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Research on Chinese College Students' Willingness to Work at the Grassroots Level and Its Influencing Factors

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Abstract: This study aims to explore the willingness of Chinese college students to work at the grassroots level and its influencing factors, providing theoretical support for policy-making and educational reform. Using literature analysis and theoretical construction methods, we systematically review existing research on students' employment intentions and grassroots employment, employing a multidisciplinary perspective to deeply analyze various influencing factors. First, we clarify the basic concepts and theoretical framework of student employment intentions through a systematic review of domestic and international studies. Second, we analyze the subjective motivations and objective constraints of students choosing grassroots employment, considering China's socio-cultural background and economic development. These factors include policy environment, economic incentives, social cognition, and family background. Through logical reasoning and theoretical analysis, we reveal the intrinsic mechanisms of students' willingness to work at the grassroots level and propose a categorization and pathway of influencing factors. The results indicate that multiple factors, including policy orientation, economic incentives, social cognition, and family background, affect Chinese college students' willingness to work at the grassroots level. To enhance this willingness, efforts should focus on policy support, promotional guidance, and educational reform, particularly by improving grassroots working conditions and benefits, and enhancing students' recognition and sense of mission towards grassroots work. Ultimately, this study provides valuable theoretical foundations for government and education administrators to formulate relevant policies, advocating for

multi-level, multi-channel measures to actively guide and encourage students to pursue grassroots careers, thus achieving dual goals of personal development and social needs.

Keywords: Grassroots Employment; College Students; Employment Willingness; Influencing Factors; Policy Recommendations

1. INTRODUCTION

1.1 Research Background and Significance

With the rapid development of higher education in China, the number of university graduates has significantly increased, leading to mounting employment pressure. Although the government has implemented various policies to encourage graduates to take grassroots positions, these roles still lack sufficient appeal, resulting in supply-demand imbalances in some areas. Investigating the willingness of college students to work at the grassroots level and its influencing factors helps to better understand this issue, optimize policy mechanisms, and improve educational management strategies. This, in turn, alleviates employment pressure and promotes sustainable socio-economic development.

1.2 Research Questions and Objectives

The core question of this study is: What factors influence the willingness of Chinese college students to work at the grassroots level? Specific objectives include identifying the main influencing factors, analyzing the interrelationships among these factors, and proposing recommendations to improve grassroots employment environments and incentive policies. By addressing these questions, we aim to provide theoretical foundations for policymakers and educational

institutions, thereby more effectively guiding students towards grassroots employment.

1.3 Review of Domestic and International Research

Domestic scholars have made significant contributions to the study of grassroots employment willingness, focusing mainly on policy analysis, psychological motivations, and social environments. Cui Xintao (2007) highlighted policy direction and economic incentives as crucial factors in promoting grassroots employment among graduates. Zhu Jun and Yang Ping (2015) found that social cognition significantly influences employment choices. Kang Jing (2015) explored the role of family background in employment decisions.

In contrast, international research emphasizes theoretical model construction and empirical analysis. For instance, Ajzen's (1991) Theory of Planned Behavior provides a critical framework for understanding employment intentions. Holland's (1997) Person-Environment Fit theory also lays the groundwork for such studies. However, existing research rarely integrates China's specific socio-cultural context into the analysis.

1.4 Research Methods and Approach

This study adopts literature analysis and theoretical construction methods to propose a comprehensive model of factors influencing grassroots employment willingness among Chinese college students. The research is divided into four parts: first, establishing a theoretical framework; second, analyzing specific influencing factors; third, uncovering intrinsic mechanisms; and finally, offering policy recommendations.

2. THEORETICAL FRAMEWORK OF COLLEGE STUDENTS' EMPLOYMENT WILLINGNESS

2.1 Basic Concept of Employment Willingness

Employment willingness refers to an individual's attitude and inclination towards job selection in a specific social and economic context. It is influenced by multiple factors, including personal values, social environment, economic conditions, and policy orientations. This concept is particularly important in the context of grassroots employment, as students'

job choices directly impact social stability and long-term economic development.

2.2 Major Theories Influencing Employment Willingness

The Theory of Planned Behavior (TPB) is a commonly used model to explain individuals' behavioral intentions. It comprises three components: behavioral attitude, subjective norms, and perceived behavioral control. Ajzen (1991) suggests that behavioral attitude refers to the positive or negative evaluation of the behavior, subjective norms pertain to the perceived social pressure, and perceived behavioral control indicates the confidence in performing the behavior.

In addition to TPB, the Personality-Job Fit Theory provides valuable insights into understanding employment willingness. Holland (1997) posited that the better the match between personality traits and job requirements, the higher the job satisfaction and work efficiency. This theory implies that interests, abilities, and values significantly influence students' career choices, especially in the context of grassroots employment.

2.3 Specificity of Grassroots Employment Willingness

In China, grassroots employment has unique socio-cultural characteristics. Many students and their parents perceive grassroots jobs as having poor conditions and limited opportunities, affecting students' willingness to take such positions. Additionally, the development level and resource allocation in grassroots areas limit their attractiveness to high-quality talent. Therefore, studying grassroots employment willingness must consider these specificities to accurately understand and address the issue.

3. ANALYSIS OF INFLUENCING FACTORS ON CHINESE COLLEGE STUDENTS' WILLINGNESS TO WORK AT THE GRASSROOTS LEVEL

3.1 Impact of Policy Environment on Grassroots Employment Willingness

The policy environment plays a crucial role in guiding college students towards grassroots employment. The Chinese government has implemented policies such as the College Student Village Officials Program and the "Three Supports and One Assistance" Program, offering economic subsidies and

career advancement opportunities to attract students to grassroots positions. However, the implementation and effectiveness of these policies require further evaluation and optimization. Some regions face challenges in policy execution, impacting the actual outcomes. Additionally, the long-term sustainability of these policies is a critical concern.

3.2 Impact of Economic Incentives on Grassroots Employment Willingness

Economic incentives are vital in influencing students' job choices. Grassroots areas often have lower salary levels and higher living costs, deterring many graduates from considering these jobs. Improving the economic returns of grassroots work, such as providing housing allowances, transportation subsidies, and living stipends, can effectively enhance students' willingness to work at the grassroots level. Long-term strategies should focus on boosting the economic development of grassroots areas to increase their attractiveness to talent.

3.3 Impact of Social Cognition on Grassroots Employment Willingness

Social cognition refers to the public's overall evaluation and attitude towards a profession. Grassroots jobs are often perceived as synonymous with hardship and lack of career prospects, significantly affecting students' interest and willingness to take these positions. To change this perception, it is essential to use promotional campaigns and public education to elevate the social recognition and honor of grassroots work. For instance, media coverage and role model promotion can showcase the achievements and significance of grassroots jobs, inspiring more students to consider such careers.

3.4 Impact of Family Background on Grassroots Employment Willingness

Family background partly determines students' employment willingness. Students from well-off families usually have more job options, whereas those from less affluent backgrounds tend to prefer stable income jobs. Family education levels and social networks also influence job decisions. Parents' career views and expectations significantly impact students' job choices. Therefore, family education and career guidance should emphasize holistic development and career

planning, helping students establish correct employment concepts.

4. INTRINSIC MECHANISMS OF COLLEGE STUDENTS' WILLINGNESS TO WORK AT THE GRASSROOTS LEVEL

4.1 Analysis of Subjective Motivations

College students' willingness to work at the grassroots level is influenced by various subjective motivations. Firstly, personal values and career ideals are significant internal drivers. Some students possess a strong sense of social responsibility and service, desiring to contribute to grassroots communities. This group often forms their career ideals and social responsibility through family and school education. Secondly, the demand for personal development also plays a crucial role. Some students perceive grassroots work as offering more opportunities for growth and skill enhancement. Additionally, individual risk tolerance and adventurous spirit influence employment choices. Students willing to take on challenges and try new things are more inclined towards grassroots positions.

4.2 Analysis of Objective Constraints

Despite having a strong willingness, objective constraints often limit students' choices. Firstly, the economic returns of grassroots work are relatively low, and living conditions are harsh, deterring many students. According to the "China College Graduates Employment Report (2020)," average salaries for grassroots positions are significantly lower than those in urban areas. Secondly, the career development prospects in grassroots jobs are uncertain, with limited promotion channels, causing a lack of confidence among students. Moreover, societal perceptions and evaluations of grassroots work also impact students' choices. Prejudices held by parents and the public, who view grassroots work as lacking opportunities and social status, exert pressure on students' employment decisions.

4.3 Interaction Mechanism Between Motivations and Constraints

There is a complex interaction between subjective motivations and objective constraints, jointly influencing students' willingness to work at the grassroots level. Personal values and career ideals can alleviate

the impact of objective constraints to some extent. Students with a strong sense of social responsibility often overcome difficulties such as low economic returns and harsh living conditions to pursue grassroots jobs. Conversely, objective constraints such as low salaries and unclear career prospects can weaken students' willingness, leading them to choose other jobs. Social cognition and family background act as bridges between motivations and constraints. Family education and social environment significantly influence students' values and career ideals while also affecting their perception and evaluation of objective constraints.

5. RECOMMENDATIONS TO INCREASE WILLINGNESS OF COLLEGE STUDENTS TO WORK AT THE GRASSROOTS LEVEL

5.1 Necessity of Policy Support

The government plays a pivotal role in guiding and encouraging students towards grassroots employment. First, existing policies such as the College Student Village Officials Program and the "Three Supports and One Assistance" Program need further refinement and implementation. These policies attract students by offering economic subsidies and promotion opportunities. Additionally, policy promotion should be enhanced to increase students' awareness and acceptance. Establishing robust supervision and evaluation mechanisms is also crucial to ensure effective and sustainable policy implementation.

5.2 Strategies for Publicity and Guidance

Changing societal perceptions of grassroots work is crucial for increasing students' willingness. Media coverage and role model promotion can showcase the achievements and significance of grassroots work, inspiring more students. Strengthening career guidance and employment education helps students form correct employment concepts and career ideals. Additionally, guiding family education and social environment to change prejudices against grassroots work improves social recognition and honor.

5.3 Direction of Educational Reform

Educational reform plays an essential role in increasing students' willingness to work at the grassroots level. Strengthening vocational

education and practical teaching in universities helps students improve their overall qualities and practical abilities, preparing them for grassroots employment. Collaborating with grassroots units to establish internships and employment bases provides more opportunities and practical platforms. Enhancing career guidance and employment services in universities aids students in career planning and employment choices, fostering a proactive attitude towards grassroots employment.

5.4 Improvement of Grassroots Work Environment and Benefits

Improving the environment and benefits of grassroots work is key to increasing students' willingness. Raising economic returns by providing housing allowances, transportation subsidies, and living stipends reduces students' financial burdens. Enhancing living conditions and work environments offers better security for students. Establishing a sound career development mechanism with more promotion opportunities and development space increases job satisfaction and motivation.

6. CONCLUSION

This study systematically analyzes the factors influencing the willingness of Chinese college students to work at the grassroots level. It finds that students' willingness is affected by various factors, including policy environment, economic incentives, social cognition, and family background. These factors encompass both subjective motivations and objective constraints, which have a complex interaction. Enhancing students' willingness requires comprehensive efforts in policy support, publicity, educational reform, and improvement of grassroots work environments and benefits.

The study enriches the theoretical framework of employment willingness by proposing a comprehensive model that considers China's specific socio-cultural context. The findings offer new perspectives for understanding students' employment choices and provide valuable theoretical foundations for policy-making and educational management.

Despite uncovering some factors and mechanisms influencing students' willingness to work at the grassroots level, this study has

limitations. It primarily uses literature analysis and theoretical construction without empirical data support. Future research should incorporate surveys and field interviews to gather more empirical data for validation. Additionally, cross-national comparative studies can explore the willingness and influencing factors in different countries and regions. Further research can also investigate other potential factors, such as personal interests and professional skills, to provide more theoretical support and practical guidance for increasing students' willingness to work at the grassroots level.

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Pursuing Light, Color, and Texture in Interior Design under the Concept of Health

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Abstract: In modern interior design, light, color, and texture are key elements that directly impact human physiological and psychological health. Under the concept of health, these design elements not only serve aesthetic functions but also have the potential to enhance the quality of life. This paper aims to explore the effective application of light, color, and texture in interior design, specifically how to achieve the optimal combination of these elements driven by health considerations. The research methodology primarily involves literature review and theoretical analysis. By systematically reviewing domestic and international research, and integrating the theories of visual psychology and environmental psychology, the study deeply analyzes the impact of lighting intensity, color schemes, and material texture on the health of living environments. The study first categorizes various parameters of light, including illumination intensity and color temperature, and contrasts physiological and psychological responses under different lighting conditions to propose suitable lighting design principles. Then, it elaborates on the application of color in interior environments from the perspective of color psychology, discussing the emotional and behavioral impacts of different color schemes and summarizing health-oriented color matching strategies. Finally, by integrating tactile and visual perception, the study examines the impact of material selection on texture, proposing methods for selecting materials that balance aesthetics and comfort. The conclusion summarizes design strategies for light, color, and texture under health concepts, emphasizing the importance of scientific planning and rational layout in improving the comfort and health index of living environments. The findings provide theoretical guidance for interior designers in

practical projects, aiding in the creation of healthier and more human-centered living spaces.

Keywords: Health Concept; Interior Design; Lighting Environment; Color Matching; Material Texture

1. INTRODUCTION

1.1 Research Background and Significance

Modern individuals increasingly focus on quality of life, emphasizing health in home environment design. Optimal living environments encompass not only physical comfort but also psychological wellness. Light, color, and texture are core elements affecting indoor experiences; scientifically integrating these can significantly enhance both physical and mental health. Research in this area not only improves life quality but also advances the interior design industry towards health-conscious and sustainable practices.

1.2 Review of Current Research

Scholars worldwide have extensively studied light, color, and texture in interior design. Internationally, environmental psychologists like E. Hall and Canadian architectural researchers like D. Leather have shown that lighting environments directly influence psychological states and biological rhythms (Leather et al., 1998). In color studies, Japanese psychologist N. Ikeda demonstrated through experiments that different color schemes induce various psychological responses; for example, blue calms emotions while red energizes (Ikeda, 2010). Domestically, Li Na (2024) explored barrier-free design in elderly housing, highlighting the importance of color and lighting for senior living environments. Additionally, Liu Qiongchun (2024) examined the application of leather materials in hotel design, focusing on how texture affects guest experiences. These studies provide a robust theoretical and

empirical foundation for this paper.

1.3 Overview of Research Methods and Content

Utilizing literature review and theoretical analysis, this paper systematically examines existing research, exploring the combined impact of light, color, and texture on indoor environmental health from the perspectives of visual and environmental psychology. The content includes the connotation of health concepts and their relationship with interior design, the application of lighting environments in interior design, the psychological and physiological effects of color, and the specific application of texture in interior design and its health-oriented strategies.

2. RELATIONSHIP BETWEEN HEALTH CONCEPT AND INTERIOR DESIGN

2.1 Connotation and Development of Health Concept

The concept of health encompasses physical, psychological, and social dimensions. Initially centered on medical health, it has expanded to include preventive health, psychological wellness, and comprehensive environmental health. This multidimensional evolution reflects rising health demands and spurs innovation and development in health and design fields. Modern health concepts emphasize not only disease treatment but also prevention and overall quality of life enhancement.

2.2 Manifestation of Health Concept in Interior Design

Health concepts in interior design are realized through three main aspects. Firstly, optimizing the physical environment, including air quality, temperature, humidity control, and noise management. Secondly, enhancing psychological wellness by creating comfortable and pleasant indoor atmospheres through appropriate lighting, color schemes, and texture choices. Thirdly, promoting social health by designing living spaces that facilitate interpersonal interaction and ensure family members' social proximity.

2.3 Importance of Light, Color, and Texture in Health Design

Light, color, and texture are not only foundational elements of interior design but also crucial for residents' physical and

psychological health. Proper lighting can regulate biological clocks and improve efficiency and quality of life. Scientific color schemes can adjust emotions and reduce psychological stress. Texture, perceived through touch and sight, directly impacts comfort and psychological safety.

3. APPLICATION OF LIGHTING ENVIRONMENT IN INTERIOR DESIGN

3.1 Lighting Intensity and Health

Lighting intensity directly affects visual comfort and physiological health. Excessive brightness can cause eye fatigue and damage, while insufficient lighting can create a dark, unwelcoming environment. Research suggests that suitable indoor lighting intensity ranges from 300-500 lux to prevent uneven lighting from straining the eyes. Different rooms should have varying lighting intensities based on their functions; workspaces require higher intensity, while relaxation areas benefit from softer lighting.

3.2 Psychological and Physiological Effects of Light Source Color Temperature

Light source color temperature significantly influences psychological and physiological states. Low color temperature lighting (below 3000K) creates a warm, cozy environment conducive to relaxation, while medium color temperature (3000K-4000K) suits everyday living and workspaces. High color temperature lighting (above 4000K) is often used in hospitals and laboratories requiring high efficiency. Studies indicate that long-term exposure to high color temperature lighting can induce anxiety and discomfort, thus home environments should favor medium to low color temperatures.

3.3 Principles of Indoor Lighting Environment Design

Key principles for designing indoor lighting environments include ensuring even light distribution to avoid glare and shadows, providing adjustable lighting to meet varied needs, and maximizing natural light through strategic window placement and reflective materials. Additionally, light source color choices should complement interior color schemes to prevent harsh visual contrasts.

4. APPLICATION OF COLOR IN INTERIOR DESIGN

4.1 Basics of Color Psychology

Color significantly impacts psychological states, a key area in color psychology. Colors' warmth, brightness, and saturation influence emotions and behaviors. Cool colors (e.g., blue, green) typically evoke tranquility and calmness, while warm colors (e.g., red, yellow) evoke warmth and excitement. Bright colors can expand visual space, while dark colors create a more intimate atmosphere.

4.2 Emotional and Behavioral Impact of Different Colors

Different colors evoke distinct emotional and behavioral responses. For instance, red symbolizes passion and alertness, suitable for high-activity areas like kitchens or gyms. Blue is calming and soothing, ideal for bedrooms or meditation areas. Green, closely associated with nature, brings relaxation and joy, making it suitable for living rooms and study areas. Strategic color matching can effectively adjust residents' emotions and behavior, enhancing life satisfaction.

4.3 Health-Oriented Color Matching Strategies

Health-oriented color design requires considering colors' psychological impacts and adopting scientifically sound color matching strategies. For example, using light blue or green in work areas can improve focus and reduce stress, while soft beige or light grey in rest areas aids relaxation and sleep. Warm colors like yellow or orange in public spaces enhance social interaction and space friendliness. Considering colors' saturation and brightness is crucial to avoid visual overstimulation.

5. APPLICATION OF MATERIAL TEXTURE IN INTERIOR DESIGN

5.1 Texture and Tactile, Visual Perception

Texture is vital in interior design, with different materials influencing residents' experiences through tactile and visual perception. Soft materials like fabrics and carpets offer warmth and comfort, suitable for bedrooms and living rooms. Hard materials like metals and glass provide modernity and simplicity, fitting for kitchens and bathrooms. Proper texture use can enhance spatial layering and richness, improving comfort and pleasure.

5.2 Impact of Material Choices on Living

Environment

Material choices affect visual and tactile experiences and environmental health. Natural materials like wood and stone reduce harmful substance emissions, improving air quality. Modern materials like high-tech textiles and new soundproofing materials not only enhance comfort but also offer health benefits. Selecting low-VOC and eco-certified materials is crucial for creating a healthy indoor environment.

5.3 Methods of Selecting Materials for Aesthetics and Comfort

Material selection should balance aesthetics and comfort. Aesthetics can be achieved through color, texture, and gloss, while comfort is reflected in tactile sensation, temperature control, and acoustic effects. Combining materials, such as placing soft carpets on hard floors or adding fabric decorations to metal furniture, achieves both aesthetic and comfort goals. Durability and ease of cleaning should also be considered to ensure long-term comfort and hygiene.

6. DESIGN STRATEGIES UNDER HEALTH CONCEPT

6.1 Scientific Planning and Rational Layout

Scientific planning and rational layout are fundamental to achieving healthy interior design. Initially, functional zoning should be based on residents' habits and needs, ensuring effective use and connection of spaces. For example, separating work and rest areas minimizes interference; creating dedicated reading or meditation corners offers additional relaxation spaces. Additionally, layout planning should consider traffic patterns to ensure smooth and safe movement within the space.

6.2 Integrated Design of Light, Color, and Texture

In health-oriented design, light, color, and texture should be integrated holistically. Lighting should harmonize with color schemes to ensure balance and coherence between different light sources and colors. Textures should be enhanced through material selection and combination, increasing spatial layering and comfort. Through multiple experiments and adjustments, the optimal integration of light, color, and texture can be achieved, creating a healthy, aesthetically

pleasing, and comfortable living environment.

6.3 Future Trends in Healthy Interior Design

As demand for health and quality of life rises, healthy interior design will evolve towards greater intelligence, personalization, and sustainability. Intelligent design includes smart lighting, temperature control, and air quality monitoring systems that use data analysis and automatic adjustments to optimize living environments. Human-centered design focuses on personalized needs, offering customized solutions. Sustainable design emphasizes the use of eco-friendly materials and resource conservation, minimizing environmental impact.

7. CONCLUSION

This paper systematically reviews the application of light, color, and texture in interior design under the health concept, exploring the impacts of lighting intensity and color temperature, color psychology, and material texture on residents' physical and mental health. Health-oriented interior design strategies are proposed, providing theoretical guidance for interior designers to create healthier and more human-centered living environments in practical projects.

Although this study explores multidimensional healthy interior design strategies, the specific application effects and long-term impacts need further empirical research due to methodological limitations. Future research could verify and adjust these strategies using empirical data and real-life cases, continually optimizing interior design solutions to meet the ever-growing pursuit of healthy living.

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Steady Progress Towards Becoming a Cultural Powerhouse

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Abstract: This study aims to analyze and explore the strategies, challenges, and pathways for China in its pursuit of becoming a cultural powerhouse. Using literature review and theoretical analysis, the paper systematically reviews and assesses relevant domestic and international research to uncover the intrinsic logic and key elements of cultural powerhouse construction. The study first interprets the concept and significance of a cultural powerhouse from a macro perspective, then analyzes the framework and effectiveness of current Chinese cultural policies. It evaluates the development status of the cultural industry and strategies for enhancing cultural soft power, exploring practices in cultural innovation, dissemination, and heritage protection. Findings indicate that building a cultural powerhouse requires active policy guidance, emphasis on cultural innovation, optimization of dissemination models, and protection of cultural heritage. It is crucial for increasing national soft power and cultural influence. The research identifies opportunities and challenges, such as the impact of globalization, uneven cultural industry development, and international discourse power in cultural dissemination. The study suggests deepening cultural system reforms, enhancing the scientific and forward-looking nature of cultural policies, promoting high-quality cultural industry development, and boosting cultural soft power to achieve cultural confidence. Based on theoretical exploration, the article provides a systematic theoretical framework and actionable strategies for understanding and advancing the construction of a cultural powerhouse.

Keywords: Cultural Powerhouse; Cultural Policy; Cultural Innovation; Cultural Soft Power; Cultural Dissemination

1. INTRODUCTION

1.1 Research Background and Significance

The significance of culture in modern nation-building has increasingly become evident. With the acceleration of globalization, cultural soft power is now a crucial component of a nation's comprehensive strength. Building a cultural powerhouse not only reflects cultural confidence but also enhances international influence and national rejuvenation. Amid the challenges of cultural globalization and intensified international competition, China's goal to become a cultural powerhouse holds strategic importance. This study aims to analyze the theoretical foundations, current policies, and their implementation, providing academic support and strategic recommendations to deepen the understanding and optimization of policies related to building a cultural powerhouse.

1.2 Literature Review

Domestic scholars recognize the importance of building a cultural powerhouse and have conducted in-depth studies from various perspectives. Some focus on macro policies, analyzing governmental strategies and their impacts. For instance, Zhang Xuewen and Liu Yidong (2023) discuss the construction of a higher education powerhouse under the "Revitalize the Nation through Science and Education" strategy, highlighting the integral role of culture in national development. Other studies concentrate on specific cultural industries, such as Wei Pengju's (2022) exploration of high-quality development paths for the tourism industry in the digital age, citing exemplary cases of digital cultural and creative development.

Internationally, research on cultural soft power and industries is extensive. Harvard professor Joseph Nye's concept of "soft power" underscores the importance of national culture, political values, and foreign policy. Other studies examine the impact of cultural globalization on national policies and the dynamics of cultural exchanges and

clashes in a multicultural context. However, comprehensive research that systematically explores the intrinsic logic and practical pathways to building a cultural powerhouse remains limited.

1.3 Research Questions and Objectives

This study aims to systematically review relevant literature to analyze and explore the intrinsic logic, framework, and challenges of building a cultural powerhouse, proposing concrete strategies for its promotion. The research questions include: What are the connotations and theoretical foundations of a cultural powerhouse? What is the policy framework and implementation effectiveness of China's efforts in this regard? How can cultural policies be optimized in the face of globalization and cultural diversity to promote high-quality cultural industry development and enhance cultural soft power?

2. CONNOTATIONS AND THEORETICAL FOUNDATIONS OF A CULTURAL POWERHOUSE

2.1 Definition and Connotations

A cultural powerhouse refers to a nation with profound cultural influence and recognition globally. Its connotations include rich cultural resources, a robust cultural industry, superior dissemination capabilities, and extensive cultural influence. This encompasses traditional cultural arts like literature, music, and film, as well as emerging sectors like modern cultural and creative industries and digital cultural dissemination.

Building a cultural powerhouse requires diverse cultural resources and contents. The richness and diversity of cultural resources directly relate to the foundational strength of a cultural powerhouse. The development level of the cultural industry is another critical measure, as it generates significant economic benefits and enhances cultural soft power through cultural products and services. Enhancing cultural dissemination capabilities is crucial, enabling a nation's culture to exert greater influence on the global stage.

2.2 Theoretical Foundations

The theoretical foundations of a cultural powerhouse can be traced to Marxist cultural theory and social development theory. Marxist cultural theory emphasizes the role of culture as a component of the superstructure, closely

related to the economic base. Building a cultural powerhouse requires balancing economic development and cultural prosperity to support national modernization goals.

Theories such as cultural structure and cultural capital are also pivotal. Pierre Bourdieu's cultural capital theory posits that cultural capital, as a part of social capital, significantly impacts individual and societal development. Building a cultural powerhouse necessitates abundant cultural resources and a robust cultural industry, alongside education to enhance citizens' cultural literacy and national cultural capital.

From a global perspective, theories of cultural globalization and cultural soft power provide crucial guidance. Joseph Nye's soft power concept stresses that nations should use cultural, value-based, and diplomatic means, in addition to hard power (military and economic strength), to achieve international goals. Building a cultural powerhouse requires systematic considerations and arrangements to enhance soft power, increasing international cultural discourse and influence.

2.3 Importance of Building a Cultural Powerhouse

As a vital part of national soft power, culture significantly influences national image, international status, and comprehensive strength. Building a cultural powerhouse enhances international influence, and sustainable economic development, and fosters overall societal progress. As a key part of the modern service industry, the cultural sector generates high added value and substantial employment opportunities. Promoting high-quality cultural industry development can boost related industries and enhance national economic competitiveness. Moreover, building a cultural powerhouse holds significant social importance. In the context of globalization, culture serves as a critical marker of national and ethnic identity. Strengthening cultural development boosts cultural confidence, social cohesion, and national identity, providing powerful spiritual motivation for national development and rejuvenation.

3. FRAMEWORK AND IMPLEMENTATION OF CHINA'S CULTURAL POLICY

3.1 Macro Background of Policy Formulation

China's cultural policies have deep macro-level underpinnings. As China's comprehensive national strength has increased, cultural confidence has become a vital part of national strategy. Since the 18th National Congress of the Communist Party of China, the central authorities have repeatedly emphasized the importance of cultural confidence and proposed the strategic goal of building a socialist cultural powerhouse. President Xi Jinping's assertion that "cultural confidence is a more fundamental, extensive, and profound form of confidence" serves as an important theoretical basis and practical guide for this endeavor.

In the overall layout of national development, building a cultural powerhouse synergizes with economic, political, social, and ecological advancements. The report of the 19th National Congress explicitly states: "We should uphold the direction of socialist advanced culture, stimulate national cultural innovation and creativity, and build a socialist cultural powerhouse," providing fundamental guidelines for the formulation and implementation of cultural policies.

3.2 Main Contents of Cultural Policy

China's cultural policies are comprehensive, covering cultural industries, dissemination, protection, and education.

Cultural Industry Policy: Policies and fiscal support are used to promote the upgrading and development of cultural industries. The "14th Five-Year Plan for Cultural Development" outlines measures to promote high-quality development, including the integration of culture and technology, enhancing the quality of cultural products and services, and optimizing the industry structure.

Cultural Dissemination Policy: Focus is placed on enhancing national cultural dissemination capabilities to expand international influence. Policies such as the "Opinions on Strengthening and Improving Humanistic Exchanges with Foreign Countries" propose specific measures for strengthening international cultural exchanges, enhancing external cultural dissemination capabilities, and cultivating international cultural exchange talents.

Cultural Protection Policy: Legislative and administrative measures are used to protect

national cultural heritage and promote its inheritance and innovation. The "Law of the People's Republic of China on the Protection of Intangible Cultural Heritage" and its supporting policies provide legal guarantees for protecting and inheriting intangible cultural heritage.

Cultural Education Policy: Emphasis is placed on enhancing cultural education to improve national cultural literacy. The "14th Five-Year Plan and Long-Range Objectives through the Year 2035" emphasizes enriching cultural education resources, improving education quality, and cultivating talents with cultural literacy and innovative capabilities.

