleges should encourage the active participation of teachers, students, and management personnel to create a collaborative management environment. Measures include establishing a management committee involving all stakeholders, formulating clear management policies delineating roles and responsibilities, and conducting regular management training

to enhance everyone's capabilities.

5.2 Establishing a Multi-Level Management System

Creating a multi-level management system is another crucial innovation. Vocational colleges should develop a hierarchical management structure with clear duties and authority at each level. Steps include formulating hierarchical policies, defining operational procedures, and establishing evaluation systems to regularly assess the effectiveness of each management tier.

5.3 Constructing an Information Management System

Implementing an information management system is essential for innovating training lab management. By integrating information technology, vocational colleges can enhance management efficiency and effectiveness. This includes using IoT for real-time monitoring of equipment, employing big data for teaching analysis and evaluation, and implementing systems to comprehensively manage equipment, personnel, and courses.

6. SPECIFIC STRATEGIES FOR INNOVATIVE LABORATORY MANAGEMENT

6.1 Personnel Training and Evaluation Mechanism

Personnel training and evaluation are critical for effective lab management. Vocational colleges should focus on systematic training and regular assessments to improve the professional skills and management capabilities of lab personnel. Strategies include developing training plans, conducting regular professional development sessions, establishing evaluation mechanisms, and implementing reward-punishment systems to motivate continuous improvement.

6.2 Institutional Development and Standardized Management

Developing robust institutional frameworks and standardized management procedures is vital. Measures include formulating comprehensive management policies, establishing clear operational standards, and implementing supervision mechanisms to ensure adherence to established protocols.

6.3 Continuous Improvement and Feedback Mechanism

Continuous improvement and feedback are key components of effective lab management. Vocational colleges should establish evaluation mechanisms to regularly assess management practices, identify issues, and implement corrective measures. Collecting and acting on feedback from all stakeholders ensures ongoing improvement and enhances overall management effectiveness.

7. CONCLUSION

This study systematically reviewed the current state and challenges of training laboratory construction and management in vocational colleges. By integrating modern educational management theories and innovative management models, the research proposed novel pathways for enhancing lab efficiency and safety, as well as students' practical and innovative abilities. Key measures include fostering a safety culture, modernizing and intelligentizing equipment, designing multifunctional labs, promoting all-staff participation, establishing multi-level management systems, and utilizing information technology for comprehensive management. Additionally, focusing on personnel training, institutional development, and continuous improvement are essential for sustainable management.

Future research should explore the practical implementation and evaluation of these innovative management strategies through empirical studies and case analyses. Further investigation into the application of information and intelligent technologies in lab management could provide deeper insights into their impact on efficiency and effectiveness. Continuous exploration and practice are necessary to support the development of vocational education and enhance the construction and management of training laboratories.

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The Critical Role of Cultural Arts in Ideological and Political Education for University Students

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Abstract: This study aims to explore the significant role of cultural arts in ideological and political education for university students, revealing how various forms and channels of cultural arts can influence students' political and moral qualities and values. Employing a literature analysis method, the study systematically reviews and analyzes relevant domestic and international literature, combining theories of ideological and political education with cultural arts. The research defines the basic concepts of cultural arts and ideological education, then examines specific forms of cultural arts in education, including music, drama, and painting. Comprehensive literature analysis shows that cultural arts possess unique advantages in enhancing students' moral qualities, social responsibility, and cultural identity. Additionally, cultural arts promote the acceptance and practice of core socialist values through emotional resonance and aesthetic experiences. Conclusions indicate that cultural arts should be fully utilized and emphasized as an essential educational resource to innovate and develop ideological and political education. Future research could further explore the application strategies and effectiveness of different forms of cultural arts in ideological education to provide more scientific and systematic theoretical support for higher education.

Keywords: Cultural Arts; University Students; Ideological and Political Education; Values; Educational Innovation

1. Introduction

1.1 Research Background and Significance

In today's rapidly globalizing society, cultural diversity is increasingly evident, and university students, as future pillars of society, play a crucial role in national development and social stability. Enhancing the ideological and political quality of students has become a pressing issue for educators, especially under the influence of new media and diverse cultures. Cultural arts, as a vital component of human civilization, possess unique value-guiding and educational functions. Through cultural arts, students can cultivate aesthetic abilities and subtly develop correct values and morals. This research aims to explore the significant role of cultural arts in the ideological and political education of university students, providing theoretical and practical references for higher education.

1.2 Review of Domestic and International Research

Internationally, the importance of cultural arts education has long been recognized. Universities in Western countries integrate arts education into their curricula, using music, drama, and painting to foster students' comprehensive qualities and moral cultivation. For example, many American universities have dedicated arts and culture centers that encourage student participation in various artistic activities to enhance social responsibility and cultural identity. Domestically, the role of cultural arts in ideological education has gained attention in recent years. Scholars have explored the theoretical foundations and practical applications of arts education, showing that cultural arts can effectively improve students' ideological and political quality and enhance their comprehensive abilities (Liu Chang, 2007; He Jian, 2001). However, existing research often remains theoretical, lacking systematic analysis of implementation mechanisms and educational methods.

1.3 Research Objectives and Methods

This study aims to explore the specific manifestations and actual effects of cultural arts in the ideological and political education

of university students through literature analysis. The research includes the theoretical foundations of cultural arts and ideological education, the penetration mechanisms of cultural arts in education, and application strategies for enhancing students' ideological and political quality. By systematically reviewing and analyzing relevant literature and combining educational theories, the study proposes a practical theoretical framework and educational recommendations.

2. THEORETICAL FOUNDATIONS OF CULTURAL ARTS AND IDEOLOGICAL EDUCATION

2.1 Definition and Characteristics of Cultural Arts

Cultural arts, a vital part of human society, encompass traditional art forms like painting, music, drama, and dance, as well as literature, film, and architecture. Their characteristics include aesthetics, producing emotional resonance through sensory experiences; sociality, reflecting the values and morals of specific times and societies; and educational potential, subtly influencing thoughts and behaviors.

2.2 Basic Concepts of Ideological and Political Education

Ideological and political education, guided by Marxism, aims to help students develop correct worldviews, values, and morals through systematic educational activities. It includes Marxist theory education, socialist core values education, patriotism education, legal awareness education, and moral education. This education is characterized by its theoretical, systematic, and practical nature, achieved through classroom teaching, social practice, and campus culture.

2.3 Relevance of Cultural Arts and Ideological Education

Cultural arts and ideological education share common goals and content, both aiming to cultivate moral qualities, aesthetic appreciation, and social responsibility. Cultural arts use aesthetic experiences and emotional resonance to instill correct values, while ideological education provides theoretical and practical guidance for developing scientific worldviews and values. Integrating cultural arts into ideological education enriches content and enhances the vividness and effectiveness of education.

3. MECHANISMS OF CULTURAL ARTS PENETRATION IN IDEOLOGICAL EDUCATION

3.1 Educational Function of Music Art

Music, a universal language, directly affects emotions and has a unique educational function. It can cultivate aesthetic abilities and emotional qualities in students. For example, revolutionary songs, specific to historical periods, enhance patriotism and social responsibility through their emotional impact (Yang Chunrong, Xiao Shuyue, 2008). Music education also helps students relieve stress, regulate emotions, and improve mental health.

3.2 Educational Function of Drama Art

Drama art conveys thoughts and values through vivid performances and narratives. As a comprehensive art form, it integrates performance, visual arts, music, and dance, offering rich educational content. Participation in drama activities enhances performance abilities and artistic literacy, allowing students to experience diverse worldviews and values. Campus drama festivals, for instance, use thematic, content-rich performances to provide ideological education (Wang Haijing, Huang Shanshan, 2021).

3.3 Educational Function of Painting Art

Painting, a visual art, stimulates emotions and thoughts through imagery and color. In ideological education, it concretizes abstract thoughts and values, enhancing impact and influence. Artistic creation fosters aesthetic abilities and creativity, allowing students to express personal emotions and thoughts through art. Activities like painting competitions and exhibitions encourage students to depict core socialist values, creating a positive campus culture (Wang Jing, 2023).

4. SPECIFIC MANIFESTATIONS OF CULTURAL ARTS IN IDEOLOGICAL EDUCATION

4.1 Integration of Cultural Arts Activities and Ideological Education

Cultural arts activities play a vital role in ideological education. Organizing concerts, drama performances, and art exhibitions

effectively incorporates educational content, enriching campus life and providing platforms for self-expression and thought exchange. For example, revolutionary song competitions enhance patriotism and responsibility (Yang Chunrong, Xiao Shuyue, 2008). Drama and arts festivals also offer opportunities for talent display and ideological education, improving moral qualities.

4.2 Cultural Arts in Classroom Teaching

Integrating cultural arts into classroom teaching enhances the vividness and effectiveness of ideological education. In theory classes, teachers can use music, film clips, or art displays to enrich content and engage students. For instance, playing "The Yellow River Cantata" or "My Motherland" deepens understanding of patriotism, while showing paintings like "The Founding Ceremony" or "The Long March" reinforces core socialist values.

4.3 Cultural Arts in Campus Culture Construction

Campus culture construction, an essential part of ideological education, enhances students' political and moral qualities through a rich cultural arts atmosphere. Establishing art corridors, organizing exhibitions, and hosting lectures enrich campus life and improve cultural literacy. Art corridors displaying student works foster aesthetic appreciation, while lectures by renowned artists and scholars broaden horizons and enhance cultural and moral qualities.

5. THE ROLE OF CULTURAL ARTS IN ENHANCING STUDENTS' IDEOLOGICAL AND POLITICAL QUALITY

5.1 Enhancing Moral Qualities

Cultural arts significantly enhance students' moral qualities. Through participation and appreciation of cultural arts, students internalize correct values and morals. For instance, viewing classic revolutionary films like "The Founding of a Republic" or "The Long March" instills patriotism and social responsibility. Engaging in drama and concerts allows students to experience diverse worldviews, deepening their understanding of society and life, thus improving their moral qualities.

5.2 Increasing Social Responsibility

Cultural arts enhance social responsibility through emotional resonance and aesthetic experience. Participation in cultural art activities exposes students to societal diversity and complexity, thereby increasing their social awareness. Engaging in public service arts activities, such as charity performances, fosters a sense of helping others and enhances social responsibility. Additionally, artworks reflecting societal realities, such as documentaries and social dramas, deepen students' understanding of societal issues, fostering a sense of social responsibility and mission.

5.3 Cultivating Cultural Identity

Cultural arts play a crucial role in cultivating students' cultural identity. By engaging in cultural arts, students appreciate the richness of Chinese culture, boosting cultural confidence and identity. Exposure to traditional Chinese arts like music, opera, and painting enhances appreciation for Chinese culture. Participation in traditional cultural activities like calligraphy contests and paper-cutting exhibitions allows students to experience the essence of Chinese culture, strengthening cultural identity and pride.

6. CULTURAL ARTS AND SOCIALIST CORE VALUES EDUCATION

6.1 Promoting Core Values Recognition

Cultural arts uniquely promote recognition of socialist core values. Through engagement in cultural arts, students internalize these values. For example, viewing art pieces like "The Founding Ceremony" or "The Long March" helps students grasp the essence of socialist core values, enhancing their recognition. Participation in core values-themed activities, such as revolutionary song contests and patriotic film screenings, helps students experience and adopt these values.

6.2 Enhancing Value Practice through Aesthetic Experience

Cultural arts enhance students' practical application of socialist core values through aesthetic experiences. Engaging in cultural arts allows students to appreciate the beauty of these values, promoting their practice. For instance, listening to music pieces like "The Yellow River Cantata" or "My Motherland" fosters a deeper appreciation for socialist core values, encouraging their practice.

Participation in value-themed theatrical performances and art creations helps students experience the values' essence, enhancing both recognition and practical application.

7. STRATEGIES FOR APPLYING CULTURAL ARTS IN IDEOLOGICAL EDUCATION

7.1 Innovating Cultural Arts Education Methods

Innovative methods in cultural arts education can enhance the vividness and effectiveness of ideological education. Incorporating modern educational technologies like multimedia and virtual reality enriches content and increases student engagement. For instance, multimedia can be used to play relevant music, film clips, or display art, enriching teaching content and stimulating interest. Virtual reality allows students to immerse themselves in cultural arts, deepening their understanding and acceptance of educational content.

7.2 Establishing Diverse Cultural Arts Education Platforms

Creating diverse platforms for cultural arts education provides more learning and practice opportunities for students. On campus, art corridors and exhibitions can display student works, fostering aesthetic appreciation and moral upliftment. Organizing cultural arts lectures and inviting renowned artists and scholars expand students' horizons and enhance their cultural literacy and ideological quality.

7.3 Enhancing Teachers' Artistic Literacy

Improving teachers' artistic literacy is crucial for high-quality cultural arts education. Organizing artistic training and exchange activities for teachers enhances their artistic skills and teaching abilities, allowing better integration of cultural arts into ideological education. Training programs in painting, music, and drama, and exchange activities with other institutions, help teachers improve their education level and teaching effectiveness.

8. CONCLUSION

This study systematically reviews and analyzes relevant literature, exploring the significant role of cultural arts in students' ideological and political education. It finds that cultural arts uniquely enhance moral qualities, social responsibility, and cultural identity. Additionally, cultural arts promote the recognition and practice of socialist core values through emotional resonance and aesthetic experiences.

Future research should further explore specific strategies and effectiveness of different cultural art forms in ideological education, providing more scientific and systematic theoretical support for higher education. Empirical studies could investigate the concrete effects and influencing factors of cultural arts in enhancing ideological quality, offering more detailed guidance for practical application.

Educational practice should fully utilize cultural arts as an essential resource, enhancing the vividness and effectiveness of ideological education through innovative methods, diverse platforms, and improved teacher literacy. Organizing various cultural arts activities enriches campus life, improves aesthetic abilities and cultural literacy, and strengthens moral qualities and social responsibility among students.

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Analysis of Narrative Structure in Classic Crime Films: Focusing on Seven (1995)

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Abstract: This paper examines the narrative structure of classic crime films, with a particular focus on David Fincher's Seven (1995). Through a detailed analysis of the film's plot development, character dynamics, and thematic elements, the study explores how Seven deviates from and subverts traditional crime genre conventions. the film's innovative narrative techniques, including its integration of linear and nonlinear storytelling, are analyzed to illustrate how they contribute to the film's suspenseful atmosphere and its impact on the audience.

Keywords: Crime Film, Narrative Structure, Seven, David Fincher

1. INTRODUCTION

The crime film genre has long been a staple of cinematic storytelling, captivating audiences with its exploration of moral ambiguity, justice, and the human psyche. Among the many contributions to this genre, David Fincher's *Seven* (1995) stands out as a groundbreaking work that redefined the narrative structure of crime films. This paper aims to analyze the narrative techniques employed in Seven and how they contribute to the film's suspenseful and impactful storytelling. By examining the film's plot, character development, and thematic elements, this study will demonstrate how Seven subverts traditional crime genre conventions while maintaining its core elements, thereby solidifying its status as a classic in the genre.

The film *Seven* (1995), directed by David Fincher, is widely regarded as the work that established him as a world-class director. Released in 1995, the film belongs to the dark thriller and suspense subgenre of crime cinema. Its narrative structure deviates from the traditional detective genre, instead unfolding through the thematic lens of the "Seven Deadly Sins" as outlined in the Bible. the story is presented from the perspectives of detectives William Somerset (played by Morgan Freeman) and David Mills (played by Brad Pitt), who investigate a series of gruesome murders imbued with religious symbolism. *Seven* achieved both critical and commercial success, grossing $327 million worldwide and winning the Best Movie award at the 1996 MTV Movie Awards. This paper will analyze the film's genre structure, with a focus on its narrative techniques.

2. THEORETICAL FRAMEWORK: NARRATIVE STRUCTURES IN CRIME FILMS

Crime films have historically adhered to specific narrative structures that guide the audience through the investigation and resolution of a crime. These structures often follow a linear progression, where the narrative unfolds in chronological order, allowing the audience to experience the investigation alongside the protagonist. Traditional crime films typically employ a dual-plot structure, where the detective's investigation is juxtaposed with the criminal's actions, providing the audience with a comprehensive understanding of the crime and its resolution.

However, Seven disrupts this conventional structure by integrating elements of nonlinear storytelling and a thematic focus on the "Seven Deadly Sins" as outlined in the Bible. This innovative approach not only enhances the suspense and unpredictability of the narrative but also deepens the film's exploration of moral and philosophical themes. the following sections will analyze how Seven employs both linear and nonlinear narrative techniques to create a unique and compelling crime story.

3. LINEAR AND NONLINEAR NARRATIVE TECHNIQUES IN SEVEN

Seven begins with a seemingly straightforward linear narrative, following detectives William Somerset (Morgan Freeman) and David Mills (Brad Pitt) as they investigate a series of gruesome murders. Each murder is discovered in chronological order, corresponding to one of the Seven Deadly Sins. However, the film's narrative is far from simple. Fincher deliberately disrupts the linearity by incorporating flashbacks, shifting timelines, and withholding crucial information until later in the film.

A simple impulsive murder case soon reflects Somerset's deep-seated disillusionment with the world, yet his inherent kindness is revealed when he expresses concern for the psychological well-being of a child who may have witnessed the murder. Mills, on the other hand, is more focused on solving the case and bringing criminals to justice, foreshadowing the differing approaches the two will take in the investigation.

On Monday, the first of the serial murders is discovered: an obese man forced to eat until he dies. Somerset immediately recognizes the calculated and torturous nature of the crime and, citing his impending retirement, refuses to take on the case. Mills, undeterred, takes charge of the investigation.

On Tuesday, the second murder is discovered: a lawyer is brutally killed, with a pound of flesh cut from his body and the word "Greed" scrawled in blood at the scene. Mills is baffled by the killer's deliberate clues, but Somerset, drawing on the evidence from the first crime, uncovers the word "Gluttony" hidden at the initial crime scene. Somerset quickly deduces that the murders are being committed according to the Seven Deadly Sins and predicts that five more murders are yet to come. He refuses to handle the complex and religiously motivated case himself, arguing that Mills is ill-equipped to do so, but Mills persists, determined to solve it. Though Somerset remains reluctant to take on the case, he cannot abandon Mills to struggle alone and begins analyzing the case by researching in the library, providing Mills with valuable leads.

On Wednesday, no new murder occurs, but Somerset's gesture of kindness begins to warm the relationship between the two detectives. Mills' girlfriend, Tracy, invites Somerset to their home, where they share their first smiles of the film. After dinner, the detectives analyze the clues further and discover a message spelled out in fingerprints at the second crime scene: "Help me. "

On Thursday, the police, guided by the detectives' leads, locate the third victim, who is barely alive but clearly near death. the word "Sloth" is written on the wall. the discovery that this victim had been tortured for a year suggests that the killer began his crimes long before Somerset and Mills started investigating, meticulously planning the timing of each discovery. This level of premeditation indicates that the killer is highly familiar with Somerset's abilities, having timed the murders to coincide with the final week of his career. However, at this point, the trail runs cold.

On Friday, Tracy meets Somerset again, confiding her doubts and fears about her future. Later, an offhand comment from Mills sparks an idea in Somerset, who uses FBI surveillance data to locate the killer's apartment. Although the killer is caught off guard by their discovery, he is prepared for all eventualities. After a dangerous chase in which Mills is injured, the killer decides to spare him. Ignoring Somerset's advice, Mills forcibly enters the killer's home, where they find clues pointing to the next murder.

On Saturday, following these leads, the detectives trace the killer to a custom leather shop, but learn only that he had visited two days earlier. Just as they believe their investigation has stalled, a prostitute is murdered using a device purchased from the shop, with the word "Lust" written on her door.

On Sunday, the killer himself contacts the police, revealing the fifth victim, an actress disfigured beyond recognition. Given the choice between calling for help or committing suicide, she chooses the latter, and "Pride" is written on her wall. Somerset, now convinced that the killer has more plans, postpones his retirement to help Mills solve the case. However, the killer turns himself in at the police station, leaving both detectives uneasy, aware that the meticulous killer would not leave the final two sins unaccounted for. the killer leads them to a remote location, where the darkest conclusion of the film unfolds.

4. FROM THIS PLOT DEVELOPMENT, WE CAN DRAW THE FOLLOWING CONCLUSIONS:

4.1 The film employs a combination of linear and nonlinear narrative techniques to advance the plot.

Unlike a purely linear narrative structure, the progression of the story in *Seven* is not entirely straightforward. While the investigation follows a chronological order, the timeline of the murders does not align perfectly with this sequence. For instance, the "Sloth" murder began a year prior to its discovery, and the critical clue for the "Gluttony" case is only found after the "Greed" murder. This intertwining of linear and nonlinear elements is crucial in building the film's suspense, as the killer's actions are meticulously timed to match Somerset's retirement week, a plan potentially disrupted by Mills' involvement, leading to an unexpected and more tragic outcome.

4.2 The film adheres to the narrative structure typical of detective films.

However, *Seven* diverges from the standard dual-plot structure seen in traditional detective narratives, which typically alternate between the detective's investigation and the crime as it unfolds. Instead, the film's plot strictly follows the detectives' progress in solving the case, maintaining the audience's perspective alongside the protagonists. This alignment of viewer and character perspectives heightens the emotional impact of the narrative, as the audience experiences the same shock, frustration, and anger as the detectives, ultimately culminating in a shared complicity in the film's devastating conclusion.

4.3 The film maintains a strong undercurrent of suspense throughout, ultimately revealing its deep roots in the crime genre.

Unlike narratives that employ a reverse chronological structure, *Seven* adheres to the sequence of events as the crimes unfold, with minimal use of flashbacks. the suspense is sustained until the final revelation, which plunges both the protagonists and the audience into profound darkness. This grim ending defies the conventional moral resolution typical of detective films, where justice prevails over evil. Instead, *Seven* transcends the suspense genre, solidifying its place as a harrowing exploration of crime and its consequences.

5. CONCLUSION

David Fincher's Seven is a masterclass in narrative structure, subverting and redefining the conventions of the crime genre. Through its innovative use of linear and nonlinear storytelling, the film creates a complex and suspenseful narrative that keeps the audience engaged and unsettled. By challenging traditional notions of justice and morality, Seven transcends the boundaries of the genre, offering a dark and thought-provoking exploration of the human condition.

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The Dynamic Study of Zibo City Color under the Concept of Digitalization

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Abstract: The Opinions of the People's Government of Zibo on Building a Global Park City have made it clear that by 2035, the "era of global Park City" will be opened. How to make the city of Zibo based on the historical context full of new vitality? Facing the requirements of the Times, we urgently need to empower new Zibo with a color system in line with the characteristics of the city through the means of combining art and technology. Digital color based on computer color model and form of optical color system, color pattern is rich, has formed a complete color science system. the research on urban color is mostly discussed from the perspective of urban planning in the field of engineering, but it lacks the perspective of art design theory and discusses the dynamic form and content of urban color combined with the research results of digital color.

keyword: Digital color, urban color planning, public space and art

1. INTRODUCTION

In the process of urbanization in China, the old city loses its characteristics, the new city lacks its characteristics, and the city image appears the characteristic crisis of "one side of a thousand cities". Color, as a key factor in determining the image of a city, has attracted much attention. As early as 3000 years ago, Qi opened the cultural gene of "change, innovation, openness, pragmatism and tolerance" of Qi culture. For thousands of years, it has shaped the spiritual core of Zibo, which is upward, new and outward. In history, "all the merchants in the world return together like running water". Since modern times, many "national firsts" have constituted a brilliant industrial history of Zibo. In the 14th Five-Year Plan of Shandong Province, Zibo, as the sub-central city of the "provincial capital city circle", is the regional central city of Shandong Province. It has been entrusted with the mission of exploring the transformation of resource-based cities into "strong cities with advanced manufacturing industries". The Opinions of Zibo Municipal People's Government on the Construction of a Global Park City has made it clear that by 2035, It will open the "global park city era". Since 2021, Zibo has concentrated on building a "five-good" city of "learning, good-looking, delicious, fun and good entrepreneurship". After the spring breeze blew the "fire" Zibo barbecue in 2023, Zibo was promoted to the "top stream" net red city, with barbecue as the trigger point. In order to publicize the brand of Wenlu and the characteristics of the city, we should strive to present the cultural connotation of the city and create a profound city business card. How to make Zibo, as an "old industrial city with a relatively heavy industrial structure", glow with new vitality based on the historical context?It is urgent to empower the new Zibo with a color system that conforms to the city's characteristics at the color level by means of the combination of art and technology.

Digital color is an optical color system based on computer color model, which has formed a complete set of color science system. Throughout the literature retrieval, the research on urban color is mostly discussed from the perspective of urban planning in the field of engineering. However, it lacks the perspective of art design theory. This opens up a new way of thinking and innovative practical means for this paper to combine the research results of digital color with the ways and means of urban color.

2. THE NECESSITY OF DIGITAL INTERVENTION IN URBAN COLOR

Internationally, in the early 1960s, western countries began to apply urban color design. With the continuous development of the modernization process, it has gained a lot of

successful experience. It also makes the urban appearance change with each passing day in color, but the research on digital color has not yet formed a perfect theoretical system; The research and cognition of chromatics in China has a history of more than 30 years. At present, many cities have worked out urban color planning, and there are many cities. The issue of urban color has also been discussed in the sharing content of master planning and urban design. On the basis of learning from the mature experience of foreign countries, most of the urban color planning is exploring Chinese-style solutions. China's urban color planning is still in the exploratory stage, and the urban color planning scheme suitable for China's national conditions is constructed. Strengthening the implementation of urban color planning is still the two outstanding problems of urban color planning in China at this stage.

It studies the dynamic color of a city so that it can be inherited and developed. It has positive cultural significance for protecting regional culture and developing urban spirit; The quality of urban color affects the environmental features of the city, and digitization is introduced into the study of urban color. It can present a more accurate visual effect, which has a very important environmental significance for the dynamic study of Zibo city color; Through the continuous development of information, the trend of new digital media such as computers is obvious. This topic through the digital color and the city color union research, It has important reference significance for Zibo to establish a forward-looking architectural color planning.

3. FEASIBILITY OF DIGITALIZATION IN THE STUDY OF URBAN COLOR DYNAMICS

3.1 Digital analysis of Zibo city color. Combined with the relative advantages of digital color, It aims at Zibo's natural environment color, artificial environment color, humanistic and historical color, urban characteristic color, color vision and so on. Expand the positioning analysis.

3.2 Research on the dynamic relationship between digital color and urban color. Through the influence of urban color on human life and the urgent demand of human society for digital color, the digital color of Zibo city is created. The relationship between digital color and urban color is discussed in terms of significance and theoretical basis; Through the evolution of human civilization, the evolution of historical process, the formation of natural characteristics and the dynamic change of urban color under the development of science and technologyDiscusses the dynamic development of urban color.

3.3 The principles and methods of Zibo urban color dynamic design. This paper discusses the macro and micro principles of Zibo digital color dynamic design and the method of digital color dynamic research. The total spectrum of Zibo city color is deduced, and the main melody of city color is composed. It provides a reference for Zibo urban color planning scheme.

3.4 The application practice of digital color dynamic design in Zibo. The representative cases of urban color at home and abroad are selected for analysis, and the general techniques of color design in existing typical cities are extracted. The color of Zibo digitization is controlled in different areas and extracted dynamically, and the feasible practical method of dynamic development is put forward. It provides theoretical and design reference for Zibo color planning in the future.

4. THE APPLICATION METHOD OF URBAN COLOR DIGITIZATIOn

The dynamic development of urban color is selected as the starting point of the study; Through in-depth analysis of Zibo's natural and cultural characteristics and existing mature cases, we can seek breakthroughs; In view of Zibo's unique regional civilization, create a shining point; Combining with the current rural aesthetic education activities being carried out in Zibo City, it breaks through the original means of artistic beautification. With the help of science and technology and rigorous digital color system, it highlights innovative points.

4.1 Through the means of digital color, supplemented by the innovative combination of building materials, according to the design principle of "people-oriented". The ways and means of implementing the design goal of

"pleasing to the eye" are discussed. The Study of the interaction between human and environment starts with the analysis of the relevant theories of digital color, combined with the dynamic study of urban color. Analyze the relationship between the two to establish the basic research, and then combine the basic research results with the design and principles and methods. Show the macro principle, micro principle and design method of Zibo digital color dynamic design; Finally, the application practice of Zibo city color under the digital concept is obtained: partition control, dynamic extraction, design practice (especially for Zibo city colorAesthetic presentation of Zibo's characteristic countryside).

4.2 Digital color combines urban color, especially architectural features, to form an architectural color system with distinct regional characteristics. Optimize and integrate the color image of Zibo city. To explore the dynamic development of urban color under the influence of human civilization, historical process, natural characteristics and science and technology; Form the dynamic induction of Zibo city color spectrum, and complete the integration of Zibo city color theme concept spectrum; Taking the dynamic development of humanity, history, nature and science as the starting point, this paper puts forward the concrete design practice of Zibo urban color.

(3) the design principle of urban color should take "people-oriented" as the rational goal and "pleasing to the eye" as the perceptual goal. It advocates the working method of combining rationality with sensibility. It summarizes the natural environment, artificial environment, human history, urban characteristics and color vision that affect urban color. It emphasizes the regional characteristics and leading role of the "key words" of the main theme of urban color. Taking regional practice as an example, a set of systematic ideas and models are summarized.

4.3 Break through the limitations of the rigid and irrational urban color design model in the past. Establish a dynamic research framework of digital color with Zibo context as the theme, and explore the future development trend of digital color; In view of the time background and the development tendency of the city color

of each district in Zibo, The relevant design methods are discussed from the four dimensions of humanities, history, nature and science, so as to guide the specific practice. It provides an effective reference for the development of Zibo city color.

5. SUBSEQUENT APPLICATION

5.1 The new situation of artistic color in the "technology ×" environment. After mankind entered the 3G era, the financial media was formed. the epidemic in recent years has also brought opportunities for digital art to ride the wave; 2019 enters the first year of 5G, as the concept of art 5G, our art knowledge system needs to be updated; At the two sessions held this year, members suggested giving play to the role of digitalization in the field of culture and art, accelerating the transformation of achievements, promoting the deep integration of "art+technology", and the effective integration of digital technology and traditional methods is an effective way to achieve green, low-carbon and high-quality development.

5.2 Digital development trend and advantages of artistic color. Traditional art color originates from the artist's multiple interactions with the environment and context, while digital color is the perfect combination of art and advanced technology. the essence of this creation is an artificial intelligence system based on massive original digital art center and memory neural network. Connecting advanced manufacturing centers of all sizes; With the "style transfer" algorithm technology in deep learning in artificial intelligence field as the core technology, the art color analysis and system construction are carried out.

By discussing the macro principle, micro principle and dynamic research method of color digital design of Zibo city, the paper deduces the total color spectrum of Zibo city and writes the main melody of city color. Through the influence of city color on human life and the urgent demand of human society for digital color, a dynamic relationship model is established between the two. According to the overall plan of Zibo city, the relationship between digital color and city color is discussed. the paper discusses the dynamic development of city color through the evolution of human civilization, the evolution

of historical process, the formation of natural characteristics and the dynamic change of city color under the development of science and technology.

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A Study on The Current Situation of Classroom Silence Tendency in Chinese Higher Vocational Colleges

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Abstract: This paper investigates and analyzes the situation of classroom silence tendency of vocational college students. Through the investigation of 268 vocational college students in Guangxi Province, China, it is concluded that although there is a general tendency of classroom silence tendency of vocational college students, the tendency of classroom silence tendency of rural students is higher than that of urban students, and the tendency of classroom silence tendency of introverted students is higher than that of extroverted students. Some suggestions should be put forward to strengthen the psychological support for students in rural areas, strengthen the screening of students' mental health, do a good job in teaching reform and students' ideological guidance, so as to eliminate the silent tendency of vocational college students in class and improve the quality of classroom teaching.
Keywords: Vocational college students, classroom silence tendency, investigation and analysis

1. INTRODUCTION

Classroom silence is a common phenomenon in university classrooms [1]. It refers to the silent non-verbal communication activities that teachers and students present in the classroom teaching environment without fixed semantics, which are specifically manifested as low class participation, avoidance of answering questions and resistance to questions [2]. Related research shows that more than half of college students have been silent in class, quiet, introverted is the state of college students in class often show. Negative classroom silence is not conducive to students' mastery and absorption of knowledge, and harm their own growth. Classroom silence is a common phenomenon in university classrooms. It refers to the silent non-verbal communication activities that teachers and students present in the classroom teaching environment without fixed semantics, which are specifically manifested as low-class participation, avoidance of answering questions and resistance to questions. Related research shows that more than half of college students have been silent in class, quiet, introverted is the state of college students in class often show. Negative classroom silence is not conducive to students' mastery and absorption of knowledge, and harm their own growth.

2. RESEARCH OBJECT AND METHOD.

2.1 Research object

In this study, a total of 268 students from three vocational schools in Guangxi Province, China were selected by random sampling method for questionnaire measurement, including 120 boys and 148 girls. Freshmen 107, sophomores 127, juniors 38; 192 people lived in rural areas, 45 in towns and cities, and 31 in cities. 93 were introverted, 120 were moderate and 55 were extroverted.

2.2 Research Tools

In this study, the Silence Status Scale for College Students in Classroom compiled by Huang Weijun (2020) was adopted. the scale has 14 questions, including three dimensions: self-protective silence, prosocial silence and conformity silence. the scale adopted a 5-level scoring system. the higher the score, the more serious the silence in class. the Krumbach coefficient of the reported total scale was 0.953, and the fitting of confirmatory factor analysis was IFI =0.952, CFI=0.952,

RMSEA=0.071, indicating that the scale had good reliability and validity.

3. RESULT REPORT AND ANALYSIS
3.1 Analysis of classroom silence of higher vocational college students
The data analysis results showed that the total silence score of higher vocational students in class was 2.37, and the average score of self-protective silence, prosocial silence and conformity silence were 2.30, 2.37 and 2.54 respectively (see Table 1). In addition, 87.70% of the subjects whose total silence score was below 3 points accounted for the total silence score. It indicates that classroom silence is a common phenomenon among higher vocational students, but to a lesser extent.

Table 1. Analysis of classroom silence of higher vocational college students

dimension	self-protective silence	prosocial silence	conformity silence	total silence
M±SD	2.30±0.78	2.37±0.82	2.54±0.82	2.37±0.74

4. ADVICE
4.1 Strengthen psychological support for students in rural areas
In universities, because people come from all over the country, their family background and living environment experience are greatly different, and most universities are located in relatively developed cities, which may cause great discomfort for students living in towns and rural areas since childhood. In addition, many rural students need to leave their hometown and relatives to continue their studies in universities. Leave your former life environment. These are easy to cause rural students' inferiority, anxiety and other emotions, and in the classroom to show "timid" or "follow the crowd" behavior habits, and eventually lead to silence in the classroom. Therefore, college education must pay attention to psychological support for students from rural areas and backward and remote areas. First of all, counselors can regularly organize some class team activities to increase communication and mutual trust among students, so that students from rural or remote backward areas can have a sense of belonging to the class and the school and integrate into campus life as soon as possible, so as to reduce negative emotions. Secondly, the interaction between teachers and counselors should be strengthened. Teachers should take the initiative to learn about the specific conditions of such students from counselors. In teaching questioning and discussion activities, students should be encouraged to actively answer questions. Finally, schools can combine the work of "precision poverty alleviation" to provide corresponding economic support for students with difficulties, reduce their pressure, so that they can study at ease, and maintain a sunny and optimistic attitude.

4.2 Strengthen students' mental health screening
Students' own factors, such as personality, self-confidence and habits, all have a certain impact on classroom performance. This study also preliminarily confirmed the predictive effect of personality type on classroom silence tendency, that is, introverted students have a higher-class silence tendency than extroverted students. Some scholars also believe that introverted students are less likely to express their personal opinions in interpersonal communication or in class, and are less likely to answer teachers' questions in front of the whole class. Therefore, colleges and universities should strengthen the character, temperament and mental health screening of students. the use of college Student Personality Inventory, AB personality Inventory and SCL-90 scale can well screen and classify students' mental health status and temperament, and then some students with relatively introverted personality and abnormal mental health status can be given targeted counseling to improve their self-confidence and activeness, so as to reduce the tendency of silence in class.

4.3 Do a good job in teaching reform and students' ideological guidance
As the leader of classroom teaching, teachers to a large extent determine the classroom teaching effect, if the teacher's teaching method is single, it will lead to poor teaching effect, and because of the influence of our traditional "respecting teachers and valuing

education" thought, students can not understand on the one hand, and dare not ask questions on the other hand, resulting in the silence of students. Therefore, teachers should continue to increase teaching reform. the teaching practice of many schools at home and abroad has proved that the flipped classroom teaching mode is conducive to the humanization of education and the reconstruction of harmonious teacher-student relationship. [3] the application of information-based teaching means enables students to fully control their own learning time and progress, and communicate with teachers and classmates through anonymous speech or bullet-screen speech in chat rooms and cloud classes. This reduces the anxiety of students directly "face to face" with teachers, and virtually improves students' classroom participation. In addition, schools and teachers should also strengthen the work of students' ideological guidance, and strive to guide students to fall in love with learning from the bottom of their hearts, and realize the importance of serious study for their own development and that of the country.

5. CONCLUSION

Although Chinese vocational college students generally have a tendency to silence in class, the degree is relatively mild. Students in rural areas have a higher tendency to silence in class than students in urban areas, and introverted students have a higher tendency to silence in class than extroverted students.

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ACADEMIC PUBLISHING HOUSE

Research on The Three-Dimensional Practical Teaching of Financial Statement Analysis Based on Vocational Ability Training

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Abstract: "Financial Statement Analysis" is a course closely combining theoretical and practical practice, which occupies an important position in the training of higher vocational accounting professional talents. dWE
This paper is based on the cultivation of accounting applied talents based on professional abilities as the starting point, analysis of financial statements analysis practice teaching situation and existing problems, through the systematic research of financial statements analysis of the connotation, objectives, content innovation, etc., design and construction of financial statements analysis three-dimensional practice teaching system, enhance the level of students' professional theoretical knowledge at the same time, improve the students' social competitiveness.
Keywords: Vocational Ability Training; Three-Dimensional Transformation; Practice Teaching System

1. THE PRESENT SITUATION AND EXISTING PROBLEMS OF PRACTICAL TEACHING OF FINANCIAL STATEMENTS

Higher vocational accounting mainly cultivates application-oriented accounting talents for the society. As one of the core courses of higher vocational accounting major, "Financial Statement Analysis" mainly cultivates students' practical ability to analyze and interpret financial statements, so as to improve students' professional ability and lay a solid foundation for future employment.

The Financial Statement Analysis is a practical and practical subject, and the characteristic of "application" should be highlighted in the teaching, and the perfection of its practice teaching system plays an irreplaceable role in cultivating students' practice and innovation ability. Our current financial statement analysis still focuses on theoretical teaching, practical teaching is not paid attention to, practical teaching content is not perfect, practical teaching resources are not sufficient, and the lack of professional teachers with professional experience, these are difficult for practical teaching to achieve good results. Therefore, it has become the top priority of financial statement analysis curriculum reform to explore the goal of financial statement analysis and practical teaching, deeply study the reform and innovation of practical teaching content and structure, and explore the three-dimensional practical teaching system based on vocational ability training.

2. THE CONNOTATION AND GOAL OF THE THREE-DIMENSIONAL PRACTICAL TEACHING OF FINANCIAL STATEMENT ANALYSIS

2.1 The goal of the three-dimensional practical teaching in Financial Statement Analysis

The talent training goal of accounting majors in higher vocational colleges is mainly to cultivate application-oriented talents, focusing on the cultivation of students' technical ability and professional quality. As the core course of accounting major in higher vocational colleges, the construction goal of the three-dimensional practical teaching system is to cultivate the professional ability of accounting students, that is, the practical operation ability,

problem handling ability, the ability to analyze financial statements and the ability to apply financial statements.

2.2 The connotation of the three-dimensional practical teaching in Financial Statement Analysis

Analysis of financial statements is a practical subject, the practice teaching of this subject is a kind of teaching activities that mainly use flexible teaching methods and teaching methods, organize and guide students to participate in the financial statements analysis practice, blend theory knowledge with practical operation, improve the students' intuitive cognitive ability, improve the students' comprehensive quality.

Under the guidance of scientific and systematic modern education theory, the three-dimensional teaching mode mainly optimizes the overall structure of classroom theory and practice, pays attention to the play of students 'main role, encourages students to study independently, stimulates students' potential learning motivation and innovation ability, so as to truly and effectively improve the classroom teaching effect.

Practical teaching is an effective way to strengthen students' practical ability. the three-dimensional practical teaching of Financial Statement Analysis is to focus on the practical teaching goal of financial statement analysis, to turn the teaching course into a comprehensive practical training course, changes the traditional teaching concept, attaches importance to the teaching of theoretical knowledge, and pays more attention to the cultivation of students' learning ability and comprehensive ability. This requires students to pay attention to practical teaching in course teaching, constantly innovate practical teaching content and teaching mode, increase the proportion of class hours of practical courses, stimulate students' enthusiasm for learning, improve students' learning efficiency, and cultivate skilled and practical talents with high professional ability and professional quality for the society.

3. THE CONSTRUCTION AND INNOVATION OF THE THREE-DIMENSIONAL PRACTICAL TEACHING SYSTEM OF THE

FINANCIAL STATEMENT ANALYSIS

"Financial Statement Analysis" in the construction of practical teaching system, need to change the teaching idea, increase the intensity of practice teaching, optimize classroom structure, optimize the teaching staff, from the perfect teaching environment of practice, design practice teaching content, rich practice teaching methods, innovation practice teaching evaluation constantly exploration and research, establish a professional ability based on the course content and the actual position seamless three-dimensional practical teaching system.

3.1 Establish a three-dimensional practical teaching concept

The characteristic of "applicability" in the course of "Financial Statement Analysis" requires that practical teaching be emphasized in the teaching process. Quality education objectively requires knowledge and ability to go hand in hand, and the disconnect between supply and demand in the talent market requires high-quality and skilled graduates. All of these require multiple levels of practical training for students, and practical teaching is the most effective way to improve students' application ability.

In the traditional teaching of "Financial Statement Analysis", teachers focus on the teaching of theoretical knowledge, so it is necessary to change the teaching concept and enhance the strength of practical teaching. In the teaching process, they pay attention to guiding students to conduct independent inquiry learning, and cultivate students' independence, practicality and innovation. Through real case teaching, create real situation teaching to improve students' practical ability and analytical ability, so as to improve the teaching effect.

3.2 Exercising a three-dimensional practical guidance teacher

Analysis of financial statements to practice teaching teachers requirement is higher, not only requires a solid comprehensive accounting professional knowledge, also need to have rich exquisite practical experience, so it requires through a variety of ways to change practice teachers "heavy theory, light practice" teachers status, improve the practice teacher team construction, ensure the quality of practice teaching. Specific ways: 1. Select

high-quality teachers with rich theory and practice levels as practice instructors; 2. We can contact enterprises or accounting firms to encourage practice instructors to participate in social practice and enrich practice experience; 3. Hold theme lectures and hire experienced senior accountants and certified accountants to improve teachers 'practical ability through training; 4. Off-campus financial directors and accounting experts can be hired as practice instructors to guide students to deal with some specific business problems to improve students' social adaptability.

Through the multi-level to create a three-dimensional practice instructor, improve the competitiveness of students' future employment.

3.3 Improve the three-dimensional practical teaching environment

Practical teaching environment is the environment and place to carry out practical teaching activities and cultivate students' practical ability. Including the school's attention to the curriculum practice teaching, the practical teaching materials and curriculum standards used, the on-campus training room and the off-campus training base and so on. The construction of a three-dimensional practical teaching system of financial statement analysis is inseparable from a good practical teaching environment.

The school needs attach great importance to the cultivation of students' practical ability and the practical teaching of the course, it will increase the proportion of class hours and the assessment intensity of the practical teaching in the talent training program.

Curriculum standards and practical teaching materials are the specific carriers of practical teaching content, which are directly related to the improvement of students' practical operation ability, as well as the effect of practical teaching and the training quality of accounting talents. According to the financial statement analysis practice teaching training objectives, formulate reasonable and feasible curriculum standards, and highlight the "practical, applicable" teaching materials.

The training room on campus and the training base outside the school also need to provide a high-quality practical teaching environment. Campus, build professional accounting training room with simulation training

software, strengthen cooperation with enterprises to build a training base for students to participate in the preparation and analysis of enterprise statements.

3.4 Design of three-dimensional practical teaching content

At present, the practice teaching of financial statement analysis is generally case analysis, and the practice teaching content is outdated. In addition, the cases used are selected according to the theoretical knowledge points of financial statements analysis. the selection of these cases does not start from the cultivation of students' practical ability. With the development of market economy, this traditional knowledge cannot meet the needs of talent cultivation and society. Therefore, according to the market demand, determine the practice teaching training objectives of financial statement analysis, and then determine the content and structure of practical teaching.

Financial statement analysis mainly cultivates applied accounting talents, so curriculum standards and practical teaching contents should be designed according to the characteristics of the course. Financial statements analysis three-dimensional practical teaching emphasizes is "comprehensive learning", so the design practice teaching content, pay attention to the combination of in-class practice and extracurricular practice, pay attention to the combination of campus practice and external practice, set up a variety of practice teaching link, actively explore the synergy between schools and enterprises, highlight the practicability and operability of teaching, strengthen the application ability of students.

3.5 Enrich the methods of three-dimensional practical teaching

The traditional practical teaching method is relatively simple, mainly using spoon-feeding teaching. Teachers are the main body of teaching activities, and rarely carry out practical teaching activities with students as the center. Practical teaching activities mainly use on-campus practical training, requiring students to complete the given "balance sheet", "income statement" and "cash flow statement" case data for analysis, and write the financial report analysis report through analysis and discussion. This practical teaching mode can

strengthen students' theoretical knowledge, but students lack the initiative of independent learning and are not good at thinking when encountering problems, which is not conducive to the overall development of students.

Build a three-dimensional practical teaching system, adopt flexible and diverse practical teaching methods, try to make classroom teaching close to the practical work, pay attention to students' autonomy and participation, turn "teaching first" to "learning first", and give full play to the main role of students.

Case analysis method, through the analysis of real cases, guide students to participate in the case analysis, while consolidating the theoretical knowledge, improve the students' ability to deal with practical problems;

Group discussion method, divided into learning mutual aid group, when financial statements analysis is going on, give full play to the collective strength and wisdom of students, improve the students' unity and cooperation ability and coordination and communication ability;

inquiry teaching method, discuss the theoretical knowledge in class, or discuss the real controversial projects, guide students to think, and master the knowledge;

simulation teaching method, through learning and operating the financial statement analysis software, improved students' skills in using modern methods for financial analysis, shortened the distance between classroom knowledge and practice;

Field investigation method, practice guidance teachers use the Internet, multimedia, big data and other teaching means to show students the actual working status of the enterprise, or organize students to visit relevant enterprises on the spot, and go deep into the practical activities of enterprises.