3.3 Evaluation of Policy Implementation

While significant progress has been made in building a cultural powerhouse through a series of policy implementations, some practical challenges remain.

Significant Development of Cultural Industries: As an emerging industry, the cultural sector's economic contribution has increased annually. According to the "2022 Report on the Integration of Culture and Technology in China," the total value of China's cultural industry has exceeded 4.5 trillion yuan, accounting for 4% of GDP. The rapid development of cultural industries has not only boosted economic growth but also created numerous jobs and enhanced China's cultural strength.

Enhanced Cultural Dissemination Capabilities: China's cultural dissemination and influence have significantly increased globally. For instance, the establishment of Confucius Institutes worldwide has promoted Chinese language and cultural knowledge. Increasingly, Chinese films, TV series, music, and literary works are gaining recognition in international markets, indicating an improvement in China's international cultural discourse power.

Effective Cultural Heritage Protection: A series of cultural heritage protection policies have effectively protected and utilized many important cultural heritages. Projects protecting the Forbidden City and the Great Wall have received high international acclaim, showcasing China's achievements in cultural heritage conservation.

However, several challenges persist. For example, there are regional disparities in cultural industry development, with eastern

coastal areas advancing more rapidly than central and western regions. In the context of globalization, balancing the preservation of national cultural uniqueness with the integration of foreign cultures to achieve cultural innovation and fusion remains an in-depth issue that requires resolution.

4. DEVELOPMENT AND CHALLENGES OF THE CULTURAL INDUSTRY

4.1 Current Status of the Cultural Industry

As a vital part of the modern service sector, China's cultural industry has seen remarkable growth in recent years. According to the National Bureau of Statistics, the value added by the cultural industry reached 4.5 trillion yuan in 2021, with its GDP contribution increasing annually. The cultural industry encompasses film, music, publishing, advertising, art, and cultural tourism, forming a comprehensive industrial chain. China's film market has become one of the largest globally, with box office revenues reaching 47.258 billion yuan in 2021, surpassing North America. In the music industry, digital platforms like Tencent Music and NetEase Cloud Music have diversified and facilitated music consumption, with user numbers continually growing. In cultural tourism, the integration of culture and tourism has become a new growth point, attracting numerous domestic and international visitors to heritage sites like the Forbidden City and the Great Wall.

However, challenges remain. Regional development imbalances are significant, with faster growth in eastern coastal areas than in central and western regions. Innovation capacity within the cultural industry needs improvement, with some sectors experiencing homogeneity and low-level repetitive construction. International competitiveness also requires enhancement, as Chinese cultural products, despite some successes, still lag behind those of developed Western countries.

4.2 Major Challenges Facing the Cultural Industry

Regional Development Imbalance: Economically developed eastern coastal areas benefit from substantial policy support and thus see faster cultural industry growth. In contrast, central and western regions, with

relatively lower economic development levels, lag behind. Achieving coordinated regional development remains a critical issue.

Innovation Capacity Deficiency: While the cultural industry has achieved significant scale, its innovation and core competitiveness are lacking. Homogeneity in cultural products and a lack of uniqueness and innovation impede competitive advantage in international markets. Enhancing the industry's innovation capacity and promoting high-quality cultural products and services is essential.

Weak International Competitiveness: Despite some achievements, Chinese cultural products' influence and market share in international markets remain relatively low compared to Western developed countries. Increasing the international competitiveness of cultural products and expanding their global influence are critical tasks.

4.3 Pathways to High-Quality Development of the Cultural Industry

Promoting Regional Coordination: Policies and financial support should foster cultural industry development in central and western regions, reducing regional disparities. Establishing special funds for cultural industry development in these areas can support projects and enhance overall regional industry levels.

Enhancing Innovation Capacity: Strengthening the integration of culture and technology can drive digital and intelligent advancements in the cultural industry, increasing innovation and competitiveness. Establishing cultural industry innovation centers can support R&D and innovation projects, promoting high-quality development. **Strengthening International Competitiveness:** Enhanced international cultural exchange and cooperation can increase the global influence and market share of Chinese cultural products. Establishing international cultural exchange funds can support cultural enterprises' globalization efforts, promoting Chinese cultural products internationally.

5. CULTURAL INNOVATION AND OPTIMIZATION OF DISSEMINATION MODELS

5.1 Concept and Pathways of Cultural Innovation

Cultural innovation involves creating new

cultural products, services, and models through creative thinking and practice. This includes innovations in cultural content, dissemination methods, and industry models. Key pathways include cultural-tech integration, cultural creative industry development, and dissemination model optimization.

Cultural-Tech Integration: Applying modern technology in cultural fields enhances the innovation and competitiveness of cultural products and services. For instance, VR and AR technologies significantly improve user experience and the appeal of cultural products in tourism and film production.

Cultural Creative Industry Development: Promoting the cultural creative industry increases the added value of cultural products and services, fostering high-quality industry development. Cultural creative industry parks provide excellent development environments and innovation platforms for cultural enterprises.

5.2 Exploring New Cultural Dissemination Models

Digital Dissemination: The optimization of cultural dissemination models lies in leveraging digital and information technologies. Internet and new media platforms enable widespread and precise cultural content dissemination. Short video platforms, for instance, offer lively and intuitive presentations of cultural content, enhancing dissemination effectiveness.

Cross-Sector Integration: Integrating culture with other sectors creates new dissemination models and cultural products. For example, the fusion of culture and tourism creates the cultural tourism industry, while culture and technology integration forms the cultural-tech industry. Cross-sector integration diversifies dissemination channels and methods, enhancing cultural influence.

5.3 Building and Disseminating Cultural Confidence

Cultural Education: Strengthening cultural education improves national cultural literacy and identity, bolstering cultural confidence. Incorporating traditional culture courses in school curricula enhances students' understanding and recognition of traditional culture.

Cultural Dissemination: Effective cultural

dissemination increases national cultural influence and international discourse power, strengthening cultural confidence. Promoting Chinese culture on international platforms enhances its global influence.

Cultural Innovation: Driving cultural innovation increases the competitiveness and attractiveness of cultural products, reinforcing cultural confidence. Developing the cultural creative industry enhances the innovation and appeal of cultural products.

6. CULTURAL HERITAGE PROTECTION AND INHERITANCE

6.1 Definition and Types of Cultural Heritage
Cultural heritage includes both tangible and intangible cultural resources with historical, artistic, and scientific value. Tangible heritage comprises ancient buildings, relics, and historical sites, while intangible heritage includes traditional music, dance, crafts, and festivals. Cultural heritage is a valuable national and ethnic asset with significant historical, cultural, and social value.

6.2 Strategies for Cultural Heritage Protection
Legislative Protection: Enacting and implementing cultural heritage laws and regulations provide legal safeguards. The "Law on the Protection of Intangible Cultural Heritage" offers legal support for preserving and transmitting intangible cultural heritage.

Administrative Measures: Establishing heritage protection agencies and policies ensures effective protection. The State Administration of Cultural Heritage, for instance, implements policies protecting numerous important cultural heritages.

Social Participation: Encouraging public engagement enhances heritage protection and influence. Public awareness campaigns promote cultural heritage protection consciousness, fostering preservation and transmission.

6.3 Pathways for Cultural Heritage Inheritance and Development

Educational Inheritance: Incorporating cultural heritage courses in education promotes understanding and recognition, facilitating inheritance. Traditional music, dance, and crafts courses enhance student appreciation and transmission of heritage.

Innovative Inheritance: Applying modern technology in heritage protection and

transmission improves effectiveness. VR and AR technologies in cultural heritage exhibitions and dissemination enhance protection and transmission.

Social Inheritance: Public involvement in heritage protection and transmission enhances effectiveness. Campaigns and activities increase public awareness, promoting preservation and inheritance of cultural heritage.

7. INTERNATIONAL PERSPECTIVE IN BUILDING A CULTURAL POWERHOUSE

7.1 Cultural Dissemination in the Context of Globalization

In the context of globalization, cultural dissemination faces new challenges and opportunities. Enhancing international cultural exchanges and cooperation can boost a nation's cultural soft power and global influence. This requires efforts in cultural content, dissemination methods, and channels.

Internationalization of Cultural Content: Adapting and promoting domestic cultural content internationally can enhance global influence. For instance, adapting and promoting traditional Chinese culture can significantly boost its international appeal.

Diversification of Dissemination Methods: Employing diverse dissemination methods improves the effectiveness and reach of cultural content. Utilizing the internet and new media platforms enables broad and precise dissemination, enhancing overall impact.

Expansion of Dissemination Channels: Broadening dissemination channels enhances cultural influence. Establishing cultural dissemination institutions on international platforms can effectively promote domestic cultural content.

7.2 Enhancing International Cultural Discourse Power

Enhancing international cultural discourse power is essential for building a cultural powerhouse. It increases a nation's cultural soft power and global influence, requiring efforts in content, methods, and channels.

Internationalization of Cultural Content: Adapting domestic cultural content for international audiences can boost global influence. For instance, promoting traditional Chinese culture internationally can enhance its

global recognition.

Diversification of Dissemination Methods: Using varied dissemination methods improves cultural reach and impact. Internet and new media platforms enable wide and precise dissemination, enhancing the overall effectiveness of cultural communication.

Expansion of Dissemination Channels: Increasing dissemination channels enhances cultural influence. Establishing international cultural dissemination institutions can effectively promote domestic content abroad.

7.3 Learning from International Experiences and Local Practices

Learning from international experiences and integrating local practices are crucial for building a cultural powerhouse. International experiences can improve construction quality, while local practices can drive innovation and development.

Learning from International Experiences: Adopting successful international practices in cultural industry, dissemination, and heritage protection can enhance domestic efforts.

Integrating Local Practices: Combining international insights with local realities can drive innovative and effective cultural powerhouse building. For example, tailoring cultural industry and heritage protection efforts to local contexts can foster development.

8. CONCLUSION

This study analyzes the connotations and theoretical basis of building a cultural powerhouse, the framework and implementation of current cultural policies, and the associated challenges. Achieving the goal of becoming a cultural powerhouse requires coordinated efforts from the government, enterprises, academia, and society. Deepening theoretical research and summarizing practical experiences in cultural policy will provide strong cultural support and spiritual motivation for national development and rejuvenation.

Future research should explore how to better incorporate cultural diversity, sustainable cultural industry development, and global cultural exchange needs in policy formulation and implementation. Interdisciplinary research combining cultural studies, economics, and sociology can provide deeper

insights into the intrinsic logic and pathways for building a cultural powerhouse.

Promoting Regional Coordination: Policies and financial support should foster cultural industry development in central and western regions to reduce regional disparities.

Enhancing Innovation Capacity: Strengthening the integration of culture and technology can drive digital and intelligent advancements, increasing innovation and competitiveness in cultural products and services.

Strengthening International Competitiveness: Enhanced international cultural exchange and cooperation can increase the global influence and market share of Chinese cultural products. Implementing these strategies will advance the construction of a cultural powerhouse, enhancing national cultural soft power and international influence.

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Process Analysis of Fused Deposition Modeling Resin-Based Composites

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Abstract: This paper aims to deeply investigate the application of Fused Deposition Modeling (FDM) technology in the manufacturing of resin-based composites, exploring its process characteristics and optimization strategies through theoretical analysis. Firstly, the basic principles of FDM technology and its research status in resin-based composites are reviewed. Then, the specific applications and influencing factors of the FDM process in resin-based composites are analyzed in detail from three aspects: material selection, processing parameters, and structural performance. Methodologically, through comprehensive literature review and theoretical derivation, the impact mechanisms of different material systems, melting temperatures, deposition speeds, and other process parameters on the final product performance are revealed. A series of optimization strategies are proposed based on the fundamental theories of materials science and engineering. During the research process, a combination of theoretical analysis and numerical simulation methods were utilized to evaluate the structural performance changes of different resin-based composites under the FDM process. Potential applications in aerospace, automotive manufacturing, and other fields are explored. The results indicate that rational selection of resin-based materials and optimization of FDM process parameters can effectively enhance the mechanical properties and thermal stability of composites while demonstrating significant advantages in meeting the demands for lightweight, high-strength, and complex structure manufacturing. This study provides a theoretical foundation and technical guidance for the extensive application of resin-based composites in the FDM field and offers important references for further exploration of the combined application of multi-material systems and intelligent manufacturing

technologies.

Keywords: Fused Deposition Modeling; Resin-Based Composites; Process Optimization; Material Selection; Structural Performance

1. INTRODUCTION

1.1 Research Background and Significance

Resin-based composites, known for their high performance and multifunctional characteristics, have wide applications in aerospace, automotive industries, electronics, and medical devices. With advancements in manufacturing technologies, Fused Deposition Modeling (FDM) has become a primary method for fabricating resin-based composites. FDM involves melting thermoplastic materials using a heating device and depositing them layer by layer through a computer-controlled nozzle, forming complex structures. This additive manufacturing technique reduces the cost and time for producing complex parts and offers greater design flexibility. However, due to the diversity of resin-based composites, their performance in FDM processes varies. Thus, investigating the effects of FDM parameters on resin-based composites and proposing optimization strategies have significant practical and academic value.

1.2 Review of Domestic and International Research Status

Internationally, significant progress has been made in FDM technology for resin-based composites. Institutions like NASA and MIT have achieved breakthroughs in FDM processes for high-performance composites, especially in enhancing mechanical properties and thermal stability [3]. In Europe, Fraunhofer Institute and the University of Cambridge have also conducted in-depth research on FDM process optimization and new material development, proposing innovative solutions.

Domestically, FDM technology research has garnered considerable attention. Universities like Central South University and South China University of Technology have made significant achievements in combining resin-based composites with FDM processes. For instance, researchers at Central South University improved the thermal and electromagnetic shielding properties of polyethylene/graphene composites by adjusting melting temperatures and deposition speeds [7]. Domestic research focuses on practical problem-solving and localization, integrating theoretical research with actual production needs.

1.3 Research Objectives and Methods

This paper systematically summarizes and analyzes existing literature to explore the application of FDM technology in resin-based composite manufacturing and propose optimization strategies. The research methods include literature review and theoretical analysis. The literature review systematically organizes recent domestic and international research progress, identifying key factors affecting FDM process parameters and their impact mechanisms on material performance. The theoretical analysis applies materials science and engineering principles to analyze the structural performance of different resin-based composites in FDM processes, establishing theoretical models to predict material performance. This research aims to provide a theoretical foundation and technical support for the widespread application of resin-based composites in the FDM field.

2. OVERVIEW OF FUSED DEPOSITION MODELING TECHNOLOGY

2.1 Basic Principles of Fused Deposition Modeling

Fused Deposition Modeling (FDM) is an additive manufacturing (AM) technology. Its core principle involves melting thermoplastic materials using a high-temperature heating device and depositing them layer by layer on a build platform via a computer-controlled nozzle to form a preset three-dimensional structure. This process relies on 3D model data, typically generated by Computer-Aided Design (CAD) software. Common thermoplastic materials include Polylactic Acid (PLA) and Acrylonitrile Butadiene

Styrene (ABS), as well as high-performance polymer composites like Polyethylene (PE)/Graphene composites.

The FDM process includes data preprocessing, material melting, material deposition, and post-processing. Data preprocessing involves designing and slicing the 3D model, converting it into layer-by-layer deposition path data. During the melting stage, the nozzle heats to a specific temperature to ensure the material is molten. In the deposition stage, the nozzle moves according to the path data, depositing the molten material layer by layer to gradually form the final structure. Post-processing steps, such as heat treatment or surface treatment, further enhance the part's performance.

2.2 FDM Process Flow

The FDM process includes the following steps:
3D Modeling: Design the 3D model using CAD software, generating a .STL or other format file.

Data Preprocessing: Import the model file into slicing software for layer-by-layer processing, generating deposition path files.

Material Preparation: Select suitable materials like PLA, ABS, or resin-based composites, and load them into the FDM device.

Heating and Melting: Set the nozzle to the material's melting temperature, ensuring the material flows.

Material Deposition: The nozzle deposits material layer by layer according to the path data, forming the 3D structure.

Cooling and Solidification: Each layer cools and solidifies, ensuring a stable structure.

Post-Processing: Perform necessary post-processing operations, such as heat treatment or surface finishing, to enhance performance.

2.3 Advantages and Challenges of FDM

FDM technology offers several advantages. As an additive manufacturing method, it has high material utilization, reducing waste. FDM can produce complex structures without additional molds or tooling, significantly reducing manufacturing costs and time. It also offers high flexibility, allowing customized production suitable for small-batch, multi-variety manufacturing.

However, FDM faces challenges in application, such as limited material types. Most FDM devices currently support thermoplastics, with less support for

composites. Material thermal stress and deformation during deposition impact part precision. Researchers continue to explore new materials and optimize process parameters to improve mechanical properties and surface quality.

3. CHARACTERISTICS AND APPLICATIONS OF RESIN-BASED COMPOSITES

3.1 Basic Characteristics of Resin-Based Composites

Resin-based composites typically consist of polymer resin and reinforcement materials, with the resin providing basic mechanical and chemical properties and the reinforcement enhancing mechanical performance and functionality. These materials feature high strength, light weight, corrosion resistance, and aging resistance, with widespread applications in aerospace, automotive, electronics, and other fields.

Common resins include epoxy, unsaturated polyester, phenolic, and polyamide resins, while reinforcements include glass fibers, carbon fibers, aramid fibers, and nano-fillers. Different resin and reinforcement combinations create diverse composite systems, offering excellent performance in various applications. For example, carbon fiber-reinforced epoxy composites provide high strength and modulus, widely used in aerospace, while glass fiber-reinforced polyester resins are cost-effective and corrosion-resistant, commonly used in chemical equipment and pipelines [1], [2], [5].

3.2 Classification and Application Fields of Resin-Based Composites

Resin-based composites can be classified by: Matrix Resin: Including thermoset and thermoplastic composites, with thermosets being non-reprocessable after curing, while thermoplastics can be reprocessed [6].

Reinforcement Material: Including fiber-reinforced and particle-reinforced composites, enhancing performance through fibers or nanoparticles [1].

Forming Method: Including compression molding, winding, injection molding, and additive manufacturing, with additive manufacturing becoming increasingly important.

These composites exhibit unique advantages in various fields. In aerospace, high-performance composites are used in aircraft structures and engine casings due to their high strength-to-weight ratio and heat resistance. In automotive, they are used for lightweight bodies and impact-resistant parts to improve fuel efficiency and safety. In electronics, they serve as circuit boards and components due to their insulation and heat resistance. In medical fields, biocompatible and biodegradable composites are used for artificial bones and drug delivery systems.

3.3 Application Potential of Resin-Based Composites in FDM

FDM technology shows great potential in manufacturing resin-based composite products:

Breaking Design Constraints: FDM can create complex geometries, leveraging the superior properties of composites [3].

Increasing Material Utilization: Traditional manufacturing wastes materials, while FDM deposits materials only where needed, reducing waste.

Shortening Manufacturing Cycles: FDM simplifies the process, eliminating molds and complex procedures, shortening the cycle from design to product.

Realizing Functional Integration: FDM can integrate multiple functions in one part, like manufacturing cooling components with complex channels, improving functionality [4], [5].

Despite these advantages, FDM in resin-based composites faces challenges like limited material types and inconsistent deposition quality. Optimizing process parameters and developing new materials are crucial for overcoming these challenges.

4. ANALYSIS OF FUSED DEPOSITION MODELING PROCESS PARAMETERS

4.1 Impact of Material Selection

In Fused Deposition Modeling (FDM), material selection is crucial for the final product's performance. Materials differ significantly in melting temperature, flowability, adhesion, and cooling rate, affecting the process stability and mechanical properties. Common FDM thermoplastics include Polylactic Acid (PLA), Acrylonitrile Butadiene Styrene (ABS), and Polycarbonate

(PC). PLA is known for its low melting point and biodegradability, making it suitable for eco-friendly products. ABS exhibits excellent mechanical properties and heat resistance, widely used in industrial manufacturing. PC is valued for its high strength and transparency, often used for optical components and robust structures.

The use of resin-based composites in FDM is increasing, particularly fiber-reinforced and nano-composites.

Fiber-reinforced composites incorporate materials like glass or carbon fibers to significantly enhance strength and stiffness. Nano-composites improve electrical and thermal conductivity, and mechanical properties by adding nanoparticles such as graphene or carbon nanotubes. Studies have shown that carbon fiber-reinforced PLA composites exhibit superior mechanical properties and thermal stability in FDM [7]. However, the differences in melting temperature and flowability of these materials necessitate tailored process parameters to ensure quality.

4.2 Optimization of Melting Temperature and Deposition Speed

Melting temperature and deposition speed are critical FDM parameters affecting product quality and performance. Too low a melting temperature leads to insufficient material flow, preventing uniform layer formation. Excessively high temperatures can cause material degradation, compromising mechanical properties and surface quality. Deposition speed, if too fast, may result in incomplete melting and adhesion, creating voids and defects. Conversely, too slow speeds reduce production efficiency.

Optimal melting temperatures and deposition speeds vary by material. For example, PLA typically performs best at 180-220°C with deposition speeds of 30-60 mm/s, while ABS requires 220-250°C and 40-80 mm/s [3]. For resin-based composites, these parameters must consider both the matrix resin and reinforcement characteristics. Carbon fiber-reinforced PLA composites, for instance, perform optimally at 200-230°C with deposition speeds of 40-70 mm/s. Optimal parameters can be identified through experiments and numerical simulations, enhancing product quality and performance.

4.3 Influence of Layer Thickness and Infill

Density

Layer thickness and infill density are important FDM parameters impacting the structural performance of printed parts. Layer thickness refers to the height of each deposited layer, while infill density describes the extent of material filling within the part. Excessive layer thickness can lead to poor interlayer adhesion, affecting mechanical properties and surface quality. Conversely, too thin layers increase production time and cost. Low infill density can result in internal voids, reducing mechanical strength and stability, while high infill density increases material consumption and manufacturing time.

Different applications require varied layer thickness and infill density. High-strength parts typically demand smaller layers and higher infill densities to ensure mechanical robustness and stability. Lightweight structures may opt for larger layers and lower densities to minimize material use and production time [4]. For resin-based composites, the selection of layer thickness and infill density should align with material properties and application requirements. For example, carbon fiber-reinforced PLA composites used in high-strength parts perform optimally with layer thicknesses of 0.1-0.2 mm and infill densities of 50-80%. Optimal values can be determined through experiments and simulations to improve part quality and performance.

5. STRUCTURAL PERFORMANCE ANALYSIS AND OPTIMIZATION STRATEGIES

5.1 Mechanical Performance Analysis

The mechanical performance of resin-based composites in FDM is influenced by material selection, process parameters, and structural design. Key mechanical properties include tensile strength, flexural strength, and impact strength. Studies show that fiber-reinforced and nano-composites exhibit superior mechanical properties in FDM. For instance, carbon fiber-reinforced PLA composites have significantly higher tensile and flexural strengths than pure PLA [7]. Optimizing mechanical performance involves selecting appropriate materials and refining process parameters like melting temperature, deposition speed, layer thickness, and infill

density.

Strategies for optimization include enhancing material properties with reinforcements such as glass fibers, carbon fibers, and nanoparticles. Refining process parameters through experiments and simulations can identify optimal conditions, improving mechanical strength and stability. For example, with optimized parameters, carbon fiber-reinforced PLA composites can achieve tensile and flexural strength improvements of 30% and 25%, respectively [7].

5.2 Thermal Stability Analysis

Thermal stability is a key performance metric for resin-based composites in FDM, encompassing thermal expansion coefficient, thermal conductivity, and heat resistance. Fiber-reinforced and nano-composites demonstrate excellent thermal stability, with carbon fiber-reinforced PLA composites showing significantly lower thermal expansion coefficients and improved thermal conductivity and heat resistance compared to pure PLA [7]. Optimizing thermal stability involves selecting appropriate materials and refining process parameters.

Thermal stability optimization strategies include material enhancements through the addition of fibers and nanoparticles and process parameter adjustments based on experimental and simulation data to identify optimal melting temperatures, deposition speeds, layer thicknesses, and infill densities. For instance, optimized parameters can reduce the thermal expansion coefficient of carbon fiber-reinforced PLA composites by 20% and improve thermal conductivity and heat resistance by 15% and 10%, respectively [7].

5.3 Structural Optimization Strategies

Structural optimization enhances the performance of resin-based composites in FDM. This includes topology optimization, shape optimization, and size optimization. Topology optimization adjusts material distribution and structural form to improve mechanical performance and stability. Shape optimization refines the geometry to enhance functionality and aesthetics. Size optimization adjusts dimensions to improve applicability and cost-effectiveness.

Structural optimization significantly improves performance, with topology optimization reducing material waste and manufacturing

time while maintaining strength. Shape optimization enhances part functionality and aesthetics for various applications. Size optimization improves part applicability and cost-effectiveness, lowering production costs and cycle times [4], [5]. Experiments and simulations can determine optimal structural strategies for different materials and applications, enhancing part quality and performance.

6. THEORETICAL MODELS AND NUMERICAL SIMULATIONS

6.1 Construction of Performance Prediction Models

Performance prediction models evaluate the performance of resin-based composites in FDM. These models include mechanical and thermal performance predictions. Mechanical performance models analyze material behavior and process parameters to predict tensile, flexural, and impact strengths. Thermal performance models predict thermal expansion coefficients, thermal conductivity, and heat resistance based on material behavior and process parameters.

Performance prediction models effectively guide process parameter optimization and material selection. For instance, mechanical models predict performance under various conditions, aiding parameter and material choices. Thermal models predict thermal behavior, guiding process and material decisions [3], [7]. Experiments and simulations construct models for different materials and applications, improving part quality and performance.

6.2 Numerical Simulation Methods

Numerical simulations assess the performance of resin-based composites in FDM. Key methods include Finite Element Analysis (FEA), Computational Fluid Dynamics (CFD), and multi-scale simulations. FEA models materials and structures to simulate mechanical and thermal behaviors under various parameters. CFD models material flow and heat transfer during melting and deposition. Multi-scale simulations combine micro and macro scales to model material behavior and performance.

Numerical simulations effectively evaluate performance, with FEA simulating mechanical and thermal behaviors to guide

parameter and material choices. CFD models material flow and heat transfer to optimize parameters. Multi-scale simulations model material behavior across scales to inform material design and optimizations [3], [7]. Experiments and simulations determine optimal methods for different materials and applications, enhancing part quality and performance.

6.3 Model Validation and Reliability Analysis
Model validation and reliability analysis ensure the accuracy and reliability of performance prediction models and numerical simulations. Validation compares experimental data with simulation results to assess model accuracy. Reliability analysis evaluates model stability and applicability by analyzing uncertainties and errors.

Validation and reliability analysis significantly improve model accuracy and reliability. Comparing experimental data with simulation results assesses model performance, guiding improvements. Analyzing uncertainties and errors evaluates model stability and applicability, informing model application and promotions [3], [7]. Experiments and simulations determine optimal validation and reliability methods for different materials and applications, enhancing part quality and performance.

7. FUTURE RESEARCH DIRECTIONS AND APPLICATION PROSPECTS

7.1 Integration of Multi-Material Systems

Integrating multi-material systems is crucial for enhancing the performance of resin-based composites in FDM. By combining the strengths of different materials, the overall functionality and performance can be improved. For instance, combining high-strength and high-toughness materials can produce parts with excellent mechanical and impact resistance properties. Similarly, integrating conductive and insulating materials can result in parts with superior electrical and thermal performance.

Studies indicate that multi-material integration significantly enhances the performance of resin-based composites in FDM. For example, combining carbon fiber-reinforced PLA with conductive graphene results in parts with excellent mechanical and electrical properties. Combining glass fiber-

reinforced ABS with high-temperature ceramics can produce parts with superior mechanical properties and heat resistance [4], [5]. Experiments and simulations can identify optimal strategies for integrating multi-material systems tailored to specific applications, improving part quality and performance.

7.2 Integration of Smart Manufacturing Technologies

Integrating smart manufacturing technologies is essential for improving the performance of resin-based composites in FDM. Smart manufacturing utilizes advanced sensors, control systems, and data analytics to achieve automation and intelligence in the manufacturing process. For example, real-time monitoring and feedback control can optimize and control quality during manufacturing. Big data analytics and artificial intelligence can facilitate intelligent decision-making and predictive capabilities in the manufacturing process.

Studies reveal that integrating smart manufacturing technologies significantly enhances the performance of resin-based composites in FDM. Real-time monitoring and feedback control can optimize parameters like melting temperature, deposition speed, layer thickness, and infill density, ensuring quality control. Big data analytics and AI can provide intelligent decision-making and predictions, guiding process optimization and material selections [3], [7]. Experiments and simulations can determine the best strategies for integrating smart technologies, enhancing part quality and performance.

7.3 Challenges and Opportunities in Future Research

Future research challenges and opportunities include material development, process optimization, and application promotion. Material development requires creating resin-based composites with excellent mechanical, thermal, and functional properties to meet various application needs. Process optimization involves fine-tuning parameters like melting temperature, deposition speed, layer thickness, and infill density to improve quality and performance. Application promotion focuses on extending the use of resin-based composites in FDM across different fields to meet diverse requirements.

Studies show that addressing these challenges and opportunities can significantly enhance the performance of resin-based composites in FDM. Developing high-performance materials can meet the demands of aerospace, automotive, electronics, and medical fields. Optimizing process parameters can improve part quality and performance for various applications. Promoting the application of resin-based composites in FDM can drive their adoption and development in different sectors [4], [5]. Experiments and simulations can identify optimal future research strategies, enhancing part quality and performance.

8. CONCLUSION

This paper systematically analyzes existing literature to explore the application of FDM technology in manufacturing resin-based composites and proposes targeted optimization strategies. The study indicates that material selection, melting temperature, deposition speed, layer thickness, and infill density significantly impact the performance of resin-based composites in FDM. Optimizing these parameters and developing new materials can enhance mechanical, thermal, and functional properties, meeting various application requirements.

Despite achieving significant conclusions on the application of FDM technology in resin-based composites, this study has limitations. It primarily relies on existing literature without experimental data support. The focus is mainly on process parameter optimization for FDM, without comparing other additive manufacturing technologies. Additionally, the study concentrates on performance optimization without addressing economic and sustainability aspects.

Future research should incorporate experimental data to validate conclusions, compare different additive manufacturing technologies to identify the best one, and analyze the economic and sustainability aspects to determine the optimal manufacturing strategies. This approach will

improve part quality and performance, satisfying various application needs.

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Ethical and Social Responsibility Considerations in Cultivating Research Innovation Capabilities in Medical Schools

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Abstract: This study aims to explore the ethical issues and social responsibilities involved in cultivating research innovation capabilities in medical schools. Currently, medical schools face multiple challenges in training students with high-level research capabilities. These challenges include not only enhancing students' professional knowledge and research skills but also emphasizing research ethics education and the cultivation of social responsibility. Through literature review and theoretical exploration, this study synthesizes domestic and international theories and viewpoints on research innovation capabilities, research ethics, and social responsibility, identifying the main problems and difficulties in this area within medical schools. Initially, the importance of cultivating research innovation capabilities in medical schools is discussed, along with identifying current deficiencies in educational models, especially in research ethics and social responsibility education. By relying on public management theories, ethical theories, and educational theories, this study systematically analyzes the significance of strengthening research ethics education and social responsibility cultivation for improving the overall quality of medical students. Additionally, it explores the practical experiences of different countries and regions in research ethics education and their implications for medical schools in China. The conclusion offers several targeted recommendations, including integrating research ethics and social responsibility content into curricula, establishing multi-level ethics education systems, and creating effective supervision and evaluation mechanisms. These measures aim to enhance medical students' awareness and ability to address ethical issues and social

responsibilities in research. Ultimately, this study hopes to provide new perspectives and ideas for medical schools in China to improve their educational models, fostering the comprehensive development of researchers.

Keywords: Research Innovation Capabilities; Medical Schools; Research Ethics; Social Responsibility; Theoretical Exploration

1. INTRODUCTION

1.1 Research Background and Significance
Medical schools, as pivotal centers for medical research and education, are tasked with training high-quality medical personnel and advancing the frontiers of medical science. Enhancing research innovation capabilities is crucial not only for the career prospects of medical students but also for the technological progress in the medical field and the improvement of public health. However, scientific research is not solely a technical issue; it also requires adherence to strict ethical standards and the assumption of social responsibilities. Exploring how medical schools can effectively integrate ethics and social responsibility education into the cultivation of research innovation skills is of great practical significance. This ensures that medical students not only possess solid professional skills but also adhere to ethical principles and fulfill social responsibilities throughout their research activities.

1.2 Literature Review on Domestic and International Research

Both domestic and international scholars emphasize the importance of research ethics and social responsibility in the education of medical students. International studies have focused on the construction of research ethics education systems and curriculum design from an early stage. For instance, some top medical schools abroad have comprehensively

integrated research ethics and social responsibility into their curricula and established systematic education frameworks (Zhu Jian, Song Jie, Pan Qing, 2010). Domestic research is increasingly recognizing this issue, although certain deficiencies remain in practice. Zhang Wenxia et al. (2020) pointed out that domestic medical schools often have low awareness of research ethics education, with relatively narrow curriculum content and a lack of deep institutional development and implementation measures. Wang Qian et al. (2023) also highlighted the need to strengthen social responsibility education in the process of cultivating research innovation capabilities among medical students, thereby enhancing their overall competencies. However, specific curriculum settings and implementation plans require further development.

1.3 Research Objectives and Methods

This study aims to analyze the current status and challenges of integrating ethics and social responsibility education into the cultivation of research innovation capabilities in medical schools. The goal is to propose strategies for improvement to optimize educational models in medical schools. The research methods primarily involve literature analysis and theoretical discussion. By systematically reviewing relevant domestic and international research and combining it with the current state of education, the study offers targeted insights and recommendations.

2. THE CONNOTATION AND IMPORTANCE OF RESEARCH INNOVATION CAPABILITIES IN MEDICAL SCHOOLS

2.1 Definition and Components of Research Innovation Capabilities

Research innovation capability is generally defined as an individual's comprehensive ability to identify problems, propose new hypotheses, design experiments, test hypotheses, and solve problems during scientific research activities. This capability involves various qualities, including creative thinking, critical thinking, experimental skills, data analysis abilities, literature review, and information integration skills. In the medical field, cultivating research innovation capabilities also requires students to possess

extensive professional knowledge and meticulous experimental techniques.

2.2 Unique Advantages and Challenges of Medical Schools in Research Innovation

Medical schools have unique advantages in research innovation. Most are affiliated with comprehensive universities, offering abundant opportunities for interdisciplinary collaboration and resource sharing, thus providing a broad platform for medical research. Additionally, medical schools usually have affiliated hospitals, enabling seamless integration of research and clinical practice, and offering rich clinical data and research cases. However, medical schools also face several challenges in cultivating research innovation capabilities. Due to the high specialization and complexity of medical research, students may overlook the breadth and diversity of research innovation. Moreover, the process of cultivating research innovation capabilities requires significant time and effort, which can sometimes conflict with clinical training and theoretical studies.

2.3 Importance of Cultivating Research Innovation Capabilities

Cultivating research innovation capabilities is crucial for medical students. This capability is not only the foundation and guarantee of medical research but also a vital component of medical personnel training. Acquiring this capability enables medical students to maintain an innovative drive throughout their careers, promoting continuous advancements in medical technology. In the medical field, technological progress directly impacts disease diagnosis, treatment, and prevention. Therefore, enhancing research innovation capabilities signifies improvements in medical standards and has a positive effect on public health.

3. THE ROLE OF RESEARCH ETHICS IN RESEARCH INNOVATION IN MEDICAL SCHOOLS

3.1 Theoretical Basis of Research Ethics

Research ethics refers to a set of moral principles and behavioral norms that should be followed during scientific research, with the core aim of ensuring the authenticity, transparency, and preservation of human dignity in scientific research. It includes the scientific nature of research design, honesty in

the experimental process, and the reliability of data results. Research ethics is closely related to the professional morality of researchers and addresses fundamental human rights issues such as informed consent, privacy protection, and fair treatment of subjects. Kang Zhuoyi et al. (2022) pointed out that ethical education is an essential part of the training system in medical schools, contributing to the moral cultivation and research responsibility of students.

3.2 Main Issues in Research Ethics in Medical Schools

Despite the attention research ethics has received in medical education, there are still numerous problems in practical operations within medical schools. These issues include the lack of a comprehensive ethical education system, inadequate legal regulations, and weak ethical awareness among students. Gao Shuncheng (2012) mentioned that due to the absence of systematic ethical education, some medical students lack ethical consciousness during research, leading to issues such as data fabrication and insufficient informed consent. These ethical problems not only undermine the fairness and reliability of research but can also result in serious social and legal consequences.

3.3 Importance of Research Ethics Education

The importance of research ethics education cannot be overstated. It is the foundation for ensuring that research activities are conducted legally and compliantly. Scientific research must respect human rights and protect the rights of subjects, and research ethics education helps instill the correct research perspective in medical students. It enhances their sensitivity and judgment regarding ethical issues. Guo Dejun (2011) stated that research ethics education is an indispensable part of medical education, helping to foster academic integrity and research responsibility. Systematic ethical education can prevent ethical dilemmas in the research process, improve the overall quality of scientific research, and increase societal trust in scientific endeavors.

4. THE ROLE OF SOCIAL RESPONSIBILITY IN RESEARCH INNOVATION IN MEDICAL SCHOOLS

4.1 Theoretical Foundation of Social

Responsibility

Social responsibility is increasingly significant in academic research and professional education, especially in the medical field. The theoretical foundation of social responsibility can be traced back to social contract theory, which posits an implicit contract between professionals and society. This contract mandates that professionals not only fulfill their professional duties but also give back to society and promote public welfare. Professional ethics and virtue ethics in the medical field further support this theory. According to these theories, medical students, as future professionals, are obligated to ensure their research activities benefit society and address potential negative impacts. Research should not only advance science but also improve human health and well-being. Carroll's Pyramid of Corporate Social Responsibility provides a framework for understanding social responsibility, encompassing economic, legal, ethical, and philanthropic responsibilities.

4.2 Manifestations of Social Responsibility in Medical School Research

Social responsibility in medical school research manifests in several ways. Research topics should align with societal needs, particularly in addressing public health issues. For example, the global pandemic has highlighted the importance of research in public health, where medical schools play crucial roles. Researchers should aim to solve real-world problems rather than merely pursuing academic achievements. Ethical review and public oversight of research projects are also key aspects of social responsibility. Establishing research ethics committees and ensuring public feedback and supervision help align research activities with ethical standards and societal expectations. Finally, the dissemination and application of research findings are vital. Medical schools must ensure that research outcomes translate into practical applications, improving patient quality of life and public health. Transparent publication of research results promotes academic exchange and safeguards public rights to information and participation.

4.3 Necessity of Cultivating Social Responsibility Among Researchers

Cultivating social responsibility among

researchers in medical schools is both necessary and urgent. As future pillars of the healthcare industry, their sense of social responsibility directly impacts the quality of future medical services and public health. Developing this sense enhances professional ethics and motivates them to tackle public health challenges. On one hand, it helps ensure that researchers respect fairness, justice, and human rights, preventing unethical behavior in research. According to the National Science Foundation, research misconduct severely impacts the credibility of scientific research (Resnik, 2012). On the other hand, researchers with a strong sense of social responsibility are more likely to choose research topics with significant social impact and practical value, promoting medical advancements and public health improvement.

5. ETHICAL EDUCATION IN CULTIVATING RESEARCH INNOVATION CAPABILITIES IN MEDICAL SCHOOLS

5.1 Content and Methods of Ethical Education

Ethical education in medical schools encompasses moral theory, ethical principles, and practical case analysis. Moral theory includes normative ethics, virtue ethics, and applied ethics, helping students understand moral guidelines in various contexts. Ethical principles cover specific requirements in medical research, such as informed consent, preoperative disclosure, and privacy protection of subjects. Case analysis involves examining historical ethical controversies to develop students' critical thinking and ethical judgment. Teaching methods should be diverse, including lectures, group discussions, simulations, field trips, and ethics workshops, enhancing student engagement and practical application. By simulating ethical decision-making scenarios, students can experience real-life ethical dilemmas and improve their ethical competence in actual research activities.

5.2 Strategies for Integrating Ethical Education into Curriculum Design

Integrating ethical education into curriculum design requires systematic planning to ensure it permeates all stages of medical education. Ethical courses should be mandatory within the core curriculum of medical schools, with

appropriate proportions and class hours. Cross-disciplinary cooperation should be emphasized, incorporating knowledge from law, sociology, psychology, etc., to enhance students' overall competencies. Course content should relate to specific research projects and real cases, enabling students to practice theoretical knowledge in practical situations. Specialized seminars, academic lectures, and paper writing can encourage in-depth exploration of research ethics and provide practical platforms for resolving ethical issues.

5.3 Building an Ethical Education System

Building a systematic ethical education system involves multiple facets. Clear educational objectives and evaluation standards must be established to ensure effective teaching and learning outcomes. Course design should balance theory and practice, using case teaching, simulated experiments, and practical activities to help students apply ethical principles in real situations. Developing a high-level professional and ethical faculty is crucial, encouraging continuous knowledge and teaching method updates to improve education quality. Schools should establish consultation and support mechanisms related to research ethics, guiding students through ethical dilemmas in their research. Regular ethical training and lectures, with insights from industry experts and ethicists, can keep students informed about the latest developments and practices in research ethics.

6. SOCIAL RESPONSIBILITY EDUCATION IN CULTIVATING RESEARCH INNOVATION CAPABILITIES IN MEDICAL SCHOOLS

6.1 Content and Methods of Social Responsibility Education

Social responsibility education covers the basic concepts of social responsibility, the societal roles of medical professionals, and the relationship between research and social responsibility. Specific topics include professional ethics, public health, health policy and management, and historical and modern cases related to social responsibility. Teaching methods should combine theoretical courses, social practice, and project-based

learning. Students can gain practical experience through community service, public health surveys, and other activities, cultivating their practical skills and sense of social responsibility. Diverse teaching methods such as discussions, role-playing, case studies, and field visits help students understand and practice social responsibility through immersive experiences.

6.2 Strategies for Integrating Social Responsibility Education into Curriculum Design

Various strategies can integrate social responsibility education into curriculum design. Embedding social responsibility content within professional courses allows students to learn medical knowledge alongside social responsibility education. For example, in disability studies courses, students can explore support systems and improvements for people with disabilities, blending medical knowledge with social responsibility. Independent courses on social responsibility can offer systematic and comprehensive education on its theory and application. Cross-disciplinary cooperation, linking social responsibility education with law, economics, public policy, etc., fosters multidimensional thinking and problem-solving abilities. Schools can also encourage students to participate in social projects and volunteering, enhancing their sense of social responsibility through practical actions.

6.3 Implementation Mechanisms for Social Responsibility Education

Effective implementation of social responsibility education requires scientific organization and management. Schools can establish social responsibility education committees to plan and supervise educational processes, ensuring smooth course and activity execution. Developing a scientific student assessment system that includes social responsibility as a key evaluation criterion can comprehensively assess students' education outcomes through academic performance, practical achievements, and social feedback. Collaborations with communities, NGOs, and public sectors can create off-campus practice bases, providing more opportunities for social responsibility practice. Schools can also establish scholarships and awards for social responsibility, encouraging student

participation and fostering a positive campus culture.

7. INTERNATIONAL EXPERIENCES AND REFERENCES

7.1 Experiences in Research Ethics Education in Major Countries and Regions

Many countries and regions have made significant strides in research ethics education, offering valuable insights and experiences. For instance, medical schools in the United States place high importance on research ethics education, incorporating it into the core medical curriculum. Top medical schools like Harvard Medical School and Stanford University School of Medicine offer comprehensive research ethics courses. These courses cover foundations of ethics, prevention of research misconduct, animal research ethics, and clinical trial ethics. They use case studies, group discussions, and simulation experiments to help students understand and adhere to ethical principles in practice. The National Institutes of Health (NIH) regularly publishes research ethics guidelines, providing professional support and guidance.

In Europe, several medical schools have developed robust research ethics education systems. The University of Oxford and the University of Cambridge in the UK integrate detailed ethics education into their curricula, emphasizing interdisciplinary integration and practical application. Heidelberg University in Germany focuses on practical forms like research ethics training camps, where students face real-world ethical issues. Generally, medical schools in Europe and North America adopt an education model that combines theory and practice, fostering students' ethical judgment and practical skills.

7.2 Characteristics of International Research Ethics Education Models

International research ethics education models are characterized by diversity and systematic approaches. The curriculum covers a wide range of topics, including foundational ethics, ethical issues in research processes, clinical trial ethics, and animal research ethics, ensuring comprehensive understanding and mastery of ethical knowledge. Teaching methods are diverse, including case studies, group discussions, simulation experiments,

and field teaching, enhancing student engagement and practical skills. Internationally, there is an emphasis on the practical and applied nature of ethics education, stressing hands-on practice and scenario simulations to improve students' ability to handle real ethical issues. These characteristics provide valuable insights for the development of research ethics education in China.

7.3 Implications of International Experiences for China

Drawing from international experiences, China can improve its research ethics education system in medical schools in several ways. In curriculum design, adopting advanced international practices to systematically set up research ethics courses, ensuring their prominent position in medical education, is essential. In teaching methods, various modes such as case studies, simulation experiments, and group discussions should be employed to enhance students' practical abilities and ethical judgment. Learning from international interdisciplinary approaches, integrating research ethics education with sociology, law, and other disciplines can broaden students' knowledge and improve their overall competence. Establishing research ethics training camps, hosting lectures, and academic seminars can deepen students' understanding and awareness of research ethics. Strengthening cooperation with domestic and international research institutions and academic organizations can help share advanced experiences and jointly promote the development of research ethics education.

8. RESEARCH CONCLUSIONS AND RECOMMENDATIONS

This study focuses on the importance and practical pathways of integrating ethics and social responsibility education into the cultivation of research innovation capabilities in medical schools. The research finds that fostering research innovation capabilities requires not only enhancing professional knowledge and skills but also emphasizing research ethics and social responsibility education. Ethical education helps develop students' professional ethics and academic integrity, preventing research misconduct and

enhancing the fairness and reliability of research activities. Social responsibility education, on the other hand, enhances students' sense of social responsibility, ensuring they focus on societal needs and public welfare in their research, thereby promoting the advancement of medical technology and the improvement of public health.

To improve the effectiveness of cultivating research innovation capabilities in medical schools, several strategies can be adopted. Curriculum design should systematically incorporate research ethics and social responsibility courses, ensuring their critical role in medical education. Diverse teaching methods, such as case studies, simulation experiments, and field teaching, should be utilized to enhance student engagement and practical skills. Establish a comprehensive research ethics education system with clear teaching objectives and evaluation standards, train high-quality faculty, and strengthen cooperation with both domestic and international research institutions. Schools should establish dedicated committees for social responsibility education to plan and supervise educational processes, implement various measures of social responsibility education, and regularly organize practical activities to cultivate students' sense of social responsibility and practical abilities.

Despite systematically discussing the importance and pathways of integrating ethics and social responsibility education into the cultivation of research innovation capabilities in medical schools, this study has limitations. The primary limitation is the lack of empirical data and case analysis. Future research could delve deeper by incorporating practical cases. This study is primarily based on literature analysis and theoretical exploration. Future research could adopt diversified methods such as surveys, in-depth interviews, and field studies to gather more empirical data and practical experiences. Further research could also explore pathways and mechanisms for interdisciplinary integration, aiming to discover more effective models for research ethics and social responsibility education, thereby promoting the improvement and perfection of educational models in medical schools.

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Exploring Innovative Development Paths for Higher Vocational English Education in the New Media Era

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Abstract: This study aims to explore innovative development paths for higher vocational English education in the context of the new media era. The rapid advancement of new media technology has brought profound changes to education, presenting both opportunities and challenges for higher vocational English teaching. Utilizing literature review and theoretical analysis, the paper systematically examines the application and current state of new media technology in vocational English education, and discusses its significant impact on educational models, student learning methods, and teaching practices. The study first reviews the history and current state of new media technology, focusing on its educational applications. It then analyzes the actual utilization and issues of new media in vocational English education based on relevant theoretical literature. Finally, the paper proposes a series of innovative development paths, including the construction of interactive teaching models based on new media, the expansion of teaching content using new media resources, and enhancing teachers' media literacy. The findings indicate that the application of new media technology can effectively improve the quality and effectiveness of vocational English education, providing students with richer and more diverse learning resources and experiences, thereby promoting their overall English proficiency and competencies. However, it also presents new demands on teachers' abilities, requiring continuous improvement in their media literacy and information technology skills. In conclusion, the innovative development of higher vocational English education in the new media era must keep pace with the times and deeply integrate new media technology to achieve comprehensive educational enhancement.

Keywords: New Media; Higher Vocational English Education; Teaching Innovation; Development Path; Educational Reform

1. INTRODUCTION

1.1 Research Background and Significance

The rapid development and widespread adoption of new media technology have significantly transformed people's ways of living, working, and learning. As a crucial component of higher vocational education, English education has also been profoundly influenced by these technologies. Exploring innovative development paths for vocational English education in this context holds significant theoretical and practical relevance. New media technologies offer new tools and methods, enhancing the interactivity and engagement of teaching and thereby improving educational outcomes. However, effectively integrating these resources into systematic educational innovations remains a pressing issue for educators.

1.2 Literature Review

Scholars both domestically and internationally have extensively studied the application of new media technology in vocational English education. Huang Xiaoqin and Ma Jianbao (2023) explored innovative approaches, highlighting the role of new media in improving teaching efficiency and student engagement. Zhao Rui (2023) proposed innovative development paths through case analysis and experimental research. While these studies provide valuable insights, most focus on the application effects of new media technology, with fewer addressing its comprehensive application and innovative development paths in vocational English education.

2. NEW MEDIA TECHNOLOGY AND

VOCATIONAL ENGLISH EDUCATION

2.1 Definition and Characteristics of New Media Technology

New media technology refers to digital and network-based information dissemination technologies, including the Internet, mobile communication, virtual reality, and artificial intelligence. Key characteristics include interactivity, diversity, and immediacy. Unlike traditional media, new media significantly expand the spatial-temporal and content dimensions of teaching through its diverse and interactive nature.

2.2 Current Application in Education

The application of new media technology in education has become widespread, especially during the COVID-19 pandemic. The Ministry of Education reported that 294 million students engaged in online learning in 2020, with vocational English courses gaining considerable attention. Vocational institutions have adopted various new media technologies, such as online courses, virtual classrooms, and mobile applications, to enhance teaching effectiveness and student learning experiences.

3.IMPACT OF NEW MEDIA TECHNOLOGY ON VOCATIONAL ENGLISH EDUCATION

3.1 Transformation of Educational Models

The introduction of new media technology has fundamentally transformed vocational English teaching models. Traditional teacher-centered approaches, reliant on paper-based materials and blackboards, have evolved into interactive, bidirectional communication models. For instance, online platforms enable real-time interaction, allowing teachers to tailor guidance based on student progress. These technologies support flipped classroom models, where students engage with multimedia resources pre-class and focus on problem-solving during class, significantly enhancing teaching efficiency and effectiveness.

3.2 Changes in Student Learning Methods

The ubiquity of new media technology has markedly changed student learning methods. Previously reliant on classroom notes and textbooks, students now leverage mobile devices for anytime, anywhere learning. Song Qiaozai (2018) noted that new media can stimulate student interest and improve

learning outcomes. Learning Management Systems (LMS) allow teachers to distribute materials, assign tasks, and facilitate online interactions, enabling students to self-pace, engage in autonomous and collaborative learning, and develop information literacy and comprehensive application skills.

3.3 Adjustment of Teaching Methods

The application of new media technology necessitates adjustments in teaching methods. Peng Peilin (2018) indicated that vocational teachers should actively learn and master new media technologies to better utilize these resources in teaching. Teachers must consider the characteristics of new media in their instructional design, employing diverse methods such as multimedia presentations, online courses, and interactive platforms. Additionally, they should continually update teaching content to incorporate current events and societal contexts, enhancing the timeliness and relevance of education.

4. ANALYSIS OF ISSUES IN HIGHER VOCATIONAL ENGLISH EDUCATION

4.1 Insufficient Utilization of Educational Resources

Despite the widespread application of new media technology in higher vocational English education, resource utilization remains inadequate. Many institutions lack systematic planning for integrating and utilizing these resources, leading to underuse. Additionally, insufficient resource sharing between institutions results in redundant construction and waste.

4.2 Deficient Media Literacy Among Teachers

New media technology demands high levels of media literacy from educators. However, many teachers still need to enhance their skills in this area. According to Bian Zhentao et al. (2019), some teachers, due to a lack of systematic training, cannot fully leverage new media technologies in teaching. Moreover, the use of these technologies often neglects student interaction and feedback, adversely affecting teaching outcomes.

4.3 Insufficient Student Self-Management Skills

The proliferation of new media technology allows students to learn through various channels, but it also requires higher levels of self-management. In an unrestricted online

environment, students are easily distracted, affecting their learning performance. Fu Jingyi (2018) noted that many vocational students lack effective time management and study planning, leading to low learning efficiency. Additionally, some students struggle to discern information online, making them susceptible to misinformation and negative content.

5. INNOVATIVE DEVELOPMENT PATHS FOR HIGHER VOCATIONAL ENGLISH EDUCATION IN THE NEW MEDIA ERA

5.1 Constructing Interactive Teaching Models Based on New Media

To address the challenges of the new media era, vocational English education needs to develop interactive teaching models. Wang Wen (2022) suggests that social media, online learning platforms, and virtual classrooms can create interactive environments, enhancing teacher-student interaction and improving teaching effectiveness. For instance, using WeChat or QQ can establish instant communication channels for post-class Q&A and tutoring. Online learning platforms allow teachers to distribute materials, assign tasks, and facilitate online interactions, enabling students to engage in self-paced and collaborative learning.

5.2 Expanding Teaching Content Using New Media Resources

The richness and diversity of new media resources provide broad opportunities for expanding vocational English teaching content. Cao Chen (2022) pointed out that teachers can utilize the Internet and new media platforms to gather multimedia resources like videos, audio, and animations, enriching teaching content and stimulating student interest. For example, watching English news videos or film clips can help students better understand the culture and society of English-speaking countries, enhancing language proficiency and intercultural communication skills. Teachers can also update content based on current events, ensuring the relevance and effectiveness of teaching.

5.3 Enhancing Teachers' Media Literacy

In the new media era, vocational English teachers must continuously improve their media literacy and ability to use new media

technologies. Sun Lingyan (2022) argued that vocational institutions should enhance media training and guidance for teachers, helping them master various new media tools and resources. This improves their instructional design and implementation capabilities. Training sessions, teaching seminars, and teacher learning communities can be organized to boost teachers' media literacy and application skills. Teachers should also actively participate in research and practice related to new media teaching, continuously innovating instructional methods and techniques.

6. CONCLUSION AND FUTURE DIRECTIONS

6.1 Main Findings

This study systematically reviewed the application of new media technology in higher vocational English education, analyzing its impact on educational models, student learning methods, and teaching practices. The research proposed several innovative development paths. Findings indicate that new media technology can significantly improve teaching quality and outcomes, offering students a richer and more diverse learning experience that enhances their English proficiency and overall competence.

6.2 Research Limitations

Despite exploring the application and innovative development paths of new media technology in vocational English education, this study has limitations due to its scope and methodology. The findings primarily rely on literature review and theoretical analysis, lacking empirical research and case studies to verify the generalizability and practicality of the results. Additionally, the study analyzes issues like resource utilization and teacher literacy from a macro perspective, with specific measures and methods needing further detail.

6.3 Future Research Directions

Future research can delve into the following areas: empirically validating the application effects of new media technology in vocational English education, detailing resource integration and utilization strategies, and developing methods for resource sharing and optimization. Further research should also focus on enhancing teachers' media literacy

and application skills, exploring effective ways to improve teacher quality and instructional capabilities.

Overall, the new media era presents both challenges and opportunities for higher vocational English education. Keeping pace with technological advancements, deeply integrating new media technologies, and continuous innovation and practice are essential for achieving comprehensive educational enhancement and providing students with superior and diverse learning experiences.

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Talent Training Model for Automotive Apprenticeship Based on Industry-Education Integration

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Abstract: This study aims to explore the talent training model for automotive apprenticeships based on industry-education integration. Through theoretical analysis, it reveals the importance and specific implementation pathways of apprenticeships in modern vocational education. The research primarily employs literature review and theoretical analysis by summarizing and analyzing relevant domestic and international literature, investigating the concepts, background, and application of industry-education integration and apprenticeship in the automotive field. Initially, this study elucidates the basic definitions, theoretical foundations, and intrinsic connections between industry-education integration and modern apprenticeships. It then delves into the practical needs and challenges of implementing apprenticeship training models in the automotive profession under the context of industry-education integration. By systematically reviewing existing apprenticeship theories and industry-education integration models, the study finds that industry-education integration effectively enhances the practical skills and professional qualities of automotive students, thereby better meeting the talent needs of the automotive industry. Furthermore, the study proposes specific strategies for establishing an automotive apprenticeship training model based on industry-education integration, including deepening school-enterprise cooperation, improving curriculum systems, strengthening faculty development, and optimizing evaluation mechanisms. The research concludes that the apprenticeship model based on industry-education integration significantly enhances students' practical abilities, professional qualities, and the close

alignment of industry and education. The conclusions provide theoretical support and practical guidance for educational reforms in automotive programs and serve as a reference for promoting industry-education integration and apprenticeships in other vocational education fields.

Keywords: Industry-Education Integration; Modern Apprenticeship; Automotive Profession; Talent Training; Vocational Education

1. INTRODUCTION

1.1 Research Background and Significance

With the rapid development of the global automotive industry, continuous technological innovations and changing market demands have rendered traditional automotive manufacturing and maintenance techniques inadequate. Particularly in China, the swift rise of new energy vehicles (NEVs) and intelligent connected vehicles (ICVs) calls for new approaches in automotive talent training. Higher education and vocational training institutions must explore more effective training models. Industry-education integration and modern apprenticeship programs have become pivotal paths to address this issue. These approaches tightly link education with industry needs, enhancing students' practical skills and fostering school-enterprise cooperation, thereby supplying highly skilled professionals to the industry. Research on automotive apprenticeship models based on industry-education integration holds significant theoretical and practical value.

1.2 Research Objectives and Methods

This study aims to explore the specific implementation pathways and outcomes of an automotive apprenticeship training model

based on industry-education integration through theoretical analysis and literature review. The research methods include systematic literature review and theoretical analysis, summarizing and analyzing relevant domestic and international literature, and integrating existing educational and industrial practices to investigate suitable apprenticeship training models for the automotive field.

1.3 Review of Current Research

Internationally, apprenticeship has become an integral part of vocational education. Germany's dual education system is widely recognized as a model for apprenticeships, with its successful experiences acknowledged worldwide. In Germany, apprenticeships cover most vocational education fields, including extensive applications in technical and engineering domains. The United States' Cooperative Education (Co-op) model is another example of industry-education integration, combining classroom learning with enterprise internships.

In China, research on industry-education integration and apprenticeships has increased in recent years but is still in its early stages. Most domestic studies focus on theoretical foundations and implementation pathways of industry-education integration, with relatively few studies on specific disciplines, particularly automotive apprenticeships. For example, Feng Zhangjun and Dai Weitao (2023) explored apprenticeship models in the elevator profession, and Shen Zhubin (2023) examined automotive apprenticeships. However, these studies mainly concentrate on empirical and case analyses, lacking systematic theoretical exploration and universal training model design.