3.6 Innovate the evaluation of three-dimensional practical teaching system

At present, the assessment method of financial statement analysis course mainly adopts the writing method of practical training report and financial statement analysis report. Generally, students submit practical training report or financial statement analysis report, and teachers give scores according to the writing situation. This assessment method is very subjective and arbitrary, and lacks clear evaluation standards and evaluation indicators, so it is difficult to achieve fairness and justice. At the same time, the assessment content of the course is still mainly for the assessment of theoretical knowledge, and there are few assessments of practical operation ability. Therefore, the assessment method is not scientific and unreasonable, which can not mobilize the enthusiasm of students, so that students do not pay attention to the learning and participation of practical activities, which affects the practical effect.

The course characteristics and teaching objectives of financial statement analysis determine the teaching method and assessment method of this course. Financial statements analysis is a practical, practical subject, starting point is higher, mainly cultivate students use the financial knowledge analysis statements, the ability of application statements, cultivate students' independent thinking, analytical judgment and comprehensive application ability, so according to the course characteristics and teaching goal reform practice teaching evaluation method is particularly important in the whole course teaching.

Innovative three-dimensional practical teaching evaluation, ability training as the core index of evaluation, implement "three-three system" evaluation method: normal grades account for 30%, mainly including attendance and classroom performance; formative assessment accounts for 50%, mainly for the completion of practical teaching tasks, generally automatically scoring by the system; analytical assessment accounts for 20%, requiring the analysis report of financial statements of a listed company.

Multiple multi-dimensional evaluation methods are conducive to truly reflect students' practical ability, and also make students' learning closer to the social reality, which is conducive to improving the teaching effect.

Overall, build based on professional ability cultivation of financial statements analysis three-dimensional practice teaching system, from the transformation teaching idea, with practical experience of teachers, high quality teaching environment, rich teaching content, flexible teaching methods, complete scientific

teaching evaluation, many aspects, further innovation and reform.

To build a complete, scientific and effective financial statement analysis three-dimensional practical teaching system, for optimizing teaching activities, improve students' professional ability, for students to lay a solid foundation for accounting work in the future.

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Aspect-Level Sentiment Analysis in E-Commerce: Techniques, Applications, and Challenges

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Abstract: The rapid expansion of e-commerce platforms has resulted in an abundance of user-generated content, particularly in the form of customer reviews. Analyzing this feedback is critical for businesses seeking to improve products and services based on customer preferences. While traditional sentiment analysis provides insights into the overall sentiment expressed in reviews, it often fails to capture the nuances of customer opinions on specific product features. Aspect-level sentiment analysis (ALSA) addresses this limitation by identifying and analyzing sentiment directed at particular aspects of a product or service. This paper reviews the methodologies used in ALSA, explores its applications in e-commerce, examines the challenges it faces, and proposes future research directions. By offering a more granular view of customer feedback, ALSA has the potential to significantly enhance business decision-making, leading to improved product development, targeted marketing, and higher customer satisfaction.

Keyword: E-Commerce; Sentiment Analysis

1. INTRODUCTION

The growth of e-commerce has brought about a massive increase in user-generated content, particularly through product reviews, feedback, and ratings. Online platforms such as Amazon, eBay, and Alibaba host millions of reviews that provide insights into customer experiences. These reviews represent valuable data for businesses seeking to understand consumer behavior and refine their products or services accordingly. Sentiment analysis, a widely used natural language processing (NLP) technique, has emerged as a critical tool for interpreting this feedback by determining whether the sentiments expressed in customer reviews are positive, negative, or neutral [1]. While traditional sentiment analysis offers valuable insights, it often lacks the ability to distinguish between different aspects of a product. For example, a customer review for a smartphone might contain positive feedback about battery life but negative feedback about the camera quality. Traditional sentiment analysis would summarize this review as either positive or negative, missing the nuanced opinions expressed about specific product features. Aspect-level sentiment analysis (ALSA) resolves this issue by identifying specific product aspects mentioned in the review and classifying the sentiment for each one. This finer level of detail provides businesses with a deeper understanding of customer satisfaction and dissatisfaction across various product attributes [2].

This paper examines the methodologies used in ALSA, its applications in the e-commerce domain, the challenges associated with implementing ALSA, and future research opportunities. Through this exploration, the paper demonstrates how ALSA can offer businesses more detailed insights into customer feedback, ultimately helping them refine their products, services, and customer engagement strategies.

2. METHODOLOGIES IN ASPECT-LEVEL SENTIMENT ANALYSIS

Aspect-level sentiment analysis involves three main tasks: aspect extraction, sentiment classification, and sentiment aggregation. Each of these tasks has evolved significantly with advancements in machine learning and NLP techniques, allowing ALSA to provide more actionable insights for businesses.

2.1 Aspect Extraction

Aspect extraction refers to identifying the specific features or attributes of a product that are mentioned in a customer review. These aspects may include features such as "battery life, " "camera, " or "display" in the case of a smartphone. Several approaches to aspect extraction have been developed over time, each with varying degrees of accuracy and complexity:

2.1.1Rule-based approaches: Rule-based methods rely on predefined linguistic rules and keyword patterns to extract aspects from the text. These approaches are simple to implement but struggle with complex or ambiguous language structures and tend to perform poorly on large datasets [2].

2.1.2Machine learning approaches: Machine learning techniques such as Support Vector Machines (SVM) and Conditional Random Fields (CRF) have been widely used for aspect extraction. These methods require a large amount of annotated data for training, which can be time-consuming and expensive to obtain. Additionally, machine learning models may not generalize well to new datasets without significant retraining [3].

2.1.3Deep learning approaches: With the advent of deep learning, transformer-based models such as BERT (Bidirectional Encoder Representations from Transformers) have significantly improved the accuracy of aspect extraction. These models can capture complex relationships between words and understand context, making them highly effective for identifying aspects in customer reviews [4].

2.2 Sentiment Classification

Once the aspects of a product have been identified, the next step is to classify the sentiment associated with each aspect. This involves determining whether the sentiment expressed about a particular feature is positive, negative, or neutral. Sentiment classification has traditionally relied on the following approaches:

2.2.. 1Lexicon-based methods: Lexicon-based approaches use predefined lists of positive and negative words to classify sentiment. While these methods are easy to implement, they often struggle with complex linguistic phenomena such as sarcasm, negation, and contextual nuance. For example, the sentence "The camera could have been better" might be classified as neutral or positive by a lexicon-

based method, even though the sentiment is clearly negative in context [5].

2.2.2Machine learning methods: Machine learning classifiers such as Naive Bayes, SVM, and Random Forest have been used to classify sentiment based on features extracted from the text. These models are often trained on labeled datasets and can provide more accurate sentiment classification than lexicon-based methods. However, they still face challenges in handling complex language structures and require large amounts of labeled data [6].

2.2.3Deep learning methods: Deep learning techniques, including Convolutional Neural Networks (CNN) and Long Short-Term Memory (LSTM) networks, have significantly improved the performance of sentiment classification tasks by capturing the sequential nature of language and understanding the context of words in a sentence. Transformer models like BERT have further advanced sentiment classification by learning contextual meaning across multiple aspects in a review [4].

2.3 Sentiment Aggregation

Sentiment aggregation involves summarizing the sentiment expressed across multiple aspects of a product or service. For example, a customer review may express positive sentiment about the "battery life" and negative sentiment about the "camera. " Sentiment aggregation aims to combine these aspect-level sentiments into a comprehensive summary that reflects the overall customer opinion. This can be done through simple methods like averaging sentiment scores or using more sophisticated techniques that weigh certain aspects more heavily based on their importance to the overall customer experience [5].

3. APPLICATIONS OF ASPECT-LEVEL SENTIMENT ANALYSIS IN E-COMMERCE

The ability to extract and analyze aspect-level sentiment has numerous applications in the e-commerce industry. Businesses can leverage ALSA to gain detailed insights into customer preferences, improve product development, enhance customer service, and gain a competitive edge.

3.1 Product Development and Enhancement

One of the primary applications of ALSA is in product development. By analyzing customer reviews at the aspect level, businesses can identify specific features that customers appreciate or criticize. For example, if a large number of customers praise the battery life of a smartphone but express dissatisfaction with its camera quality, the manufacturer can prioritize improving the camera in future iterations of the product [2]. This granular insight allows businesses to focus their efforts on enhancing the features that matter most to customers, ultimately leading to higher customer satisfaction and increased sales.

3.2 Personalized Product Recommendations

In the context of e-commerce platforms, personalized recommendations are essential for improving customer experience and driving sales. ALSA can be used to provide more personalized product recommendations by taking into account the specific preferences of individual customers. Instead of recommending products based solely on overall ratings or purchase history, ALSA enables platforms to suggest products that align with a customer's preferences for specific features. For example, if a customer values battery life over camera quality, the platform can recommend smartphones that have received positive sentiment for battery life [3].

3.3 Customer Service and Experience Management

Customer service teams can use ALSA to identify recurring issues that customers mention in reviews. By analyzing sentiment at the aspect level, businesses can proactively address problems that may negatively impact the customer experience. For instance, if customers consistently complain about slow shipping times, the company can investigate and improve its logistics processes. This level of insight allows businesses to address customer concerns more effectively, leading to better customer service and improved satisfaction [1].

3.4 Competitive Benchmarking

In addition to improving their own products, businesses can use ALSA to benchmark their performance against competitors. By analyzing aspect-level sentiment for both their own products and those of competitors, businesses can identify areas where they excel or lag behind. For example, if customers frequently praise a competitor's product for its user-friendly interface but criticize the company's own product for being difficult to use, the business can prioritize improving its interface to remain competitive [6].

3.5 Brand Reputation Management

Aspect-level sentiment analysis can also be used to monitor a company's brand reputation over time. By tracking sentiment trends for key product features, businesses can identify potential threats to their brand's image and address them before they escalate. For example, if negative sentiment about a specific feature starts to increase, the company can take steps to improve that feature or address the issue through customer communication. Monitoring aspect-level sentiment allows businesses to protect their brand's reputation and maintain a positive image in the marketplace [4].

4. CHALLENGES IN ASPECT-LEVEL SENTIMENT ANALYSIS

Despite its many advantages, ALSA faces several challenges that limit its widespread adoption and effectiveness in e-commerce.

4.1 Language Ambiguity and Complexity

Natural language is inherently complex and ambiguous, presenting significant challenges for ALSA. Customers may use indirect expressions, sarcasm, or colloquialisms that complicate sentiment classification. Even advanced models like BERT can misinterpret nuanced language, leading to inaccuracies in sentiment detection [5].

4.2 Domain-Specificity

ALSA models trained on one domain, such as electronics, may not generalize well to other domains like fashion or food. Domain-specific vocabulary and customer preferences necessitate retraining models for different industries, limiting the scalability of ALSA applications [2].

4.3 Data Requirements

Deep learning models, which often outperform traditional methods, require large amounts of annotated data for training. Annotating aspect-level sentiment data can be labor-intensive and costly, making it difficult to implement ALSA across diverse domains. the lack of sufficient labeled datasets can

hinder model performance and limit the widespread adoption of ALSA [6].

4.4 Handling Noisy Data

User-generated content often contains noise, such as spelling errors, irrelevant information, or unrelated comments. Filtering out this noise is essential for accurate analysis, yet it poses additional challenges, as noise can obscure valuable insights. Robust preprocessing techniques must be developed to ensure that ALSA can effectively handle real-world data [1].

5. FUTURE DIRECTIONS

The future of aspect-level sentiment analysis (ALSA) in e-commerce involves addressing current challenges through innovative techniques and exploring new research avenues. the following sections outline promising directions for future advancements in ALSA.

5.1 Transfer Learning and Pre-trained Models

Transfer learning has emerged as a powerful technique to enhance the performance of sentiment analysis models, particularly in scenarios where labeled data is limited. By leveraging pre-trained models like BERT (Bidirectional Encoder Representations from Transformers), businesses can fine-tune these models on domain-specific data with relatively little additional labeled data. BERT and other transformer-based models are trained on vast amounts of general text data and can capture complex language patterns and contextual relationships. Fine-tuning these models for specific tasks, such as aspect-level sentiment analysis, allows them to adapt to new domains and capture nuances in customer feedback more effectively [4]. This approach not only improves accuracy but also reduces the time and resources required to develop ALSA systems for different industries. For instance, a pre-trained model can be fine-tuned to handle product reviews in the fashion industry, addressing specific terminology and sentiment expressions unique to that domain.

5.2 Multimodal Sentiment Analysis

The integration of multimodal data into sentiment analysis represents a significant advancement in capturing a more comprehensive understanding of customer feedback. Multimodal sentiment analysis involves combining textual analysis with other data types, such as images, videos, or audio recordings, that customers might include in their reviews. For example, product reviews on e-commerce platforms often feature user-uploaded photos or videos demonstrating product use, which can provide additional context and insights beyond text alone [1]. Analyzing these multiple forms of feedback together can enhance the accuracy and depth of sentiment analysis. Multimodal ALSA can improve product insights by correlating textual sentiment with visual evidence, thereby offering a richer understanding of customer experiences. For instance, a review praising a product's durability might be supported by an image showing the product in use, reinforcing the sentiment expressed in the text and providing a more robust basis for evaluating customer satisfaction.

In conclusion, the future of ALSA in e-commerce is promising, with potential advancements in transfer learning and multimodal analysis poised to overcome current limitations. By adopting these innovative techniques, businesses can gain deeper, more actionable insights from customer feedback, ultimately driving better product development, personalized recommendations, and enhanced customer engagement.

6. CONCLUSION

Aspect-level sentiment analysis (ALSA) offers a robust method for extracting nuanced insights from customer reviews in e-commerce, focusing on specific product features to inform product development, customer service, and competitive strategies. This granular approach enables businesses to understand precisely which aspects of their products are praised or criticized, leading to more targeted improvements and strategic decisions. Despite its advantages, ALSA faces challenges, including language complexity, domain-specific nuances, and the need for extensive data. Addressing these issues requires future research into innovative solutions such as transfer learning to adapt pre-trained models for specific domains, multimodal sentiment analysis to integrate textual and visual feedback, and real-time processing to provide timely insights.

Exploring these avenues will enhance ALSA's effectiveness and broaden its applications in e-commerce.

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Rural Memory: Animation Helps Pass on Traditional Culture

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Abstract: In the process of rapid urbanisation, the memory and traditional culture of the countryside are in danger of being forgotten and marginalised. However, with the development of digital media technology, especially animation, an art form full of creativity and expressiveness, it provides brand new opportunities for the inheritance of rural memory and the promotion of traditional culture. the purpose of this paper is to discuss how animation can help rural memory and traditional culture inheritance, and to demonstrate the unique advantages of animation in the protection, dissemination and innovation of traditional culture through specific cases and theoretical analysis.

Keywords: Rural Memory, Animation, Inheritance

1. INTRODUCTION

Rural memory is an important part of the long history and rich culture of the Chinese nation, which contains many aspects of rural lifestyle, customs, folk art, historical stories and so on. However, in modern society, with the movement of population to cities and the impact of foreign cultures, rural memory is gradually fading and the inheritance of traditional culture is facing challenges. How to effectively protect and pass on rural memory has become an urgent problem.

As a highly integrated art form, animation, with its unique visual expressiveness and rich narrative techniques, has become an important carrier for the inheritance and promotion of traditional culture. Through animation, the complex traditional cultural content can be presented to the general audience, especially the young generation, in a vivid and intuitive way, so as to stimulate their sense of cultural identity and inheritance consciousness.

2. ADVANTAGES OF ANIMATION IN TRADITIONAL CULTURE

INHERITANCE

2.1 Visual presentation

Animation has a strong visual presentation ability, which can transform words, symbols, patterns and other elements in traditional culture into vivid images and scenes. This intuitive way of expression greatly helps the audience to better understand and accept traditional culture, especially for those abstract or complex contents. For example, showing the production process of traditional paper-cutting art through animation allows viewers to clearly see each step, thus gaining a deeper understanding of the essence of this technique. the visual presentation of animation is not only limited to static elements, it can also show the dynamic beauty of traditional culture through dynamic effects, such as through animation to show the body and movements of Peking Opera, so that the audience can feel the charm of traditional theatre.

2.2 Narrative expression

Animation is not only a visual art, but also a narrative art. Through animation, it can tell the historical stories, folklore and customs of traditional culture, so that the audience can subconsciously accept the cultivation of traditional culture in the process of enjoying animation. This kind of narrative expression can help the inheritance and dissemination of traditional culture and make the audience feel the charm of traditional culture in a relaxed and pleasant atmosphere. the narrative expression of animation can also cross the limitations of time and space, presenting ancient stories in a way that is more acceptable to modern audiences, such as telling the myths in the Classic of Mountains and Seas through animation, so as to give these ancient stories a new vitality.

2.3 Youthful Communication

As a popular art form among young people, animation has a wide audience base. By

combining traditional culture with animation, it can attract more young people's attention and participation, thus promoting the inheritance and development of traditional culture. the youthful communication characteristics of animation can help to break the age boundaries of traditional culture, so that traditional culture can take on new vigour and vitality among the younger generation. In addition, animation can be disseminated through the Internet and social media platforms, further expanding its influence and enabling traditional culture to be more widely recognised and accepted globally. For example, by producing animated short films with the theme of Chinese traditional culture and releasing them on YouTube, Bilibili and other platforms, it can attract young viewers around the world, thus realising the international dissemination of traditional culture.

3. PRACTICAL CASES OF ANIMATION IN THE INHERITANCE OF RURAL MEMORY

3.1 Animation Elements in the Documentary Series of Remembering Nostalgia

Remembering Nostalgia' is a documentary film that takes ancient villages as the narrative carrier and digs deep into the vernacular culture and architectural features. the documentary series has cleverly integrated animation elements, presenting profound themes from multiple angles through vivid visual elements. For example, when telling the historical origin and customs of an ancient village, the animation form is used to restore the historical scene, so that the audience seems to travel through time and space, and feel the memory of the countryside and the charm of traditional culture in an immersive environment.

3.2 Non-heritage animation cases: shadow puppet theatre, paper-cutting art, etc.

Shadow puppetry and paper-cutting art are very characteristic traditional art forms in China. In recent years, with the in-depth promotion of the protection of non-legacy, these traditional art forms have gradually come into people's view. In order to better inherit and promote these traditional arts, some non-heritage animations have come into

being. For example, the animation of 'Shadow Theatre' restores and reconstructs traditional shadow theatre characters through computer technology, giving new life to this ancient art form; the animation of 'Paper Cutting Art' demonstrates the production process and techniques of paper-cutting, so that the audience can appreciate the animation and at the same time, also learn about the unique features of this traditional art.

3.3 Ethnic and Folk Culture in School Activities

Animation also plays an important role in the activities of ethnic folk culture in schools. Some schools have guided students to learn and create animation works related to ethnic folk culture by offering animation courses or organising animation competitions. These works not only show students' creativity and talent, but also promote the inheritance and promotion of ethnic folk culture. For example, the Ethnic Affairs Bureau of Songtao Miao Autonomous County in Guizhou Province has introduced ethnic and folk cultures into schools through activities such as 'Ethnic Style in Schools, Ethnic Cultures with Characteristics' and widely disseminated them through animation and other forms.

4. STRATEGIES AND SUGGESTIONS FOR ANIMATION TO HELP TRADITIONAL CULTURE INHERITANCE

As an attractive and infectious art form, animation plays an important role in the inheritance and development of traditional culture. the following are the strategies and suggestions for animation to help traditional culture inheritance:

4.1. Explore and organise traditional cultural resources

First of all, we need to systematically sort out traditional culture and excavate representative historical stories, myths and legends, folk customs and other resources. This requires not only in-depth research and excavation, but also cooperation with experts and scholars to ensure the accuracy and authority of animation works in terms of content. In this way, we can present the essence of traditional culture to the audience in a more vivid and graphic way.

4.2. Innovative animation expression

methods

Combine with modern animation technology, such as 3D animation, holographic projection, virtual reality, etc., to give new forms of expression to traditional culture. In animation creation, focus on the combination of traditional art elements and modern aesthetics to improve the ornamental and attractive nature of the work. Through innovative methods of expression, traditional culture can be given new vigour in modern society and attract more young people's attention.

4.3. Cultivate professional talents

Strengthen the training of animation professionals and improve their literacy and skills in the field of traditional culture. Encourage animation creators to go deeper into the study of traditional culture and cultivate their love and sense of responsibility for traditional culture. By training professionals, we can create more high-quality animation works and better transmit and develop traditional culture.

4.4. Strengthen policy support and financial input

The government should increase its support for the animation industry and provide policy and financial guarantee for the inheritance of traditional culture. Encourage enterprises, social organisations and individuals to participate in the animation industry and jointly promote the inheritance and development of traditional culture. Through policy and financial support, it can provide a good environment for the development of animation industry and promote the inheritance of traditional culture.

4.5. Integration into modern lifestyles

Combine traditional culture with modern lifestyle to create animation works that are close to the needs of modern audiences. Use animation works to guide the audience to pay attention to and understand traditional culture, and improve the social cognition of traditional culture. In this way, traditional culture can be better inherited and developed in modern society.

4.6. Expand communication channels

Make use of the Internet, social media and other new media platforms to expand the dissemination of animation works. Cooperate with famous animation festivals and film festivals at home and abroad to increase the popularity and influence of animation works in the international market. By expanding communication channels, more people can understand and pay attention to traditional culture and increase its influence.

4.7. Strengthen cross-border cooperation

Co-operate with other cultural industries such as tourism, education, design and other fields to achieve resource sharing and mutual benefits. Encourage animation creators to carry out cross-border co-operation with other artists and designers, etc., so as to inject new vitality into the inheritance of traditional culture. Through cross-border co-operation, traditional culture can be better combined with modern society to create more innovative and attractive works.

4.8. Enhance cultural confidence

Demonstrate the unique charm of Chinese outstanding traditional culture through animation works, and enhance national pride and cultural self-confidence. In international exchanges, actively promote China's animation works and enhance the soft power of national culture. In this way, we can let the world better understand and know our traditional culture and improve our cultural influence.

This thesis reveals the great potential of animation as a modern medium in preserving and promoting rural memory through an in-depth discussion of the unique role of animation in passing on traditional rural culture. We have analysed how animation can cross the boundaries of age and geography in a lively and interesting form to transmit the precious cultural heritage of the countryside, such as its history, customs and arts, to a wider audience. the study shows that animation can not only effectively stimulate the public's interest in and identification with rural culture, but also promote cultural innovation and development, opening up new paths for the protection and inheritance of rural culture.

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The Glimmer of Feminine Consciousness in the Revolutionary Era—The Physical Expression of the "younger sister" Image in Chinese Films during the "17 Years"

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Abstract: In the unique historical context of Chinese films during the "17 Years" (1949-1966), the trend of revolutionary images, predominantly male, became prominent. Female roles were often portrayed as "Iron Girls" and "Heroines" showcasing resilience and strength beyond gender. Notably, amidst this male-dominated revolutionary narrative, the image of "younger sisters" emerged as a distinct bright spot. These characters ingeniously rooted their "bodies" in revolutionary beliefs, finding a niche for self-expression within the framework of mainstream discourse. This paper aims to explore the physical expression of the "younger sister" image in Chinese films during the "17 Years" seeking the subtle presence of feminine consciousness within the mainstream ideology of the time.
Keywords: 17 Years; Chinese Films; Younger Sister; Physical Image

1. INTRODUCTION

Throughout "17 Years" of Chinese cinema, numerous female heroes appeared on screen. While these characters were granted a share of discursive power, they lost their gender identity and the gendered nature of their discourse within the cultural context [1]. Their postures and demeanors were imbued with a strength that transcended gender, exhibiting a masculine style of resilience and bravery. This excessive elevation and idealization of female images aimed to promote revolutionary spirit but significantly weakened feminine traits, leaving a heavy imprint of the era. However, the representation of female body images was not monolithic. Even under unified ideological guidance and state censorship policies, where female images bore obvious political discourse, they still displayed diverse tendencies [2]. "Younger sisters" are a typical example, often appearing as close younger sisters, cousins, or nieces of male characters. Though indispensable participants in the revolutionary wave, their non-central roles allowed for a broader exploration of their inner worlds, presenting the audience with more vivid, emotionally rich female characters, reflecting the filmmakers' deep understanding and gentle care for women in New China.