2. THEORETICAL FOUNDATION

2.1 Basic Concepts and Theoretical Foundations of Industry-Education Integration

Industry-education integration refers to the close combination of education and industry, fostering deep cooperation between schools and enterprises to achieve resource sharing and complementary benefits, thereby nurturing talents that meet social needs. The theoretical foundations include human capital theory, which posits that educational investment enhances labor productivity, and

social capital theory, which emphasizes that school-enterprise cooperation enriches students' social resources, accelerating their career development. Industry-education integration not only enhances interaction between education and industry but also improves the effectiveness and relevance of education.

2.2 Definition and Theoretical Basis of Modern Apprenticeships

Modern apprenticeships combine academic education with vocational training through school-enterprise cooperation, allowing students to learn and practice in real work environments. Their theoretical foundations include constructivist education theory and vocational education theory. Constructivism posits that knowledge is constructed through activity, and hands-on practice facilitates better knowledge acquisition. Vocational education theory emphasizes the integration of vocational skills and theoretical knowledge, suggesting that learning in real environments provides students with richer practical experience.

2.3 Intrinsic Connection Between Industry-Education Integration and Modern Apprenticeships

Industry-education integration and modern apprenticeships are inherently connected. Industry-education integration provides an excellent practical platform for apprenticeships, while apprenticeships are an effective way to achieve industry-education integration. Through industry-education integration, a comprehensive apprenticeship system can be established, allowing students to receive systematic theoretical education while gaining practical experience in enterprises. These two elements complement each other, promoting positive interaction and development between education and industry.

3. NECESSITY OF AUTOMOTIVE APPRENTICESHIPS

3.1 Talent Demand Analysis in the Automotive Industry

With the continuous development of NEVs, intelligent driving, and vehicle networking technologies, the automotive industry increasingly demands highly skilled professionals. According to data from the China Association of Automobile

Manufacturers, NEV sales have grown at an annual rate of over 50% in the past five years, raising the bar for automotive professionals. There is a pronounced shortage of highly specialized and practically experienced talents, particularly in the intersecting fields of NEV technology, intelligent connected vehicles, and information communication technology.

3.2 Realistic Background for Implementing Automotive Apprenticeships

Apprenticeship training models in the automotive profession are becoming essential to address these challenges. Industry-education integration and apprenticeships allow students to accumulate rich practical experience during their studies, directly meeting enterprises' needs for skilled workers. Research by Zhang Fujun and Huang Chaohui (2024) shows that the apprenticeship training model for automotive body repair technology has successfully enhanced both skills and knowledge, significantly improving students' employability.

3.3 Limitations of Traditional Training Models

Traditional automotive training models often emphasize theoretical knowledge while neglecting practical skill development, resulting in a long adaptation period for graduates in the workplace. Nie Kunyue (2019) pointed out that traditional teaching models in secondary vocational automotive repair programs suffer from outdated content and insufficient practical resources, severely impacting students' skill levels. At the same time, enterprises face high training costs and slow integration of new employees. Therefore, innovating and deepening automotive talent training models is urgently needed.

4. AUTOMOTIVE APPRENTICESHIP MODEL BASED ON INDUSTRY-EDUCATION INTEGRATION

4.1 Principles of Model Design

Designing an automotive apprenticeship model based on industry-education integration requires adhering to several principles to ensure scientific and operational feasibility. The goal is to combine theory and practice to enhance students' overall quality and vocational skills. The first principle is "balancing education and practice," emphasizing both theoretical knowledge and

practical teaching. The second principle is "phased and systematic," with clear stages from foundational knowledge, skills training to practical application. The third principle is "student-centered," considering students' learning needs and career development plans, providing personalized educational resources and support. The fourth principle is "school-enterprise co-construction and sharing," requiring deep cooperation between schools and enterprises in resource sharing, curriculum development, and faculty building, collaboratively formulating educational plans and sharing resources.

4.2 Building a School-Enterprise Cooperation Mechanism

School-enterprise cooperation is the core of industry-education integration. A well-constructed cooperation mechanism can achieve resource sharing and complementary advantages, improving the quality and efficiency of talent training. Firstly, a systematic cooperation framework should be established, clarifying responsibilities and obligations, such as schools providing theoretical knowledge and basic training, and enterprises offering practical environments and hands-on training. Secondly, fixed cooperation platforms should be set up, such as joint training bases and school-enterprise cooperation committees, facilitating coordination and communication. A study suggests that in school-enterprise cooperation, school teachers can be dispatched to enterprise frontline work, and enterprise experts can periodically teach and guide students at schools (Zhang Fujun, Huang Chaohui, 2024). This bidirectional exchange promotes deep integration of theory and practice. Additionally, enterprises can participate in curriculum development, textbook compilation, and training project settings to ensure teaching content aligns with actual needs.

4.3 Optimizing the Curriculum System

Optimizing the curriculum system is key to achieving apprenticeship training goals. Existing curricula often face issues of disconnection between theory and practice, necessitating adjustments and optimization. First, the curriculum system can be divided into foundational theory courses, professional skills courses, and practical operation courses,

ensuring organic integration of theoretical knowledge and hands-on practice. Second, curriculum content should be updated and optimized, adding courses in emerging fields such as NEV technology and intelligent driving technology to adapt to industry trends. Furthermore, project-based teaching methods can be introduced, allowing students to develop practical skills and problem-solving abilities through specific projects. Project-based teaching not only helps students master knowledge through practice but also cultivates teamwork and innovation skills. The Ministry of Education (2021) emphasizes strengthening vocational education curriculum reform, focusing on competency-based curriculum development, which is particularly relevant in the current context.

4.4 Building a Dual-Qualified Faculty Team

A dual-qualified faculty team comprises educators with high academic levels and industry experts with rich practical experience. Building such a team is essential for implementing industry-education integration and apprenticeships. First, through school-enterprise cooperation, frontline engineers and technical experts can be hired as part-time teachers to participate in teaching and guidance. Second, faculty training and professional development should be enhanced to improve existing teachers' professional skills and practical abilities. Schools and enterprises can jointly organize professional training courses or technical exchange meetings to promote teachers' professional growth. The Ministry of Education's initiative on "dual-qualified" teacher development encourages teachers to immerse themselves in enterprise work environments, enhancing their practical capabilities and professional levels. Additionally, establishing performance evaluation and incentive mechanisms for teachers who excel in teaching and practical training can motivate them to be more proactive in their roles.

4.5 Apprentice Evaluation and Feedback Mechanisms

A scientific evaluation and feedback mechanism is a crucial component of the apprenticeship training model. A multi-dimensional and multi-level evaluation system can objectively and fairly assess apprentices' knowledge and skill levels. The

evaluation system should include theoretical knowledge assessments, skills operation assessments, and comprehensive quality evaluations. Theoretical assessments can use traditional written exams and interviews to evaluate apprentices' understanding of foundational theories. Skills operation assessments should take place in practical environments, evaluating task completion, operational processes, and outcome quality. Additionally, comprehensive quality evaluations should consider professional attitudes, teamwork, and innovation capabilities. Evaluation results should be promptly communicated to apprentices, with guidance and adjustments made based on feedback to improve the training program's relevance and effectiveness.

5. INNOVATION IN TRAINING MODELS BASED ON INDUSTRY-EDUCATION INTEGRATION

5.1 Application of New Technologies in Apprenticeships

The rapid advancement of information technology brings new opportunities for innovation in apprenticeships. The use of technologies like Virtual Reality (VR), Augmented Reality (AR), big data analytics, and artificial intelligence can significantly enhance apprenticeship programs. VR and AR can simulate real operational environments, allowing students to practice in virtual settings, which increases engagement and addresses the issue of limited real-world practice opportunities. Research shows that using VR and AR for technical training significantly improves learning efficiency and operational proficiency (Li Siming, 2022). Big data analytics and AI can analyze student learning behaviors and offer personalized educational recommendations, providing targeted learning resources and guidance to help students better master knowledge and skills.

5.2 Establishing a Diversified Evaluation System

A diversified evaluation system is crucial for enhancing the effectiveness of apprenticeship training. In addition to traditional evaluation methods, new metrics such as task completion, problem-solving skills, and teamwork should be included. Firstly, process evaluation can be introduced to continuously assess students'

progress and skill development. Secondly, a multi-stakeholder evaluation approach involving enterprise mentors, academic instructors, and students can ensure objectivity and comprehensiveness. Research indicates that multi-stakeholder evaluations improve fairness and scientific accuracy (Wang Hong, 2023). Additionally, creating apprentice portfolios to systematically record students' performance, project results, and training records can provide valuable references for future learning and employment.

5.3 International Cooperation and Exchange

International cooperation and exchange are vital for deepening industry-education integration and apprenticeships. Collaborating with leading international vocational education institutions and enterprises can help adopt advanced educational philosophies and practices, improving apprenticeship implementation. Firstly, partnerships with top international vocational education institutions can facilitate joint training programs, faculty development, and curriculum design. Secondly, organizing overseas exchange programs for teachers and students can broaden perspectives and enhance capabilities through participation in international vocational training and practice projects. Research shows that international cooperation and exchange significantly enhance students' professional qualities and global competitiveness (Chen Yi, 2023). Furthermore, participating in international vocational skills competitions, seminars, and other activities allows for dialogue and learning from international peers, assimilating advanced global experiences.

6. CONCLUSION AND OUTLOOK

6.1 Research Summary

This study explores the design principles, school-enterprise cooperation mechanisms, curriculum optimization, faculty development, and evaluation and feedback mechanisms for an automotive apprenticeship training model based on industry-education integration through theoretical analysis and literature review. The research indicates that combining industry-education integration with modern apprenticeships effectively enhances students' practical skills and professional qualities, offering significant application value.

Additionally, innovative training model aspects, including new technology applications, diversified evaluation systems, and international cooperation, provide new approaches and methodologies for apprenticeship implementation.

6.2 Recommendations for Future Research

Future research can delve into the application of industry-education integration-based apprenticeships across different professional fields, using empirical studies to validate adaptability and effectiveness. Additionally, further exploration of the application effects and implementation pathways of new technologies in apprenticeships will be critical to assess their feasibility and impact. Research can also examine practices of industry-education integration and apprenticeships in various regions and countries, drawing on best practices to propose innovative implementation strategies.

6.3 Policy and Practice Implications

Policy-wise, the government should develop and refine policies to encourage and support the implementation of industry-education integration and apprenticeships. Financial support, policy incentives, and reward mechanisms can promote school-enterprise cooperation and the development of dual-qualified faculty teams. In practice, schools and enterprises should strengthen collaboration, leveraging their respective advantages to jointly advance apprenticeship programs. By establishing systematic school-enterprise cooperation mechanisms, optimizing curriculum systems, and building dual-qualified faculty teams, a comprehensive apprenticeship training system can be gradually constructed, thereby improving the quality and effectiveness of vocational education.

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Research on Network Information Security Issues and Protection Strategies in the Age of Artificial Intelligence

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Abstract: In the rapidly advancing era of artificial intelligence (AI), network information security issues have become increasingly complex and severe. This paper aims to systematically explore network information security issues and protection strategies from a humanities and social sciences perspective in the context of AI. Initially, a literature review method is employed to outline current research achievements domestically and internationally, analyzing the application status and primary challenges of AI technology in network information security. Subsequently, a comparative research method is used to examine the experiences and strategies of different countries and regions in network information security protection, integrating game theory and other theoretical models to establish a comprehensive protection strategy framework. By analyzing existing literature, theoretical models, and policy documents, the study summarizes the opportunities and challenges AI technology brings to network information security and the pros and cons of current protection strategies. Finally, this research proposes a series of forward-looking and targeted network information security protection strategies, including AI-based multi-layered protection models, intelligent response mechanisms, data privacy protection strategies, and security culture development. The conclusion indicates that effective responses to network information security issues in the AI era require coordinated efforts across technology, law, and society to build a secure and reliable network environment.

Keywords: Artificial Intelligence; Network Information Security; Protection Strategies;

Multi-layered Protection; Security Culture

1. INTRODUCTION

1.1 Research background and importance

With the rapid development of information technology, artificial intelligence (AI) technology has gradually penetrated into all fields of social life and become an important force to promote social progress. However, the wide application of artificial intelligence technology has also brought new network information security problems. Network information security is not only related to personal privacy and enterprise data security, but also related to national security and social stability. Under the background of the current global informatization, the problem of network information security has become increasingly prominent, and has become the focus of attention of governments and academia.

The rapid development of artificial intelligence technology has made the means of cyber attack more intelligent and concealed. Traditional network security protection means have been difficult to cope with new network threats, and new protection strategies and technical means are urgently needed. Therefore, it is of great practical significance and theoretical value to study network information security and its protection strategies in the era of artificial intelligence.

1.2 Research objectives and methods

The purpose of this study is to systematically discuss the network information security and its protection strategies in the era of artificial intelligence. Through literature review, theoretical analysis and comparative research, this paper comprehensively analyzes the

impact of artificial intelligence technology on network information security, summarizes the advantages and disadvantages of existing protection strategies, and puts forward forward-looking and targeted protection strategies.

1.3 Review of research status at home and abroad

In China, network information security and protection strategies in the era of artificial intelligence have become a research hotspot for many scholars. Gao Desheng and Ji Yan (2021) discussed personal information security governance strategies, pointing out that in the information society driven by artificial intelligence technology, personal information security is facing unprecedented threats, and targeted governance strategies are urgently needed. These strategies include strengthening the construction of laws and regulations, optimizing technical safety measures, and enhancing public safety awareness and moral literacy [1]. Huang Jian (2024) further analyzed the specific problems brought by artificial intelligence technology to network information security and the corresponding protection strategies. He believes that intelligent malware and complex means of network attack have become the main security risks at present, and proposes a series of protective measures, such as the introduction of artificial intelligence detection mechanism and multi-level protection system [2]. Lu Yun (2023) focused on computer information technology security and protection strategies, and proposed a "human-machine combination" protection model. She pointed out that relying on artificial intelligence background monitoring and real-time early warning can significantly improve the security of computer information systems [3]. In addition, Zhang Pengran (2023) discussed the application strategy of artificial intelligence technology in network information security. He believes that artificial intelligence technology can not only enhance network defense capabilities, but also be used in many fields such as network attack defense and abnormal traffic detection, so as to effectively improve the level of network information security [5]. Li Zhida (2020) emphasizes the importance of security culture by discussing computer information security

and protection strategies. He pointed out that technical support alone is far from enough, and it is also necessary to improve the safety awareness and capacity of staff through education and training [6]. In his research, Li Xiaodong (2019) mainly analyzed the threats faced by computer network information security in the era of artificial intelligence, and put forward a series of protective suggestions based on these threats [7]. Zhang Hua (2020) focused his research on university computer network information security and discussed methods and measures to improve security [8]. Chen Xiayang (2019) studied the security protection strategy of the industrial Internet based on game theory, providing theoretical support for the information security of the industrial Internet [4].

Foreign scholars' discussions on network information security in the era of artificial intelligence are also rich and diverse. Through the review of the above literature, we can summarize the following research directions and main viewpoints: Foreign scholars have widely applied artificial intelligence and machine learning technology to the detection and protection of network information security. For example, abnormal behavior in network traffic is detected in real time through deep learning models, and security policies are dynamically adjusted through adaptive algorithms. These technologies significantly improve the efficiency and accuracy of network information protection. Some scholars have proposed a multi-level defense system based on artificial intelligence to build a more robust network defense line through hierarchical and multi-dimensional methods. This method integrates traditional firewall, intrusion detection system (IDS), anomaly detection system and other technologies, and is supplemented by artificial intelligence optimization. The automatic response mechanism based on artificial intelligence has been widely studied and applied. It can predict and respond to potential threats and attacks in real time through machine learning models to achieve rapid handling of network security incidents. Data privacy protection in the context of big data is also highly concerned by foreign scholars. Through artificial intelligence technology, automatic encryption and decryption of sensitive information can be

realized, as well as intelligent monitoring of data access behavior, so as to ensure data security and privacy.

To sum up, scholars at home and abroad have made rich achievements in the research of network information security issues and protection strategies in the era of artificial intelligence, but there are still many challenges. Future research should pay more attention to the combination of technology and system, take into account many factors such as technology, law and society, and build a comprehensive and effective protection system.

2. NETWORK INFORMATION SECURITY THREATS IN THE ERA OF ARTIFICIAL INTELLIGENCE

2.1 Rapid development of artificial intelligence technology

The rapid development of artificial intelligence technology makes its application in various fields increasingly extensive. According to a report by International Data Corporation (IDC), the global AI market size is expected to reach \$190 billion by 2025, with a compound annual growth rate of up to 35.6%. The wide application of artificial intelligence technology not only promotes the improvement of social productivity, but also brings new network information security threats.

At the heart of AI technology lies machine learning and deep learning algorithms that are able to self-learn and optimize through large amounts of data to achieve complex tasks. However, this powerful ability to learn also makes AI systems vulnerable to malicious attacks. For example, an attacker can carry out a cyberattack by manipulating training data or algorithmic models to make an AI system make bad judgments.

2.2 Basic concepts of network information security

Network information security means to protect the hardware, software and data in the network system from unauthorized access, use, disclosure, destruction, modification or loss through various technical and management means. The core objective of network information security is to ensure the confidentiality, integrity and availability of information.

Confidentiality means that information can only be accessed by authorized users, preventing unauthorized access and disclosure. Integrity means that the information is not tampered with or destroyed during transmission and storage, ensuring the accuracy and reliability of the information. Availability means that information can be accessed and used by authorized users when needed to prevent information from being unavailable due to system failures or attacks.

2.3 New forms of network security threats

With the rapid development of artificial intelligence technology, new cybersecurity threats continue to emerge. These threats are not only in various forms, but also hidden, and traditional means of protection are difficult to cope with.

Artificial intelligence technology makes the development and spread of malware more intelligent. For example, intelligent malware can automatically adapt to different network environments and protection means by self-learning and optimization, thereby evading detection and defense. Deepfakes use artificial intelligence to generate realistic fake images, video and audio for deception and attacks. For example, an attacker could use deep forgery to generate fake videos of leaders speaking to carry out political or social engineering attacks. Artificial intelligence technology is making phishing attacks smarter and more subtle. For example, smart phishing attacks can improve the success rate of attacks by analyzing users' behaviors and habits and generating personalized phishing emails. Intelligent botnets utilize artificial intelligence technology to self-manage and optimize for large-scale distributed attacks. For example, intelligent botnets can automatically adjust attack strategies and targets through self-learning and optimization to improve the efficiency and success rate of attacks.

To sum up, the rapid development of artificial intelligence technology has made network information security face unprecedented challenges. Traditional protection methods have been unable to cope with new network threats, and new protection strategies and technical means are urgently needed. Therefore, it is of great practical significance and theoretical value to study network information security and its protection

strategies in the era of artificial intelligence.

3. THE IMPACT OF ARTIFICIAL INTELLIGENCE TECHNOLOGY ON NETWORK INFORMATION SECURITY

3.1 Application of artificial intelligence in network security

The application of artificial intelligence technology in the field of network security is increasingly extensive, mainly reflected in intelligent detection, intelligent response and intelligent protection. Intelligent detection technology utilizes machine learning and deep learning algorithms to automatically identify and detect cyber attacks by analyzing massive amounts of data. Intelligent response technology can rapidly respond to and deal with network attack events by automated means, reduce human intervention and improve response efficiency. The intelligent protection technology can automatically adjust the protection strategies and measures to improve the protection effect through self-learning and optimization.

The application of intelligent detection technology makes the detection efficiency of network attacks significantly improved. Traditional network attack detection methods mainly rely on feature matching and rule matching, which is difficult to deal with complex and changeable network attack behavior. The intelligent detection technology can automatically identify and detect abnormal behaviors by analyzing network traffic, log data and user behavior, and improve the accuracy and timeliness of detection. For example, intrusion detection systems (IDS) based on deep learning can automatically identify and detect network attacks by analyzing network traffic data, significantly improving detection efficiency and accuracy.

The application of intelligent response technology makes the response efficiency of network attack significantly improved. The traditional response to network attack mainly relies on manual intervention, and the response speed is slow, which easily leads to the spread of attack and the expansion of loss. Intelligent response technology can rapidly respond to and deal with network attack events by automated means, reduce human intervention and improve response efficiency.

For example, an automated response system (ARS) based on machine learning can automatically generate and execute response strategies by analyzing attack behavior and network environment to quickly stop attack behavior and reduce losses.

The application of intelligent protection technology makes the effect of network protection significantly improved. Traditional network protection methods mainly rely on static rules and policies, which are difficult to deal with complex and changeable network attacks. The intelligent protection technology can automatically adjust the protection strategies and measures to improve the protection effect through self-learning and optimization. For example, an adaptive firewall (AFW) based on reinforcement learning can automatically adjust protection policies and rules by analyzing network traffic and attack behaviors to improve the protection effect.

3.2 Security risks brought by artificial intelligence technology

Although the application of artificial intelligence technology in the field of network security has brought remarkable results, it has also brought new security risks. The strong learning ability and self-optimization ability of artificial intelligence technology make it vulnerable to malicious attacks and exploitation, and become a new network security threat.

Training data and algorithmic models of AI systems are their core assets, but also their biggest security concerns. An attacker can carry out a cyberattack by manipulating training data or algorithmic models to make an AI system make bad judgments. For example, attackers can use Poisoning attacks to add malicious data to training data to make artificial intelligence systems produce incorrect classification and judgment, thus implementing cyber attacks. Research has shown that poisoning attacks can significantly reduce the accuracy and reliability of AI systems, becoming a new cybersecurity threat. The black-box nature and complexity of artificial intelligence systems make it difficult to conduct security audits and verification, increasing security risks. The decision-making process of AI systems is often black box and difficult to explain and understand, increasing

the difficulty of security audit and verification. Attackers can exploit the black box nature of AI systems to carry out covert cyber attacks that are difficult to detect and defend against. For example, an attacker can use an Adversarial Attack to generate adversarial samples that cause an AI system to make bad judgments and thus carry out a cyberattack. Research has shown that countersample attacks can significantly reduce the accuracy and reliability of AI systems, becoming a new cybersecurity threat.

The automation and intelligence characteristics of artificial intelligence systems make them easy to be exploited by attackers to carry out large-scale network attacks. The automation and intelligence characteristics of artificial intelligence systems make it possible to automatically execute complex tasks and improve the efficiency and success rate of attacks. Attackers can use the automation and intelligence characteristics of artificial intelligence systems to carry out large-scale network attacks, increasing the risk of network security. For example, attackers can use intelligent botnets (botnets) to automatically adjust attack strategies and targets through self-learning and optimization, and carry out large-scale distributed denial of service (DDoS) attacks, significantly increasing the risk of network security.

3.3 Intelligent malicious behavior and its prevention

Intelligent malicious behavior refers to the malicious behavior implemented by artificial intelligence technology, which has the characteristics of intelligence, concealment and automation, and is difficult to detect and defend. Intelligent malicious behavior mainly includes intelligent malware, deep forgery technology, intelligent phishing attacks and intelligent botnets.

Intelligent malware refers to the use of artificial intelligence technology to develop and spread malware, with self-learning and optimization capabilities, can automatically adapt to different network environments and protection means, to evade detection and defense. The prevention of intelligent malware mainly relies on intelligent detection technology and intelligent protection technology. By analyzing network traffic, log

data and user behavior, intelligent malware is automatically identified and detected to improve the protection effect.

Deep forgery refers to the use of artificial intelligence technology to generate realistic fake images, video and audio for deception and attacks. The prevention of deep forgery technology mainly relies on intelligent detection technology and intelligent protection technology, which can automatically identify and detect deep forgery content by analyzing image, video and audio data, and improve the protection effect.

Intelligent phishing attack refers to the phishing attack implemented by artificial intelligence technology. It has the characteristics of personalization and concealment. It can generate personalized phishing emails by analyzing users' behaviors and habits, and improve the success rate of attacks. The prevention of intelligent phishing attacks mainly relies on intelligent detection technology and intelligent protection technology. By analyzing email content and user behavior, intelligent phishing emails can be automatically identified and detected to improve the protection effect.

Intelligent botnets are self-managed and optimized botnets that use artificial intelligence technology to automatically adjust attack strategies and targets and carry out large-scale distributed attacks. The defense of intelligent botnets mainly relies on intelligent detection technology and intelligent protection technology. By analyzing network traffic and attack behavior, intelligent botnets are automatically identified and detected to improve the defense effect.

4. ANALYSIS OF NETWORK INFORMATION SECURITY PROTECTION STRATEGIES

4.1 Multi-level network protection system

Multi-level network protection system refers to the construction of a comprehensive network security protection system through multi-level protection means and measures to improve the overall protection effect of network security. The multi-level network protection system mainly includes the protection means and measures of the network layer, system layer and application layer.

The protection measures at the network layer

mainly include firewalls, intrusion detection systems (IDS), and intrusion prevention systems (IPS). By analyzing network traffic and attack behaviors, network attack behaviors are automatically identified and detected to improve the protection effect at the network layer. Protection measures at the system layer include operating system security hardening, vulnerability scanning, and patch management to enhance the security and reliability of the operating system. Protection measures at the application layer include application security hardening, code audit, and security testing to enhance application security and reliability. The construction of a multi-level network protection system requires comprehensive consideration of the means and measures of protection at the network layer, system layer and application layer to form a comprehensive network security protection system and improve the overall protection effect of network security.

4.2 Intelligent detection technology based on artificial intelligence

Intelligent detection technology based on artificial intelligence refers to the use of machine learning and deep learning algorithms to automatically identify and detect network attack behaviors by analyzing massive data, and improve the accuracy and timeliness of detection. The application of intelligent detection technology has significantly improved the detection efficiency of network attacks and become an important means of network security protection.

The core of intelligent detection technology lies in machine learning and deep learning algorithms, which automatically identify and detect abnormal behaviors by analyzing network traffic, log data and user behavior, and improve the accuracy and timeliness of detection. The application of intelligent detection technology has significantly improved the detection efficiency of network attacks and become an important means of network security protection.

The application of intelligent detection technology needs to combine the specific network environment and attack behavior, select the appropriate machine learning and deep learning algorithms, conduct model training and optimization, and improve the

accuracy and timeliness of detection.

4.3 Intelligent response mechanism and protection measures

Intelligent response mechanism and protective measures refer to the rapid response and processing of network attack events through automated means, reducing human intervention and improving response efficiency. The application of intelligent response mechanism and protection measures has significantly improved the response efficiency of network attacks and become an important means of network security protection.

The core of intelligent response mechanism and protection measures lies in automated means, which can automatically generate and execute response strategies by analyzing attack behavior and network environment, quickly prevent attack behavior and reduce losses. The application of intelligent response mechanism and protection measures has significantly improved the response efficiency of network attacks and become an important means of network security protection.

The application of intelligent response mechanism and protection measures should be combined with specific network environment and attack behavior, select appropriate automated means to generate and execute policies, and improve response efficiency and protection effect.

4.4 Data privacy protection and risk management

Data privacy protection and risk management refers to the protection of data privacy and security through various technical and management means to reduce the risk of data leakage and abuse. The application of data privacy protection and risk management has significantly improved the privacy and security of data and become an important means of network security protection.

The core of data privacy protection lies in data encryption, access control, data desensitization and other technologies. By encrypting and desensitizing data, data privacy and security are protected and the risk of data leakage and abuse is reduced. The application of data privacy protection has significantly improved the privacy and security of data and become an important means of network security protection.

The core of risk management lies in risk assessment, risk control and risk transfer, which can reduce the occurrence and impact of risks and improve the overall protection effect of network security through risk assessment and control. The application of risk management makes the overall protection effect of network security significantly improved, and becomes an important means of network security protection.

5. COMPREHENSIVE PROTECTION STRATEGY FRAMEWORK AND THEORETICAL SUPPORT

5.1 Comprehensive protection policy framework design

The comprehensive protection policy framework is to build a comprehensive network security protection system and improve the overall protection effect of network security by comprehensively considering the protection means and measures at the network layer, system layer and application layer. The design of comprehensive protection policy framework needs to combine the specific network environment and attack behavior, select appropriate protection means and measures, and form a comprehensive network security protection system.

The design of comprehensive protection policy framework needs to comprehensively consider the protection means and measures of the network layer, system layer and application layer to form a comprehensive network security protection system and improve the overall protection effect of network security.

5.2 Application of game theory in network information security

Game theory, widely used in economics, management and computer science, is a theory that studies how decision makers make optimal decisions in the environment of mutual influence. In the field of network information security, game theory can be used to analyze the game relationship between attackers and defenders, and formulate optimal protection strategies and measures.

The application of game theory in network information security mainly includes game analysis between attacker and defender, optimization of protection strategy and

evaluation of protection effect. Through the analysis of game theory, the optimal protection strategies and measures can be formulated to improve the overall protection effect of network security.

5.3 Safety culture construction and public awareness enhancement

The construction of safety culture and the promotion of public awareness refers to improving the public's awareness and protection ability of network security through various means of publicity and education, and forming a good network security cultural atmosphere. The application of security culture construction and public awareness enhancement has significantly improved the public's network security awareness and protection ability, and has become an important means of network security protection.

The core of safety culture construction lies in publicity and education. Through various publicity and education means, the public's awareness of network security and protection ability are improved, and a good network security culture atmosphere is formed. The application of security culture construction has significantly improved the public's awareness of network security and protection ability, and has become an important means of network security protection.

The core of public awareness promotion lies in training and education. Through various training and education means, the public's awareness and protection ability of network security are improved, and a good network security culture atmosphere is formed. The application of public awareness enhancement has significantly improved the public's network security awareness and protection ability, and has become an important means of network security protection.

6. CONCLUSION

This research systematically discusses the network information security and its protection strategies in the era of artificial intelligence. Through a comprehensive analysis of the application of artificial intelligence technology in network security, the characteristics of new network security threats are revealed, the limitations of current protection strategies are discussed, and the

future protection strategies and research directions are proposed. Studies have shown that artificial intelligence technology has significant advantages in improving the efficiency of network security detection and response, but its introduction has also brought new security risks.

The key to the problem is how to balance the application of artificial intelligence technology and the prevention of security risks, and realize the overall network security protection through advanced technical means and comprehensive protection strategies. It is necessary to consider multiple factors such as multi-level protection system, automated detection and response technology, and data privacy protection to build a comprehensive protection system to cope with increasingly complex network security threats.

The main contribution of this study lies in the following aspects. Firstly, the impact of artificial intelligence technology on network security is comprehensively analyzed, including intelligent detection, intelligent response and intelligent protection. Secondly, through the detailed demonstration of the characteristics of new network security threats, the security risks brought by artificial intelligence technology are revealed. These analyses provide theoretical basis and practical reference for the formulation of protection strategies. In addition, this study proposed a multi-level protection system and a specific application framework of AI-based detection and response technology, combined with data privacy protection and risk management, to provide a comprehensive protection strategy analysis. These strategies provide practical guidance for building a comprehensive network security protection system and have important practical significance.

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Advances in CNC Machine Tool Reliability Technology

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Abstract: This study systematically reviews the advances in CNC machine tool reliability technology, identifying key factors affecting reliability, analyzing current research status and technical challenges, and proposing future research directions and development recommendations. Utilizing a comprehensive literature review, we examined recent national and international research and technical documents on CNC machine tool reliability. By comparing methodologies and theoretical frameworks in machine tool design, manufacturing, usage, and maintenance, we summarized the core content and development trends of CNC machine tool reliability technology. The study reveals that CNC machine tool reliability is influenced by multiple factors, including design and manufacturing quality, usage and maintenance strategies, and operating environment. Research indicates that fault prediction and health management (PHM), reliability design and manufacturing technology, model-based diagnosis and maintenance techniques, and IoT and smart manufacturing technologies are critical for improving CNC machine tool reliability. However, challenges such as the precision of fault prediction models and the practical effectiveness of maintenance strategies remain. Future research should focus on developing more accurate and efficient fault prediction models, exploring new preventive maintenance strategies, and further enhancing the quality of machine tool design and manufacturing. These efforts aim to achieve comprehensive improvements in CNC machine tool reliability, ensuring efficient production and high-quality development in the manufacturing industry.

Keywords: CNC Machine Tools; Reliability Technology; Fault Prediction and Health Management; Reliability Design; Smart Manufacturing

1. INTRODUCTION

1.1 Research background and significance

Numerical Control Machine Tools (NC machine tools), as the core equipment of modern industrial production, has been widely used in many fields such as aerospace, automobile manufacturing, mechanical manufacturing and electronic manufacturing. Its wide application has promoted the technological upgrading and production efficiency improvement of the manufacturing industry. However, with the continuous expansion of complexity and application scenarios, the reliability of CNC machine tools is increasingly apparent. Improving the reliability of CNC machine tools can not only reduce production downtime and maintenance costs, but also significantly improve product quality and process level. Therefore, the research on the reliability technology of CNC machine tools is undoubtedly of great significance.

1.2 Review of research status at home and abroad

In the aspect of reliability research, domestic and foreign scholars have carried out a lot of in-depth work. Domestically, Yang Zhaojun et al. proposed a variety of new technologies to improve the reliability of CNC machine tools by studying the life, failure mode and reliability optimization methods of key components of CNC machine tools (Yang Zhaojun et al., 2013). Their research shows that the reliability of CNC machine tools is mainly affected by the quality of key components, design, operating environment and maintenance level. For example, Zhang Hui discussed how to improve the reliability of CNC machine tools from two aspects of process and maintenance, pointing out that the reliability of equipment can be significantly improved by monitoring the operation process of CNC machine tools and timely detection and treatment of potential faults (Zhang Hui,

2016). Foreign research, most of the focus on improving the reliability of CNC machine tools through advanced technical means. European and American researchers have proposed a machine tool monitoring system based on intelligent control and Internet of Things technology, which uses sensors and big data analysis to monitor machine tool status in real time and achieve predictive maintenance. In the field of heavy-duty CNC machine tools, Han Shangyun has studied the impact of material selection and manufacturing process on machine tool reliability (Han Shangyun, 2014).

1.3 Research objectives and methods

The purpose of this study is to systematically organize and summarize the development and research status of CNC machine tool reliability technology, explore the key factors affecting the reliability of CNC machine tools, analyze the advantages and disadvantages of existing solutions and potential research directions. Through literature review and analysis, this paper will demonstrate the core content of CNC machine tool reliability technology in detail, evaluate the practical application effect of current technology, and put forward the strategy and suggestion to enhance the reliability of CNC machine tool.

2. THE BASIC CONCEPT OF RELIABILITY TECHNOLOGY OF CNC MACHINE TOOLS

2.1 Definition and connotation of reliability

Reliability refers to the ability of a device to perform a specific function under specified conditions and at specified times. For CNC machine tools, reliability means that the machine tool can run stably in the production process, without failure, and can maintain the consistency of product quality. Reliability not only affects production efficiency and product quality, but also involves equipment operating costs and enterprise competitiveness. the reliability research of CNC machine tool usually includes three aspects: design reliability, manufacturing reliability and operation reliability.

2.2 The composition and working principle of CNC machine tools

CNC machine tool consists of machine tool body, CNC system and drive system. the main body of the machine includes main parts such

as spindle, tool and workpiece table. the CNC system is composed of computer, control software and electronic components, which is used to control the operation of the machine tool. the drive system is composed of servo motor and servo amplifier, which is responsible for converting the command issued by the CNC system into the actual action. CNC machine tool through the CNC system to set the machining program, according to the program to control each part of the machine tool precision machining.

2.3 Application of reliability technology in CNC machine tools

The reliability technology application of CNC machine tools covers many aspects of practice. Fault prediction and health management (PHM) technology is a hot spot in reliability research of CNC machine tools. Combining sensor, Internet of Things and big data analysis technology, PHM can monitor machine tool status in real time, predict potential faults and take measures in advance. Ouyang Zhao et al. pointed out that by introducing sensor technology, machine tool operation status can be monitored in real time, and machine tool failures can be predicted using statistical models and machine learning algorithms, effectively reducing downtime (Ouyang Zhao, 2014). During the design and manufacturing process, reliability design and manufacturing techniques ensure the high quality and durability of the machine. Research shows that optimized design and material selection as well as the application of precision manufacturing technology can greatly improve the reliability of machine tools (Hu Xuyan, 2016). In addition, model-based diagnosis and maintenance technology can diagnose and maintain the working state of the machine tool through a mathematical model, which can accurately locate and analyze the cause of the fault and reduce the possibility of misjudgment and misoperation. the combination of intelligent manufacturing technology and the Internet of Things further improves the reliability of CNC machine tools. Xiao Jun's research discussed the application of Internet of Things technology in machine tool condition monitoring, combined with big data analysis technology, can realize real-time monitoring of machine tool condition and fault prediction, and provide theoretical and

technical support for the reliability improvement of CNC machine tools (Xiao Jun, 2014).

To sum up, the research of reliability technology of CNC machine tools not only has theoretical significance, but also has important practical significance. With the upgrading of the manufacturing industry and the continuous development of technology, the application of reliability technology in CNC machine tools will provide reliable guarantee for the high-quality development of the manufacturing industry.

3. THE KEY FACTORS AFFECTING THE RELIABILITY OF CNC MACHINE TOOLS

3.1 Design and manufacturing factors

The quality of design and manufacture has a direct influence on the reliability of CNC machine tools. the structural design of the equipment, material selection, processing technology, etc., all determine the initial quality of the machine tool. Yang Zhaojun's research shows that by improving the design and manufacturing process of machine tools, the failure rate of machine tools in operation can be effectively reduced (Yang Zhaojun et al., 2013). For example, the analytical methods of reliability engineering are applied in the design phase to evaluate and improve the reliability of each component.

3.2 Usage and Maintenance factors

The use and maintenance of CNC machine tool is an important link to ensure its reliability. Li Xinfeng proposed that the reliability and service life of CNC machine tools can be significantly improved through scientific maintenance strategies (Li Xinfeng, 2017). For example, maintenance strategies such as regular maintenance, replacement of worn parts, and lubrication not only extend equipment life, but also reduce the frequency of failures. In addition, the skill level and training of the operator will also affect the reliability of the CNC machine.

3.3 Environmental Factors

The operating environment has a significant impact on the reliability of CNC machine tools. Zhang Hui's research pointed out that in harsh environments, such as high temperature, high humidity, high dust and other conditions, the failure rate of machine tools increased

significantly (Zhang Hui, 2016). Therefore, by improving the working environment of the machine tool, such as controlling temperature and humidity, reducing dust and vibration, the reliability of the machine tool can be effectively improved.

4. RESEARCH PROGRESS OF RELIABILITY TECHNOLOGY OF CNC MACHINE TOOLS

4.1 Fault Prediction and Health Management (PHM)

PHM technology is a hot topic in reliability research of CNC machine tools in recent years. PHM technology collects and analyzes data in real time through various sensors installed on the machine tool to predict possible failures and take measures to prevent them in advance. In his research, Ouyang Zhao pointed out that the use of sensor technology and big data analysis can monitor the status of machine tools in real time, predict potential failures, and significantly reduce downtime (Ouyang Zhao, 2014).

4.2 Reliability design and manufacturing technology

Reliability design and manufacturing technology can effectively improve the reliability of machine tools through reliability optimization in the design and manufacturing stage. Hu Xuyan's research suggests that by introducing reliability analysis at the design stage, many potential design flaws can be avoided, thereby improving the reliability of machine tools (Hu Xuyan, 2016). For example, the use of fatigue resistant materials and optimized component structural design can increase the durability and stability of the machine tool.

4.3 Model-based diagnosis and maintenance technology

The model based diagnosis and maintenance technology can diagnose and maintain the working state of CNC machine tools by using mathematical models, and can accurately locate and analyze the fault causes. Han Shangyun's research shows that by applying data-driven and model-driven fault diagnosis methods, machine tool faults can be effectively identified and predicted, thereby improving their reliability (Han Shangyun, 2014).

4.4 Internet of Things and intelligent

manufacturing technology

The application of Internet of Things technology in CNC machine tools provides technical support for real-time monitoring and fault prediction. Xiao Jun's research pointed out that the application of Internet of Things technology in machine tool monitoring, combined with big data analysis technology, can achieve real-time monitoring of machine tool status and fault prediction, thus significantly improving the reliability of equipment (Xiao Jun, 2014).

5. CHALLENGES AND FUTURE RESEARCH DIRECTIONS OF RELIABILITY TECHNOLOGY OF CNC MACHINE TOOLS

5.1 Current technical challenges

Although the reliability technology of CNC machine tools has made remarkable progress, it still faces many challenges. The accuracy of the existing fault prediction models depends on a large number of historical data, and the prediction effect of the models is limited in the case of insufficient data or poor data quality. In addition, the practical application effect of maintenance strategy varies greatly in different enterprises and application scenarios, which leads to the difficulty of technology popularization and application promotion. Data privacy and security issues are also difficult to use the Internet of Things and big data technology, which needs to be solved through the development of sound data privacy protection policies and technical means.

5.2 Future research direction and development suggestions

In the face of these challenges, future research on the reliability of CNC machine tools should focus on the following aspects: First, develop more accurate and efficient fault prediction models, improve the prediction accuracy by introducing advanced machine learning and artificial intelligence algorithms, and provide a reliable basis for preventive maintenance. Secondly, explore a new preventive maintenance strategy, combined with the actual needs and application environment of the enterprise, design a personalized maintenance plan to improve the practicality and effectiveness of the maintenance strategy. Third, further optimize the design and

manufacturing process, improve the quality and durability of the machine tool by improving the material selection and structural design. In addition, strengthen interdisciplinary cooperative research, combined with advanced technology in the fields of mechanical engineering, computer science and material engineering, to provide more comprehensive theoretical support and technical solutions for CNC machine tool reliability research. Finally, promote the application of intelligent manufacturing technology, through the introduction of the Internet of Things, big data and intelligent control technology, to achieve comprehensive monitoring and intelligent management of CNC machine tools, improve the automation and intelligent level of equipment. Through these research and technological innovation, it is expected to achieve a comprehensive improvement in the reliability of CNC machine tools in the future, providing a strong guarantee for the efficient production and high-quality development of the manufacturing industry.

6. CONCLUSION

This paper systematically reviews the research progress of reliability technology of CNC machine tools, discusses the key factors affecting the reliability of CNC machine tools, and analyzes the current research hotspots and challenges. The future research direction and development suggestions are further pointed out. CNC machine tool as an important equipment in modern manufacturing industry, its reliability research not only helps to improve production efficiency and product quality, but also has important significance to promote the upgrading of manufacturing technology. Through continuous research and technological innovation, it will provide strong support for the reliability improvement of CNC machine tools and the high-quality development of manufacturing industry.

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Integrating Traditional Culture into Vocational Education under the Context of "Cultural Confidence"

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Abstract: This study explores effective ways to integrate traditional culture into vocational education under the concept of "cultural confidence" to enhance students' cultural literacy and identity. Using literature review and theoretical analysis, the study aims to construct a scientifically grounded pathway for vocational education. Initially, the research reviews the academic background and development of the "cultural confidence" concept, highlighting its role in enhancing national soft power and pride. Subsequently, by comparing different educational systems and cultural transmission models domestically and internationally, the study examines the unique advantages and challenges of vocational schools in cultural education. Four fundamental pathways are proposed: optimizing curriculum and teaching content, fostering campus culture, enhancing faculty development, and designing practical activities. These pathways emphasize systematically incorporating traditional culture into courses, creating a culturally rich campus environment, improving teachers' expertise in traditional culture education, and designing diverse cultural activities to enhance students' experiential learning. The research concludes that constructing a multi-level and multi-dimensional traditional culture education system can significantly boost vocational students' cultural confidence and overall competence, laying a foundation for nurturing globally minded and nationally proud talents. The study provides valuable theoretical insights for educational practice in vocational schools and offers comprehensive references and new perspectives for policymakers, educational administrators, and researchers.

Keywords: Cultural Confidence; Traditional

Culture; Vocational Education; Educational Pathways; Educational System

1. INTRODUCTION

1.1 Research background and significance

Under the background of globalization, the cultural exchanges and collisions of different ethnic groups are becoming more frequent. As an important part of the world culture, the excellent traditional culture of the Chinese nation is of great significance to the promotion of national soft power. As an important part of China's higher education system, higher vocational education not only bears the responsibility of training highly skilled personnel, but also shoulders the mission of inheriting excellent traditional Chinese culture. However, in the actual teaching process, many higher vocational colleges do not pay enough attention to the inheritance and promotion of excellent traditional culture, the path is unclear and the practice effect is not good. Therefore, exploring effective ways to integrate excellent traditional culture into higher vocational education system not only helps to enhance students' cultural self-confidence, but also has a far-reaching impact on the overall promotion of quality education.

1.2 Research objectives and methods

The main purpose of this study is to explore how to effectively integrate excellent traditional culture into the education system of higher vocational colleges under the guidance of the concept of "cultural self-confidence", so as to enhance students' cultural literacy and cultural identity. The research methods include literature review and theoretical analysis. By combing the relevant research results at home and abroad, the current situation and problems in the excellent traditional culture education in higher

vocational colleges are analyzed, and the solutions are proposed. The research will focus on the optimization of curriculum and teaching content, the construction of campus culture, the construction of teaching staff, and the design and implementation of practical activities.

1.3 Review of research status at home and abroad

In terms of domestic research, Lin Feiyan (2021) discussed the path of integrating excellent traditional culture into ideological and political education in colleges and universities, and proposed to achieve this goal through various approaches such as curriculum setting, teaching content optimization, and campus culture construction [1]. Yan Ying (2018) studied the specific path of educating people with excellent traditional culture in higher vocational colleges and emphasized the importance of practical activities in cultural inheritance [2]. From the perspective of cultural self-confidence, Xu Zhe (2024) studied how to integrate excellent traditional Chinese culture into higher vocational Chinese curriculum and proposed specific implementation strategies [3]. Foreign studies mostly focus on the study of multicultural education and cultural identity. The United States and some European countries realize cultural inheritance by diversifying curriculum and holding cultural exchange activities.

2. THE THEORETICAL BASIS OF CULTURAL SELF-CONFIDENCE AND EXCELLENT TRADITIONAL CULTURE

2.1 Connotation and development of cultural confidence

Cultural confidence is not only an inherent requirement for socialism with Chinese characteristics to enter a new era, but also an important guarantee for the great rejuvenation of the Chinese nation. The connotation of cultural self-confidence includes cognition and identification of cultural tradition, confidence in cultural development, and adherence and promotion in practice. Cultural confidence not only requires a deep understanding and recognition of traditional culture, but also requires continuous innovation and development under new

historical conditions, so that traditional culture will radiate new vitality in the new era.

The development path of cultural self-confidence covers three levels: cultural cognition, cultural practice and cultural communication. On the level of cultural cognition, it is necessary to strengthen the comprehensive understanding of the excellent traditional Chinese culture through in-depth research and systematic education. This includes the study of cultural classics, the study of history and the profound grasp of the connotation and value of traditional culture. At the level of cultural practice, cultural confidence requires the practice and embodiment of the essence of traditional Chinese culture through daily life and social practice, such as festival celebration, traditional etiquette, and artistic creation. At the level of cultural communication, through a variety of modern media and international communication channels, the excellent traditional Chinese culture is disseminated to all parts of the world, and the international community's cognition and recognition of Chinese culture is enhanced.

2.2 Definition and characteristics of excellent traditional culture

The fine traditional Chinese culture refers to the essence of ideas, culture, art and social system accumulated by the Chinese nation in the long course of historical development. It includes not only explicit cultural forms such as literature and art, but also implicit cultural connotations such as philosophical thoughts, ethics and social customs. Traditional culture is the spiritual foundation of a nation, and its significance to social stability and development is self-evident.

Excellent traditional culture has several remarkable characteristics. The first is history. Traditional Chinese culture has a history of more than 5,000 years, which is one of the oldest cultures in the world. Secondly, excellent traditional culture is highly inclusive. In the course of its historical development, Chinese culture has absorbed the essence of different historical periods and different regional cultures and formed an inclusive cultural system. Third, excellent traditional culture has profound philosophical rationality. Confucian culture, Taoist culture, legalist culture and other distinctive philosophical

thoughts are important components of traditional Chinese culture, and these ideological systems have exerted a profound influence on the behavior pattern and value construction of the Chinese nation. Finally, excellent traditional culture has strong practical guidance. Traditional culture provides systematic theoretical and practical guidance in ethics, family education and social governance.

2.3 Relationship between cultural self-confidence and excellent traditional culture

There is a close relationship between cultural confidence and excellent traditional culture. The foundation of cultural confidence is the high recognition and deep understanding of fine traditional culture. Without the identity of one's own culture, there can be no real cultural confidence. Traditional Chinese culture provides rich spiritual resources and moral guidelines for modern Chinese society, and is an important cultural support for realizing the Chinese dream of the great rejuvenation of the Chinese nation.

At the same time, cultural self-confidence promotes the inheritance and innovation of excellent traditional culture. As an important base for talent training, higher vocational colleges can effectively promote the inheritance and development of excellent traditional Chinese culture in the new era by cultivating students' cultural self-confidence. This not only helps to enhance the cultural quality and cultural identity of students, but also can pass the values of traditional culture to all levels of society through the bond of students.

3. CURRENT SITUATION AND CHALLENGE OF THE EDUCATION SYSTEM IN HIGHER VOCATIONAL COLLEGES

3.1 Current situation of education system in higher vocational colleges

As an important part of China's higher education system, the main task of higher vocational colleges is to train highly skilled talents with practical ability and professional accomplishment. At present, the education system of higher vocational colleges mainly includes professional curriculum education, ideological and political education, vocational skills training and comprehensive quality

training. In terms of professional curriculum education, higher vocational colleges pay attention to the combination of theory and practice, and improve students' practical ability through school-enterprise cooperation, internship and training. In ideological and political education, higher vocational colleges cultivate students' political accomplishment and social responsibility through ideological and political theory courses, thematic class meetings, social practice and other forms. In terms of vocational skills training, vocational colleges improve students' vocational skills through skills competitions, vocational qualification certification and other ways. In terms of comprehensive quality training, vocational colleges enrich students' after-school life and improve their comprehensive quality through sports and sports activities, club activities and other forms.

However, although higher vocational colleges have made some achievements in the construction of education system, there are still some shortcomings in the inheritance and promotion of excellent traditional culture. Many higher vocational colleges pay more attention to the teaching of professional knowledge and skills in the curriculum and teaching content, but pay less attention to the education of excellent traditional culture. In terms of campus culture construction, traditional cultural elements are less integrated, and students' cognition and identity of traditional culture are low. In the construction of teachers, the professional ability of teachers in traditional culture education needs to be improved. In terms of practical activities, there are few activities related to traditional culture, and students' sense of actual experience is insufficient.

3.2 Challenges faced by the education system of higher vocational colleges

The challenges faced by higher vocational colleges in excellent traditional culture education mainly include the following aspects:

The first is the challenge of curriculum setting and teaching content. At present, the curriculum and teaching content of higher vocational colleges are mainly based on professional knowledge and skills, and the traditional culture courses are few, and the teaching content is single, lacking of

systematicness and depth. Many students' knowledge of traditional culture is limited to the surface, lacking in-depth understanding and identification.

The second is the challenge of campus culture construction. The construction of campus culture in higher vocational colleges pays more attention to modern culture and popular culture, while traditional culture elements are few, so students can hardly feel the atmosphere of traditional culture on campus. In campus cultural activities, there are few activities related to traditional culture, students' participation is not high, and the inheritance and promotion of traditional culture are not good.

The third is the challenge of teaching staff construction. The professional ability of teachers in vocational colleges in traditional culture education needs to be improved. Many teachers lack systematic knowledge and teaching experience of traditional culture, and it is difficult to integrate traditional culture into teaching effectively. Teachers have few training and further study opportunities in traditional culture education, and their professional development is limited.

The fourth is the challenge of designing and implementing practical activities. The practice activities of higher vocational colleges pay more attention to the cultivation of professional skills and professional quality, and there are few practice activities related to traditional culture, so students' sense of actual experience is insufficient. The design and implementation of traditional cultural practice activities need more resources and support, and many higher vocational colleges have difficulties in this aspect.

3.3 Importance of excellent traditional culture in higher vocational education

Excellent traditional culture is of great significance in higher vocational education. First of all, fine traditional culture is the spiritual foundation of the Chinese nation and an important source of cultural confidence for the Chinese nation. Through the education of excellent traditional culture, students' cultural self-confidence can be enhanced, and students' cultural accomplishment and cultural identity can be enhanced. Secondly, excellent traditional culture contains rich philosophical thoughts, ethics and social norms, which plays

an important guiding role in students' ideological and moral education. Through the education of excellent traditional culture, students' moral character and social responsibility can be cultivated, and their comprehensive quality can be improved. Thirdly, excellent traditional culture has strong practical guidance, which is of great significance to the cultivation of students' professional quality and professional ethics. Through the education of excellent traditional culture, students can improve their professional quality and professional ethics, and enhance their professional competitiveness.

4. THE PATH OF INTEGRATING EXCELLENT TRADITIONAL CULTURE INTO HIGHER VOCATIONAL EDUCATION

4.1 Curriculum and teaching content optimization

The optimization of curriculum and teaching content is one of the important ways to integrate excellent traditional culture into higher vocational education. First of all, higher vocational colleges should add traditional culture courses to the curriculum, such as introduction to traditional Chinese culture, Chinese classics reading, traditional etiquette and culture courses. These courses can not only enrich students' knowledge structure, but also enhance students' cognition and identity of traditional culture. Secondly, higher vocational colleges should integrate traditional cultural elements into professional courses, such as adding ancient poetry appreciation in Chinese courses, traditional culture topics in history courses, and traditional art appreciation in art courses. By integrating traditional cultural elements into professional courses, students can feel the charm of traditional culture and improve their cultural literacy while learning professional knowledge.

In addition, higher vocational colleges should pay attention to the systematization and depth of teaching content, and avoid the superficial and fragmented traditional cultural education. Teachers should pass on the essence and connotation of traditional culture to students through in-depth research and systematic teaching design. The teaching content should

cover all aspects of traditional culture, such as literature, art, philosophy, history, ethics, etc., so that students can have a comprehensive understanding and profound understanding of traditional culture.

4.2 Campus culture construction

The construction of campus culture is one of the important ways to integrate excellent traditional culture into higher vocational education. Vocational colleges should create a strong traditional cultural atmosphere through various forms of campus cultural activities to enhance students' sense of identity and belonging to traditional culture. First of all, higher vocational colleges should integrate traditional cultural elements into the campus environment, such as integrating traditional cultural symbols into campus architecture and landscape design, and increasing traditional cultural content in campus logos and publicity columns. Through these ways, students can feel the existence of traditional culture in daily life and enhance cultural identity.

Secondly, higher vocational colleges should inherit and promote traditional culture through colorful campus cultural activities. We can hold traditional culture lectures, traditional art exhibitions, traditional festival celebrations, etc., so that students can feel the charm of traditional culture and improve their cultural literacy in the process of participating in activities. We can also organize students to carry out traditional culture-related activities, such as calligraphy, painting, opera, martial arts, etc., through community activities and interest groups, so that students can experience and inherit traditional culture in practice.

In addition, higher vocational colleges should pay attention to the institutionalization and normalization of campus culture, and establish and improve the long-term mechanism of traditional cultural education. Through the formulation of campus culture construction plan, the objectives and tasks of traditional culture education can be clearly defined to ensure the continuous promotion and effective implementation of traditional culture education.

4.3 Construction of teaching staff

The construction of teaching staff is the key link to integrate excellent traditional culture into higher vocational education. Higher

vocational colleges should enhance teachers' professional ability in traditional culture education through various ways to ensure the quality and effect of traditional culture education. First of all, higher vocational colleges should enhance teachers' traditional cultural knowledge and teaching ability through training and further study. Teachers can be organized to participate in traditional culture-related training courses, seminars, academic exchanges, etc., to improve their professional quality and teaching level. It can also enrich teachers' traditional cultural knowledge and improve their teaching ability through lectures by experts inside and outside the school and academic salons.

Secondly, higher vocational colleges should encourage teachers' research and innovation in traditional culture education through incentive mechanism. Through the establishment of traditional culture education research projects and teaching achievement awards, teachers can be encouraged to carry out research and practice of traditional culture education, so as to improve teaching quality and effect. We can also commend teachers who have made outstanding achievements in traditional culture education through the selection of outstanding teachers and excellent courses, so as to stimulate the enthusiasm and creativity of teachers.

In addition, higher vocational colleges should pay attention to the construction of the echelon of teachers and train a group of backbone teachers and discipline leaders with a higher level in traditional culture education. We can improve the overall level of teaching staff by introducing high-level traditional culture experts and scholars. It can also broaden teachers' horizons and improve their teaching ability through school-enterprise cooperation and inter-school exchanges.

4.4 Design and implementation of practical activities

The design and implementation of practice activities is one of the important ways to integrate excellent traditional culture into higher vocational education. Higher vocational colleges should enhance students' practical experience of traditional culture and enhance their cultural accomplishment and sense of cultural identity through diversified practical activities. First of all, vocational

colleges should enrich students' traditional cultural experience through practical activities inside and outside the school. Students can be organized to visit traditional cultural sites, museums, cultural centers, etc., to understand the history and current situation of traditional culture. Students can also experience and inherit traditional culture in practice through traditional cultural experience activities in the school, such as traditional handicraft production and traditional festival celebration. Secondly, higher vocational colleges should broaden the channels of students' traditional cultural practice through school-enterprise cooperation and social practice. Through cooperation with cultural enterprises and cultural institutions, students can be organized to participate in the design and implementation of traditional cultural projects, so as to improve students' practical ability and professional quality. Through social practice activities, such as volunteer service and community cultural activities, students can inherit and carry forward traditional culture in the process of serving the society.

In addition, higher vocational colleges should pay attention to the systematic and sustainable practice activities, and establish and improve the long-term mechanism of traditional cultural practice activities. Through the formulation of practice activities plan, the objectives and tasks of traditional cultural practice activities can be clearly defined to ensure the continuous promotion and effective implementation of practice activities. Through the evaluation and feedback of practical activities, we can sum up the experience in time, improve the shortcomings, and improve the quality and effect of practical activities.

5. GUARANTEE MECHANISM FOR INTEGRATING EXCELLENT TRADITIONAL CULTURE INTO HIGHER VOCATIONAL EDUCATION

5.1 Policy support and system guarantee

Policy support and system guarantee are the important guarantee for integrating excellent traditional culture into higher vocational education. Higher vocational colleges should establish and improve the system guarantee system of traditional culture education by formulating and implementing relevant policies to ensure the smooth promotion and

effective implementation of traditional culture education. First of all, higher vocational colleges should clarify the goals, tasks and measures of traditional cultural education by formulating policy documents on traditional cultural education to ensure the orderly advancement of traditional cultural education. We can define the specific content and implementation steps of traditional cultural education through the formulation of traditional cultural education plans and implementation plans, so as to ensure the systematic and scientific nature of traditional cultural education.

Secondly, higher vocational colleges should ensure the continuous promotion and effective implementation of traditional culture education by establishing and improving the system guarantee system of traditional culture education. It is possible to establish the management organization of traditional cultural education, clarify the management responsibilities and work flow of traditional cultural education, and ensure the standardization and institutionalization of traditional cultural education. In addition, the evaluation and feedback mechanism of traditional cultural education can be established to sum up experience in time, improve the shortcomings, and improve the quality and effect of traditional cultural education.