2. BODY LANGUAE: THE EXTERNALIZATION OF PSYCHOLOGICAL LANGUAGE

In Chinese films during the "17 Years, " the body language of "younger sisters" differed from the "being amused" existence of modern Shanghai women in contemporary films or the mannerisms of female heroes like Hua Mulan. They inhabited a relatively safe ideological middle ground, conveying their life states either directly or subtly.

In the film "The Cuckoo Cukoo Again" when Tong Yanan, the "cuckoo" receives a gift—a comb—from her lover Wang Bihao, she turns her head with joy and shyly responds, "I like it!" As Wang Bihao helps her with the comb, she gazes at him affectionately, takes off her headscarf to reveal her thick black hair, and smiles warmly while looking in the mirror together, indicating a blend of shyness and acceptance, akin to a harmonious couple. Despite few lines, the actor's facial expressions, eyes, and body language vividly

portray a young, pure rural girl dreaming of love, resonating with the audience.

In the film "The New Guard Neon Lights" Lin Yuanyuan is more straightforward, openly expressing her affection. Upon seeing her lover Tong Anan, she beams with joy, raises her hands, and runs towards him, holding his hands up in the air and bouncing with happiness. In subsequent scenes, whether in public or private, she boldly holds or entwines her lover's hand, expressing her feelings openly.

Additionally, in films like "Spring Breeze Blows Nuomin River", "Three Comrades" and "The Younger Generation" "younger sisters" also exhibit body movements that convey feminine consciousness, adding more laughter to the films. Their appearances shift the audience's focus from the film's conflicts to their everyday joys and sorrows.

3. COSTUMES: THE EXTENSION OF THE BODY

Costumes, evolving from basic warmth needs to symbol of social status and class, reflect the changes of the times. After the founding of New China, the fundamental transformation of social forms led to a renewal of costume culture. the modern image of Shanghai cheongsam women became the other under the new national appearance. Conversely, Soviet-style uniforms, especially the gray-blue Lenin suit, became the new trend for revolutionary women. In this context, "younger sisters" used unique ways to shine in the gray-blue sea, subtly expressing their yearning for a better life.

In the film "The Cuckoo Cukoo Again" to highlight Tong Yanan's youthful vitality and distinctiveness, other characters wore plain clothes while she wore colorful checkered outfits when going out. Even when at home in plain clothes, her red belt reminded the audience of her uniqueness. In "The Flute Plays Across" Wang Jierong changes her clothes four times, each outfit simple and elegant. A towel used for wiping sweat turns into a scarf around her neck, and a straw hat becomes an accessory, making her look fresh and cool. Liu Hui's entrance in "Ku Mu Feng Chun" is even more striking, dressed in a bright-collared shirt, a pleated skirt, long

socks, leather shoes, and a shoulder bag, exuding a leisurely and elegant lifestyle.

In other films like "Scene of Flighting Against Flood", "The Younger Generation" and "Spring Breeze Blows Nuomin River", "younger sisters" also showcase distinct yet fitting costumes, becoming a unique sight in the otherwise uniform scenery. This highlights the subtle feminine brilliance beneath the dominant ideology of the time.

4. CONCLUSION

"At the beginning of New China, films were more profoundly influenced and intervened by politics than ever before. the portrayal of female images was incorporated into the framework prescribed by ideology, transforming films from individual discourse into a tool of state power discourse, constructing ideology" [3]. Thus, Chinese films during the "17 Years" are often labeled as an era of "invisible" women by scholars, with Dai Jinhua and others describing their female identity as "invisible" and the women in the films as "women disguised as men, becoming heroes in a male identity" [4]. However, a deeper exploration reveals the faint but precious feminine consciousness within. During this period, filmmakers skillfully used body language, costumes, and other delicate touches to outline the physical beauty of young women in New China— "younger sisters" This beauty transcended traditional constraints, showcasing youth, vitality, and healthy naturalness. Despite the special revolutionary era, where "younger sisters" displayed a spirit of resistance and progress, their feminine consciousness was still limited by the times. However, this authenticity is precisely their unique historical imprint.

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A Brief Analysis on The Cultivation and Stimulation of Pupils' Interest in Physical Education

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Abstract: the primary school is a important stage in the development of life, values, outlook on life, the interest view of key stage; Their interest and attitude towards sports are also formed in the primary school stage. Therefore, cultivating and stimulating their interest in sports in the primary school stage will have an important impact on their later sports learning at a higher stage and even the formation of lifelong sports. This article is from the students' psychological characteristics, analysis of the cultivation of the interest in sports and inspire. **Key words:** Primary School Students; Sports Interest; Cultivate; Stimulate

1. INTRODUCTION

The interest is to know and to explore the psychological tendency of certain things or activities, is the main driving force of motivation. But interest is not born, but on the basis of acquired needs. Sports interest is an important branch of interest, it is a psychological tendency to feel the need of sports activities, is an important driving force to participate in sports activities.

2. THE IMPORTANCE OF INTEREST IN PRIMARY SCHOOL SPORTS

Physical education in primary school is different from physical education in senior grades. Primary school students are younger, lack of understanding of the nature of things, and lack of recognition of the purpose of physical education, which leads to their lack of interest in teaching and slow learning, which is not conducive to the achievement of physical education goals.

From the actual teaching process, the primary school students like sports activities, relatively do not like physical education, the fundamental reason is the lack of interest in physical education, which inevitably leads to the process of physical education, careless, absent-minded, lack of initiative in learning, not to mention creativity. As a result, teaching time becomes a formality, classroom teaching objectives cannot be achieved, and even injury accidents may occur. Therefore, cultivating students' interest in physical education is a favorable guarantee for the completion of various physical education teaching tasks in primary school.

3. ELEMENTARY SCHOOL STUDENTS PSYCHOLOGICAL CHARACTERISTICS

First of all, primary school students have a wide range of interests, but not exclusive. Primary school students are younger, lively and active is their nature, always show interest in sports, but it is easy to have interest, interest is relatively easy to transfer, this time like table tennis, after a period of time may like badminton, like the sports continue to transfer. In elementary school, different grades show different interests, the lower grades may prefer simple, the upper grades may prefer complex.

Secondly, in the interests of primary school students, direct interest occupies a large proportion, indirect interest is relatively less. Primary school students participate in sports activities, more is to experience the joy and happiness that sports activities themselves bring to them, and will not consider too much about the later results that sports activities bring to them, which is in line with their age stage.

Finally, pupils pay more attention unintentionally than intentionally. Primary school students are younger, have strong curiosity, and show a strong interest in the new things around, but the duration is short, they will be attracted by other more fresh things,

with the growth of age, they will gradually strengthen their intentional attention, and the things they are interested in will be maintained for a longer time.

4. CULTIVATION AND STIMULATION OF PRIMARY SCHOOL STUDENTS' INTEREST IN SPORTS

4.1 Establish a harmonious relationship between teachers and students

The teacher-student relationship directly affects the teaching effect, especially in the physical education teaching. In the whole process of teaching, ever-present in the communication between teachers and students, and teachers every expression, even a eye contact is a direct impact on students, especially for elementary school. They are young and have just begun to enter the campus, and they are particularly concerned about the attitudes of people around them, especially teachers. In physical education, when primary school students learn new movements, when doing exercises, physical education teachers are kind and positive eyes, which can increase their self-confidence and help achieve teaching goals. On the contrary, the disharmonious relationship between teachers and students, pupils are afraid of physical education teachers, in learning and practicing, afraid of hands and feet, more conducive to the learning and mastery of movement.

4.2 Primary school students' physical education learning changes from passive to active

In traditional PE teaching, PE teacher is the master of the classroom, is the ruler of the PE classroom, what content in the classroom, how to do, it is entirely up to him, students are passive recipients. For elementary school students, this is a passive participant. Therefore, PE teachers must change their ideas. the study of physical education technology is an important form of physical education teaching. Through the study of technology, students can improve their interest in physical education, and cultivate their good learning attitude and independent learning methods. Therefore, in the process of preparing lessons, PE teachers should start from the actual situation of primary school students, fully consider their own psychological and physiological

characteristics, and at the same time clearly grasp their actual physical education level, the difference between them, including different interests.

At the same time, PE teachers should also bear in mind that they are not the indoctrinator of sports knowledge and sports technology, not the master of sports classroom, let alone the dictator of sports classroom; It is the guide of primary school students' physical education learning, the service provider and the collaborator of primary school students' physical education learning. Teach pupils have age small, self-discipline, has something new to see, but attention and easy to spread, for new things to maintain short time; Greatly affected by the external environment,

4.3 Clarify the value of sports learning

In accordance with the younger age of primary school students, they do not have a deep understanding of the significance of sports learning; It is also impossible to carry out sports learning because of the significance of sports learning. However, through certain teaching means and teaching methods, students can have a deep understanding of the significance of sports learning within their own cognitive scope. If the physical education teacher through the simple theory of preaching, pupils may not listen to, can not achieve good teaching effect. According to the characteristics of each primary school student, targeted education can be carried out, so that they realize the personal value and social value of sports learning, and physical exercise and sports learning are closely related to their physical health and lifelong sports awareness. Have a good body, in order to better serve the motherland, so as to mobilize their enthusiasm and initiative in sports learning.

4.4 The selection of teaching content should be novel and appropriate

With the development of society, the experience and experience of primary school students have also undergone great changes, and the old teaching content has been unable to fully mobilize their interest in sports learning, which corresponds to the strong curiosity of young children. At the same time, we should also consider the suitability of the content, including the suitability of the difficulty, the selection of sports teaching content is relatively simple, they have no

interest in learning; the content of sports teaching chosen is too difficult for them to learn, nor can it cultivate their interest in sports. the existing research results have shown that the prerequisite for students to be interested in new learning content is that the content they need to learn is related to their original sports knowledge and technology, and they can master it through their own efforts, repeated learning and practice. Only in this way can they experience the pleasure of success and cultivate and stimulate their interest in sports learning.

4.5 Appropriate and correct learning motivation

In the study of sports psychology, sports motivation is divided into direct motivation and indirect motivation. Direct motivation is the motivation generated by the interest in sports learning itself, the interest in sports activities themselves, and the feeling of such stimulation brought by sports activities; On the contrary, indirect interest is the social significance of sports study late, through the study of sports, can exercise the body, to better serve the motherland; Indirect motivation relatively direct motive, more solid, stay longer, better able to maintain interest in sports.

4.6 Appropriate teaching methods

The use of teaching methods is the key to the enthusiasm and initiative of pupils' PE learning. In the process of physical education teaching for primary school students, there is no fixed teaching method. the choice of teaching methods, taking into account the teaching content, taking into account the actual situation of the student, including age, gender, sports level, etc. In the primary school physical education, we can make full use of the heuristic teaching method, under the premise of giving full play to the basic role of physical education teachers, the enthusiasm and creativity of students can be fully

mobilized. the competition method and the game method can change the relatively boring physical education and mobilize the enthusiasm and initiative of primary school students in physical education learning.

4.7 The organization form of flexible

The form of organization is an important part of PE teaching. the traditional form of PE teaching organization does not take into account the actual situation of students and is relatively monotonous. After the implementation of the new curriculum standards, PE teachers can change the traditional form of organization according to their own experience, design boldly, innovate boldly, and design a harmonious classroom atmosphere and organizational form that meets the needs of students. And to make different adjustments and changes according to different content and environment.

4.8 More encouragement

In the process of sports teaching, must be good at find the best in students, give more encouragement and affirmation, less criticism and preach, more can let students actively involved in the physical education learning and exercise.

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Exploration of the Practice Path of Aesthetic Education in Colleges and Universities in the New Era

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Abstract: In the process of Chinese path to modernization, aesthetic education is one of the important links to realize educational modernization, and it is of great significance to explore its practical path. Art education encompasses artistic beauty, natural beauty, social beauty, and scientific beauty. the article analyzes the common problems of underestimation of concepts, fragmented teaching, standardized evaluation scores, and single subject in current college aesthetic education, and proposes suggestions to strengthen the concept of aesthetic education, improve the aesthetic education system, and involve multiple subjects, providing some ideas for exploring the practical path of college aesthetic education.

Keywords: Aesthetic Education; Higher Education Institutions; Practice

1 INTRODUCTIONS

Art education is not only the education of beauty, but also showcases the beauty of education. Since incorporating aesthetic education into China's modern education system, the academic community has formed a relatively mature understanding and relatively rich achievements on this century old topic of aesthetic education. However, there are still problems such as uneven development, insufficient attention, and ineffective education. It is necessary to reflect on specific practices and further deepen the understanding and practice of aesthetic education in universities.

2 THE VALUE DIMENSIONS OF COLLEGE ART EDUCATION

2.1 Talent Guarantee For China's Great Rejuvenation

Art education contributes to the construction of spiritual civilization by consolidating cultural centripetal force, providing talent intelligence, cultural motivation, and social synergy for the great rejuvenation of the Chinese nation. Colleges and universities are important bases for aesthetic education. Integrating aesthetic education into the college education system can infiltrate the soul, stimulate creative vitality, cultivate all-round elites, and provide a talent base for Chinese path to modernization and the great rejuvenation of the Chinese nation.

2.2 The Essence Of Education In Universities To Cultivate Moral Character And Talents

As the foundation of aesthetic education, traditional Chinese aesthetics has formed the aesthetic value of seeking truth, the aesthetic evaluation of seeking goodness, the aesthetic appreciation of distinguishing differences, and the aesthetic realm of seeking similarities. the cultivation of college students is not only an individualized practice, but also a pursuit of modern goals such as overall social freedom, equality, and liberation. Through aesthetic activities and education, college aesthetic education integrates excellent traditional Chinese culture into the cultivation of personal character. Although the role of aesthetic education is not as immediate as the acquisition of theoretical knowledge, it is a deep penetration of "moistening things silently", ultimately achieving the goal of cultivating morality and practical education in higher education. [1]

2.3 The Intrinsic Needs Of Young People To Achieve Comprehensive Development

The demand for rebuilding humanistic spirit and care through aesthetic education is urgent. Art education matches personal development with social progress, helps young people cultivate cultural consciousness and confidence, form a broad vision and mind,

stimulate their innovation and vitality in building a new era, and provide talent guarantee for building a modern socialist cultural power

3. THE REALISTIC DILEMMA OF AESTHETIC EDUCATION IN UNIVERSITIES

In the context of modernization of education, in order to achieve the comprehensive development of young people, the emphasis on aesthetic education in universities has gradually deepened, and the effectiveness of aesthetic education has significantly improved. the level of artistic aesthetics and humanistic literacy of college students has also significantly improved. At the same time, in the process of aesthetic education practice in universities, there are still problems such as weak aesthetic education awareness, incomplete aesthetic education system, and single aesthetic education forms, which have reduced the effectiveness of aesthetic education in teaching practice.

3.1 Neglecting the Concept Of Aesthetic Education

In fact, although aesthetic education has achieved a transformation from professional education to universal education, the degree of specialization still needs to be improved. Some universities still focus on the imparting of skills in aesthetic education, and have not achieved the sublimation from skill transmission to quality improvement. In the early stage of educational practice, firstly, there was a lack of profound understanding of the connotation and value of aesthetic education, which led to the situation of "discussing aesthetic education based on aesthetic education". the psychological characteristics and cognitive level of students were not accurately grasped, resulting in low student participation and a tendency for aesthetic education teaching to become mere formalities; the second issue is the insufficient creation of an aesthetic education atmosphere in universities. As a part of university cultural construction, it cannot exist in isolation from the whole. However, some universities still clearly lean towards the education model of "emphasizing theory over practice, emphasizing majors over quality, and emphasizing scores over development". the

lack of a holistic environment in aesthetic education teaching has led to the marginalization of aesthetic education.

3.2 Fragmentation Of Aesthetic Education Teaching

Firstly, in terms of quantity, due to the relatively small number of courses offered, they mostly appear in the form of elective courses, and the number of teachers and students actively participating in aesthetic education construction is relatively small; In terms of quality, due to the weak overall atmosphere of aesthetic education, the innovation and influence of aesthetic education courses are insufficient, and the depth and breadth of aesthetic education work cannot be effectively expanded. Secondly, although aesthetic education is a comprehensive discipline, it does not mean a simple superposition of multiple disciplines, but an organic integration. Currently, the development of aesthetic education courses in universities mainly focuses on art textbooks, cutting and splicing the content about aesthetics and art from various related disciplines. This fragmented teaching lacks the support of core viewpoints.

3.3 Score Based Evaluation Of Aesthetic Education

Firstly, from the perspective of evaluation indicators, most universities still use the theoretical acquisition of art as the main assessment content, resulting in a narrow connotation of aesthetic education and a lack of emphasis on its comprehensiveness, diversity, and systematicity; Secondly, from the perspective of evaluation criteria, it is difficult to define evaluation standards accurately, resulting in vague evaluation criteria, strong subjectivity in evaluation, and a lack of unified standards; Finally, the evaluation results are still based on quantitative scores as the evaluation criteria, with a single form and emphasis on outcome based evaluation, lacking process based evaluation. This ultimately leads to the value of aesthetic education being coarsened as the transmission of artistic knowledge, and fails to achieve the ultimate goal of aesthetic education in universities.

3.4 Unifying the Subject Of Aesthetic Education

Firstly, the participants in aesthetic education

practice are relatively single, which is fundamentally due to the imperfect system, resulting in aesthetic education still remaining at the formal level; Secondly, there is insufficient practical guidance for aesthetic education. [2] In reality, aesthetic education lacks support from the social environment, often resulting in a situation where teachers impart knowledge and students passively accept it within universities; Thirdly, the allocation of teaching staff is relatively single. Due to the differences in their professional backgrounds, most aesthetic education teachers in universities unconsciously lean towards their own majors in teaching and lack teachers with outstanding comprehensive abilities; the fourth issue is the lack of relevant mechanisms for teacher development, which have not formed a systematic, regular, and traceable system, resulting in difficulties in expanding the main body of aesthetic education and the inability to form a collaborative aesthetic education environment among multiple subjects.

4 EXPLORATION OF THE PRACTICAL PATH OF COLLEGE ART EDUCATION

4.1 Strengthen the Concept Of Aesthetic Education And Enhance Cultural Confidence

Firstly, universities should attach importance to aesthetic education from the perspective of educational philosophy and strengthen top-level design. College aesthetic education should take the excellent traditional Chinese culture as the starting point, combine theory with practice as the way, and grasp the direction of aesthetic education construction from a holistic perspective. Secondly, universities should improve aesthetic education teaching from the perspective of cultivating students, follow the characteristics of aesthetic education, promote the Chinese spirit, deepen the reform of aesthetic education teaching, attach importance to the establishment and cultivation of aesthetic education professional teachers, and fully mobilize the active participation of students. Finally, universities should create an aesthetic education atmosphere in campus culture and highlight campus cultural styles in material environment construction; In terms of cultural environment construction, enrich the content of aesthetic activities.

4.2 Integrate Multiple Resources And Improve the Aesthetic Education System

Art education bears the important task of promoting and cultivating correct values, and attaching importance to and improving the art education system is one of the focuses of higher education work in the new era. Firstly, we should start with the teaching system and make aesthetic education courses a compulsory part, in order to enhance the importance of aesthetic education among teachers and students. Secondly, we should improve the evaluation system, optimize the aesthetic education evaluation mechanism, attach importance to the positive role of the evaluation system in promoting the soundness of the system, and uphold the principles of comprehensiveness, development, and diversity. Finally, by empowering university art education with digital technology, integrating multiple resources, collaborating with multiple platforms, and combining offline teaching with online teaching aids, a digital art education platform is constructed to achieve resource sharing, establish an art education database, track the effectiveness of art education implementation in a timely manner, and identify and solve problems in a timely manner. [3]

4.3 Multi Stakeholder Participation, Forming a Joint Force For Aesthetic Education

Family is the first school in life. In today's society, there is a tendency towards utilitarianism. Faced with the pressure of further education and employment, families attach far more importance to children's intellectual education than aesthetic education, and have not deeply realized the importance of aesthetic education for children's long-term and comprehensive development.

Firstly, relevant government departments should provide corresponding resource allocation from various aspects such as policies, funds, and organizations. Secondly, all enterprises, communities, and organizations should recognize the fundamental role of aesthetic education in building a harmonious social environment, and guide college students to actively acquire and practice aesthetic education. Finally, the construction of aesthetic education cannot be

separated from the infiltration of family environment. Parents should pay attention to the influence of family aesthetic education views on their children, contribute family strength to aesthetic education construction, and ultimately form a joint force of government, society, and family in aesthetic education, promoting the continuous improvement and development of the aesthetic education system.

5 CONCLUSIONS

College students are at a critical period when their worldview, outlook on life, and values are transitioning from ambiguity to maturity. Universities should not only educate people with intelligence, but also with moral education and beauty to nourish their minds, play their role in educating people for the realization of educational modernization, and provide a basic talent guarantee for the great rejuvenation of the Chinese nation. the goal of modern university art education is to cultivate a group of young people with firm beliefs for the great rejuvenation of the Chinese nation. the process is to enhance students' humanistic literacy and promote excellent traditional culture as means, and the result is to practice moral education and cultivate high-quality practical talents with comprehensive development of heart and mind. the practice of aesthetic education in universities is undoubtedly a long and arduous process that requires long-term persistence. Although the process is long and difficult, as long as multiple subjects participate, work together and move forward, continuously improve and perfect the aesthetic education system, and constantly strengthen cultural self-confidence, the ultimate goal of aesthetic education in universities can be achieved, and outstanding young people with comprehensive development can be cultivated for the great rejuvenation of the Chinese nation.

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Analysis and Suggestions on the Reasons for Exceeding the Assembly Gap between the Bogie Arm Node and Arm Positioning Slot

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Abstract: Against the backdrop of thriving social and economic development, the rail transit industry has entered an unprecedented stage of development. As a crucial component of high-speed trains, the quality of the bogie directly affects the operational safety of the train. This article takes the 160 kilometer per hour power concentrated high-speed train as the research object, and conducts a comprehensive analysis of the causes and rigorous experimental verification of the phenomenon of excessive clearance between the bogie arm node and the arm positioning groove assembly. Based on this, scientific and reasonable suggestions are proposed.
Keywords: Arm turning node; Arm positioning slot; Gap exceeding tolerance; Cause analysis; Experimental verification

1. PREFACE

As a key component of the high-speed train, the bogie plays a crucial role in the safe operation of the train. As an important process in the assembly of bogies, the production quality of the bogie wheel drop has a significant impact on the product quality of the bogie and even the entire vehicle. During the wheel dropping process of the bogie of a 160 kilometer per hour power concentrated high-speed train, it was observed that the sealing gasket in the positioning groove of the eight-position angle arm of the bogie was deformed due to excessive compression. According to on-site measurements, the gap between the arm node and the arm positioning groove assembly is 11.1mm, which exceeds the technical theoretical requirement of 12.9mm to 16mm. Given this phenomenon, it is necessary to conduct in-depth root cause analysis and experimental verification, and propose reasonable suggestions.

2. THEORETICAL ANALYSIS

By checking the assembly diagram of the arm node and arm positioning groove, as well as the single piece diagram of the arm node and frame arm positioning groove, and based on the size requirements of the single piece diagram of the arm node and frame arm positioning groove, the remaining gap after assembly of the arm node and arm positioning groove is calculated to determine the theoretical range of the remaining gap size after assembly of the arm node and arm positioning groove.