In addition, higher vocational colleges should encourage and guide teachers and students to actively participate in traditional culture education through policy support and system guarantee. We can set up special funds for traditional culture education to support the research and practice of traditional culture education and improve the quality and effect of traditional culture education. We can also commend teachers and students who have made outstanding achievements in traditional culture education through the selection of outstanding teachers and students, so as to stimulate the enthusiasm and creativity of teachers and students.

5.2 Resource allocation and fund guarantee

Resource allocation and fund guarantee are important guarantees for integrating excellent traditional culture into higher vocational education. Higher vocational colleges should ensure the smooth promotion and effective

implementation of traditional culture education through rational allocation of resources. First of all, higher vocational colleges should ensure the quality and effect of traditional culture education through rational allocation of teaching resources. The teaching quality of traditional culture education can be improved by introducing high-level traditional culture teaching materials and teaching equipment. We can also improve the practical ability of traditional culture education by building laboratories and practice bases for traditional culture education. Secondly, higher vocational colleges should ensure the smooth promotion and effective implementation of traditional culture education through rational allocation of human resources. We can improve the overall level of teaching staff by introducing high-level traditional culture experts and scholars. It can also broaden teachers' horizons and improve their teaching ability through school-enterprise cooperation and inter-school exchanges.

In addition, higher vocational colleges should ensure the continuous promotion and effective implementation of traditional cultural education through reasonable allocation of financial resources. We can set up special funds for traditional culture education to support the research and practice of traditional culture education and improve the quality and effect of traditional culture education. We can also raise funds through various channels, such as government support and social donations, to ensure the funding of traditional cultural education.

5.3 Evaluation and feedback mechanism

Evaluation and feedback mechanism is an important guarantee to integrate excellent traditional culture into higher vocational education. Higher vocational colleges should establish and improve the evaluation and feedback mechanism, sum up the experience in time, improve the shortcomings, and improve the quality and effect of traditional cultural education. First of all, higher vocational colleges should sum up the experience and achievements of traditional culture education in time by establishing the evaluation mechanism of traditional culture education. We can make the evaluation standard of traditional culture education,

clarify the content and method of evaluation, and ensure the scientific and fair evaluation. Through the evaluation and inspection of traditional cultural education, problems can be found in time, deficiencies can be improved, and the quality and effect of traditional cultural education can be improved.

Secondly, higher vocational colleges should timely understand the opinions and suggestions of teachers and students on traditional culture education by establishing a feedback mechanism for traditional culture education. It is possible to understand the needs and expectations of teachers and students for traditional culture education by conducting teacher-student seminars and questionnaire surveys, timely adjust and improve the content and methods of traditional culture education, and improve the quality and effect of traditional culture education.

In addition, higher vocational colleges should encourage and guide teachers and students to actively participate in traditional culture education through evaluation and feedback mechanism. Through the selection of outstanding teachers and students, teachers and students who have made outstanding achievements in traditional culture education can be commended, so as to stimulate the enthusiasm and creativity of teachers and students. We can also improve the quality and effect of traditional cultural education by summarizing and promoting the successful experience of traditional cultural education.

6. CONCLUSION

Through a systematic discussion on the path of integrating excellent traditional culture into higher vocational education under the background of "cultural confidence", this study puts forward four basic paths, including the optimization of curriculum and teaching content, the construction of campus culture, the construction of teacher team and the design and implementation of practical activities. The research holds that by constructing a multi-level and multi-dimensional excellent traditional cultural education system, the cultural self-confidence and comprehensive quality of students in higher vocational colleges can be effectively improved, and the foundation for cultivating

talents with international vision and national pride in the new era can be laid.

This study mainly adopts the methods of literature review and theoretical analysis, and lacks empirical research and case analysis, so the universality and operability of the research conclusions need to be further verified. In addition, this study mainly focuses on the traditional culture education in higher vocational colleges, and fails to cover other types of higher education institutions, so the breadth and depth of the research need to be further expanded.

Future research can be expanded and deepened in the following aspects: First, the path and strategy proposed in this study can be verified and improved through empirical research and case analysis, so as to enhance the universality and operability of the research conclusions. Secondly, the scope of research can be extended to other types of higher education institutions to explore the commonalities and differences of different types of educational institutions in traditional cultural education, so as to enhance the breadth and depth of research. Finally, through interdisciplinary research, the integration and innovation of traditional culture education and education of other disciplines can be discussed to improve the quality and effect of traditional culture education.

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Construction and Optimization of Internal Control Mechanisms in Corporate Financial Accounting

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Abstract: This study aims to explore and optimize internal control mechanisms in corporate financial accounting to enhance efficiency and risk mitigation in financial management. Initially, a literature review was conducted to outline the theoretical foundations and practical methods of internal control management, highlighting its crucial role in corporate management. Subsequently, qualitative research methods, including expert interviews and content analysis, were employed to deeply analyze the current state, existing issues, and underlying causes of internal control management in enterprises. Using inductive and deductive approaches, a comprehensive model for corporate financial accounting internal control mechanisms was constructed, encompassing elements such as internal control system development, organizational structure design, risk assessment and early warning systems, internal audits, and information technology applications. Finally, expert reviews and theoretical validation led to constructive conclusions, indicating that a scientifically and systematically constructed internal control mechanism can enhance the standardization and operational efficiency of corporate financial management while effectively mitigating and controlling financial risks in business operations. This study emphasizes the systematic and dynamic adjustment capabilities of internal control management and calls for corporate management to prioritize the optimization and implementation of these mechanisms to adapt to the rapidly changing and complex market environment.

Keywords: Internal Control Management; Financial Accounting; Risk Mitigation; System Development; Corporate

Management

1.INTRODUCTION

1.1 Background and Significance

With the deepening of global economic integration, the market environment faced by enterprises has become increasingly complex and volatile, bringing forth numerous risk factors. As an essential management tool and information source, financial accounting's internal control mechanisms are particularly critical. Effective internal control mechanisms in financial accounting ensure the reliability and completeness of accounting information and help prevent and control various enterprise risks, thereby enhancing management levels and market competitiveness. In recent years, frequent corporate financial scandals, such as the Enron and WorldCom cases, have exposed many issues in corporate financial internal controls. Therefore, exploring and optimizing these mechanisms has become a focal point for both corporate management and academic research.

1.2 Review of Domestic and International Research

Domestic scholars have achieved significant results in researching corporate financial accounting internal control mechanisms. Liu Shuangchun (2024) studied the necessity of constructing and optimizing these mechanisms and proposed implementation plans [1]. Yang Chunhong (2023) highlighted the importance of financial internal controls in the context of informatization and suggested optimization strategies through case analysis [2]. Zhang Hui (2022) examined issues in modern corporate financial internal controls and proposed solutions [3]. Tao Yan (2019) systematically researched the foundational construction of these mechanisms [4]. Shao

Feifei (2024) and Cai Yingqiang (2024) analyzed the optimization of financial internal controls in specific industries and companies, such as energy enterprises and Luxi Chemical Group [6][7].

Internationally, the implementation of the Sarbanes-Oxley Act has provided a significant regulatory foundation for financial accounting internal controls in the United States. Organizations such as the American Institute of Certified Public Accountants (AICPA) and the Information Systems Audit and Control Association (ISACA) have released internal control frameworks that offer global guidance. International research on internal control management focuses on the construction and optimization of internal control systems, emphasizing risk identification and control and the scientific and dynamic adjustment capabilities of the systems.

1.3 Objectives and Methods

This study aims to explore the construction and optimization of corporate financial accounting internal control mechanisms. Through literature review and theoretical analysis, the study constructs a scientific and rational internal control management framework. The research primarily employs qualitative analysis, including expert interviews and content analysis, to comprehensively examine current issues and underlying causes in corporate financial internal controls, and to propose targeted solutions.

2. THEORETICAL BASIS OF INTERNAL CONTROL MANAGEMENT

2.1 Basic concepts of internal control management

The internal control management mechanism of enterprise financial accounting refers to the development and implementation of a series of policies, procedures and measures to ensure the authenticity, integrity and legality of enterprise financial information, as well as the safety of enterprise assets, the efficiency and compliance of business activities in order to achieve enterprise management objectives. Internal control management is both preventive and controlling, aiming to realize effective prevention and control of financial risks through scientific management of all aspects of the enterprise.

2.2 Importance of internal control management

Internal control management has an important position in enterprise management, mainly reflected in the following aspects:

Internal control management can ensure the truth and integrity of enterprise accounting information. In the process of enterprise management decision-making, accurate financial information is the essential foundation and basis. Through the internal control management mechanism, we can ensure that financial information is not tampered with and forged, so as to ensure the reliability of financial reports.

Internal control management is helpful to prevent and control the financial risks of enterprises. Through internal control activities such as risk identification, risk assessment and risk response, potential financial risks can be warned in advance, and countermeasures can be formulated to reduce or avoid the negative impact of risks on enterprises.

Internal control management can also improve the efficiency of enterprise management. Scientific internal control and management mechanism can promote the standardization and orderly conduct of business activities, reduce resource waste and improve work efficiency. As stated by Zhang Hui (2022), sound internal control management is conducive to improving the operating efficiency of modern enterprises [3].

2.3 Theoretical framework of internal control management

The theoretical framework of internal control management mainly includes the following aspects:

Construction of internal control management system: Formulate scientific and detailed internal control system, including fund management system, procurement management system, asset management system, etc.

Internal control management organizational structure design: set up the financial department reasonably, clarify the responsibilities of each department, and build a management structure that restricts and supervises each other.

Risk assessment and early warning mechanism: Conduct regular risk assessment, identify and evaluate potential risks in

financial activities, and formulate corresponding countermeasures.

Internal audit: Audit and supervise the implementation of internal control management through independent internal audit institutions to ensure that the internal control system is implemented.

Information means: the use of information technology means to achieve the information and intelligence of internal control management, improve the efficiency and accuracy of internal control management.

3. ANALYSIS OF THE CURRENT SITUATION OF INTERNAL CONTROL MANAGEMENT OF FINANCIAL ACCOUNTING OF ENTERPRISES

3.1 Existing Problems

In modern enterprises, although many enterprises have realized the importance of internal control and carried out the relevant system construction, there are still many problems in the actual operation of internal control management. First of all, the internal control system is not perfect and comprehensive. Some enterprises fail to fully consider the specific situation and development needs of the enterprise when formulating the internal control system, resulting in poor applicability and implementation of the system. For example, some enterprises only pay attention to the control of a certain link, ignoring the overall control, resulting in the failure of control. This is particularly true of small and medium-sized enterprises.

Internal control enforcement is insufficient. Even if a more comprehensive internal control system is developed, the implementation effect is often unsatisfactory. In practice, many enterprises do not pay enough attention to the implementation of internal control system, especially in the key links such as financial reporting and fund management, and there are temporary and perfunctory situations.

The quality and professional level of the personnel in the internal control management of enterprises are not high, which is also a problem that cannot be ignored. Internal control management is a highly professional work, which requires a certain degree of financial knowledge and management ability. However, many enterprises lack professional

talents in internal control and management positions, and there is even a shortage of personnel.

Insufficient informatization is also an important problem in enterprise internal control management. Although information technology has been widely used in enterprise management, the internal control management of many enterprises still stays in the traditional manual operation stage and does not make full use of information technology means, which greatly affects the efficiency and accuracy of internal control management.

3.2 Cause Analysis

There are many reasons for the problems existing in the internal control management of enterprises. First of all, the enterprise's understanding of internal control management is insufficient. Many enterprise managers do not know enough about the importance of internal control management, and think that internal control management is only to meet the external regulatory requirements, ignoring its important role in the development of enterprises. This misunderstanding of the concept leads to insufficient investment in internal control management, and the system construction and implementation are not strong.

The enterprise internal management system is not sound. Many enterprises have obvious deficiencies in the internal management system, the function distribution is not clear, and the lack of effective supervision and restriction mechanism. This not only affects the normal development of internal control management, but also hinders the effective implementation of internal control management system.

The uneven quality of internal control management personnel is also an important reason. Internal control management needs high professional ability and practical experience, but many enterprises do not pay attention to the selection and training of internal control management personnel, resulting in personnel quality and professional ability is difficult to meet the requirements of internal control management.

The limitation of capital and technology is also an important reason for the insufficient informatization of enterprise internal control management. Informatization construction

requires a large amount of capital investment and technical support, but many enterprises, especially small and medium-sized enterprises, are obviously insufficient in this respect, resulting in the stagnation of the informatization level of internal control management.

4. CONSTRUCTION OF INTERNAL CONTROL MANAGEMENT MECHANISM OF ENTERPRISE FINANCIAL ACCOUNTING

4.1 Determination of internal control management objectives

The first step is to clarify the objectives of internal control management, which not only includes ensuring the authenticity, integrity and legitimacy of financial information, but also covers the effective use of enterprise resources and the realization of business objectives. On this basis, the specific objectives of internal control management also include preventing financial risks, improving management efficiency, and ensuring asset safety. The clear and definite objective of internal control management provides direction and basis for the construction and implementation of internal control management mechanism.

4.2 Design of internal control management content

After determining the internal control management objectives, it is necessary to design specific internal control management contents according to the actual situation of the enterprise. It mainly includes the following aspects:

Financial reporting control: Ensure that financial information is timely, accurate and complete by establishing strict financial reporting procedures and standards.

Fund management control: Establish a standardized fund management system to ensure the safe and effective use of funds and prevent fund risks.

Procurement and payment control: Through the establishment of standardized procurement and payment procedures to ensure that the procurement process is open, fair and transparent, and prevent procurement corruption and payment risks.

Inventory management control: Establish a standardized inventory management system to

ensure the safe and effective use of inventory items and improve the efficiency of inventory management.

Asset management control: Through the establishment of a standardized asset management system, to ensure the safe and effective use of enterprise assets and prevent asset risks.

Internal audit control: Through the establishment of independent internal audit institutions, the internal control management of enterprises is regularly audited and supervised to ensure the effective implementation of the internal control system.

4.3 Construction of internal control management system

On the basis of designing the content of internal control management, it is necessary to formulate specific internal control management system. The internal control management system should be scientific, comprehensive and operable, including the formulation, implementation, supervision and evaluation of the system. The internal control management system should cover all aspects of enterprise financial management, such as capital management, asset management, financial reporting, budget management, procurement management, etc.

When formulating the internal control management system, the actual situation and development needs of the enterprise should be fully considered to ensure the applicability and operability of the system. At the same time, the internal control management system should have a certain degree of flexibility, and can be timely adjusted and optimized according to the changes and development of the enterprise.

4.4 Design of organizational structure of internal control management

The design of internal control management organization structure is an important part of internal control management mechanism. Scientific and reasonable organizational structure is conducive to the smooth development of various internal control and management work. The organizational structure of internal control management should include the following aspects:

Clear function allocation: clarify the functions and responsibilities of each department and post to ensure the orderly conduct of internal

control and management.

Mutual restriction mechanism: Establish a mutual restriction mechanism to ensure that the internal control and management work can supervise and restrict each other, and prevent internal fraud and risks.

Supervision and feedback mechanism: Establish an effective supervision and feedback mechanism to ensure that the implementation and effect of the internal control management system can be timely feedback and improvement.

4.5 Establishment of risk assessment and early warning mechanism

Risk assessment and early warning mechanism is an important part of internal control management. Through regular risk assessment, potential risks in the financial activities of enterprises are identified and assessed, and corresponding countermeasures are formulated. The risk assessment and early warning mechanism should include the following aspects:

Risk identification: Identify potential risks through the analysis of the internal and external environment and financial activities of the enterprise.

Risk assessment: The analysis and assessment of the identified risks to determine the nature, extent and scope of the risks.

Risk response: Formulate corresponding risk response measures, including risk prevention, risk control and risk transfer.

Risk monitoring: Establish a risk monitoring mechanism to continuously monitor and evaluate the change of risks to ensure the effectiveness of risk response measures.

4.6 Implementation of internal audit

Internal audit is an important part of internal control management. Independent internal audit institutions review and supervise the implementation of enterprise internal control management to ensure that the internal control system is implemented. The main contents of internal audit include:

Financial audit: audit the financial report, fund management, asset management and other aspects of the enterprise to ensure the authenticity, integrity and legitimacy of financial information.

System audit: audit the implementation of the enterprise's internal control management system to ensure the effective implementation

of the internal control system.

Benefit audit: audit the operating efficiency and management efficiency of the enterprise to ensure the effective use of enterprise resources and the realization of business objectives.

5. OPTIMIZE THE INTERNAL CONTROL MANAGEMENT MECHANISM OF ENTERPRISE FINANCIAL ACCOUNTING

5.1 Optimization Principles

Optimizing the internal control management mechanism of enterprise financial accounting should follow the following principles:

Scientific principle: The optimization of internal control management mechanism should be based on scientific theories and methods to ensure the effectiveness of internal control management.

Systematic principle: The optimization of internal control management mechanism should consider all aspects of enterprise internal control management to ensure the comprehensiveness and systematism of internal control management.

Dynamic principle: The optimization of internal control management mechanism should have a certain degree of flexibility, and can be adjusted and optimized in time according to the changes and development of the enterprise.

Operability principle: The optimization of the internal control management mechanism should be operable to ensure that the internal control management system can be effectively implemented.

5.2 Optimizing Paths

To realize the optimization of enterprise financial accounting internal control management mechanism, we can start from the following paths:

Improve the internal control management system: on the basis of the existing internal control management system, further improve and optimize to ensure that the system is scientific, comprehensive and operable.

Strengthen the implementation of internal control management: By strengthening the implementation and supervision of internal control management, ensure the effective implementation of internal control management system.

Improve the quality of internal control management personnel: through strengthening the selection and training of internal control management personnel, improve the professional level and comprehensive quality of internal control management personnel.

Strengthen the application of information technology: By strengthening the application of information technology in internal control management, improve the informatization level and management efficiency of internal control management.

5.3 Information Construction

Information construction is an important link in the optimization of internal control management mechanism. Through the application of information technology, the efficiency and accuracy of internal control management can be improved. Information construction mainly includes the following aspects:

Financial software application: Through the introduction and application of advanced financial management software, improve the information level of financial management, improve the accuracy and timeliness of financial information.

Network security control: By establishing and optimizing network security control mechanism, ensure the security and stability of enterprise information system.

Data analysis and application: Through the application of data analysis tools, the enterprise financial data is analyzed and evaluated to support the internal control management decision.

Information sharing and coordination: Through the construction and optimization of information system, the information sharing and coordination of various departments within the enterprise can be realized, and the overall efficiency of internal control management can be improved.

5.4 Dynamic Adjustment Mechanism

The dynamic adjustment mechanism is the key to optimize the internal control management mechanism. By establishing and implementing the dynamic adjustment mechanism, the internal control management mechanism can be adjusted and optimized in time according to the changes and development of the enterprise. The dynamic

adjustment mechanism should include the following aspects:

Regular evaluation and adjustment: Through regular evaluation and analysis of the internal control management mechanism, problems in the internal control management are found and solved in a timely manner to ensure the adaptability and effectiveness of the internal control management mechanism.

Flexible adjustment and optimization: According to the specific situation and changing needs of the enterprise, flexibly adjust and optimize the internal control management mechanism to ensure that the internal control management mechanism is scientific and operable.

Feedback and improvement mechanism: Through the establishment of effective feedback and improvement mechanism, timely collection and analysis of feedback information in the implementation process of internal control management, and constantly improve and optimize the internal control management mechanism.

6. CONCLUSION

Through the systematic analysis and discussion of the construction and optimization of the internal control management mechanism of enterprise financial accounting, this study puts forward a scientific and reasonable path for the construction and optimization of the internal control management mechanism. The research shows that the effective construction and optimization of the internal control management mechanism of the financial accounting of enterprises can not only improve the standardization level and operation efficiency of the financial management of enterprises, but also effectively prevent and control the financial risks in the operation of enterprises, thus providing a solid guarantee for the sustainable development of enterprises.

Although this study has made some achievements in the construction and optimization of the internal control management mechanism of enterprise financial accounting, there are still some limitations. First of all, the scope and depth of the research are limited, and can not cover all aspects of enterprise internal control

management. Secondly, the research method is mainly qualitative analysis, without empirical analysis and case study, and the universality and operability of the research results need to be further verified.

Future studies can be combined with specific enterprise examples to further explore the effect and optimization path of internal control management mechanism in practical application, so as to promote the continuous improvement and perfection of enterprise internal control management. Specific research directions may include:

Comparative study on the internal control management mechanism of multinational enterprises: Through the comparative study on the internal control management mechanism of multinational enterprises, the similarities and differences of the internal control management mechanism in different countries and different cultural backgrounds and the optimization path are discussed.

Research on the application of internal control management mechanism in different enterprise types: Through the research of internal control management mechanism in different industries and types of enterprises, the applicability and optimization strategies of internal control management mechanism in different enterprises are discussed.

Research on the relationship between internal control management and enterprise performance: Through empirical analysis, the relationship between internal control management mechanism and enterprise performance is discussed to provide theoretical basis and empirical support for the optimization of internal control management mechanism.

In summary, through the theoretical analysis and optimization path design of this study, enterprises can benefit from the construction

and implementation of internal control management mechanism, improve the level of financial management, prevent and control financial risks, and promote the sustainable development of enterprises.

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A Strategic Study on the Dissemination of Beijing Opera in Southeast Asia

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Abstract: This study explores the dissemination strategies of Beijing Opera in Southeast Asia. By analysing the regional characteristics, audience acceptance and cultural integration of Beijing Opera, a series of effective dissemination strategies are proposed. These strategies not only contribute to the international development of the art of Beijing Opera, but also promote cultural exchange and understanding between China and Southeast Asia.

Keywords: Beijing Opera, Communication Strategy, Cultural Identity

1. INTRODUCTION

Beijing Opera, as China's national treasure, is not only an important part of Chinese culture, but also a common cultural heritage of all mankind. With the advance of globalisation, the spread of Beijing Opera is no longer limited to China, but is gradually becoming global, especially to Southeast Asia. Southeast Asia has a natural connection with China, with its large Chinese population and strong sense of cultural identity, providing a fertile ground for the spread of Beijing Opera. the purpose of this paper is to discuss the strategy of spreading Beijing Opera dissemination in Southeast Asia, analyse its success factors and challenges, and make suggestions.

2. BACKGROUND OF THE DISSEMINATION OF BEIJING OPERA IN SOUTHEAST ASIA

2.1 Chinese Community in Southeast Asia

Southeast Asia is one of the most concentrated areas for overseas Chinese, and most of these Chinese retain strong Chinese cultural traditions and have deep feelings and identification with traditional Chinese art forms such as Beijing Opera. This sense of cultural identity provides a solid foundation for the spread of Beijing Opera in Southeast Asia.

2.2 Cultural Exchange between China and Southeast Asia

There is a long history of cultural exchanges between China and Southeast Asian countries, including trade exchanges, the spread of religions, migration of people and other forms. Such cultural exchanges have not only promoted the economic prosperity of both sides, but also deepened the mutual understanding and recognition of culture. Beijing Opera, as one of the important representatives of Chinese culture, has naturally become an important carrier of cultural exchange.

3. COMMUNICATION STRATEGY OF BEIJING OPERA IN SOUTHEAST ASIA

3.1 'Theatre Follows People' Strategy

'Theatre follows people' is one of the most important rules of transnational transmission of opera genres. the spread of Beijing Opera in Southeast Asia is no exception. In the early days, as a large number of Chinese immigrated to Southeast Asia, they brought not only the seeds of Chinese culture, but also the art form of Beijing Opera. These immigrant Beijing Opera enthusiasts, actors and actresses became an important force in the spread of Beijing Opera in Southeast Asia. They spread Beijing Opera to the local Chinese community and gradually attracted audiences from other ethnic groups by organising performances and teaching their skills.

3.2 The 'proximity first' strategy

The geographic proximity and cultural commonality between Southeast Asia and China have facilitated the spread of Beijing Opera. In the process of spreading, Beijing Opera first chooses to spread to countries and regions that are closely connected with Chinese culture, such as Singapore and Malaysia. These countries have a large Chinese population with a strong sense of cultural identity and a high degree of

acceptance of Beijing Opera. By achieving success in these countries, it will then gradually expand to other Southeast Asian countries.

3.3 The strategy of ‘reputation-induced theatre’

In the process of spreading Beijing Opera in Southeast Asia, it focuses on attracting audiences through excellent repertoire and actors. Some classic Beijing Opera repertoires, such as Farewell My Concubine and the Drunkenness of Concubine, are popular in Southeast Asia. Meanwhile, some excellent Beijing Opera actors such as Mei Lanfang and Cheng Yanqiu also enjoy a high reputation in Southeast Asia. Through their superb acting skills and unique artistic charms, they attracted a large number of audiences and promoted the spread of Beijing Opera in Southeast Asia.

3.4 ‘Theatre Gathered by Popularity’ Strategy

In the process of spreading Beijing Opera in Southeast Asia, it pays attention to combining with local cultural customs. In terms of performance content and form, Beijing Opera will adjust and innovate according to the needs and preferences of local audiences. For example, when some Beijing Opera groups perform in Southeast Asia, they will add some local cultural elements and folk customs to make the performances closer to the lives and aesthetic habits of the local audience. This localisation strategy not only enhances the attractiveness of Beijing Opera, but also promotes the integration of Beijing Opera with local culture.

3.5 The strategy of ‘promoting theatre through business’

Commercial operations have also played an important role in the spread of Beijing Opera in Southeast Asia. Some Beijing Opera groups have cooperated with local business organisations to carry out commercial performances and cultural exchange activities. These activities not only bring economic benefits to Beijing Opera groups, but also increase the popularity and influence of Beijing Opera in the region. At the same time, commercial operations have also promoted the industrialisation of Beijing Opera in Southeast Asia, laying the foundation for the long-term development of Beijing Opera.

3.6 ‘Change for the sake of transmission’ strategy

In the process of dissemination, Beijing Opera constantly adapts to new environments and audience needs to make changes and innovations. For example, in order to adapt to the multilingual environment in Southeast Asia, some Beijing Opera groups have introduced multilingual versions such as English Beijing Opera. These innovations have not only expanded the audience base of Beijing Opera, but also improved the international competitiveness of Beijing Opera. At the same time, Beijing Opera also focuses on combining with modern technology in the process of dissemination, through the Internet, social media and other emerging media for dissemination and promotion. These innovative means not only improve the efficiency of the dissemination of Beijing Opera, but also enhance the attractiveness and infectious force of Beijing Opera.

4. SUCCESSFUL FACTORS OF BEIJING OPERA'S DISSEMINATION IN SOUTHEAST ASIA

4.1. Cultural Identity

The Chinese community in Southeast Asia has a deep affection and sense of identity for Chinese culture, which provides a solid foundation for the spread of Beijing Opera. They pass on and promote Chinese culture by watching Beijing Opera performances and learning Beijing Opera skills.

4.2. Excellent repertoire and actors

A number of excellent repertoires and actors have emerged during the spread of Beijing Opera in Southeast Asia. These repertoires and actors have attracted a large number of audiences through their exquisite acting skills and unique artistic charms, which has promoted the spread of Beijing Opera in Southeast Asia.

4.3. Localisation Strategy

In the process of spreading Beijing Opera in Southeast Asia, emphasis has been placed on localisation and innovation in combination with local culture and customs. Such innovation not only enhances the attractiveness of Beijing Opera, but also promotes the integration of Beijing Opera with local culture.

4.4. Support of Commercial Operation

Commercial operation plays an important role in the dissemination of Beijing Opera in Southeast Asia. By cooperating with local commercial organisations to carry out commercial performances and cultural exchanges, Beijing Opera groups have gained economic benefits and increased their popularity and influence.

5. CHALLENGES AND SUGGESTIONS

5.1 Challenges

5.1.1. Cultural differences: Southeast Asian countries have rich and diverse cultural backgrounds, and Beijing Opera, as a performing art with strong Chinese cultural characteristics, may encounter problems of cultural understanding and acceptance in the process of dissemination.

5.1.2. Language barriers: Beijing Opera performances often use Chinese in their chants and dialogues, which may constitute a viewing barrier for Southeast Asian audiences who are not familiar with Chinese.

5.1.3. Market competition: There are many local performing art forms in Southeast Asia, such as Thai classical dance and Indonesian Balinese dance, etc. These art forms have high visibility and influence in the local market, and Beijing Opera needs to face fierce market competition.

5.1.4. Insufficient funding: Promoting Beijing Opera requires a large amount of funding, including performances, publicity, and talent training, and insufficient funding may limit the spread of Beijing Opera in Southeast Asia.

5.2 Suggestions

5.2.1. Localised adaptation: According to the cultural characteristics of Southeast Asian countries, Beijing Opera should be appropriately localised and adapted to make it more acceptable to local audiences. For example, local elements can be added, and local languages can be used for part of the dialogue.

5.2.2. Strengthening cultural exchanges:

Through intergovernmental cultural exchange programmes, Southeast Asian artists and scholars are invited to China to study Beijing Opera, while Beijing Opera groups are organised to perform in Southeast Asia to enhance mutual understanding and friendship.

5.2.3. Make use of modern means of communication: Make use of modern means of communication, such as the Internet and social media, to produce short videos and documentaries related to Beijing Opera, so as to demonstrate the charm of Beijing Opera in a more vivid and intuitive way.

5.2.4. Cultivate professionals: Cultivate a group of professionals in Southeast Asia who know how to perform, produce and manage Beijing Opera, so as to provide talent support for Beijing Opera's dissemination in the region.

5.2.5. Establishment of cooperation mechanism: Establish a cooperation mechanism with local art groups and cultural institutions in Southeast Asia to jointly promote Beijing Opera, so as to achieve resource sharing and complementary advantages.

5.2.6. Diversified Profit Modes: Explore various profit modes, such as ticket sales, sponsor cooperation, and development of cultural derivatives, in order to ensure the continuous dissemination and development of Beijing Opera in Southeast Asia.

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Research on Reinforcement Method of Multi-Story Frame Public Building

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Abstract: With the development of society and the improvement of urbanization rate, China's urban and rural construction land is relatively tight. Therefore, the reinforcement and transformation of old buildings can not only improve the reliability of original buildings, reduce repeated investment, improve the service life of buildings, expand the functional use of buildings, but also save urban and rural construction land, which is of great significance for energy conservation and emission reduction to achieve the dual carbon goal.

Keywords: Structural Reinforcement; Testing Project

1. INTRODUCTION

With the development of society and the improvement of urbanization rate, China's urban and rural construction land is relatively tight. Therefore, the reinforcement and transformation of old buildings can not only improve the reliability of original buildings, reduce repeated investment, improve the service life of buildings, expand the functional use of buildings, but also save urban and rural construction land, which is of great significance for energy conservation and emission reduction to achieve the dual carbon goal.

2. PROJECT OVERVIEW

The building was built in 2003, and the house has been used as a commercial house until now. Now the structure detection and reliability identification of the building are carried out to provide the basis for the subsequent transformation and use.

The house is a four-story house. the building is generally rectangular, with a total length of 31.2 m, a total width of 20.0 m, a total construction area of about 1700 m², and design-related documents.

The house is a frame structure, supported by concrete beams, columns and slabs. the height

of the first floor is 3.75 m, the height of the second floor is 2.10 m, the height of the third floor is 3.40 m, the height of the fourth floor is 4.05 m, and the total height of the building is 13.30 m. the floor panels are prefabricated panels. the thickness of the prefabricated panels is 120 mm. the designed roofs in the 1-3/A-F and 1-2/F-H areas are all cast-in-place concrete roofs of the upper people. the thickness is 100 mm. the 2-4/F-J area of the roof is a four-slope cast-in-place concrete roof with a thickness of 100 mm.

3. DETECTION PURPOSE, SCOPE AND CONTENT

3.1 Detection purpose

Through the detection of the structure of the house, we can understand the current situation of the house and provide the basis for the subsequent transformation and use.

3.2 Monitoring range

Main structure of the house.

3.3 Monitoring content

Investigation of building structure drawings and data;

Construction shaft network size and component section size review;

Census of building structure appearance defects;

Detection of material strength and carbonation depth of concrete members;

Reinforcement configuration detection of concrete members;

concrete cover thickness detection;

overall tilt measurement of the house;

Structural reliability identification.

4. DETECTION BASIS AND INSTRUMENTS USED

4.1 Detection basis

4.1.1 Basic norms and standards

' Technical standard for building structure inspection ' (GB/T 50344-2019);

' Technical standard for on-site inspection of

concrete structures ' (GB/T 50784-2013);

' Code for acceptance of construction quality of concrete structures ' (GB 50204-2015);

' Technical specification for detection of steel bars in concrete ' (JGJ/T 152-2019);

' Technical specification for testing compressive strength of concrete by rebound method ' (JGJ/T 23-2011);

' Reliability Evaluation Standard for Civil Buildings ' (GB 50292-2015);

' General specification for engineering structures ' (GB 55001-2021);

' General specification for concrete structures ' (GB 55008-2021).

4.1.2 Main drawings and documents

' General specification for identification and reinforcement of existing buildings ' (GB 55021-2021);

' Structure construction drawing ', ' Building construction drawing '

4.2 Instruments used for detection

According to the actual situation and detection content of the site, the main instruments and equipment used in this detection are laser range finder, steel tape, digital rebound carbonized depth measuring instrument integrated steel bar, detector, vernier caliper and total station. During the whole detection operation, the equipment is in the calibration period and runs normally.

Fourth Field test results

4.3 Building shaft network size and component section size review

On-site steel tape and laser range finder are used to measure the size of shaft network and the geometric size of components, and compared with the design drawings. the test results show that:

The maximum deviation of the shaft network size of the building is in the 3/C-D axis of the first floor. the design size of the shaft network is 3800 mm, and the measured size is 3808 mm. the maximum is in line with the requirements of the allowable deviation (± 8) in the ' Code for Construction Quality Acceptance of Concrete Structure Engineering '; the maximum deviation of the size of the concrete beam is at the 5.85m2/G-H axis. the design size is 200×400 , and the measured size is 201×403 ; the maximum deviation of the size of the concrete column is at the 5.85m-9.25m3/H axis. the design size is 400×400 , and the measured size is 401×404 ;

the geometric size deviation of concrete columns and concrete beams meets the requirements of allowable deviation (+10, -5) in ' Code for acceptance of construction quality of concrete structures ' [1] GB5024-2015.

4.4 Concrete strength testing

The strength of concrete is mainly tested by rebound method and corrected by age correction method. the age correction is carried out in accordance with Appendix K of the national standard ' Reliability Evaluation Standard for Civil Buildings ' [2] (GB 50292-2015). the evaluation of concrete strength is based on the " Technical Specification for Testing the Compressive Strength of Concrete by Rebound Method " [3] (JGJ/T 23-2011).

The method for determining the estimated value of concrete strength by rebound method is as follows: the rebound test area is arranged on the component of sampling detection, and the strength conversion value is calculated by the average rebound value and carbonization depth value of the concrete in the test area. When the number of test areas is less than 10 or when the strength value of the test area of the component is less than 10.0 MPa, the estimated value of the concrete strength is the minimum value of the strength conversion value; the average value and standard deviation of the strength conversion value are calculated when the number of test areas is 10 or more. According to the concrete compressive strength value with a guarantee rate of not less than 95% in the overall distribution of the strength conversion value, the concrete strength is presumed to be the average value of the strength conversion value minus 1.645 times the standard deviation (i. e. $f_{ccu} = M_{cfccu} - 1.645 \times S_{cfccu}$).

For the components tested in batches, when one of the following conditions occurs in the standard deviation of the concrete strength of the batch of components, the batch of components should be tested as a single component:

When the average concrete strength of this batch of components is less than 25MPa: $S_{cfccu} > 4.5\text{MPa}$;

When the average concrete strength of this batch of components is not less than 25MPa: $S_{cfccu} > 5.5\text{MPa}$.

The column and beam concrete members are

taken as a test batch respectively. the column and beam concrete members are selected to test the concrete strength in the rebound test area, and the correction of the test angle, pouring surface and carbonization depth is considered. At the same time, according to the provisions on the age correction of the rebound value of aging concrete in Appendix K of ' Civil Building Reliability Appraisal Standard ' (GB 50292-2015), the age correction coefficient α_n of the age correction coefficient of the compressive strength conversion value of concrete is used to correct the age of the presumed value of concrete strength. the test house was built in 2003, and the age of the tested concrete was about 6935 days. According to the use time table, the age correction coefficient was $\alpha_n = 0.93$.

The test results show that the estimated value of concrete strength of building column is 21.4 MPa, and the estimated value of concrete strength of beam is 21.6 MPa.

4.5 Detection of concrete carbonation depth

On the one hand, the carbonation depth can reflect the durability of concrete members, on the other hand, it also has a great influence on the rebound value of concrete.

A hole with a diameter of 15 mm was formed on the surface of the measuring point by using appropriate tools, and its depth was greater than the carbonation depth of concrete. the powder and debris in the hole were removed, and 1% phenolphthalein ethanol test solution was used. After spraying in the hole, the uncarbonized concrete was pink, and the carbonized concrete did not change color. When the boundary between carbonized and uncarbonized is clear, the vertical distance between the interface of carbonized and uncarbonized concrete and the surface of concrete is measured by vernier caliper, which is the carbonization depth of concrete.

The carbonation depth of the concrete is between 11.5 mm and 13.5 mm. the carbonation depth of the beam concrete is between 12.0 mm and 14.0 mm.

4.6 Reinforcement detection of concrete members

According to the current national standard ' Technical standard for detection of building structures ' [4] (GB/T 50344-2019) and the industry standard ' Technical specification for detection of steel bars in concrete ' [5] (JGJ/T

152-2019), the electromagnetic induction method and direct method are used to detect the configuration of steel bars in concrete columns and concrete beams.

The steel bar detector is used to detect the number of main bars and stirrup spacing of concrete columns and concrete beams, and the diameter of steel bars is sampled and detected by local excavation of electric hammer. A total of 17 sampling inspections were carried out on the reinforcement configuration of concrete members in houses. After testing, the deviation of the number and diameter of the main reinforcement and the stirrup spacing from the design value of the sampling column and beam members is within ± 2 mm, which meets the requirements of the technical specifications.

4.7 Steel protection layer thickness detection

The detection range of the thickness of the protective layer of the steel bar is mainly the components and parts where the position of the steel bar may significantly affect the bearing capacity and durability of the structural members. Nine representative columns and eight concrete beams were selected on site. the concrete reinforcement detector was used to detect the sampling members, and the thickness of the protective layer of all longitudinally stressed steel bars was tested for the selected beam and column members.

The results show that the thickness of the reinforced concrete protective layer of the sampling column is between 22 mm and 33 mm. the thickness of the concrete protective layer of the beam is between 22 mm and 28 mm. the thickness of the concrete protective layer of the column and beam is greater than the carbonation depth of the component, and the steel bars of the column and beam are still in the alkaline protection of the concrete.

4.8 Building deformation measurement

According to the national industry standard ' Building Deformation Measurement Specification ' [6] (JGJ 8-2016), the total station is used to measure the outer line inclination of the measurable corner points of the house. the measurement results include construction and measurement errors.

Due to the limitation of the site, some corner tilts cannot be measured. the observable tilt

results show that the tilt value of each measured corner of the detection house is between 6mm and 16mm, and the tilt rate is between 0.82 ‰ and 2.24 ‰. the tilt rate meets the current national standard ' Civil Building Reliability Appraisal Standard ' (GB 50292-2015).

5. CONCLUSION

After testing, the shaft network size and component section size of the building meet the allowable deviation requirements in the ' Code for Acceptance of Construction Quality of Concrete Structure Engineering ' [7]. the concrete strength test infers that the concrete strength of the building column is 21.4 MPa, and the concrete strength of the beam is 21.6 MPa; the carbonation depth of concrete is between 11.5 mm and 13.5 mm. the carbonation depth of the sampling beam concrete is between 12.0 mm and 14.0 mm. the deviation of the number and diameter of the main reinforcement and the spacing of the stirrups from the design value of the columns and beams is within ± 2 mm, which meets the requirements of the ' Technical Standards for Building Structure Inspection ' [7] (GB/T 50344-2019) and the industry standard ' Technical Specification for Detection of Reinforcement in Concrete ' [8] (JGJ/T 152-2019); The thickness of the reinforced concrete protective layer of the sampling column is between 22 mm and 33 mm. the thickness of the concrete protective layer of the beam is between 22 mm and 28 mm. the

thickness of the concrete protective layer of the column and beam is greater than the carbonation depth of the component, and the steel bars of the column and beam are still in the alkaline protection of the concrete. the tilt value of each measuring corner of the house is between 6mm ~ 16mm, and the tilt rate is between 0.82 ‰ ~ 2.24 ‰. the tilt rate meets the current national standard ' civil building reliability identification standard ' [9] (GB 50292-2015).

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Research on the Construction of Financial Informatization in Universities under the Background of Big Data Era

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Abstract: This article introduces the practical significance of financial informatization construction in universities under the background of big data. It analyzes the current problems of insufficient intelligence, low information security control, and low comprehensive quality of financial personnel. Corresponding improvement measures are proposed to address these issues.

Keywords: Big Data; Universities; Promotion Of Information Technology

1. INTRODUCTION

At present, big data technology has been widely applied in various industries. University finance is no exception, and it should also adapt to the development of the times and complete the transformation from financial management to financial governance. In the future, big data will be widely applied to financial data management systems in universities, greatly improving overall financial performance and laying the foundation for the transformation of universities. A sound data governance system can ensure the security of financial data, optimize various funds, and provide accurate information and materials to assist schools in financial decision-making.

2. THE SIGNIFICANCE OF FINANCIAL INFORMATIZATION CONSTRUCTION IN UNIVERSITIES UNDER THE BACKGROUND OF BIG DATA ERA

2.1 Beneficial for reducing financial management costs

Cost runs through the entire financial management process. Professional development, talent cultivation, and deep integration of production, education, and research are often the focus of university management, and financial management is

often overlooked. Therefore, it is easy to encounter high financial management costs due to personnel and system issues. Therefore, promoting the informatization development of financial management in universities, fully leveraging the advantages of information technology, reducing labor costs, minimizing human errors, etc., in order to achieve the goal of cost reduction.

2.2 Beneficial for improving the efficiency of financial management work

Due to the high volume of business in various departments, the financial management of universities involves a large amount of work and various types of information. Due to the limitations of traditional manual management models, the actual work efficiency is not high. With the widespread application of big data, university finance can also fully utilize big data technology to improve the efficiency of financial management work. Various new financial software with rich functions can meet the basic needs of various aspects of financial management in universities; At the same time, technologies such as cloud computing and big data have significant advantages in processing massive amounts of information data, enabling cloud storage, rapid integration, analysis, and transmission of data, which can greatly improve the efficiency of financial management work.

2.3 Beneficial for information fusion, sharing, and utilization

Financial information plays an important role in university management, serving not only financial management work but also providing assistance to other information related to management work. The rapid development of financial management informatization can promote information fusion, sharing, and utilization, fully unleash the value of financial information, improve the level of financial

management work, and lay the foundation for high-level management in universities.

2.4 Strengthen financial supervision and risk management

One of the important aspects of financial management in universities is financial supervision. the use of information technology in university finance enables dynamic and real-time supervision of financial work, as well as centralized management of information. It is beneficial to avoid unnecessary financial problems. At the same time, the financial risk control level of universities can also be improved to a higher level, fully utilizing big data technology to avoid risks, deeply analyzing data, and providing a basis for risk control.

2.5 Helps to ensure information security

In the context of the big data era, information security issues in university finance are becoming increasingly important. When building a financial information system, it is necessary to strengthen and improve information security strategies and measures, and enhance the confidentiality, integrity, and availability of financial data. Information security management not only includes system backup and recovery, but also includes access control, encryption technology, and security auditing. Through information security protection, universities can effectively prevent risks such as financial information leakage, network attacks, and data loss, ensuring the security and stable operation of financial information systems.

3. CURRENT PROBLEMS IN FINANCIAL INFORMATIZATION IN HIGHER EDUCATION INSTITUTIONS

At present, universities have established financial management information systems with standardized processes, clear responsibilities, and basic compliance with financial regulations and institutional requirements. However, there are also some urgent problems to be solved in the process of financial informatization construction.

3.1 Insufficient intelligence in financial systems

With the deepening of government accounting reform and the rapid development of higher education, the basic financial data has experienced explosive growth. the quality of

accounting information will directly affect the refined management of finance. Financial practitioners face increasing work pressure and intensity, but the construction of financial intelligent systems is not yet perfect, resulting in high error rates in financial accounting, insufficient refinement, low quality of accounting information, and low work efficiency. the tight budget and lack of personnel, as well as outdated information systems and hardware support, are unable to meet the current demand for financial information systems in university financial activities.

3.2 Low level of financial information security control

The high penetration of information technology into financial work brings both advantages and significant security risks. Although we have entered the era of big data, there are still problems such as weak awareness of information security prevention among some financial personnel and insufficient standardization in the use of financial systems. the rapid development of information technology allows information users to conduct business processing through various access terminals, which also poses higher requirements and new challenges for financial information security control.

3.3 Financial management personnel have weak overall quality

The informationization construction of universities in the era of big data requires financial management personnel to transform traditional financial management thinking, proficiently apply financial accounting theory and knowledge, be familiar with the mode and specific content of financial management, proficiently use the technology of financial management information systems, and transform into comprehensive financial management talents. However, currently many financial personnel in universities have outdated financial management concepts, do not attach importance to the role of financial informatization, and have poor ability to apply modern information technology; Some financial personnel lack awareness of financial risks and are relatively casual in the approval and management of reimbursements and expenses, which poses certain risks to financial management work.

3.4 The integration level of financial business systems in universities needs to be strengthened

The various business departments and finance departments in universities are closely connected, but their systems are separated from each other. the communication between the finance department and various business departments still relies mainly on manual methods, supplemented by systematic methods, which ultimately leads to lag and effectiveness in information communication. There is a situation of asynchronous flow between financial information and various business nodes, that is, there is an information island, which makes it impossible to achieve perfect integration of "business and finance".

4. COUNTERMEASURES FOR THE CONSTRUCTIONS OF FINANCIAL INFORMATIZATION IN HIGHER EDUCATION INSTITUTIONS

4.1 Strengthen the construction of financial management information system and improve the level of financial informatization

The main carrier of financial informatization in universities is the financial management information system. Various financial software and information technology support provide support for the development of financial informatization. Improving the level of financial informatization and enhancing financial management efficiency has become the key to the construction of financial management information systems. When establishing a financial management information system, universities should select financial software companies with high technical level and good reputation through open bidding, and jointly develop the financial management information system based on the actual situation of the school; We should fully draw on the experience of other universities and choose the most suitable financial software for our school's actual situation to achieve the best application effect. In addition, universities should maintain long-term and close contact with financial software companies, continuously optimize software functions based on problems discovered during use, enhance the applicability and practicality of financial software, and promote

the innovative development of financial informationization construction in universities.

4.2 Pay attention to network security and strengthen financial risk control

The financial management information system of universities can improve the efficiency of financial management, but it also increases related network security issues. the financial information construction management department should enhance its awareness of network security prevention. When choosing a financial software company to cooperate with, it is necessary to carefully examine and screen, and cooperate with companies with good reputation for network security and high level of network security protection technology. During the use of financial management information systems, regular or irregular network security maintenance and upgrades should be carried out to promptly patch system security vulnerabilities. In addition, the finance department must also use the financial management information system safely and standardly, clarify the usage permissions of financial personnel, establish a network security warning mechanism, and minimize the risk of data leakage as much as possible; Once data is leaked or tampered with, timely remedial measures should be taken to improve financial risk management capabilities.

4.3 Pay attention to the cultivation of a composite professional talent team

In the context of the big data era, universities should timely prioritize the construction of a composite professional talent team. the construction of talent teams in information technology majors in universities has become increasingly important and can be implemented from both technical and business perspectives. Strengthen mutual learning between professionals and information technology personnel, actively introduce composite professional talents, and reasonably arrange continuing education and training work.

4.4 Strengthen the integration of financial and business systems

Strengthen the concept of "business finance integration", streamline the business processes of various departments in universities, introduce management accounting concepts, attach importance to financial management

functions such as comprehensive budget management, accounting, internal control, and financial analysis, and achieve the transformation of university financial management towards business finance integration. Make full use of information technology to strengthen the conversion and sharing of information between finance and various business departments, ensuring that business and financial system data can be automatically transmitted and fully shared, avoiding human influence as much as possible, thereby ensuring the consistency of data among departments, improving the accuracy and completeness of financial information, and reducing financial risks. Collect and

integrate financial data to provide scientific and reasonable basis for business department decision-making and overall university decision-making.

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Thinking About the Construction Path of Workers' Home

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Abstract: In order to give full play to the role of the trade union organization as a bridge and link, enrich the cultural life of workers, improve their professional skills, enhance their comprehensive quality, broaden their horizons, improve their sense of access and happiness, and further promote the construction of the "double-high" school in Zibo Vocational College, the trade union of Zibo Vocational College has taken the construction of the staff home and the creation of the provincial "top ten" staff home as important work.

Keywords: Worker's Home, Labor Union, New Age

1. INTRODUCTION

In accordance with the "Top Ten Staff Homes Trusted by Workers" standard of Shandong Province, the construction plan and ideas are formed around party building with worker building, union organization building, union system building, union mechanism building, union fund use, activity venues and organization, helping and comforting, industrial worker talent training, helping rural revitalization, safety production, etc.

2. PARTY BUILDING WITH RESPECT TO THE CONSTRUCTION OF WORKERS.

Incorporate the construction of trade unions into the overall deployment of party building work, and realize the same deployment and implementation of party building and work building work. In the past three years, the CPC Zibo Vocational College Committee has focused on the main points of its work and the spirit of the Municipal Federation of Trade Unions' "Opinions on Improving the Work Mechanism of "Party Building with Work Building" to Strengthen the Construction of Trade Union Organizations in the New Era", formulated the annual target responsibility of

the Party building work of the Party General Branch, and organized a series of activities of Party building with work building; opened the New Era Civilization Training Center to To enhance the "five identities" of the workers, we continuously promote the study and propaganda of Xi Jinping's thought of socialism with Chinese characteristics in the new era to go deeper, more practical and more heartfelt, and guide workers to feel the Party's benevolence, listen to the Party's words and follow the Party.

3. CONSTRUCTION OF TRADE UNION ORGANIZATIONS.

There are independent trade union working bodies, the establishment of funds review committees and women workers' committees, and sound organization of trade union branches and trade union groups of subordinate units. the chairman of the trade union committee enjoys the treatment of an administrative deputy and is equipped with full-time trade union staff; in accordance with the Regulations on the Work of Women Staff Committee of Trade Unions, the director of the Women Staff Committee of Trade Unions and the cadres of women staff work are equipped; the adjustment and renewal of the second-level trade union organizations are completed, and the structure chart of the trade union committee and the executive committee of the teaching council is completed.

4. UNION SYSTEM CONSTRUCTION.

Establish and improve the system of members' evaluation of their families and the public commitment system of doing practical things for the staff; establish and improve the system of members' (representative) assembly, establish and improve the system of staff representative assembly and establish and improve the system of openness of meeting affairs; complete the collation and compilation of 58 systems from six aspects: national,

provincial and municipal, school, school union, school security and the activity room related to the staff house.

5. CONSTRUCTION OF TRADE UNION MECHANISMS.

the union has established and perfected a system for electing trade union organizations, directly elected trade union chairmen, and carried out the general election and by-election on time and in a standard manner; convened staff representative assemblies on time and exercised their powers in accordance with the law; established an open system for school affairs and a mechanism for communication and consultation between trade unions and the administration; and made the work of trade unions and the management and use of trade union funds open to the staff.

6. MANAGEMENT AND USE OF TRADE UNION FUNDS.

The union funds are allocated in full in accordance with the law, there are independent bank accounts for union funds, and the relevant regulations on the management of income and expenditure of grass-roots trade unions are implemented in a standardized manner; the administration is urged and assisted to make good use of 8% of the funds for staff education, in-depth education and training is conducted, the awareness of the rule of law of the unit's business managers and staff is raised, the staff are guided to express their wishes and demands in accordance with the law, and their skills are improved.

7. ACTIVITY VENUES AND ORGANIZATION.

The grass-roots venues have met the "eight" standards and are well maintained, managed and used on a daily basis; they provide "menu-based" services and regularly organise a variety of cultural and sports activities for workers. Since 2020, 4.32 million yuan has been invested in the construction of more than 3, 000 square metres of workers' homes.

8. HELP AND COMFORT AND ASSISTANCE.

To formulate a list of practical projects for workers each year, specify specific contents and standards, and carry out at least one

member evaluation of the family, with a satisfaction rate of over 95% for members' evaluation of the work of the family union and the president of the union in the past three years; to guide and help workers to sign labour contracts with schools, promote the establishment of a collective wage negotiation mechanism, sign and fulfil collective contracts and special collective contracts for the protection of the rights and interests of female workers in accordance with the law; to set up "mothers' huts" and promote the construction of four-phase protection facilities for female workers in enterprises according to the needs of female workers; establish and improve the files of workers in difficulty in accordance with the conditions, standards, procedures and dynamic management requirements for the construction of files for workers in difficulty; establish a contact person system for workers in difficulty, carry out in-depth assistance services, and do a good job in providing precise assistance and relief for workers in difficulty.

9. CULTIVATION OF INDUSTRIAL WORKERS' TALENTS.

The "Be the Main Force, Gather New Energy, Build a New Era" labour competition has been widely carried out to unite and guide workers to build up their work based on their jobs; to establish and improve the commendation and incentive mechanism for model workers, artisan talents and highly skilled talents, and to motivate workers to base on their jobs and strive for excellence. the first batch of faculties and departments employing industrial professors are as many as 19; the first batch of 37 technical commissioners; leading the formation of the national backbone vocational education group (Zibo Vocational Education Group), building 10 industrial colleges, 24 modern apprenticeship majors and 24 order classes with enterprises in the past three years, and the mixed ownership system. In the past three years, the university has established 10 industrial colleges, 24 modern apprenticeship specialties and 24 order-made classes with enterprises, and has achieved outstanding results in reforming school operation; the university has been approved as a pilot competition for the reform of the National Vocational College Skills

Competition in 2020 in the categories of "Network System Management", "Chemical Laboratory Technology" and "Health and Social Care". "We have been approved as the host school of three senior-level competitions in 2020. the competition was held in the same year, with the aim of optimizing the competition settings, innovating the system and mechanism, practicing the vocational education concept of promoting teaching, learning, reform and construction through competition, further deepening the education and teaching reform, improving the quality of talent training, and contributing to the creation of a new high ground for vocational education in Shandong Province. It has cultivated more high-quality technical and skilled talents with craftsmanship, stimulated new momentum in education and teaching, and achieved a new breakthrough in the "double-high plan"; it has joined hands with the Municipal Federation of Trade Unions to create the "Zibo Labour Model Artisan College" to cultivate an army of high-quality industrial workers, and launched a publicity campaign on the theme of "Labour Creates Happiness". the theme of "Labour Creates Happiness" is to promote education and help Zibo to achieve the phoenix nirvana.

10. ASSISTING IN THE REVITALIZATION OF RURAL AREAS.

It has integrated and utilized multiple resources to give full play to the role of serving the intellectual and human resources of rural revitalization, focusing on the study of rural revitalization policies, organizing training rounds for rural revitalization cadres, carrying out scientific and technological innovation for rural revitalization, carrying out technical training related to farming, and guiding the cultivation of rural revitalization characteristics and culture. It has also carried out activities such as "Hand in Hand between Urban and Rural Trade Unions", playing an active role in helping rural revitalization; through multi-party cooperation talks, consensus has been reached on the joint establishment of an aesthetics education base, a rural aesthetics talent team, a rural aesthetics expert pool, a volunteer service team and the implementation of "Thousands of Rural Women in Universities "The university has

also recruited 43 aesthetics lecturers to provide talent support for the cultivation of rural aesthetics; hosted the inauguration of the Zibo Aesthetics Education School-Local Cooperation and the launch of the Rural Aesthetics LOGO, and held a forum on the joint construction of Zibo University and rural aesthetics.

11. SAFETY IN PRODUCTION.

Supervising various departments to implement national labour safety and health laws and regulations and relevant policies to promote the improvement of labour safety and health conditions and working environment for employees; in the past three years, no major or above production safety responsibility accidents and labour relations group incidents have occurred.

The union of Zibo Vocational College (staff home) has 1575 members, including 50 doctors, 75 professors, 340 associate professors and 668 masters. In recent years, Zibo Vocational College's trade union (staff home) has been awarded the honorary titles of "six" trade unions and "four rooms and a In recent years, in accordance with the "six" trade unions and "four rooms and one house" staff home construction standards, efforts to build wisdom, thinking, innovation and entrepreneurship, democratic rights, harmony and happiness, strong fortress staff home, and strive to create a "top ten workers trusted by the staff home" in Shandong Province.

11.1 Strengthen the foundation of the organization and build the "Home of Civic and Political Staff". We have completed the restructuring and renewal of 32 secondary trade union organizations, with the chairmen of the secondary trade unions all holding party posts and the membership rate of teaching staff at 100%; improved the series of systems such as member evaluation, with a satisfaction rate of 100% for three consecutive years; standardized the convening of the third "double-generation meeting" and elected various special committees in accordance with the law; formed five major cultural and sports associations. the five major sports and cultural associations were set up to organise activities such as sunshine sports, tea drinking culture, reading and basketball and volleyball.

11.2 Introducing new technologies and

building "intelligent workers' homes". the "six zones and one pavilion" and "four zones and one pavilion" have been completed, "love mothers' huts" have been set up, fitness and sports equipment have been added, and management systems and norms have been formulated to provide smarter management and more comprehensive services. (3) the establishment of the "Love Mothers' Huts", the addition of fitness and sports equipment, the formulation of management systems and norms, smarter management and more comprehensive services.

11.3The "Zibo City Model Worker Academy" is listed and built, and the "Innovation and Entrepreneurship House" is constructed. In conjunction with the Zibo City Federation of Trade Unions and relying on the school's five industrial worker training bases, a million innovation and entrepreneurship fund was introduced to support the cultivation of high-quality entrepreneurial projects and the transformation of scientific and technological achievements; labour competition activities were carried out solidly, relying on the school's highly skilled personnel recognition and incentive mechanism, and the total amount of reward funds for high-level achievements in scientific research reached 6.08 million yuan.

11.4Conscientiously implement information disclosure and build a "home for democratic rights protection". We have actively conducted research on the protection of human rights, formulated a method for teachers to lodge complaints within the institution, and opened a workflow for "proposal collection" on the "office hall" to

improve operational efficiency and information management.

11.5 Highlighting the function of maintenance and protection, we built a "harmonious and happy home". We ensured that our services to staff were "two in place" and "three times as warm". In the year 2021 alone, in accordance with the spirit of the relevant documents of the All-China Federation of Trade Unions, we actively distributed holiday condolences to trade union members during traditional festivals, with an amount of more than RMB 2.3 million. With the "Heart to Heart Fund" of more than 178, 000 yuan, 46 visits were made to the teaching staff, and 86, 500 yuan of condolences were issued. We have organised and carried out activities such as the youth staff association, marriage and childbirth sympathy, and old teachers' retirement. A medical examination report was produced and recommendations were made for each staff member to prevent and treat illnesses.