The required dimensions for the turning arm node drawing are: maximum width of mm, height of mm, and slope of 1:10.

According to the drawing requirements, the dimensions of the trapezoidal positioning groove are: the maximum opening width is mm, the height is 65mm (no allowable tolerance is specified, according to GB/T 1804-2000, the tolerance range is ± 0.3mm), and the slope is 1:10.

The calculation process of the gap size range between the arm node and the arm positioning slot after assembly is as follows:

Simplify the theoretical model of the arm node and arm positioning groove using SolidWorks, and assemble them to calculate the clearance after assembly.

2.1 Theoretical maximum clearance after assembly

When the positioning groove of the frame arm is machined according to the single piece drawing, with a maximum opening width of 57.3mm, height of 65.3mm, and slope of 1:10, and the node of the arm is machined according to the single piece drawing, with a maximum width of 58.2mm, height of 58mm, and slope of 1:10, the maximum clearance after

assembly is the maximum value, and the maximum clearance measured after theoretical model assembly is 16mm.

2.2 Theoretical minimum clearance after assembly

When the positioning groove of the frame arm is machined according to the single piece drawing, with a maximum opening width of 57.5mm, height of 64.7mm, and slope of 1:10, and the arm node is machined according to the single piece drawing with a maximum width of 58.1mm, height of 58.1mm, and slope of 1:10, the clearance after assembly is the minimum value. the theoretical model measured the minimum clearance after assembly is 12.9mm.

After on-site measurement, the gap between the eight-position angle arm node of the bogie and the arm positioning groove assembly is 11.1mm, which is less than the theoretical minimum gap of 12.9mm.

3.   CAUSE   ANALYSIS   AND EXPERIMENTAL VERIFICATION

Table 3-1 Dimensions of Arm Positioning Slot

	NOMINAL	+TOL	-TOL	MEAS	DEV	OUTTOL
X	57.500	0.000	-0.200	57.395	-0.105	0.000
Y	65.000	0.300	-0.300	65.002	0.002	0.000

According to the measurement results of the coordinate measuring machine and the frame processing inspection sample, the maximum opening width of the positioning groove of the frame arm node is 57.395mm, the height is 65.002mm, and the slope is 1:10, which meets the requirements of the drawing and excludes the assumption of the size of the positioning groove of the frame arm exceeding the tolerance.

Table 3-2 Dimensions of Arm Nodes

	NOMINAL	+TOL	-TOL	MEAS	DEV	OUTTOL
X	58.000	0.200	0.100	58.015	0.015	0.085
Y	58.000	0.100	0.000	58.075	0.075	0.000

According to the measurement results of the three-coordinate measuring machine, the maximum width of the eight-position angle arm node in the X direction is 58.015mm (lower than the lower difference of 0.085mm), the height is 58.075mm, and the slope is 1:10, which meets the requirements of the drawing. the maximum width of the arm node is lower than the lower difference.

Three hypotheses are proposed for the reason that the clearance between the arm node and the arm positioning groove after assembly is less than the theoretical minimum clearance: (1) the size of the arm positioning groove of the frame exceeds the tolerance; (2) the size of the arm node exceeds the tolerance; (3) the assembly of the arm node and the arm positioning groove of the frame mainly uses hexagonal bolts to connect the arm node to the frame, so it is proposed to apply torque to cause deformation, resulting in size deviation.

3.1 Verification of out of tolerance test for the positioning slot size of the framework arm

Disassemble the bogie and use a coordinate measuring machine to check the maximum opening width and height of the frame arm positioning groove. Use a frame processing inspection gauge to check the slope. the data measured by the coordinate measuring machine is shown in Table 3-1.

3.2 Verification of Arm Node Size Exceeding Deviation Test

Use a coordinate measuring machine to measure the maximum opening width and height of the eight position angle arm node, and use the arm node template to detect the slope. the data measured by the coordinate measuring machine is shown in Table 3-2.

3.3 Verification of size deviation caused by deformation due to torque testing

Based on the measured dimensions of the arm positioning groove and arm node using a coordinate measuring machine, the arm node and arm positioning groove were theoretically modeled and assembled using SolidWorks. the theoretical clearance after assembly was calculated.

According to the calculation results, the theoretical gap after assembly is 13.13mm, and the measured gap on site is 11.1mm, with a difference of 2.03mm between the actual and theoretical values. the assembly of the pivot arm node and the frame pivot arm positioning groove mainly uses hexagonal bolts to connect the pivot arm node to the frame, with a tightening torque of 90 ± 5N • m. the actual assembly gap differs from the theoretical assembly gap by 2.03mm, mainly due to deformation caused by the application of torque. To address this issue, establish a finite element model, conduct simulation analysis, and conduct experimental verification. the finite element model is shown in Figure 3-2.
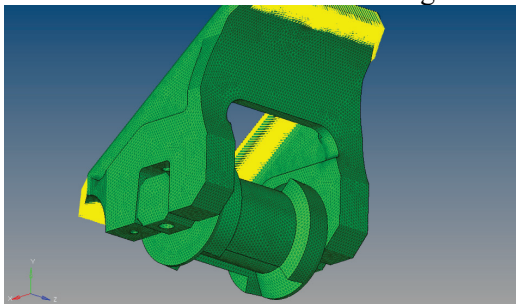

Figure 3-2 Finite Element Model of Assembly between Arm Node and Arm Positioning Slot

Selecting a friction coefficient of 0.14 (only applying assembly paste on the thread), and calculating a tightening force distance of 90Nm, the tightening force is 30.8kN. By looking up the force displacement curve, it can

be seen that the pressing amount is 2mm. If the friction coefficient is considered to vary between 0.12 and 0.16, the range of variation in the pressing amount is 1.8 mm to 2.3 mm. the force displacement curve is shown in Figure 3-3.
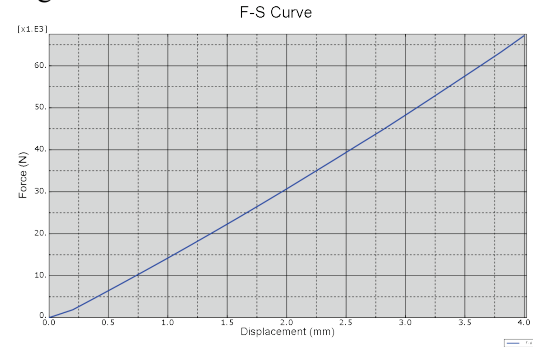
Figure 3-3 Force displacement curve

Randomly select 20 locations on the production site to test and verify the simulation results. the verification method is to first pre assemble the arm node with the frame arm positioning groove. Only the arm node needs to fit the assembly surface of the frame arm positioning groove without applying a final torque of 90 ± 5N • m. Measure the gap value after pre assembly and record it. After recording, apply a torque of 90 ± 5N • m and measure and record it again. the test data is shown in Table 3-3.

Table 3-3 Experimental Data

number	Pre assembly remaining space(mm)	Remaining space after fastening(mm)	Remaining space change value (mm)	number	Pre assembly remaining space(mm)	Remaining space after fastening(mm)	Remaining space change value(mm)
1	13.1	11.3	1.8	11	13.6	11.7	1.9
2	13.4	11.6	1.8	12	13.5	11.6	1.9
3	13.7	11.5	2.2	13	14	11.9	2.1
4	14.1	11.9	2.2	14	14	11.7	2.3
5	13.5	11.7	1.8	15	13.5	11.5	2
6	13.1	11.2	1.9	16	13.7	11.6	2.1
7	14	11.6	2.4	17	13.6	11.5	2.1
8	14.1	11.7	2.4	18	13.8	12	1.8
9	13.6	11.4	2.2	19	14	11.6	2.4
10	14	11.7	2.3	20	13.5	11.5	2

According to the experimental data, the remaining space variation values are mainly

concentrated in the range of 1.8-2.4mm, which is basically consistent with the simulation

results. Therefore, it can be inferred that the difference of 2.03mm between the actual assembly gap and the theoretical assembly gap calculated based on the measured dimensions of the frame arm positioning groove and arm node using a coordinate measuring machine is mainly due to deformation caused by the application of torque.

4. CONCLUSION

According to the measurement results of the eight position corner turning arm node by the coordinate measuring machine, the main reason for the excessive depth of the eight position corner turning arm node in the trapezoidal positioning groove of the bogie of the power concentrated high-speed train at a speed of 160 kilometers per hour is that the maximum width dimension of the turning arm node exceeds the tolerance and the deformation caused by the applied torque leads to the dimension exceeding the tolerance. To prevent the occurrence of the turning arm node of the bogie entering the trapezoidal groove too deeply, it is recommended to process the turning arm node according to the medium difference.

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Multi-objective Function Optimization Design of Hard Point for All-Terrain Vehicle Double Wishbone Suspension

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Abstract: In this paper, the dynamic model of the double wishbone suspension is established, and the initial parameters of the hard point are determined through the body structure. The dynamic simulation analysis of the initial parameters is carried out, and the design variables in the hard point optimization process of the double-wishbone suspension are determined according to the simulation analysis results. The swing angle of the lower swing arm is used as input for dynamic analysis and optimization, which reduces the number of iterations in the optimization process and improves the efficiency of suspension design.

Key Words: Double Wishbone Suspension; Dynamic Analysis; Multi-Objective Optimization; Unified Objective Method

1.INTRODUCTION

At present, the research on hard point optimization of double-wishbone suspension [1] mainly focuses on high-speed passenger cars, and there are few studies on double-wishbone suspension of off-road vehicles. The wheel runout of all-terrain off-road vehicles is significantly higher than that of ordinary cars, and the wheel alignment parameters change greatly during the runout process of the tires relative to the body, resulting in serious tire wear, steering wheel thugs when steering, and heavy steering when accelerating and braking. The dynamic simulation analysis of the front suspension of the all-terrain vehicle is carried out, and the coordinates of the hard point of the double-wishbone suspension are optimized.

the toe-in adjustment of the wheel is less difficult to change in the later stage. Optimization analysis of suspension hard points. [2]

2. DETERMINATION OF DESIGN GOALS

2.1Wheel camber

Consider the design requirements of the wheel camber angle for handling stability. The wheel camber angle affects the relationship between the wheel slip angle and the lateral force. When the wheel camber angle is negative, a smaller side slip angle can obtain a larger lateral force.

2.2 Kingpin caster angle

The righting moment under the action of the lateral force of the vehicle. The amount of runout of the wheel of an all-terrain vehicle is relatively large. It is required that the caster angle of the kingpin has tendency to decrease when the wheels run out, which can effectively reduce the righting moment and steering resistance moment.

2.3Kingpin inclination angle

The kingpin offset caused by the inclination angle of the kingpin will generate a righting moment when the wheel is subjected to a longitudinal force. When the wheels are turning, the center of gravity of the vehicle is raised due to the inclination angle of the kingpin, thereby generating steering resistance.

3.DYNAMIC ANALYSIS OF DOUBLE WISHBONE SUSPENSION

The dynamic model of the double-wishbone suspension is shown in Figure 1. According to the body structure, the initial hard point coordinates of the double-wishbone suspension are initially determined, as shown in Table 1.

The change of the toe angle of the wheel is shown in Figure 2. Set the suspension compression stroke to 150 mm and the extension stroke to 50 mm. The maximum value of the toe angle is 0.12°, and the

minimum value is -1.33°. Toe angle, when the wheel jumps up, the toe angle changes from positive to negative. When the wheel camber is negative, an appropriate negative toe angle can reduce wheel wear.

Table 1 Initial hard point coordinates of double wishbone suspension

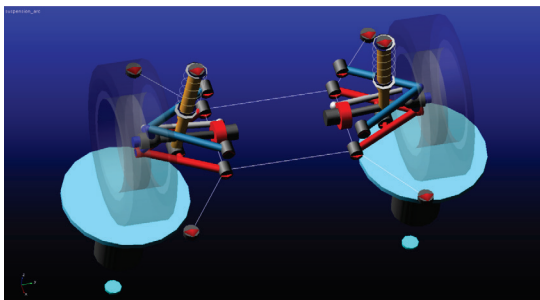|	x	the y	z
hpl_lca_front	-160	-250	160
hpl_lca_outer	-10	-530	153
hpl_lca_rear	140	-250	160
damper_lower	0	-480	300
tie_rod_inner	-50	-220	200
tie_rod_outer	-80	-500	200
damper_upper	0	-360	380
hpl_uca_front	-140	-260	300
hpl_uca_outer	10	-520	307
hpl_uca_rear	160	-260	300
wheel_center	0	-570	227
drive_shaft_inner	0	-220	200

Figure 1 Dynamic model of double wishbone suspension

Through analysis, it is found that the change trend of wheel camber with wheel runout is shown in Figure 3. The initial hard point design shows obvious negative camber when the wheel jumps up, and the camber angle changes from 0.83 ° to - 5.12 °. larger.

The change of the caster angle directly affects the righting moment of the wheel, if it is too small, it will lead to a decrease in handling stability, and if it is too large, it will cause the steering wheel to thug. Through the simulation of the dynamic model, it can be concluded that the change trend of the kingpin caster angle with the wheel stroke is shown in Figure 4, the maximum value is 7.32 °, the minimum value is 6.64°, and the kingpin caster angle decreases during the suspension compression

process. It is 0.68° smaller, the range of change is small, and it is a decreasing trend, but the kingpin caster angle is too large, and it will produce a larger righting moment for roads with higher unevenness.

The kingpin inclination is to reduce the kingpin offset, so that the steering of the vehicle can be easily returned. Increasing the inclination angle of the kingpin can reduce the offset distance of the kingpin, thereby reducing the excessive righting moment caused by the longitudinal load of the wheel during the steering process. As shown in Figure 5, the static kingpin inclination within the suspension stroke Angle is 3.828°, and the kingpin inclination angle is 8.923° at the maximum compression stroke, and the kingpin inclination angle changes greatly during the compression stroke, reaching 5.095°, and the variation range reaches 133%, which does not meet the design requirements.

4. OPTIMIZATION OF SUSPENSION HARD POINT COORDINATES

In the upper and lower swing arms of the double-wishbone suspension, and 2 points in total in the upper and lower mounting points of the shock absorber. If the three-dimensional coordinates of each point are used as design variables, there are a total of 24. If the hard point of the steering knuckle is optimized at the same time, Three more design variables need to be added. In order to reduce the variables in the design process, an optimized method is designed according to the structure of the double wishbone suspension.

Simplify the double-wishbone suspension structure to establish a structural model. When the road surface excites y to drive the wheel, the wheel jumps upward and the upper and lower suspension arms rotate around their respective equivalent rotation centers of gravity. The kingpin caster angle determined by the kingpin P_1P_2 of the wheel, The kingpin inclination angle, the angle between the wheel P_7P_8 and the vertical plane – the wheel camber angle, changes with the increase of the wheel y-direction travel. Since the rotation planes of the upper and lower swing arms are not coplanar, the process of establishing the dynamic equations for spatial mechanism analysis is cumbersome, and the mechanism model is simplified. The lower swing arm

angle θ is used as input for dynamic analysis, and the motion state of the entire suspension system shows that the parameters are only the initial angle φ of the upper swing arm, the length a of the upper swing arm, the length b of the lower swing arm, and the equivalent rotation center of gravity O of the upper swing arm relative to At the coordinate position of the equivalent rotation center of gravity O_0 of the lower swing arm , 6 variables are reduced, and the optimization process Is simplified [3] .
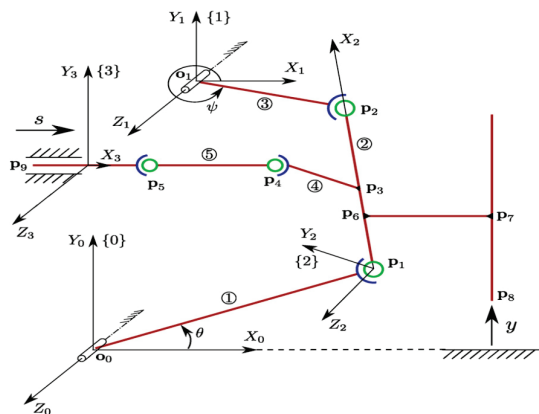

Figure 2 Schematic diagram of the suspension structure

Optimization methods for multiple objective functions. The weighted combination method is used to establish a multi-objective optimization method with kingpin caster angle, kingpin inclination angle and wheel camber angle as design objectives, and the objective function is unified. The caster angle of the kingpin is α, the inclination angle of the kingpin is β, and the camber angle of the wheel is γ. According to the basic structure of the double-wishbone suspension, the initial design parameters are determined as the length a of the upper swing arm and the length b of the lower swing arm. The initial angle of the lower swing arm is 0 , the initial angle of the upper swing arm is θ, and the relative coordinates (x, y, z) of the rotation center of the upper swing arm relative to the rotation center of the lower swing arm . The design variable vector is

$X=[a,b,\theta,x,y,z]^T$

objective function

$f(X)=\{\alpha(X),\beta(X),\gamma(X)\}$

constrained to

$\alpha_{min} \leqslant \alpha(X) \leqslant \alpha_{max}$

$\beta_{min} \leqslant \beta(X) \leqslant \beta_{max}$

$\gamma_{min} \leqslant \gamma(X) \leqslant \gamma_{max}$

Calculate the factor

$\Delta a=(\alpha_{max}-\alpha_{min})/2$

$\Delta\beta=(\beta_{max}-\beta_{min})/2$

$\Delta\gamma=(\gamma_{max}-\gamma_{min})/2$

$\Omega_\alpha=1/(\Delta\alpha)^2$, $\Omega_\beta=1/(\Delta\beta)^2$, $\Omega_\gamma=1/(\Delta\gamma)^2$,

Ultimate optimization target function

$f(X)=\Omega_a\cdot a+\Omega_b\cdot\beta+\Omega_c\cdot c$

The change range of the wheel camber is within the design requirements, and the camber angle decreases more obviously when the wheel jumps, and negative camber appears, which helps to improve the adhesion performance of the wheel. The kingpin inclination becomes larger, which reduces the kingpin trail and reduces the influence of wheel longitudinal force on handling stability. After optimization, the variation range of the toe angle is reduced when the wheel jumps, which effectively reduces the wear of the wheel and the front wheel shimmy during the wheel jump, and improves the comfort and stability of the vehicle. [4][5] [6]

5. CONCLUSION

Through the simulation analysis of the kinematic characteristics of the double-wishbone suspension of an all-terrain vehicle, the multi-objective optimization is carried out using the wheel alignment parameters as the optimization objective, and the swing angle of the lower swing arm is used as the input to reduce the design variables in the optimization process. The weighting factor is determined according to the initial variation range of the optimization objective, and the optimized objective function equation is established by using the unified objective method, which effectively reduces the number of iterations of optimization simulation and improves the efficiency of suspension hard point desig

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A Preliminary Exploration of The Application Composition and Types of Vr Technology Systems in Animation Art

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Abstract: Virtual reality technology is a newly developed technology that integrates light, mechanics, electronics, ergonomics, information technology, and related technologies. This article elaborates on the five major components of virtual reality technology and attempts to explore some thoughts on virtual reality systems. It deeply feels that virtual reality, which is based on the perception of virtual objects, will bring a vast imaginative space and time to humans. Although it sometimes does not conform to objective laws and logic, it can promote the development of human imagination and creativity, Let virtual experiences enter life.

key word: Human Machine Engineering; Information Technology; Computer; Virtual Experience

1. INTRODUCTION

Virtual reality technology is a new technology developed by integrating light, mechanics, electronics, ergonomics, information technology (IT), and related technologies. It is a new branch of computer technology and widely used in animation art production. A system constructed based on virtual reality technology, consisting of software and hardware for processing virtual reality, is called a Virtual Reality System (VRS). Generally speaking, an ideal virtual reality system is a human centered human-machine system (or humanized system) composed of software, hardware, and operators. the hardware part includes processors that generate and process virtual environments, visual systems centered around helmet displays, auditory systems centered around speech recognition, sound synthesis, and sound localization, body orientation and posture tracking devices centered around position trackers, data gloves, and data suits,

as well as functional units such as taste, smell, touch, and sensory feedback systems. the software part includes operating system, database system, software development tools, application software, etc. These software may be standalone, C/S, or S/B models, etc.

2. COMPOSITION OF VIRTUAL REALITY SYSTEMS

Virtual reality technology mainly consists of five components: virtual world, computer, virtual reality system software, input devices (helmets, gloves with various trackers and sensors, microphones, etc.), and output devices (helmet displays, headphones, data gloves, etc.). After receiving input signals from trackers and sensors, the virtual reality system software interprets them, updates the virtual environment database as necessary, adjusts the current virtual environment scene, and immediately transmits the three-dimensional visual images and other (such as sound, touch, force feedback, etc.) information from this new viewpoint to the corresponding output devices, so that the operator can obtain various sensory virtual effects in a timely manner.

3. TYPES OF VIRTUAL REALITY SYSTEMS

In practical applications, virtual reality systems are divided into four typical types based on the level of immersion and operator interaction of virtual reality art: Desktop Virtual Reality System, Immersive Virtual Reality System, Augmented Reality System, and Distributed Virtual Reality System.

3.1 desktop Virtual Reality System

Desktop virtual reality systems use computers or entry-level workstations to simulate virtual environments. the computer screen serves as a window for the operator to observe the virtual

environment, and various external devices are generally used to manipulate various objects in the virtual environment and virtual scene. Due to the fact that desktop virtual reality systems can be implemented through computers, the cost is relatively low, but the functionality is relatively limited. This type of virtual reality system is mainly used in fields such as Computer Aided Design (CAD), Computer Aided Manufacturing (CAM), architectural design, desktop games, etc.

3.2 Immersive virtual reality system

Immersive virtual reality system is an advanced and ideal virtual reality system. It provides a completely immersive experience, giving the operator a sense of being there. It mainly utilizes devices such as head mounted displays (HMDs) to enclose the operator's visual, auditory, and other senses in a designed virtual reality space, and uses sound, position trackers, data gloves, and other input devices to create a fully engaged feeling for the operator. Common immersive VR systems include helmet mounted display systems, projection based virtual reality systems (including multi-channel pillar screens, curved screen Powerwalls, CAVE systems), and remote systems.

Immersive virtual reality systems are based on helmet mounted display systems that achieve full immersion through helmet mounted displays. It isolates the real world from it, allowing operators to immerse themselves in the virtual environment from both auditory and visual senses. the "remote presence" technology is an emerging technology that comprehensively utilizes computer, 3D imaging, electronics, holography, and other technologies to move the distant real environment closer and intervene in this moving environment. At present, this system is commonly used for combined operation of VR technology and robotics technology. When an operator manipulates a virtual reality system in one place, the result occurs in another place. the operator obtains a sense of depth through a stereoscopic display, which is connected to a remote camera; Track the operator's movements through motion tracking and feedback devices, provide feedback on the remote motion process, and transmit the actions to the remote location for completion.

Immersive virtual reality systems are a common type of VR technology system, and as a representative application type, they possess five characteristics that cannot be ignored here:

3.2.1Has real-time performance. In immersive virtual reality systems, to achieve the same feeling as the real world, high real-time performance is necessary. When the operator rotates their head to change the observation viewpoint, the tracking device in the system must detect it in a timely manner, calculate and output the corresponding scene by the computer, and require a sufficiently small delay and continuous and smooth changes.

3.2.2Has a high degree of immersion. Due to the use of multiple input and output devices in immersive virtual reality systems to create a virtual world that looks, sounds, and feels real, while requiring a high degree of immersion, the operator is completely isolated from the real world and not affected by the external real world.

3.2.3Has good system integration. In order to create a comprehensive immersion experience for the operator, multiple devices and related software technologies must interact with each other without any influence, so the system must have good system integration.

3.2.4Has good openness. In immersive virtual reality systems, it is necessary to utilize the latest hardware devices and software technologies as much as possible, which requires the virtual reality system to be able to easily improve hardware devices and software technologies. Therefore, it is necessary to construct the system's software and hardware architecture in a more flexible way than before.

3.2.5It has a parallel working mechanism that supports multiple input and output devices. In order to create a comprehensive immersion experience for the operator, it may be necessary to integrate multiple devices and maintain synchronous operation. Virtual reality systems should have a mechanism that supports parallel operation of multiple input and output devices.

3.3 Augmented Reality System

Virtual reality technology establishes artificially constructed 3D virtual environments, where operators interact and influence objects in a natural way, greatly expanding human abilities to understand,

simulate, and adapt to the world. the main scientific issues of virtual reality include modeling methods, representation techniques, human-computer interaction, and devices. However, there are currently widespread problems such as large modeling workload, high simulation costs, insufficient matching with the real world, and low credibility. In response to these issues, various virtual reality enhancement technologies have emerged, which match and synthesize virtual environments with real environments to achieve enhancement. Among them, the technology of overlaying 3D virtual objects onto the real world for display is called augmented reality, and the technology of overlaying information of real objects onto the virtual environment for rendering is called augmented virtual environment. These two types of technologies can be vividly described as "virtual in reality" and "virtual in reality", respectively. Virtual reality enhancement technology reduces the workload of 3D modeling through the synthesis of the real world and virtual environment, improves the operator's experience and credibility with the help of real scenes and objects, and promotes the further development of virtual reality art.

Augmented reality system is a technology system that integrates the real environment seen by the operator with the virtual reality scene simulated by the computer, and has the characteristics of virtual real combination and real-time interaction. Unlike traditional virtual reality systems, augmented reality systems mainly provide operators with a composite visual effect based on the existing real world. When the operator moves in the real scene, the virtual object also changes accordingly, perfectly integrating the virtual object with the real environment. This can reduce the cost of generating complex experimental environments and facilitate the operation of objects in the virtual experimental environment. the system generally consists of a head mounted display, a position tracking system, interactive devices, and computing devices, truly achieving a state of both reality and illusion.

3.4 Distributed Virtual Reality System

Distributed virtual reality system is an integrated virtual environment formed by connecting multiple virtual environments through a network, which can be distributed in different spatial locations. Multiple operators located in different spatial positions can interact and share information in this integrated virtual environment through the virtual reality devices of the system. In the system, multiple operators can observe and operate the same virtual world through the network to achieve collaborative work. Simply put, a distributed virtual reality system refers to a software system that supports real-time interaction among multiple people through a network. Operators interact with other operators in a virtual reality environment through computers and share information.

The distributed virtual reality system has four basic components: stereoscopic graphics display, network communication and control equipment, processing system, and data network. Distributed virtual system is a product of the combination of distributed system and virtual system. According to the number of shared application systems running in the distributed system environment, it can be divided into two system architectures: centralized and replicated.

A centralized structure is a shared application system that runs only on a central server. the system can be a conference agent or a dialogue management process. the role of the central server is to manage the input/output manipulation of multiple operators, allowing for information sharing among multiple operators. Its characteristics are simple structure and easy implementation, but it has high requirements for network communication bandwidth and is highly dependent on the central server.

The replication structure is to replicate the central server on each operator's machine, so that each operator process has a shared application system. the server receives input information from other workstations and transmits the information to the application system running on the local machine, which performs the required calculations and generates the necessary outputs. Its advantage is that it requires less network bandwidth. In addition, since each operator only interacts with the local backup of the application system, the interactive response effect is good. But it is more complex than a centralized structure, and it is more difficult to maintain

consistency in the information or state of multiple backups in a shared application system.

The main application areas of distributed virtual reality systems. At present, distributed virtual reality systems are mainly applied in remote virtual conferences, virtual medical consultations, multiplayer online games, virtual war exercises, distributed design in manufacturing, and other fields.

Distributed virtual reality systems and online games. Online games, also known as Online Games (OLG), generally refer to video games in which multiple players interact and entertain themselves through computer networks. There are various types of games such as strategy games, action games, sports games, fighting games, music games, racing games, web games, and role-playing games, as well as a few online single player games. What we want to introduce here is a virtual world type online game, mainly provided by servers set up by companies, and players connect to the company's servers through clients provided by the company to play the game. Nowadays, most of the games referred to as online games belong to this type. the characteristic of this type of game is that most players have their own unique character (virtual identity), and all documents and game information are recorded on the company side. From the current development of online games, mainstream online games have some basic characteristics of distributed virtual reality, but this is only a low-level application of distributed virtual reality. Because in terms of the realism of pseudo entity behavior, online games are far from reaching the level of virtual reality, and their communication methods are not as good as distributed virtual reality systems. Their communication methods are too single, relying mostly on language and text communication, lacking natural communication methods such as action gestures. In addition, most online games currently do not allow operators to naturally manipulate objects in the environment like virtual reality, and operators still cannot do without mechanical input devices such as mice.

4. THOUGHTS ON VIRTUAL REALITY SYSTEMS

Overall, virtual reality VR technology refers to freely creating scenarios that are impossible to occur in the real world or phenomena that do not conform to objective laws. In the art of animation, there are many elements such as games, myths, fairy tales, and science fiction that can be easily transformed into "reality" in this world. Therefore, virtual reality, which is based on the perception of virtual objects, brings people a vast imagination space and time. Although it sometimes does not conform to objective laws and logic, it can promote the development of human imagination and creativity.

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Research on The Curriculum Reform of Architectural Decoration Engineering Technology Under the Background Of 'Post-Course-Race-Certificate' Integration

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Abstract: Promoting the integration of 'post-course-race-certificate' is an important direction for the reform of national vocational and technical education. Focusing on the current demand for professional and technical talents in the architectural decoration industry, this paper explores the status quo and reform path of the professional curriculum construction of architectural decoration engineering technology based on the requirements of the core job competence requirements of the architectural decoration enterprises, and explores the direction of cultivating high-quality technical and skillful talents adapted to the characteristics of the new era.

Keywords: Post-Course-Cace-Certificate; Architectural decoration engineering technology; Curriculum reform

1. INTRODUCTION

The concept of 'post-course-race-certification' is proposed to solve the problems of vocational education, such as teaching and production are out of line, and the training of talents can't meet the needs of the society. Through the integration of post-course competition certificate, it aims to enhance the adaptability of vocational education, improve the quality of talent training, make the content of education closer to the actual job requirements, and improve the quality of vocational education.

Strengthening the real economy requires a large number of skilled personnel, promoting industrial transformation and upgrading relies on knowledge integration and technological innovation, skilled personnel are increasingly becoming the core resources of competition, and the development of skilled personnel has risen to a national strategy [1]. Compared with other industries, the building decoration industry has a short cycle, flexible operation, and a great demand for the industry. Its demand for architectural decoration talents is mainly divided into the following types: ① Operational talents who can skillfully operate AutoCAD, Photoshop, SketchUp, 3DsMAX and other software; ② Programme design talents with a high degree of creativity and aesthetic ability; ③ Constructors, salespersons, furniture designers, soft furnishings designers and other related high-skilled talents.

2. CURRICULUM REFORM STATUS

Architectural decoration engineering technology has its own limitations in the face of teaching reform. Firstly, the progress of professional learning is slow, due to the influence of the profession itself, students need to accumulate a certain amount of project experience to reach a higher level of design, and the slow speed of professional skills enhancement will cause a decline in students' interest in learning. Secondly, teaching is still dominated by a single teacher. Even though the shouting of taking students as the main body has become higher and higher, and the professional teachers have tried various methods to determine the dominant position of students in the classroom, but due to the limitation of various factors, the results of promoting the teaching with students as the main body are not obvious. Finally, the evaluation system is incomplete, the teaching means is single, the type of school-enterprise cooperation is single, etc., are the resistance of

the professional curriculum reform.

2.1 Cognition of the needs of the 'post' is not deep enough and accurate, resulting in 'post course' integration is not enough.

Some teachers do not have a deep enough understanding of the actual needs of the industry positions, and only stay in the shallow cognition. This makes in the curriculum and teaching content arrangement, can not fully meet the actual needs of jobs. For example, in the design courses, too much attention may be paid to the teaching of theoretical knowledge, while ignoring the requirements of the actual work on the operability of the design programme, cost control and the interface with the construction process. At the same time, not enough attention is paid to the cultivation of professionalism and comprehensive ability required by the post, such as communication ability, teamwork ability, ability to solve practical problems and so on. This leads to the fact that students need a longer adaptation period when they enter the post after graduation, and they cannot be competent for the job quickly.

2.2 Insufficient understanding of 'competition', resulting in insufficient integration of 'classroom competition'.

Competition can not only stimulate students' interest in learning and competitive awareness, but also test the results of teaching and promote the innovation of teaching methods and content. However, in actual teaching, the integration of courses and competitions is not high. On the one hand, teachers do not integrate the competition projects into daily teaching and lack a competition-oriented teaching mode. On the other hand, the transformation and utilisation of the results of the competition is insufficient, and the cutting-edge design concepts and innovative technologies in the competition are not introduced into classroom teaching in a timely and effective manner, resulting in a relative lag in teaching content.

2.3 Insufficient recognition of the 'certificate', resulting in the lack of deep integration of the 'course certificate'.

Some teachers and students do not have a good understanding of the importance of the '1+X' certificate and neglect its significance in enhancing professional competence and vocational quality. For example, in the construction management programme, there is no targeted teaching on the key points of the relevant vocational qualification certificates, which leads to insufficient preparation of students for the certificates. At the same time, the cooperation with certificate-issuing institutions and enterprises is not close enough, and there is a lack of timely understanding and updating of certificate standards, which makes the teaching of the courses out of touch with the requirements of the certificate.

3 REFORM PATH

At this stage, 'post course competition certificate' integration is mainly carried out from the optimisation of talent training programme, restructuring the curriculum system, updating the course content and other aspects [2-3]. Drawing on the experience of other similar institutions in the integration of 'post course competition certificate', and combining the characteristics of building decoration engineering technology, we conclude that the curriculum reform is carried out in four aspects, namely, curriculum system structure, teaching process, evaluation system, and school-enterprise cooperation.

3.1 Establishing a project-oriented core curriculum system

The core courses of architectural decoration engineering technology usually include 'living space design', 'exhibition space design', 'public space design' and so on. These courses are easy to realise practical training project teaching, which can mobilise students' enthusiasm to the maximum extent. the real cases of enterprises are used as the course content carrier, and the selection of each real case can be closely integrated with the social hotspots, and the practical teaching is carried out in the form of design groups, so that students can fully understand the new standards, new techniques and new technologies of the industry, and at the same time, students' teamwork spirit and sense of social responsibility are stimulated.

3.2 Teaching process of matching project design work

The teaching process of the course should integrate the workflow decomposition of the real project into each task. Completing the teaching task means completing the work task,

and each key teaching node corresponds to the key content of the project. Real problems are real, students play the role of designers in the decorative design practical training, the teacher acts as a mentor and plays the role of the design director of the design company. Students integrate the decorative project design in the learning process, the use of professional knowledge and skills learned in the 'real-world' exercises, in improving vocational skills and the ability to solve practical problems, while cultivating teamwork and communication skills and other professional qualities.

We have built a curriculum system with elements of civic and political system, and the curriculum projects are closely related to current affairs and social hotspots, so as to expand the civic and political connotation of design practice. Combined with the actual situation of the design industry, we take the design practice as an important position for the penetration of ideology and politics, incorporate the ideological and political elements reflecting the professional ethics, sense of professional identity and the socialist core values of 'honesty, trustworthiness, love of work and dedication', guide students to correctly treat the relationship between learning, career and society, complete the coursework, expand knowledge and skills, and also solve socially relevant spatial design problems to enhance the sense of achievement in learning. They can expand their knowledge and skills, and at the same time solve socially relevant spatial design problems and improve their sense of achievement.

3.3 Multi-subject and multi-dimensional curriculum evaluation system

The courses of architectural decoration engineering technology are mostly in the form of examination and evaluation, and the comprehensive evaluation of design works is more subjective. Multi-subject and diversified evaluation methods can comprehensively and systematically promote teaching evaluation and truly restore the original appearance of learning. Project design courses can be based on the third-party evaluation involved in the workflow as one of the evaluation subjects, and the node evaluation between the Party A, the design enterprise, the user, the teacher, and the group members as the evaluation process

system, forming a systematic and complete four-dimensional evaluation system of teachers, enterprises, students, and the Civic Party. And the results of all kinds of competitions are integrated into the course evaluation system as an increase in evaluation to promote the objectivity and comprehensiveness of the evaluation system.

3.4 Multi-dimensional school-enterprise cooperation mode

According to the nature of architectural decoration professional target enterprises can be divided into design companies, construction companies and material companies. At present, the type of school-enterprise co-operation is relatively single, and the co-operative enterprises are mostly professional design companies, and there are fewer co-operative enterprises with professional coordination, such as decorative material companies, furniture companies, etc., which makes the employment surface of students narrow. On the basis of maintaining the existing scale of co-operation with mainstream professional design co-operation enterprises, extend the interior design branch industry, such as lighting design enterprises, soft furnishing design enterprises. Focus on the upstream and downstream enterprises in the industry, such as landscape design enterprises, decorative structure and construction enterprises, decorative material enterprises. Through multi-dimensional school-enterprise co-operation, we can grasp the latest information and technology of the industry and expand the employment of students.

4. CONCLUSION

To establish the comprehensive education mode of 'post course, race and certificate', to improve the quality of talent cultivation, to promote the development of students' skills as the centre, to promote the reform of the teaching mode of "post course, race and certificate", which is a four-in-one teaching mode of architectural decoration engineering technology, to enhance the adaptability of integrated courses and to innovate integrated courses by integrating the elements of "post", "race" and "certificate" into "course". By integrating the elements of 'post', 'race' and 'certificate' into 'class', the adaptability of the

integrated course is enhanced and the integrated course is innovative. Teaching mode.

The curriculum of architectural decoration engineering technology should be based on the needs of vocational ability training and the demand for highly skilled personnel, closely linked to the actual development of local industry, the teaching content of the course is designed as a specific skills training project, with project content to organise the implementation of teaching and assessment. Using the project design process as a carrier, focusing on the current social issues, integrating into the curriculum ideology, enhancing students' vocational core qualities, so that they can match the fast-growing demand for highly skilled personnel.

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Research on The Innovative Integration Mechanism of Mainstream Ideological Guidance and Cultural Confidence Cultivation Among College Students in The Era of Big Data

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Abstract: With the development of big data technology, cyberspace has become an important field for information dissemination, cultural exchange and ideological collision. As the main force of Internet users, the guidance of mainstream ideology and the cultivation of cultural confidence among college students have become important tasks in the ideological and political work of colleges and universities. This paper aims to explore how to use big data to innovate the integration mechanism of mainstream ideological guidance and cultural confidence cultivation in the era of big data, so as to cope with the complex challenges of cyberspace and promote the all-round development of college students.

Keywords: Big Data Era; College Students; Mainstream Ideology on the Internet; Cultural Confidence; Integration Mechanism

1. INTRODUCTION

In the era of big data, the massiveness, immediacy and fragmentation of information are significant, providing soil for the diversified development of network ideologies. However, this also brings unprecedented challenges to ideological and political work in colleges and universities. In cyberspace, various ideological and cultural exchanges and confrontations occur, and some erroneous ideological trends and negative information can easily have a negative impact on college students, affecting their recognition of mainstream ideologies and the establishment of cultural confidence. Therefore, studying the integration mechanism of mainstream ideological guidance and cultural self-confidence cultivation in the Internet in the era of big data has important practical significance and theoretical value.

2. THE NECESSITY OF AN INTEGRATION MECHANISM TO GUIDE COLLEGE STUDENTS' MAINSTREAM IDEOLOGICAL GUIDANCE AND CULTIVATE CULTURAL CONFIDENCE IN THE INTERNET IN THE ERA OF BIG DATA

1.1 Background of the times and practical needs

1.1.1 College students have become the key majority in cyberspace who identify with mainstream ideologies and have cultural confidence.

As "participants" and "present-hands" of the Internet, college students are the key majority in the identification of the mainstream ideology and cultural confidence in cyberspace. First, college students are good at using new media technology to express their views. As the "Internet generation", contemporary college students are more familiar with various new media means, good at using the Internet to retrieve information and conduct self-education, and are willing and dare to express their views online. Secondly, college students are the main concern of hot events on the Internet. They have a natural sensitivity and curiosity about

Internet hot searches, hot topics, and sensitive events. They are generally flamboyant, have a strong sense of self-expression, and are familiar with various Internet discourses. Thirdly, college students' media literacy directly affects the effect of the identification of the mainstream ideology and cultural confidence in the Internet. As the main force of Internet use, college students have active thoughts, strong curiosity, and are easy to accept new things, but they are also easily affected by negative information on the Internet. Therefore, strengthening the guidance of the mainstream ideology of the Internet and the cultivation of cultural confidence is of great significance for guiding college students to establish a correct world outlook, outlook on life, and values.

1.1.2The Internet has built a new platform for enhancing college students' recognition of mainstream ideology and cultural confidence
The Internet has broken through the limitations of time and space, and the limitations of subject and object, and has injected new impetus into the identification of mainstream ideology and built a new position for cultivating college students' cultural confidence. First of all, compared with traditional positions such as newspapers, books, film and television media, and classrooms, the Internet has the characteristics of integration and diversity, integrating text, pictures, sounds, and images. the unique intuitive sense is easier to stimulate the enthusiasm of college students to participate, which is in line with the short-term and fast reading cognitive preferences of college students in the new era. Secondly, with the help of the Internet, college teachers or propaganda workers can not only pay attention to the ideological and political status of college students at any time and answer their questions, but also respond to online voices in a timely manner, criticize and refute wrong ideas, and further do a good job in the dissemination of mainstream ideology and the cultivation of cultural confidence.

1.2. Theoretical value and practical significance
Combining the guidance of mainstream online ideology with the cultivation of cultural confidence can enrich and develop the theory of ideological and political education and

provide new ideas and methods for ideological and political work in colleges and universities. Cultural confidence is an important part of cultural soft power. Combining the guidance of mainstream online ideology with the cultivation of cultural confidence can deepen the understanding of the connotation, characteristics and role of cultural confidence and provide new perspectives and materials for theoretical research on cultural confidence.
1.2.2 Improve college students' online literacy and enhance their cultural identity and pride
By strengthening the guidance of the mainstream ideology of the Internet and cultivating cultural confidence, we can improve college students' Internet literacy and information discrimination ability, so that they can consciously resist the influence of negative information in cyberspace and maintain correct ideas and values. By deeply exploring and promoting the excellent traditional Chinese culture, college students can have a deeper understanding and identification with Chinese culture, enhance their sense of identity and pride in Chinese culture, and thus strengthen their cultural confidence. the organic combination of the guidance of the mainstream ideology of the Internet and the cultivation of cultural confidence will help create a clean and healthy Internet environment and promote the healthy development of the Internet ecology. This is not only conducive to the healthy growth of college students, but also conducive to the harmony and stability of society.

1.3 Innovation and deepening of integration mechanisms
Actively build a network mainstream ideological discourse system with Chinese characteristics and characteristics of the times in cyberspace, and spread mainstream values and cultural concepts in a language and way that college students can easily accept. This will help enhance the appeal and appeal of mainstream ideology and improve college students' recognition of mainstream ideology. Incorporate network literacy education into the ideological and political curriculum system of colleges and universities to improve college students' network literacy and information discrimination ability. This will help guide college students to keep a clear mind in cyberspace and consciously resist the

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influence of negative information.

2. THE PATH OF THE INTEGRATION MECHANISM OF MAINSTREAM IDEOLOGICAL GUIDANCE AND CULTURAL CONFIDENCE CULTIVATION FOR COLLEGE STUDENTS IN THE ERA OF BIG DATA

When we deeply explore the integration mechanism of mainstream ideological guidance and cultural confidence cultivation in the era of big data, we have to pay attention to how technological innovation can open up new paths and possibilities for this integration process. With the rapid development of cutting-edge technologies such as artificial intelligence, cloud computing, and blockchain, the way information is obtained, processed, and disseminated is undergoing unprecedented changes, which provides strong technical support for building a more efficient, accurate, and comprehensive integration mechanism.

2.1 Technology empowerment and precise guidance

First, by using big data analysis technology, we can achieve real-time monitoring and in-depth mining of online public opinion. By collecting, sorting and analyzing massive amounts of online data, we can accurately grasp the ideological trends, values and cultural preferences of college students, and provide a scientific basis for formulating targeted mainstream ideological guidance strategies.

2.2 Scenario-based education to enhance experience

At the same time, with the help of immersive technologies such as virtual reality (VR) and augmented reality (AR), we can create an online mainstream ideological education platform that integrates knowledge, fun, and interactivity. By simulating real or fictional scenes, college students can feel the charm of China's excellent traditional culture in an immersive experience and deepen their understanding and recognition of the core socialist values. This scenario-based education method can not only enhance the fun and effectiveness of learning, but also subtly enhance people's cultural confidence.

2.3 Blockchain technology to ensure authority

The decentralized and tamper-proof characteristics of blockchain technology provide a strong guarantee for the authority of the guidance of the mainstream ideology and the cultivation of cultural confidence on the Internet. By building a digital copyright protection system based on blockchain, it is possible to effectively prevent the piracy and abuse of cultural resources, protect the legitimate rights and interests of creators, and stimulate the vitality of cultural innovation. At the same time, blockchain technology can also be used to record and disseminate the entire process of mainstream ideological education, ensure the authenticity and traceability of educational content, and enhance the public's sense of identity and trust in mainstream ideology.

2.4 Intelligent interaction, deepening communication

The interactive technology of artificial intelligence has injected new vitality into the guidance of mainstream ideology and the cultivation of cultural confidence on the Internet. Through tools such as intelligent chat robots and emotion recognition systems, we can achieve efficient and personalized communication with college students. These intelligent systems can not only answer questions and provide learning resources, but also dynamically adjust communication strategies according to user feedback and emotional changes, making the education process more intimate and persuasive. In addition, the intelligent interactive platform can also promote communication and collision between college students from different backgrounds and different perspectives, forming a more open and inclusive ideological atmosphere, and providing fertile soil for the cultivation of cultural confidence.

2.5 Cloud platform sharing, broadening horizons

The widespread application of cloud computing technology has built a huge resource sharing platform for the guidance of mainstream ideology and the cultivation of cultural confidence on the Internet. Through the cloud platform, we can bring together various high-quality educational resources and cultural achievements to achieve seamless connection across regions and fields. College students can obtain rich learning materials and

cutting-edge cultural information anytime and anywhere with just a click, which greatly broadens their knowledge and cultural horizons. At the same time, the cloud platform also supports interactive sharing among users, encouraging college students to actively upload their learning experiences and cultural creations, forming a virtuous cycle of learning ecosystem.

2.6 Innovative communication, leading the trend

In the era of big data, innovation in communication methods is also crucial for the guidance of mainstream ideology and the cultivation of cultural confidence on the Internet. We need to make full use of new media channels such as social media and short video platforms to spread the concept of mainstream ideology and cultural confidence in a more vivid and intuitive way. Through carefully planned theme activities, short video challenges and other forms, we can attract more attention and participation from college students, so that mainstream ideology and cultural confidence can become a clear stream and a trend-leading force in cyberspace. At the same time, we also need to pay attention to the evaluation and feedback mechanism of communication effects, continuously optimize communication strategies and content quality, and ensure the maximization of communication effects.

In summary, technological innovation has opened up new paths and possibilities for the integration mechanism of mainstream ideological guidance and cultural confidence cultivation on the Internet in the era of big data. Through the comprehensive use of various means such as technology empowerment, scenario-based education, blockchain security, intelligent interaction, cloud platform sharing and innovative communication, we can build a more efficient, precise and comprehensive integration mechanism system to contribute wisdom and strength to the cultivation of new-era college students with high cultural confidence and firm identification with mainstream ideology.

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The Exploration and Implementation of New Media Matrix Operation in College League Studies

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Abstract: This paper elaborates on the significance of constructing new media for college league studies. It summarizes the typical characteristics of college league studies' new media and analyzes its operational mode from platform type, business level to consciousness orientation. Feasible paths for operating new media for college league studies are also summarized.
Key words: Application-oriented university; Group learning new media; New media matrix

1. INTRODUCTION

In the era of mobile internet, it is crucial for universities to create new media works using diverse forms of media that cater to the preferences of young students. This understanding and grasp of the laws and trends in all-media era news and communication will help establish a conducive environment for news and publicity, strengthen mainstream discourse, enhance communicability, guidance, influence, and credibility.

2. THE CONSTRUCTION OF NEW MEDIA WITHIN COLLEGE LEAGUES HOLDS PARAMOUNT SIGNIFICANCE.

In July 2021, the Opinions on strengthening and improving ideological and political work in the new era, issued by the CPC Central Committee and the State Council, underscored the need to fortify ideological and political efforts online. It called for a more profound implementation of network content projects and enhanced social management according to law. Furthermore, it advocated integrating traditional strengths with information technology - transforming the internet from a variable into a catalyst for career growth.

With the surge of the mobile Internet, the news propaganda work in colleges and universities is facing unprecedented opportunities and challenges. In this context, it is particularly critical to actively use diverse media forms to create new media works that are close to young students' preferences and in line with the pulse of the Times. This can not only help universities to deeply understand and accurately grasp the internal laws and frontier dynamics of news communication in the all-media era, but also lay a solid foundation for creating a positive, healthy and orderly news publicity environment. By strengthening the guiding power of mainstream public opinion, these new media works effectively improve the speed of news dissemination, expand the coverage, and enhance its orientation, influence and credibility, injecting strong impetus into the shaping of the image of universities and the promotion of brand value.

3. THE DISTINCTIVE FEATURES OF THE NEW MEDIA FRAMEWORK IN COLLEGE-LEVEL RESEARCH.

During the long-term evolution of new media within college student unions' developmental processes, a structure has been established featuring by WeChat, Micro-blog, website, client and Tiktok, Which aimed at innovating three-dimensional educational content. The adoption of this matrix approach extends across platform channels, integrative practices, and technological methods, resulting in heightened levels of student engagement through micro-participation while elevating network-based ideological education.

3.1 "Audience"+"Content" is more targeted

In today's digital age, the way of obtaining information and the channel of expressing views of college students are increasingly showing the remarkable characteristics of fragmentation. the wide popularity and high openness of new media not only break the

inherent limitations of the traditional platform in time and space, but also extend the educational position to every corner of the Internet, and greatly enrich the content and form of ideological and political teaching in the curriculum. Through the new media platform, a large number of current affairs, fresh cases and multicultural materials are rapidly integrated, providing inexhaustible educational resources for ideological and political courses, effectively promoting the deep integration and efficient use of education carrier resources, and further enhancing the sense of the Times, attractiveness and effectiveness of ideological and political education.

3.2"Narrative"+"Landscape" is more attractive

The rapid development of new media technology has profoundly reshaped the habits of college students in accessing media and observing the world, making them more inclined to diversified and instant information acquisition methods. In this context, the university campus new media matrix actively innovates, explores a new path of three-dimensional content production, skillfully integrates the profound "narrative" mode based on text and the vivid "landscape" presentation supported by multimedia technology, and realizes the double leap of the depth and breadth of content expression. At the same time, through the multi-platform linkage strategy, the diversified media use preferences of college students are accurately connected, which not only enrich is the campus cultural life, but also effectively improves the coverage and influence of ideological and political education and information dissemination.

3.3 "Online"+"Offline" Interactive Education

The in-depth development of the online platform for education has completely subverted the relatively one-way information output mode mainly centered on "classroom" between the disseminator (teacher) and the audience (student) in the traditional ideological and political work. On this new platform, the introduction of real-time interactive functions such as "like", "comment" and "bullet screen" not only greatly broadens the communication channels

between teachers and students, but also stimulates the enthusiasm and initiative of students to participate in ideological and political learning. Many new media in colleges and universities have innovatively integrated a variety of high-quality functions such as one-stop "learning circle", which not only effectively broke the communication barriers between the two sides of the communication, making the flow of information smoother and more unimpeded, but also provided valuable feedback channels for ideological and political workers to help them accurately grasp the needs of students and continuously optimize working methods. We will promote the development of ideological and political education in a more efficient, accurate and humanized direction.

3.4 "Co-building" & "Sharing"

Under the framework of the same new media matrix, all network education subjects show a high degree of cooperation spirit, and realize the optimal allocation and efficient use of resources through appropriate sharing of communication materials, fan resources and platform advantages. In this process, they skillfully use the hierarchical planning strategy of multi-level issues to accurately connect the unique functions of different terminal products and the audience preferences of different subjects, so as to give full play to their respective expertise and advantages. In order to further expand their influence, each subject also actively adopted innovative forms such as "help push", "mutual transfer" and "relay" to join hands in promoting on cross-campus media platforms, jointly building a strong public opinion field, and forming a significant cluster effect. It is particularly worth mentioning that many college teachers and students actively participate in the field of campus we-media, and a number of successful cases have emerged. They take "pan-campus media" as a platform, which not only enrich is the content and form of online education, but also becomes an important force to promote the coordinated development of online education in colleges and universities.

4. EXAMINATION OF THE OPERATIONAL MODELS OF NEW MEDIA IN COLLEGE STUDENT

UNIONS.

4.1 Platform types

Currently, educational institutions specializing in new media primarily utilize the following three categories of new media platforms:

4.1.1. Short-text category

Micro-blog, QQ Space discussions, and WeChat "Moments" posts.

4.1.2 Long-form graphics

WeChat public accounts, Baidu, Today's Headline articles, and Bilibili articles.

4.1.3Short-video category

Tiktok, Kwai, WeChat video accounts, and Bilibili.

4.2 Business level

The operation of new media in universities encompasses three essential levels: positioning, business, and organizational.

4.2.1 Positioning level

The new media platforms of universities should be tailored to specific target audiences. For example, the users of university official new media include faculty, students, alumni, prospective students and their parents, as well as the general public interested in university development. the service users of college Youth League Committee's new media are young faculty and students, league organizations, alumni invested in league development and the general public.

4.2.2Business level

This includes content design, functional design, interactive design, promotion design etc., with a focus on serving the users at the positioning level.

4.2.3 Organizational level

In order to meet the business needs of new media operation in colleges and universities, it is urgent to build a systematic organizational structure, which is closely centered on the four core elements of team, technology, products and activities. the team is responsible for content creation and operation management, technology is the key to support the stable operation and innovative development of the platform, products focus on user experience and function optimization, and activities serve as a bridge connecting teachers and students to enhance interaction and participation. Through the effective operation of this organizational framework, the aim is to efficiently realize the mission of publicity and education and the goal of public opinion guidance of new media in colleges and universities.

4.3 CONSCIOUSNESS ORIENTATION

In the study of new media in colleges and universities, it is imperative to rigorously adhere to the following four consciousness principles in order to minimize operational mishaps.

4.3.1Political awareness

New media platforms in colleges and universities should align with Marxist guidance, fully implement the Party's educational policy, prioritize ideal and belief education, focus on patriotism education, and base their efforts on ideological and moral construction. It is essential to persistently foster and promote socialist core values.

4.3.2Awareness of the big picture

In the process of operation, the primary task of the new media platform in colleges and universities is to closely focus on the central work of the university and the overall situation of service, accurately grasp its own coordinate positioning in the information communication ecology, and always bear in mind the social responsibility and mission of the platform. In the pursuit of innovation and development, we must deeply reflect on and continue to solve the fundamental proposition of "for whom, rely on whom, and who I am" to ensure that the direction of work is not biased and the goal is not shifted. Establishing a strong overall view is the cornerstone of the healthy growth of new media platforms in universities. It requires us to pursue speed in the dissemination of information, but also to ensure the accuracy and authenticity of the content, and to avoid blindly following the trend or acting impulsively when the truth is not clear. At the same time, we should be alert to short-sighted behavior of "stealing the limelight", so as to avoid missing opportunities and wasting valuable resources and time due to eagerness for success. Only in this way can the new media platform of colleges and universities become a solid position to transmit positive energy and lead the trend of thought.

4.3.3 Service awareness

Despite any changes or transformations within university new media platforms, service

remains at its core. By repeatedly assisting teachers and students with problem-solving tasks while consistently providing necessary service-related information for them, these platforms can build trust among their followers while strengthening connections between fans and the platform itself. the goal for college/university new media platforms should be establishing an online communication platform—an online educational hub—that young educators/students desire; one they can easily find solace in.

4.3.4Be aware of the bottom line

While many college/university new media outlets have been driven by pursuits of high readership numbers/rankings/followers leading them into competitive beauty contests—traditional journalistic standards must not be overlooked; especially so for new digital mediums where boundaries are less defined than those found within traditional forms of journalism/media coverage.

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Finite-Time H_∞ Control for Stochastic Nonlinear Time-Delay Systems with Applications to Intelligent Driving

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Abstract: The applications of finite-time H_∞ control for stochastic nonlinear time-delay systems to intelligent driving is investigated in this paper. Intelligent driving technology is subject to multiple distractions as it evolves, which can affect vehicle perception, decision making, and overall safety. Firstly, the finite-time H_∞ control problem of nonlinear stochastic systems with time-delay is defined. Secondly, by using Lyapunov-Krasoviskii functional method and matrix inequality technique, some sufficient conditions for the existence of finite-time H_∞ state feedback controllers for nonlinear stochastic systems with time-delay are obtained. These conditions guarantee the mean-square finite- time boundedness of the system and determine the H_∞ control performance index. Finally, a numerical example is given to verify the effectiveness of the proposed method.

Keywords: Stochastic Systems; Finite-Time Stability; H_∞ Control; Time-Delay; Intelligent driving

1. FINITE-TIME H_∞ CONTROL PROBLEM OF INTELLIGENT DRIVING SYSTEMS

In order to solve the problem of stochastic control system analysis and synthesis, stochastic control theory has a wide range of research fields, in which stability analysis is the basic content of stochastic control system research. Generally speaking, the prerequisite for the normal operation of stochastic control system is stability. The Lyapunov stability theory is more general in the current system control theory, which describes the steady-state characteristics of the system over an infinite period of time. Although the research on Lyapunov stability is extensive, it is also important to consider the steady-state characteristics of the system over a short period of time in many engineering applications. Therefore, the concept of finite time stability came into being.

Stability is the basic premise of the normal operation of the control system, is the characteristics of the system itself, the stability of the control system is only related to the parameters and structure of the system itself, rather than depending on the input and output signals, so the first thing to ensure when designing the controller is the stability of the system. So far, most of the results of stochastic systems are based on asymptotic stability in the Lyapunov sense [1], which only concerns the asymptotic behavior of the system over infinite time. Because it can realize the analysis of linear, time-varying systems and other control systems, it solves many control related research problems and promotes the research and development of control theory. At present, many achievements have been made in the study of stability in the sense of Lyapunov.

H_∞ control is an optimal control, which can make the objective function obtain an extreme value. As one of the important robust control methods, H_∞ control can make uncertain systems meet the robustness, and its main goal is to suppress external interference and reduce the effect of random disturbance on system errors. The advantages of H_∞ control problems mainly include the following aspects:
1.1 It can effectively solve the shortcomings of the current control theory and integrate the advantages of various research methods;
1.2 Replace the corresponding design

problems by using control studies to make them more practical and meet the requirements of the research;

1.3Adopt the method of solving linear matrix inequalities and combine other related technologies to design the controller, and finally get the controller that meets the requirements;

1.4In the frequency domain design problem, compared with the optimal regulator, the solution of the parameters of this controller is more concise.

In recent years, the control problems of stochastic nonlinear systems have received more and more attention because they have been widely used in many practical systems, such as chemical reactor systems [2], industrial and economic systems [3]. However, most results for stochastic systems are based on asymptotic stability in the Lyapunov sense, which involves only the asymptotic behavior of the system in an infinite time limit. But in many practical systems, transient behavior is also important. For example, excessive transient voltage can disrupt the normal operation of the power system [4]. In order to solve this problem, the concept of finite-time stability is proposed.

Intelligent driving systems rely on a variety of sensors to sense their surroundings, such as radar, lidar, cameras, and more. Electromagnetic interference is an important problem in intelligent driving, and it can come from a variety of sources such as other vehicles, road infrastructure, wireless communication devices, and so on. Electromagnetic interference can affect the normal operation of sensors, resulting in inaccurate environmental perception, decision-making errors and other issues, which threaten the safety and reliability of autonomous vehicles.

Although the problem of finite-time H_∞ control has been investigated, there is a lack of literature on Itô-type stochastic nonlinear time-delay systems. To redress this issue, the finite-time H_∞ control these systems was investigated in our study. Because of the complexity of the systems considered, designing a H_∞ controller with state feedback is difficult. By using the Itô formula, the Gronwall inequality, and the

matrix inequality technique, the above difficulties are overcome.

2. FINITE-TIME H_∞ CONTROL FOR STOCHASTIC NONLINEAR TIME-DELAY SYSTEMS

Consider the following stochastic nonlinear time-delay systems

$$\begin{cases} dx(t) = (A_{11}x(t) + A_{12}x(t-\tau) + B_{11}u(t) + B_{12}v(t) + G_0(x(t)))dt \\ \qquad + (A_{21}x(t) + A_{22}x(t-\tau) + G_1(x(t)))dw(t) \\ y(t) = D_1x(t) \\ z(t) = D_2x(t) \\ x(t) = \varphi(t) \in L^2(w, F_0, C([-\tau, 0], R^n)), t \in [-\tau, 0] \end{cases} \quad (1)$$

where x(t) is the state input of the system, y(t) is the measurement output, u(t) is the control input, z(t) is the control output, $\varphi(t)$ is the initial state function, and w(t) is the Wiener process. $\tau > 0$ is the time-delay, v(t) is the external interference and the following conditions are met:

$$\Phi(v(t)) = \{v(t) \mid E\int_0^T v'(s)v(s)ds < h^2\} \quad (2)$$

The nonlinear terms $G_0(x(t))$ and $G_1(x(t))$ satisfy

$$\|G_i(x)\| \le \xi \|x\|, i = 0, 1 \quad (3)$$

Next, a new definition of the mean-square finite-time boundedness for the system (1) is given.

Definition 1: For given $0 < \mu_1 < \mu_2$, $T > 0$, $R > 0$, the system (1) is bounded in mean square finite-time with respect to $(\mu_1, \mu_2, T, R, h^2)$ under the condition $u(t) \equiv 0$, if

$$\sup_{-\tau \le t_0 \le 0} \{x'(t_0)Rx(t_0)\} \le \mu_1^2 \Rightarrow E[x'(t)Rx(t)] < \mu_2^2, \quad \forall t \in [0, T], v(t) \in \Phi$$

The design of the state feedback finite-time H_∞ controller is described next.

Consider the following state feedback controller

$$u(t) = Kx(t) \quad (4)$$

where K is the controller gain matrix to be solved.

A closed-loop system is obtained by substituting (4) into system (1) giving

$$\begin{cases} dx(t) = (\tilde{A}_{11}x(t) + A_{12}x(t-\tau) + B_{12}v(t) + G_0(x(t)))dt + (A_{21}x(t) \\ \qquad + A_{22}x(t-\tau) + G_1(x(t)))dw(t) \\ y(t) = D_1x(t) \\ z(t) = D_2x(t) \\ x(t) = \varphi(t) \in L^2(w, F_0, C([-\tau,0], R^n)), \ t \in [-\tau,0] \end{cases} \quad (5)$$

where $\tilde{A}_{11} = A_{11} + B_{11}K$.

Next, the definition of state feedback finite-time H_∞ control problem for nonlinear stochastic time-delay systems is given as follows.

Definition 2: For given scalars $0 < \mu_1 < \mu_2$, $h > 0, T > 0, \gamma > 0$, and a matrix $R > 0$, if there exists a state feedback controller (4) such that:
(i) the closed-loop system (5) is mean-square finite-time bounded with respect to $(\mu_1, \mu_2, T, R, h^2)$;
(ii) for any non-zero disturbance v(t), the control output z(t) satisfies the following inequality with zero initial condition

$$E\int_0^t z'(s)z(s)ds < \gamma^2 E\int_0^t v'(s)v(s)ds \quad (6)$$

then (4) is said to be a state feedback finite-time H_∞ controller for system (1).

Remark 2: The definition considers both the attenuation level of the disturbance and the mean-square finite-time boundedness, which is widely applied in practical systems. For example, in the solar power supply system, if the load power is too large or the external interference is strong, the normal operation of the system will deteriorate.

The sufficient conditions for the existence of the state feedback finite-time H_∞ controller (4) are given below.

Theorem 1: For given scalars $0 < \mu_1 < \mu_2$, $T > 0$, h > 0 and a matrix R > 0, if there are scalars $\alpha \geq 0$, $\gamma > 0$, $\sigma > 0$, $\theta > 0$, $\tau > 0, \xi > 0$, two symmetric positive definite matrices U, W, and a matrix M satisfying

$$\begin{bmatrix} \Gamma_{11} & * & * & * & * \\ \Gamma_{21} & \Gamma_{22} & * & * & * \\ UA_{12}' & 0 & -W & * & * \\ 0 & 0 & \sqrt{3}UA_{22}' & -U & * \\ UB_{12}' & 0 & 0 & 0 & -\gamma^2 I \end{bmatrix} < 0 \quad (7)$$

$$\sigma R^{-1} < U < R^{-1} \quad (8)$$

$$0 < W < \theta R^{-1} \quad (9)$$

$$\begin{bmatrix} h^2\gamma^2 - \mu_2^2 e^{-\alpha T} + \mu_1^2 \tau\theta & \mu_1 \\ \mu_1 & -\sigma \end{bmatrix} < 0 \quad (10)$$

where
$\Gamma_{11} = (1-\alpha)U + W + UA_{11}' + A_{11}U + M'B_{11}' + B_{11}M$,
$\Gamma_{22} = diag\{-U, -I, -U, -I\}$,
$\Gamma_{21} = \left[\sqrt{3}A_{21}U, C_2U, A_{21}U, 2\xi\sqrt{\beta_2}U\right]'$, then (4) is a state feedback finite-time H_∞ controller. In this case, $K = MU^{-1}$.

3. NUMERICAL EXAMPLES
The matrix of coefficients of the system (1) is given as follows.

$A_{11} = \begin{bmatrix} -30 & 25 \\ -10.38 & -30.16 \end{bmatrix}$, $A_{12} = \begin{bmatrix} 0.2 & 0.1 \\ 0 & 0.3 \end{bmatrix}$, $B_{11} = \begin{bmatrix} -4 \\ 3 \end{bmatrix}$, $B_{12} = \begin{bmatrix} 0.1 & -0.1 \\ 0.5 & 0.7 \end{bmatrix}$,

$A_{21} = \begin{bmatrix} -2.7 & 0.8 \\ 0.9 & -1.6 \end{bmatrix}$, $A_{22} = \begin{bmatrix} -0.2 & -0.5 \\ -0.3 & -1.4 \end{bmatrix}$, $D_1 = \begin{bmatrix} 1 & 0 \\ 0 & 0 \end{bmatrix}$, $D_2 = \begin{bmatrix} 2 & 1 \\ 2 & 3 \end{bmatrix}$.

Let $\mu_1 = 1$, $\mu_2 = 4$, $T = 1$, $h = 1$, $\tau = 0.5$, $\xi = 1.2$, R = I be the identity matrix.

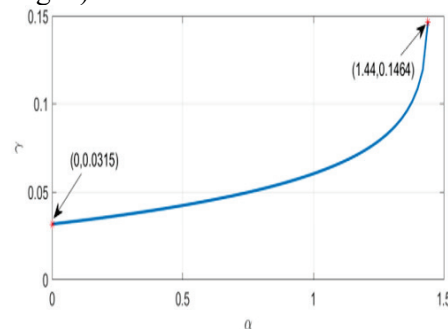To find the minimum value of γ, the relationship between γ and α is obtained (see Fig. 1).

Figure 1. Plot of the minimum upper bound of γ when $\alpha \in [0,1.44]$

From Fig. 1, γ increases with increasing α, and the minimum value of γ = 0.0315 is obtained when α = 0.

Setting α = 0, according to Theorem 1, we obtain the state feedback controller is as follows:

$$u(t) = \begin{bmatrix} 1.3484 & 0.2326 \end{bmatrix} x(t)$$

4. CONCLUSION

This paper investigated the finite-time H_∞ control problem for stochastic nonlinear time-delay systems with applications to intelligent driving. Based on this problem, a finite-time H_∞ controller was designed. The derived sufficient conditions can not only ensure the mean-square finite-time boundedness of the closed-loop system, but also determine the performance index of H_∞ control.

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Employment Psychology of College Graduates and Its Countermeasures

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Abstract: The current situation and coping strategies of employment psychology among college graduates

In today's society, the employment of college students is one of the social issues that attract attention. Faced with the severe employment situation, the employment psychology of college graduates has shown significant fluctuations and has resulted in varying degrees of employment psychological problems. This article elaborates on the significance of research on the employment psychology of college graduates. Through investigation and interview methods, the current situation of employment psychology of graduates is understood. the reasons for its emergence are explored from four aspects: society, universities, families, and graduates, and solutions are proposed to promote the healthy development and smooth employment of college graduates.

Keywords: College graduates; Employment psychology; Present situation; Countermeasure

1 INTRODUCTIONS

Employment is the foundation of people's livelihood. It not only relates to the personal development of students, but also to the family interests behind each student. More importantly, it relates to national construction, economic development, and social stability. At present, the severe employment situation has affected the employment psychology of college graduates to varying degrees, making the employment problem more complex and variable, leading to many psychological problems among graduates. Psychological health is an important component of overall health. By understanding the current employment psychology of college graduates and developing relevant strategies, it can provide guidance and protection for college students during their transition from campus to society.

2 THE RESEARCH SIGNIFICANCE OF EMPLOYMENT PSYCHOLOGY OF COLLEGE GRADUATES

2.1 Beneficial for Promoting the Healthy Development of College Graduates

Universities are the main battlefield for cultivating morality and talents, and should cultivate talents with comprehensive development in morality, intelligence, physical fitness, aesthetics, and labor for the country. By strengthening employment psychological education for college students, helping them to conduct rational self analysis and objective practical analysis, timely discover their own shortcomings, improve their employment competitiveness, actively seize employment opportunities, and make reasonable decisions; Fully exercise oneself in employment practice, thereby laying the foundation for the healthy development of their future career.

2.2 Beneficial For Completing the Role Transformation Of College Graduates

Graduates are about to enter society, and campus life is different from social life. Once they truly enter society and switch roles, various problems will arise. If their self psychological adjustment is not good, it often triggers psychological problems. Graduates need to establish awareness of role transformation in advance, and constantly adjust themselves in the new work environment, and overcome difficulties with practical actions to integrate into society as soon as possible. Cultivating a good employment psychology among graduates can promote their ability to better handle complex interpersonal relationships, adapt to the social environment of future employment, and complete role transitions more smoothly. [1]

2.3 Beneficial For Resolving the Psychological Crisis Of College Graduates

In recent years, China's economy has developed rapidly, and people's material living standards have significantly improved. However, the construction of spiritual civilization has not yet reached the corresponding level and height, and psychological problems among various groups in society have become prominent, especially among college students. Some students have poor psychological resilience and insufficient ability to handle problems on their own. If they encounter significant setbacks during their job search, it may lead to psychological breakdown and even extreme behaviors such as self harm and suicide. By studying the employment psychology of college graduates, psychological problems can be screened, preventive measures can be taken in advance, and psychological crises can be resolved in a timely manner.

2.4 Beneficial for Promoting Smooth Employment of College Graduates

The employment issue of college graduates is not only related to career choices, but also involves mental health issues. To handle things well, first deal with your mood. Through the investigation and research of graduates' employment psychology, we can truly understand the employment needs and psychology of college graduates, propose prevention and response strategies for employment psychological problems, and provide theoretical guidance for implementing psychological health education for graduates' employment and formulating measures to promote college students' employment. On the basis of understanding the specific situation of graduates, timely identify problems, provide psychological counseling, help them recognize the employment situation, adjust their career mentality, face their own abilities, and better prepare themselves psychologically for future work. Solving the psychological dilemma of graduates' employment can make them more proactive in seeking job opportunities and promote their smoother employment.

3 THE INFLUENCING FACTORS OF EMPLOYMENT PSYCHOLOGY AMONG COLLEGE GRADUATES

3.1 Social Factors

The world's unprecedented changes are accelerating, and China's economic and social development is facing great challenges. the employment situation for graduates has become more complex, and the employment work in universities is facing unprecedented problems. With the expansion of enrollment scale in universities, the number of college students is constantly increasing, and employment competition is becoming more and more fierce. Graduates have a growing sense of employment crisis, and the huge job search team is in stark contrast to the limited employment opportunities, which brings huge psychological pressure to graduates.

3.2 Family Factors

Family is an important influencing factor of psychological pressure on college students' employment. Whether the family provides timely economic and spiritual support when choosing a career greatly affects the enthusiasm of college students for employment. the education and family environment of parents deeply affect the psychological state of students. Some parents have too high expectations for graduates, cling to traditional concepts, and place the hopes of the entire family on students, excessively intervening in students' employment choices, seriously affecting the autonomy of graduates' employment. the higher the expectations of parents, the greater the psychological pressure they bring to students. Some parents spoil graduates, leading to poor psychological resilience and a lack of problem-solving skills. There is also a lack of effective communication between parents and graduates, as well as lagging family education, which results in graduates not receiving the care and support they need, leading to psychological deviations.

3.3 School Factors

As a place for talent cultivation, universities offer courses on career planning and employment and entrepreneurship guidance as required. However, due to the large number of students, employment guidance is not personalized or specialized enough, and there is a lack of targeted assistance for students facing employment difficulties. It does not help students recognize their own needs and alleviate graduates' concerns about employment. Regarding mental health education in universities, there are very few

courses specifically designed for graduates, and they are basically lacking. There is a lack of timely understanding of the employment psychology status of graduates and providing them with the necessary guidance and support. In addition to education and guidance, universities often lack screening for graduates' employment psychological problems, neglect to pay attention to their psychological state, and fail to do a good job in preventing and intervening in graduates' employment psychological problems. the employment psychological construction methods that teachers can adopt are relatively backward, and it is difficult to meet the demands of different levels of students' employment psychological development. In addition, a single psychological health education method is not conducive to maintaining students' enthusiasm for participation. Therefore, it is difficult to help students form correct employment concepts and psychological literacy through psychological health education work. [2]

3.4 Personal Factors

Graduates have uncleared self positioning, unclear employment goals, lack sufficient confidence, face heavy employment pressure, and are unable to self adjust, resulting in various psychological problems and even mental illnesses. Some graduates have weak employment will and cannot face difficulties squarely. Some even have a mentality of avoiding employment, slow employment, laziness in employment, and a few are unwilling to work. Graduates are influenced by individual differences and have different employment psychological states, mainly manifested as cognitive biases and personality issues in job selection, including cognitive biases of college graduates towards their own value, professional alignment, occupation, and social status. Faced with future employment issues, if graduates cannot have a correct understanding of themselves, analyze their strengths and weaknesses, and are unclear about what they want to do and what they can do, they are prone to falling into a state of confusion, unable to tap into their potential, and unable to realize their own value. Due to insufficient personal abilities, some graduates find it difficult to achieve the goal of 'I am determined by myself, not by fate'. In the process of career selection, graduates are prone to various negative psychological states when facing a complex job market.

4 STRATEGIES FOR COPING WITH THE PSYCHOLOGICAL DIFFICULTIES FACED BY COLLEGE GRADUATES IN THEIR EMPLOYMENT

4.1 Taking Multiple Measures To Broaden Channels And Solve Practical Employment Problems

Faced with an increasingly severe employment situation, the government needs to strengthen its support and guidance for graduates' employment, creating more job opportunities for them. the government should keep the employment channel unblocked, release employment information for college graduates, make students deeply understand the employment market through various measures, give full play to the advantages of the Internet, strengthen the education of graduates' world outlook, outlook on life and values, and encourage and support graduates to start businesses. the government should ensure the standardization of the job market, strengthen supervision and management of the job market, establish a sound talent selection and employment mechanism, assist college graduates through various channels, create a good social employment atmosphere, ensure a fair, scientific, and reasonable employment environment, and reduce the employment psychological problems of graduates. On the other hand, enterprises and units in society should actively respond to national policies, consciously implement relevant requirements, broaden employment opportunities, increase job seeking positions, provide more understanding, tolerance, and support to graduates, and alleviate their sense of employment crisis.

4.2 Play the Role Of Family Education To Reduce the Psychological Burden On Students

Family is a harbor of warmth for graduates, and family education plays a very important role in the physical and mental health of college students. the expectations of parents also have a significant impact on the employment of graduates. Parents must learn to understand their children, start from reality, and not impose their subjective wishes on

them. In the process of choosing a career, parents can help their children analyze employment issues together and provide assistance when necessary, but they should also give their children enough time, space, and rights to make their own choices. [3]

4.3 Strengthen Mental Health Education And Establish a Long-Term Working Mechanism

Colleges and universities should attach great importance to education on students' career planning, mental health, and other aspects. They should provide accurate employment information to students, provide employment guidance and psychological counseling, and invite outstanding alumni to hold employment experience sharing and exchange meetings for graduates, teach job seeking methods, relieve ideological confusion, and enable graduates to conduct scientific self-evaluation, establish correct career values, and cope with setbacks in the workplace with an optimistic attitude. To better understand the psychological status of graduates, universities can conduct psychological screening for them. If students with psychological problems are identified, experienced teachers can be organized to have heart to heart talks with these students and provide appropriate guidance and support. Universities should establish a psychological health service mechanism for graduates' employment based on actual situations, carry out daily psychological counseling and guidance, provide timely, professional, and efficient services, and solve problems for graduates. At the same time, schools can also strengthen school enterprise cooperation, visit enterprises to expand employment opportunities, mobilize various forces to search for employment resources, actively collect employment recruitment information, and combine online and offline methods to timely release employment information, providing more employment opportunities for graduates. For graduates from economically disadvantaged families with insufficient job seeking abilities, schools can adopt a "one-on-one" approach to provide targeted assistance and establish long-term and effective work mechanisms.

4.4 Transform Employment Mindset And Improve Psychological Adjustment Ability

Faced with employment issues, college graduates need to change their employment mindset and improve their psychological adjustment abilities. Self adjustment can alleviate employment pressure, guide college students to face adversity and setbacks bravely, have a correct understanding and continuously improve themselves, and transform employment pressure into internal motivation for learning and self-improvement. As individuals about to enter society, graduates should learn to identify, analyze, and solve problems during the job search process, constantly hone their minds, improve their overall quality, and enhance their confidence in future employment.

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Higher Vocational Education in the New EraResearch and Exploration of Labor Education in Higher Vocational Colleges under the Background of New Era

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Abstract: the socialist education system with Chinese characteristics requires students to set up correct labor values, so labor education courses are particularly important. At present, there are some problems in the implementation of labor education in some higher vocational colleges. This article starts from the significance of labor education course establishment in higher vocational colleges, analyzes the predicament of labor education in higher vocational colleges, and puts forward corresponding improvement measures to solve the problems urgently needed.

Key words: Labor Education; Higher Vocational Education

1. INTRODUCTION

With the development of the times, higher vocational colleges are required to train more technical talents for the society. With the advent of the digital age, people are placed in the data grid constructed by digital technologies such as big data, artificial intelligence, and cloud computing. New industrial formats, new economic models, new occupations, and new labor forms have emerged. This also brought profound changes and challenges to the development of the form and connotation of labor education. At present, there are still some problems in labor education in some higher vocational colleges. How to combine labor education closely with professional technical skills education in higher vocational colleges with the combined hand and brain to promote the reform and innovation of labor education and teaching so as to construct a labor education system with the characteristics of the new era? It is a problem to be solved urgently to form a new pattern of allround education in higher vocational colleges that meets the requirements of the times and future development.

2. SIGNIFICANCE OF ESTABLISHING LABOR EDUCATION IN HIGHER VOCATIONAL COLLEGES IN THE NEW ERA

2.1 Basic Requirements of Lide Shuren in the New Era

The construction of social director is inseparable from the college students in the new era. In the cultivation of college students, we should take the establishment of moral integrity as the top priority, and train the college students in the new era who have all round develop-
ment of moral, intellectual, physical and aesthetic for the socialist construction. the great Chinese dream the great rejuvenation of the Chinese nation cannot be separated from the
college students in the new era. As the new generation of laborers, the training of college students should be integrated into labor education, which is not only the implementation o the Party's educational policy, but also the fundamental requirement of building up moral
integrity.

2.2 Objective needs of workers in the new era

Higher vocational colleges make full use of the cooperation between schools and enterprises to build a labor education system and train the laborers of the times needed by the country. the higher vocational colleges

fully combine the campus culture of their own campus, ingeniously integrate into the labor education construction, form a unique labor education system, deepen students's; labor consciousness, and help students establish correct labor values. To enable students to establish their own value must be achieved through labor.

2.3 Internal Needs of Student's All-round Development

The labor education should embody the spirit of labor, and the college students love and respect labor in the new era. Share Achievements, college students should achieve mo

ral, intellectual, physical and American labor inseparable from labor education. Through labor education, let students establish correct labor values, learn to grow, learn to integrate into society, learn to become a real worker. Reflect the value of life and contribute to the realization of the great Chinese dream.

3. THE DILEMMA OF LABOR EDUCATION IN HIGHER VOCATIONAL COLLEGES

3.1 Inadequate attention to labour education

On the one hand, due to the deep imitation of the mode of running a school, setting of majors and educating students of ordinary universities in the early development process, some vocational colleges have not paid enough attention to labor education, weakened labor education, and had little or only a few labor education materials. the role of labor education is not fully played. On the other hand, the difference of social value judgment and recognition of different occupations will also affect the degree of attention paid to labor education. Moreover, at the teacher level, some teachers do not fully realize the importance and urgency of integrating professional education and labour education, resulting in inefficient educational practices. Some teachers only attach importance to the teaching of professional knowledge, do not integrate the content of labor education with professional courses, and do not have the experience of labor education.

3.2 Systematic planning for labor education is not perfect

To do well in labor education, we need to

deeply understand its essential laws and meet the requirements of the times to improve the effect of labor education. However, although some vocational colleges have offered labor education courses, the talent training program has not been included in the labor education assessment. the labor education assessment lacks toplevel design, there is no systematic planning, and there are two skins. In practice, labor education has not fully played its role, but is used as a means to discipline students, and can not really highlight the value of labor education. Some vocational colleges take the labor skill competition as labor education, which does not fully reflect the value of labor, which causes the students to think that labor education is simply skill education, and makes some students think that labor education is not important.

3.3 Lack of scientific evaluation criteria

The evaluation of professional education focuses on theoretical knowledge and professional skills, while the evaluation of labor education focuses on students' practical ability, work attitude and social responsibility. If the evaluation is listed separately, the evaluation objectives are not connected. the high proportion of professional knowledge and skills in the evaluation content can also lead to the restriction of students's overall development.

Professional education uses more evaluation methods such as examinations, essays and project reports, while labor education focuses more on observation, internship feed back and skill tests. the differences in evaluation methods make it difficult to measure students's; performance in different fields with the same standard. Because the evaluation framework is not uniform, the evaluation criteria may be subjective.

4. THE REFORM OF LABER EDUCATION IN HIGHER VOCATIONAL COLLEGES UNDER THE NEW ERA

4.1 Multi-subjects' linkage cultivation of integrated education ecology

As the common main body of cooperative education, the government, schools and enterprises should strengthen the responsibility of connecting the schools, actively promote the integration of production

and education and the integration of science and education, and construct a resource matrix of talent cultivation inside and outside the school, so as to cultivate more compound and applied talents for the construction of an innovative country. First, with government support as coordination, we should strengthen policy guidance and optimize the environment. Government plays the role of planner and motivator in labor education ecology, and plays the key role of top-level design and policy guidance. the government

needs to issue relevant policies to provide financial, tax, and legal support for school

enterprise cooperation and integration of production and education, so as to stimulate the enthusiasm of schools and enterprises. In addition, the government should, through the guidance of public opinion, raise society's awareness of the importance of labor education, and build a social atmosphere that respects labor and encourages innovation. Secondly, the school education as the leading, multiinnovation to adapt to development.

4.2 Standardizing the Implementation of Labor Education Organizations

First of all, we need to strengthen the construction of teachers and build a labor education system with "craftsmen" as the core. We will strengthen the training of labor teachers and establish a system for hiring labor class teachers. Model workers, frontline technical personnel of enterprises, and non-genetic inheritors will be specially hired as labor teachers. We

will establish a "double-teacher" teaching team with both theoretical and practical skills. We should optimize the content design of labor education courses and the specific imple-

mentation plan of the courses, and strengthen the students' recognition and satisfaction of labor education. Secondly, deepen the construction of labor training base, design and build labor education practice platform, take into account both inside and outside the school. Give full play to the advantages of both schools and enterprises resources to carry out base construction. Among them, the campus base takes the training room, teaching building, library as the core, and focuses on cultivating students' working habits, service spirit

and dedication consciousness; Out of school base focuses on training students; labor skills and labor quality, thus enhancing students' employment core competitiveness through labor education. Finally, it is necessary to perfect the demonstration of achievements and highlight the value of cultivating craftsman spirit by carrying out campus cultural activities. the campus fully builds a cultural atmosphere of advocating labor and loving labor, and and moistens all things softly, without sound affects students' ideas and concepts. This requires that the campus culture activities such as labor education month should be carried out, and the display platform of labor results should be provided by means of clarifying the content of activities, strengthening the design of activities, strengthening labor protection and perfecting labor evaluation.

Attaching Importance to the Main Body of Evaluation and Innovating Evaluation Methods

The fair and just evaluation standard should be incorporated into the evaluation design of labor education, and the students should be regarded as the evaluation subject. Encourage students to actively participate in the practice of labor in and out of school, strengthen the cooperation between colleges and social organizations and enterprises, and enhance students' labor enthusiasm. Increase the scope of labor evaluation. Ensure that the evaluation is comprehensive and extensive. To ensure that the evaluation ofExtract Text x in FigureOn the Actual Situation of Higher Vocational Collegesthe Integrating Practice of Students Assessment in different forms. the evaluation model of teachers+students+outside

enterprises is constructed, and the evaluation system of participation+completion+mastery is highlighted.

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Dream Interpretation Is Used in Psychological Counseling

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Abstract: Under the background of Chinese culture, there are still a large amount of people confused the dream interpretation of mental identify and Zhou Gong's dream analysis then mix them together. Even in the fields of mental interpretation and psychology, lots of people don't pay attention to the value of dream interpretation too much and includes a variety dimensions of dream interpretation, but the dream interpretation doesn't have a standard answer, it is mainly the dream interpretation method of classical psychoanalysis and the Jung's dream interpretation method. the former is much closer to the reality, digging the past private experience, and the later one is more forward looking, point to the future. I'm really interested in dream interpretation and think the people ignore the value of dream interpretation. It can not only conscientize the subconscious, but also could be an excellent entry point of psychological counseling.
Keywords: Dream Interpretation

1. THE VALUE OF DREAM INTERPRETATION

The discussion of the function of dream interpretation involves a variety of schools and theories of psychology, among which the views of Freud and Jung are particularly prominent.

According to Freud's theory, dream interpretation is one of the important techniques of psychoanalysis. He proposes that dreams are the fulfillment of wishes, which are suppressed during the day and therefore expressed in disguise during sleep. the process of dream interpretation aims to uncover the hidden meanings behind these repressed desires and to understand their underlying psychological motivations. Freud believed that dream interpretation is not only an explanation of the content of the dream, but also an in-depth analysis of the dreamer's psychological state.

Jung, on the other hand, looked at dream interpretation from a different perspective. He believed that dreams contained impersonal content, the embodiment of the collective subconscious, and not merely the expression of individual wishes. Jung emphasized that the imagery in dreams is a direct reflection of the dreamer's inner personality structure and used methods such as positive imagery to help the dreamer better understand and integrate these images. the purpose of dream interpretation is not only to understand the dream itself, but also to explore and understand one's innermost thoughts and feelings through the dream. Dream interpretation can help people discover and deal with inner conflicts and anxieties, which can promote mental health and personal growth.

Dream interpretation techniques are widely used in psychological counseling. Dream interpretation can be used as a clinical examination and auxiliary diagnostic tool to help the counselor better understand the client's psychological problems. In the process of dream interpretation, the focus is on listening and empathy, and the client is gradually guided to explore his or her subconscious [1].

As an important method of understanding the subconscious, dream interpretation is of great significance in both theoretical research and practical application. Not only does it help us understand the deeper meaning behind dreams, but it also promotes the development of an individual's mental health and self-awareness [2].

According to Jung, dreams are a way through which archetypes and archetypal images are presented to the conscious self with far-reaching meaning and revelation. the collective unconscious is autonomous, creative and impersonal, and it expresses itself directly and completely through dreams, "dreams are a kind of spontaneous self-portrait

of real situations in the subconscious". This suggests that dreams are not only a reflection of mental development, but also a reflection of real situations and archetypal images in the collective subconscious.

2. DREAM INTERPRETATION IN THERAPY AND TREATMENT IN DREAM INTERPRETATION

2.1. Interpreting Dreams in Therapy

It is generally believed that dream interpretation is only a means and tool of psychological counseling, and dream interpretation in psychological counseling is mainly reflected in several aspects:

(1) Bypass Impedance and Psychological Diagnosis: Dream interpretation techniques can help counselors bypass topics or emotional agitations that the client is trying to avoid, allowing them to gain a deeper understanding of their inner world. This approach not only improves self-awareness, but also stimulates the client's interest and makes them better able to cooperate with the counselor.

(2) Change cognitive mode and improve psychological state: Through dream interpretation, it can effectively integrate the body's polar emotional responses, especially for negative emotions and physical reactions. This contributes to one of the goals of counselling – to improve the psychological state of the client.

(3) Assisted treatment of depression: Dream interpretation technology has also achieved success in the treatment of depression. For example, a patient with depression experienced a major transformation through dream interpretation. After the symbolic meaning of the dream was interpreted, the patient's mood improved significantly.

(4) Promote mental health: Dream interpretation technology can not only be used for diagnosis and treatment, but also promote the mental health of seekers by recording dreams. This approach can help clients better understand and manage their own emotions and behavioral patterns.

(5) Cultural adaptability: In the context of Chinese culture, dream interpretation technology needs to be combined with traditional Chinese cultural symbols for operation. For example, Jung's dream interpretation theory emphasizes multipolar body feelings and believes that dreams are a manifestation of the collective subconscious and a natural part of the mind. Therefore, in practical applications, it is very important to establish a symbolic dictionary that conforms to Chinese cultural traditions.

2.2. Treatment In Dream Interpretation

Treatment through dream interpretation is a relatively recent view. the method of understanding subconscious psychology through dream analysis can help individuals discover and deal with inner conflicts and anxieties, reveal hidden true subconscious motives, and enable individuals to see themselves more clearly. emotional states and understand how these emotions are suppressed or semi-successfully dealt with.

This view believes that the process of dream interpretation itself is a process of cognitive enlightenment, which can enable the seeker to achieve personality integration. Through dream interpretation, individuals can better understand their true inner thoughts and feelings, conduct psychoanalysis with the help of a psychological counselor, and enter the stage of psychotherapy. Therefore, to a certain extent, dream interpretation is an introduction, and Some scholars believe that simple dream interpretation can provide treatment. This view is mainly derived from Jung's analytical psychology. For example, by comparing the characters in the dream with the prototype, find the gap between the two, and then conduct a dialogue about the gap. Adjust the dreamer's cognition to achieve therapeutic effects.

3. POINTS OF ATTENTION IN DREAM INTERPRETATION

Dream interpretation is a very rigorous process. If there is a deviation in one detail, the direction of the entire dream interpretation may be completely different. For example, there is a dream:

"I dreamed that my cousin had given birth to a child and he was raising the child by himself (it was quite hard). I saw his strong arms and broad shoulders, so I hugged him and cried, telling me how difficult it has been for me over the years. He held him Me, pat me gently and comfort me.

I took the exam. After the exam was over, someone asked me to run a marathon quickly, saying that the marathon had already started. I hurriedly ran. Halfway through the run, I didn't seem to see any crowds or roads, so I thought I had reached the finish line and went to sleep. When I woke up, I found that I had not finished the race, so I continued running, but the race was over and I had not finished the race. I was thinking, hey, how could I think I was done running and then go to sleep? I was a little disappointed not to finish on time. the dream ends. "

This dream is relatively clear, and it has been on the road. the dreamer took an important exam before, and the results have not yet come out. In this dream, the dreamer's description and association of his cousin are the key. There are probably two directions, one is related to the fact that the test results have not yet been announced, and the other is related to the current intimate relationship. Therefore, without specific questioning (questioning may cause defensiveness), the conclusion given is: the test results have not been announced, just like the long-distance love race has not ended. the dreamer will understand or be touched when he sees it, or this dream may be a pun-intended dream.

In the long-term interpretation of dreams, the author summarized several points to note:

(1) Combination of holistic view and detail view: When interpreting dreams, we should not only focus on a certain detail in the dream and ignore the whole. Dream interpretation requires grasping the dream as a whole and avoiding the mistake of not seeing the forest for the trees. At the same time, it is also important to pay attention to the specific imagery and details in the dream, as these details often provide important clues.

(2) Pay attention to the dreamer's feelings: When interpreting dreams, we should pay special attention to the feelings experienced by the dreamer in the dream, because these feelings are often directly related to the needs and behaviors in the dream. By feeling the act of concatenation, it is possible to help understand the intent of the dream as a whole.

(3) Associative analysis and extended analysis: Dream interpretation can obtain specific personal data and subconscious content through associative analysis, and can also be understood through extended analysis to put the content of dreams in a broader collective unconscious and archetype.

(4) Avoid excessive free association: When interpreting dreams, we should avoid rambling free associations, but start from some specific images and carefully explain the associations that are directly related to them.

(5) Understand the background information of the dreamer: Before interpreting the dream, the counselor should first understand the basic life situation of the dreamer through communication including family, emotional, or other significant events. This helps to interpret the dream more accurately.

(6) Pay attention to the choice of dream interpretation methods: There are various methods of dream interpretation, such as Freud's free association, Jung's archetypal analysis, etc. Choosing the right method is crucial to the effectiveness of dream interpretation.

(7) Avoid taboos: Some dreams are not suitable for interpretation, especially those involving private or sensitive content. the dream interpreter should respect the dreamer's privacy and psychological state to avoid causing unnecessary distress.

(8) Personalized dream interpretation: Dream interpretation should be individualized according to the specific situation and needs of the dreamer, and cannot be generalized. For example, after analyzing a child's dreams, if a problem is found that is detrimental to mental health, work should be done on the child's parents instead of directly explaining the dream to the child.

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