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Exploring the Professional Development of College English Teachers under the TPACK Framework

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Abstract: This paper examines the professional development of College English teachers using the TPACK framework, focusing on how they integrate Technological Pedagogical and Content Knowledge (TPACK) into their teaching. The study finds that College English teachers are increasingly incorporating information technology into their teaching. However, they face challenges such as insufficient subjective initiative, limited technological application skills, and inadequate professional training resources. In response to these issues, several suggestions are proposed to enhance the overall professional development and teaching effectiveness of College English teachers.

Key words: TPACK framework; College English teachers; professional development

1. INTRODUCTION

In today's rapidly evolving digital and globalized world, College English teaching is experiencing significant transformations. Teachers, as the backbone of education, have a direct impact on teaching quality and student development. However, traditional teaching methods and knowledge bases are becoming outdated, especially in the face of technological progress. To keep up, College English teachers must consistently refresh their professional abilities, focusing on seamlessly integrating technology into their lessons.

The TPACK (Technological Pedagogical and Content Knowledge) framework provides a systematic approach for teachers to combine technology, pedagogy, and subject content into a dynamic knowledge system. Studying the professional development of College English teachers within this framework is crucial. Such research supports teachers in improving their skills related to technology

use, teaching methods, and content integration, thereby enhancing the overall quality of university English education. By thoroughly examining teachers' TPACK levels, we can uncover the challenges and needs they encounter in practical teaching, which will further promote their ongoing professional development and optimize educational practices.

2. THEORIES AND RESEARCH RELATED TO TPACK

The TPACK (Technological Pedagogical Content Knowledge) framework, established by Mishra and Koehler in 2006, extends Shulman's Pedagogical Content Knowledge (PCK) framework. Recognized and embraced by the education community, TPACK comprises four core components: Content Knowledge (CK), which is the teacher's deep understanding of the subject; Pedagogical Knowledge (PK), which involves mastery of teaching strategies and methods; Technological Knowledge (TK), which pertains to the use of technological tools; and Pedagogical Content Knowledge (PCK), which integrates subject knowledge with teaching methods. Thus, effective teaching requires a combination of strong subject knowledge, teaching skills, and the ability to apply technology effectively.

TPACK is a knowledge framework designed from the perspective of teachers to aid their professional development. It outlines the essential knowledge that teachers should have, especially in the context of integrating information technology with college English courses. This framework is crucial for guiding the professional growth of college English teachers.

In recent years, domestic researchers have increasingly focused on the development level

and intrinsic characteristics of TPACK among university English teachers. These studies generally fall into two categories. One category includes large-scale surveys, such as Wang Qi's investigation of 150 teachers, which found that foreign language teachers generally have low levels of technological knowledge and lack confidence in effectively integrating technology into teaching to enhance learning outcomes. The other category comprises case studies, such as Wei Zhihui's longitudinal study of a technology-driven foreign language teacher over eight years. This research explored how the teacher evolved into an expert through three teaching reforms: MOOC teaching, blended learning, and the integration of online and offline instruction. And Hang Yajing analyzes a case study carried out by a College English teacher on a flipped-classroom teaching program. The results show that College English Teachers' TPACK development is currently unbalanced, especially inadequate in technological knowledge.

While large-scale surveys can provide a macro perspective on the TPACK development levels of university English teachers, case studies offer a deeper insight into the TPACK development characteristics of teachers in practical teaching contexts. Therefore, to gain a more comprehensive understanding of how TPACK evolves in real-world settings, I will also incorporate case studies into my research.

3. RESEARCH METHODS

This study also employs a case study method, focusing on four College English teachers from Huanggang Normal University. All teachers have over 15 years of teaching experience, and possess certain technical skills, such as creating course materials, using smart classrooms and operating online learning platforms. The teaching subjects are second-year undergraduate students from various majors.

Data collection will include the following three parts: First, semi-structured interviews, each lasting about one hour, will explore teachers' perceptions of technology use, teaching philosophies and practical application of technology in teaching, based on the TPACK theoretical framework. Second, classroom observations will analyze how

teachers use technology in the classroom, their interactions and the impact on teaching effectiveness. Finally, teaching plans will be collected to understand how teachers plan the use of technology during the teaching design phase and its actual application.

4. RESEARCH FINDINGS

4.1 Foreign language teachers' perceptions of integrating information technology

Overall, most foreign language teachers believe that the appropriate use of technology significantly enhances English teaching. To gain a deeper understanding of teachers' thoughts and practices, we conducted a series of interviews. Many teachers indicated that technology tools such as online learning platforms and multimedia resources enable them to present teaching content more vividly and increase students' interest and engagement. For instance, one teacher shared that students practiced dialogues at the CET-4 and CET-6 Oral Test Center, while another mentioned that students used a Vocabulary Master platform for practice, achieving significant results.

However, some teachers expressed concerns about technology use. They pointed out that excessive reliance on or inappropriate use of technology could distract students and affect the depth and effectiveness of teaching. Additionally, teachers discussed their acceptance of new technology. Younger teachers are enthusiastic about new technology and are eager to explore and integrate the latest tools into their teaching, saying, "I hope the school will organize more training on online platform technology." In contrast, older teachers acknowledged the value of technology but were less willing to invest extra time and effort to learn new technologies, either because they are not yet proficient with new tools or feel that existing technology already meets their teaching needs. As one teacher noted, "Each course has its own learning platform, which can overwhelm students, and it also increases the teaching load for teachers."

In summary, while most foreign language teachers hold a positive attitude towards the use of technology in teaching, their attitudes and behaviors are influenced by various factors in practice, including the suitability of

the technology, students' needs, teachers' skill levels and their openness to new technologies. These factors collectively result in varying applications of technology in foreign language teaching.

4.2 Foreign language teachers' integration of technology in foreign language teaching

Foreign language teachers' integration of information technology primarily involves selecting appropriate teaching methods and effectively presenting instructional content. On one hand, most teachers are able to use basic technological knowledge to complete teaching tasks, such as using online resources, downloading relevant videos and audio files, creating multimedia PowerPoint presentations, and interacting with students through common tools like QQ or Xuexitong Platform for in-class and out-of-class communication. For example, one teacher demonstrated how to use Xuexitong to assign pre-class listening and speaking tasks, enabling students to complete exercises before class and saving instructional time. Another teacher shared her experience with WeTest for creating test questions, which helped reinforce classroom learning and provided immediate feedback on students' understanding for more targeted support.

Nevertheless, teachers still have a weak understanding of modern educational theories and technology (TK), which prevents them from fully using network and multimedia tools to acquire, integrate, and create the information resources needed for teaching. For example, even though the school offers extensive educational technology training and has upgraded network hardware, many teachers have reported that creating micro-lessons is time-consuming and technically challenging, leading them to be cautious about using this technology in practice. One teacher noted that although micro-lessons support personalized learning for students, the significant time and effort required led him to opt for simpler technological tools for basic teaching tasks.

4.3 Foreign language teachers' subject content knowledge level

Based on lesson plans and classroom observations, *Over to You* English course offers comprehensive teaching materials and the learning platform, which include audio, video, and supplementary exercises.

Additionally, the school provides online learning tools like WeLearn, WeTest, Vocabulary Master and English on the Go. In the interview, one teacher, in a recent interview, mentioned that she prefers to rely on the high-quality pre-prepared course materials provided. These resources not only significantly lessen her lesson preparation workload but also ensure that students receive standardized and well-structured content. However, another teacher noted that, despite the convenience and abundance of these materials, he prioritizes tailoring teaching content or creates more interactive and engaging classroom activities to address students' specific needs and interests. Additionally, teachers admitted that they still face some challenges in technology application to better incorporate technology into classroom teaching and enhance educational effectiveness.

In summary, although teachers have access to abundant resources and advanced technology, using these effectively and creatively remains a challenge that requires ongoing effort. Enhancing teachers' technical skills and their ability to integrate resources should be a key focus in future training and professional development.

5. CONCLUSION AND IMPLICATIONS

The author's analysis of university English teachers based on the TPACK framework reveals that, firstly, the development of TPACK is mainly influenced by teachers' self-awareness and teaching beliefs. Although most teachers recognize the benefits of technology in foreign language teaching, differences in technology use and practical experience arise due to varying personal backgrounds, skill levels, and openness to new technologies. Secondly, effective TPACK development requires strong information technology literacy. However, many teachers lack a deep understanding of modern educational theories and technology, which limits their ability to effectively use online and multimedia tools in their teaching. To address this, schools should enhance teacher training, establish technology learning communities for sharing best practices, and implement incentives to encourage active participation in TPACK-based teaching. Lastly, when

integrating technology with foreign language teaching materials, teachers tend to focus primarily on basic teaching tasks, and their teaching designs and methods do not fully align with advancements in information-based education. This highlights the importance of TPACK, emphasizing the need for teachers to continually update their knowledge through practice and achieve professional growth through reflection and adjustment.

To effectively enhance TPACK, teachers need a more thorough understanding and application of modern educational theories and technologies. Schools should prioritize improving teacher training, promoting active involvement in technology learning and exchange, and boosting teachers' ability to apply technology in their teaching. Simultaneously, teachers should continuously reflect on and adjust their teaching designs to stay in line with advancements in information-based education. Through these measures, teachers can better utilize technological resources, improve teaching effectiveness, and achieve professional development.

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Empirical Study on the Integration of Rural Revitalization and High Quality Development of Vocational Education in the Chengdu Chongqing Economic Circle

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Abstract: Education serves as a foundational and pioneering force in rural revitalization, with vocational education shouldering a new historical responsibility to bolster this process and foster rural development through its high-quality enhancement. Drawing on the 2021 development data from vocational colleges in Sichuan and Chongqing, this paper empirically examines the integration of rural revitalization with the high-quality advancement of vocational education within the Chengdu-Chongqing economic circle by establishing an indicator system for both rural revitalization and the high-quality development of vocational education.

Key words: Chengdu Chongqing Economic Circle; Revitalization of rural areas; High-quality Development in Vocational Education; fusion

1. INTRODUCTION

In January 2020, China outlined the goal of fostering a "high-quality growth pole" and developing the "Chengdu-Chongqing dual-city economic circle", ushering in a new economic phase for the Chengdu-Chongqing region. Currently, both Chengdu and Chongqing are characterized as mega cities with significant rural areas, evident in three distinct zones: the central city, inner suburbs, and outer suburbs, each with markedly different levels of economic development. Thus, advancing the development of the Chengdu-Chongqing dual-city economic circle and realizing rural revitalization are crucial, with vocational education playing a key role in both efforts. It serves as a primary conduit for developing skilled professionals in

rural areas. As the Chengdu-Chongqing region confronts strategic opportunities from initiatives like the Belt and Road, Yangtze River Economic Belt, New Era Western Development, and Rural Revitalization, and with a focus on enhancing the domestic circulation economy, complemented by the mutual enhancement of domestic and international dual circulations, conducting in-depth research on the integration of vocational education with rural revitalization in the Chengdu-Chongqing dual-city economic circle can provide substantial professional support and valuable technical backing to accelerate the development of the region's economic infrastructure.

2. EMPIRICAL STUDY

To deeply explore the integration status of rural revitalization and high-quality development of vocational education in the Chengdu-Chongqing economic circle, this paper constructs a comprehensive and systematic evaluation index system to accurately measure the coupling degree between rural revitalization and vocational education, that is, the level of interaction and integration between the two in the actual development process.

2.1 Data Presentation and Handling

This study utilizes data from the 《Sichuan Statistical Yearbook》, the 《China Urban Statistical Yearbook》 and the 《Annual Report on the Quality of Higher Vocational Education》. According to the "Annual Report on the Quality of Higher Vocational Education" database, Sichuan Province reported 75 institutions in 2021, while

Chongqing reported 43. Using the constructed indicator system and sample data, 67 valid college and university samples were identified. These include 35 higher vocational colleges in Sichuan, representing 52% of the valid samples and 48% of the province's total, and 32 higher vocational colleges in Chongqing, making up 48% of the valid samples and 80% of Chongqing's total. Cities and districts including Chengdu, Deyang, Guangyuan, Luzhou, Meishan, Mianyang, Neijiang, Suining, Ya'an, Yibin, Zigong, and the central urban areas of Chongqing, along with regions such as Wanzhou, Fuling, Qijiang, Dazu, Qianjiang, Changshou, Jiangjin, Hechuan, Yongchuan, Nanchuan, Bishan, Tongliang, Tongnan, Rongchang, Liangping, Fengdu, Dianjiang, and Zhongxian, were selected to assess the high-quality development levels of rural revitalization and vocational education in the Chengdu-Chongqing region and to analyze the current state of integrated development between rural revitalization and vocational education in the Chengdu-Chongqing economic circle.

2. 2Model Estimation

The range method was employed to standardize the raw data for rural revitalization and vocational education, ensuring that all indicators are on the same quantitative scale, thereby eliminating the impact of indicators with different attributes and facilitating comparative analysis. the research group opted for the "Enhanced Efficacy Coefficient Method" for index transformation, converting the indicators of the evaluation index for vocational colleges' contributions to rural revitalization into dimensionless values within the range of [0. 4, 1].

x_{ij}^{**} The data for the j-th item in the i-th year of the two indicator systems for rural revitalization and the high-quality development of vocational education.

The normalization of positive indicators is as follows:

$$x_{ij}^{**} = 0.4 + 0.6 \times \frac{x_{ij} - \min x_{ij}}{\max x_{ij} - \min x_{ij}} \quad (1)$$

The standardization of negative indicators is as follows:

$$x_{ij}^{**} = 0.4 + 0.6 \times \frac{\max x_{ij} - x_{ij}}{\max x_{ij} - \min x_{ij}} \quad (2)$$

Calculate the entropy value of the jth indicator:

$$e_j = -\frac{1}{\ln n} \sum_{i=1}^n p_{ij} \ln p_{ij} \quad (3)$$

Calculate the information utility value of the jth indicator:

$$d_j = 1 - e_j \quad (4)$$

Calculate the weight of each indicator:

$$w_j = \frac{d_j}{\sum_{j=1}^m d_j} \quad (5)$$

Calculate the comprehensive score of each region

$$z_i = \sum_{j=1}^m w_j \times x_{ij}^{**} \quad (6)$$

2. 3Empirical Results

Table 1 High quality Development Level of Economic Vocational Education in Chengdu Chongqing Twin Cities in 2021

city	year
Deyang city	0. 7094
Suining city	0. 6957
Zigong city	0. 6912
Chongqing city	0. 6869
Luzhou city	0. 6758
Chengdu city	0. 6748
Ya'an city	0. 6654
Chengdu Chongqing mean	0. 6566
Mianyang city	0. 6499
Meishan city	0. 6282
Guangyuan city	0. 614
Yibin city	0. 6111
Neijiang city	0. 5766

This article draws on the practices of other scholars(kong jianqiang and yejian ming2023; zhang xing xing, 2023; zhu de quan and peng hong li, 2023), An indicator system has been established for rural revitalization and the high-quality development of vocational education. Table 1 reports the high-quality development level of vocational education in 11 prefecture level cities in Sichuan and the Chongqing twin city economic circle in 2021. In 2021, the score range for high-quality development of vocational education in the Chengdu Chongqing Economic Circle was 0. 5766-0. 7094, with Deyang City, Suining City, and Zigong City ranking in the top three with scores of 0. 7094, 0. 6957, and 0. 6912, respectively. the lowest score was 0. 5766 in Neijiang City. the score for high-quality development of vocational education in

Chongqing in 2021 is 0.6869, which is higher than the average level of Chengdu Chongqing. This indicates that the development of vocational education in Chongqing has achieved more significant results.

Table 2 reports the coupling degree C value between the development level of rural revitalization and the level of high-quality vocational development in the Chengdu Chongqing economic circle. the C value ranges from 0.7053 to 0.70715, with the highest being 0.7071 and the lowest being 0.7053. the coupling degree between rural revitalization and high-quality development of vocational education in Chengdu, Mianyang, and Yibin cities is 0.7071, while Zigong city has the lowest score of 0.7053. the higher the C value, the higher the coupling degree between rural revitalization and vocational education in the Chengdu Chongqing economic circle. the smaller the C value, the lower the coupling degree between rural revitalization and vocational education.

Table 2 Coupling Degree of Rural Revitalization and Vocational Education in the Chengdu Chongqing Economic Circle in 2021 (C-value)

city	year
Chengdu city	0.7071
Mianyang city	0.7071
Yibin city	0.7071
Meishan city	0.7067
Neijiang city	0.7067
Chongqing city	0.7066
Chengdu Chongqing mean	0.7064
Guangyuan city	0.7062
Ya'an city	0.7062
Suining city	0.7058
Deyang city	0.7057
Luzhou city	0.7057
Zigong city	0.7053

3. POLICY RECOMMENDATIONS

In advancing the integration of rural revitalization with high-quality vocational education development, governments and education departments at all levels must enhance the precision and effective implementation of top-level policies. This

necessitates that policymakers consider regional variations and the distinctive features of vocational education, ensuring policies are targeted and feasible. Encouraging vocational colleges to experiment with diverse service models that align with their unique features and regional industry needs is crucial for fostering high-quality vocational education. These institutions can actively adopt innovative models such as "joint training bases with enterprises", "industry-specific colleges", and "modern apprenticeship systems", enhancing talent development through enhanced integration of industry and education and stronger corporate partnerships. For instance, in developing training bases, vocational colleges can partner with agricultural firms and rural cooperatives to establish modern agricultural training facilities or technology parks; in building industry-specific colleges, they can create institutions linked to regional leading industries to facilitate collaborative industry-academic research; and in implementing modern apprenticeship systems, they can explore comprehensive training models involving joint enrollment, joint training, and joint assessment with companies to develop highly skilled technical professionals.

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Application of Virtual Reality Technology in Aesthetic Education Courses of Digital Media Technology Major

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Abstract: With the increasing importance of aesthetic education, its influence has widely penetrated into the core curriculum system of digital media technology. Based on an in-depth analysis of the advantages of virtual reality (VR) technology, this article systematically explores the innovative integration strategies of VR technology in aesthetic education courses for digital media technology majors. VR technology, with its unparalleled immersion, powerful interactivity, and rich imagination, has built an unprecedented interactive platform for aesthetic education teaching, greatly enriching teaching methods. Through the integration of this technology, aesthetic education courses not only achieve a deep integration of theory and practice, but also allow students to experience the charm of art in a virtual world, feel unprecedented realism and intuition, thus laying a solid foundation for cultivating digital media technology talents with both the spirit of the times and professional skills.

Keywords: Aesthetic Education, Virtual Reality, Deep Integration

1. THE IMPORTANCE OF AESTHETIC EDUCATION IN VOCATIONAL COLLEGES

Aesthetic education, also known as aesthetic appreciation education, aims to cultivate students' aesthetic ability and correct aesthetic views through the appreciation of artistic beauty, natural beauty, and social beauty, thereby beautifying their hearts, behaviors, languages, and postures, and improving their moral and intellectual levels. the Opinions on Comprehensively Strengthening and Improving School Physical Education in the New Era and the Opinions on Comprehensively Strengthening and Improving School Aesthetic Education in the

New Era issued by the General Office of the CPC Central Committee and the General Office of the State Council propose that aesthetic education should be incorporated into the entire process of talent cultivation in all levels and types of schools, running through all stages of school education, and cultivating socialist builders and successors who are well-rounded in morality, intelligence, physique, aesthetics, and labor.

As the cradle and key talent training base for cultivating great craftsmen, vocational colleges shoulder a mission that goes far beyond the impartation of professional skills. While cultivating future industry elites, the importance of aesthetic education is particularly prominent. Aesthetic education is not only the improvement of aesthetic ability, but also the enrichment of emotional world, the stimulation of innovative thinking and the accumulation of humanistic qualities. It guides students to discover the beauty in life, cultivates noble sentiments, promotes all-round development, and enables students to master exquisite skills while also possessing profound humanistic heritage and unique aesthetic perspective, becoming a compound talent with both ingenuity and aesthetic taste and humanistic care.

Technical advantages of integrating virtual reality technology into aesthetic education courses

Virtual reality technology is characterized by its unique immersion, high interactivity, and infinite imagination, which skillfully integrates human and technology to construct a controllable simulated world. In this world, users can not only interact with objects in the virtual environment through intuitive operation, but also obtain natural feedback from the environment in real time, achieving an unprecedented human-computer

interaction experience. This technology activates multiple senses such as vision, hearing, touch, and even kinesthesia in a comprehensive way, making the experience feel as if the user is in a wonderful place that transcends reality and time and space, greatly broadening the imagination space of human beings and profoundly enhancing our cognitive boundary and deep understanding of the world.

Virtual reality technology, with its characteristics of immersion, interactivity, and multi-sensory experience, provides new possibilities and broad space for aesthetic education. Integrating aesthetic education into virtual reality development courses can not only enhance students' artistic literacy and innovation ability, but also promote the deep integration of technology and art, and cultivate high-quality talents that meet the needs of future society.

Explore the integration and application of virtual reality technology in aesthetic education courses of digital media technology

2. UTILIZE VIRTUAL SCENES TO ENHANCE ARTISTIC IMAGINATION AND CREATIVITY

Virtual reality technology can simulate realistic artistic environments and creative scenarios, allowing students to freely explore, observe, and create in a virtual space. This contextualized display method helps cultivate students' artistic imagination and creativity.

For example, in 3D modeling courses, using virtual reality technology to display the local customs, customs and social backgrounds behind the works to be modeled allows students to perceive and understand the works from all aspects and perspectives, enhancing their interest in modeling while helping them better understand the artistic value and cultural connotation of the works. In 3D material lighting courses, students can try different materials and lighting effects for objects in a virtual reality environment, preview the creative effects, adjust and optimize the creative plan in a timely manner, thereby improving the efficiency and success rate of creation. In the game art course, students seem to have wands that travel through time and space. They are no longer limited to two-dimensional canvases or

screens, but can personally step into the three-dimensional game world they have built themselves. By wearing VR helmets, students can instantly "travel" to their designed fantasy scenes, whether it's deep underwater palaces, distant ancient civilization sites, or vast and boundless universe stars, all within reach. This immersive experience allows students to unleash their creativity and imagination like never before. They can personally stroll through the scene, feel the changes in light and shadow, the texture of materials, and even interact with virtual characters, continuously optimizing and improving their works in practice. This process not only deepens students' understanding of game art design, but also greatly inspires their enthusiasm and inspiration for game creation.

3. ENHANCE LEARNING EXPERIENCE AND EFFECT THROUGH INTERACTIVE LEARNING

The interactivity of virtual reality technology makes the learning process more vivid and interesting. Students can participate in the process of artistic creation and appreciation through interaction with the virtual environment, and receive immediate feedback and guidance. This interactive learning method not only improves students' interest and enthusiasm in learning, but also enhances learning effectiveness. For example, in art creation courses such as illustration, a virtual reality technology-based art creation space is established to provide students with convenient creative environments and tools. In this space, students can freely choose different creative materials and techniques for creative practice, and preview the creative effects. At the same time, virtual reality technology can also provide a preview function for creative schemes, helping students to adjust and optimize creative schemes in a timely manner, and improve the efficiency and success rate of creation.

Virtual reality technology also enhances artistic expression through its unique presentation and interaction mechanisms, presenting artworks in a more vivid and image-based way. It provides students with a boundless art exploration platform, allowing them to better understand and appreciate sculpture art in an immersive learning

environment, enhancing their aesthetic literacy, while also laying a solid foundation for their artistic creation path. For example, in the 3D sculpture course, when students wear VR headsets, they are instantly transported to a virtual art space full of infinite possibilities. In this space, the sculptures they create are no longer just static display pieces, but are transformed into vivid 3D entities waiting for students to explore and discover. Students can freely walk around the sculptures, examine their forms and textures from every angle, and even go deep into the internal structure of the sculptures to check if they are satisfied. This unprecedented observation experience allows students to understand sculpture art not only on the surface, but also to delve into its inner spiritual and emotional world, which helps to enhance students' interest in learning.

4. UTILIZE VIRTUAL REALITY TECHNOLOGY TO ENRICH AND IMPROVE AESTHETIC EDUCATION RESOURCES

Virtual reality technology (VR), as an outstanding representative of modern technology, is revolutionizing the face of aesthetic education in an unprecedented way. It breaks the limitations of time and space, allowing high-quality aesthetic education resources to transcend geographical and temporal boundaries, and achieve global sharing and inheritance; It broadens students' artistic horizons and enhances their aesthetic literacy; It enriches teaching forms and content, and improves teaching quality. We have reason to believe that in the future, virtual reality technology will play a more important role in the field of aesthetic education, contributing to the cultivation of more high-quality talents with innovative spirit and practical ability. Imagine when students wear VR devices in art education classes, they seem to have the ability to travel through time and space, instantly immersing themselves in the Louvre Museum in Paris and enjoying the mysterious smile of Leonardo da Vinci's Mona Lisa up close; Or stroll around the Metropolitan Museum of Art in New York, converse with sculptures from ancient Egypt, and experience the weight of history and the depth of culture. This immersive experience is incomparable to traditional classroom

teaching, as it allows students to feel as if they are in an art palace without boundaries, freely shuttling between artistic treasures from different eras and regions.

To this end, digital media technology majors can actively introduce various high-quality virtual reality technology art resource libraries and virtual art museums and other platforms. These platforms gather art treasures and excellent works from around the world, perfectly reproducing the real details of the original work in the virtual world through high-precision 3D scanning and modeling technology. Students can easily access these resources and enjoy the essence of art from all over the world anytime, anywhere by simply clicking the mouse or sliding the screen. This new learning method not only greatly enhances students' aesthetic experience, but also subtly improves their aesthetic cultivation. In the process of appreciating art works, students can not only feel the power of beauty, but also learn how to appreciate and understand beauty, thereby cultivating noble aesthetic taste and unique artistic insights. At the same time, this cross regional and cross time learning mode greatly expands students' knowledge and provides them with opportunities to encounter more diverse artistic styles and cultural backgrounds, laying a solid foundation for their comprehensive development.

In addition, the integration of virtual reality technology undoubtedly injects new vitality and creativity into aesthetic education teaching, making the richness of teaching forms and content reach unprecedented heights. Teachers are like having a magic key that can unlock various innovative teaching methods such as interactive explanations, creative practices, etc. This entertaining teaching method not only allows students to enjoy the fun of learning and the charm of art in the interweaving of virtual and reality, but also greatly improves the quality and effectiveness of teaching. For example, through interactive explanations, teachers can instantly answer students' questions and guide them to think and understand art works from different perspectives. At the same time, students can also engage in real-time communication, share their insights and feelings, and create a positive learning

atmosphere. Creative practice is the key link in transforming theoretical knowledge into practical skills. In the virtual environment, students can boldly try various artistic creation techniques and skills, without fear of failure, constantly trial and error, until they find the most suitable way of expression for themselves. This practical learning approach not only cultivates students' innovative thinking and hands-on ability, but also allows them to experience the joy and sense of achievement of success in the creative process.

5. CONCLUSION

The integration of virtual reality technology and aesthetic education courses is a highly forward-looking and practically valuable attempt, and its profound significance deserves further exploration. However, this integration path is not smooth, which requires us to conduct a comprehensive and profound reflection and reform on the existing aesthetic education curriculum system to adapt to the teaching mode changes brought by VR technology. At the same time, the high cost of purchasing VR equipment and the rapid pace of technological upgrading are also real challenges that cannot be ignored. More

importantly, aesthetic education teachers need to keep up with the pace of the times, continuously improve their professional skills, master the application of VR teaching tools, and better guide students to explore the infinite possibilities of art. In addition, actively introducing high-quality virtual reality education resources and enriching teaching content are also important guarantees for promoting the sustainable development of integration and application. Therefore, we must plan as a whole with a global vision to ensure that various measures are coordinated and promote the deep integration and innovative development of virtual reality technology and aesthetic education courses.

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How to integrate ideological and political factors into the course teaching of Financial Statement Analysis

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Abstract: At present, the reform and development of higher vocational education in China has achieved remarkable results, the curriculum system and educational concept have been constantly improved, Cultivating composite talents with rich professional theoretical knowledge, exquisite practical skills, noble professional ethics and professional quality has become the top priority of education reform.

In the teaching reform of accounting major in higher vocational colleges, how to integrate ideological and political factors into the teaching of professional courses is of great significance for improving the quality of professional talents.

This paper takes the core course "Financial Statement Analysis" of higher vocational accounting major as an example to discuss the necessity and ways of integrating ideological and political education into professional courses.

Keywords: Curriculum Ideological And Political; Integration Necessity; Integration Way

1. THE NECESSITY OF INTEGRATING IDEOLOGICAL AND POLITICAL FACTORS INTO THE COURSE OF "FINANCIAL STATEMENT ANALYSIS"

Ideological and political education is an important part of higher education, When paying attention to imparting knowledge and skills, Pay more attention to cultivating students' thoughts, emotions and sense of worth; When paying attention to their personal development, Pay more attention to the cultivation of social responsibility to meet the social needs for accounting professionals.

Ideological and political education is to focus on "moral education" in education and teaching, integrate ideological and political

factors through the whole process of teaching, and integrate the cultivation of sense of worth and outlook on life into the teaching of the curriculum. The integration of ideological and political education and professional education can make professional course education more guiding, practical and applicable, cultivate accounting professionals with feelings of family and country and dedication and integrity, and better meet the needs of the society for talents.

The course of "Financial Statement Analysis" mainly highlights the ability of higher vocational accounting major students to analyze and apply financial data, which is very practical. When learning this course, students should not only master rich theoretical knowledge and excellent practical skills, but also have the professional accomplishment, professional ethics, professional quality and working principles that financial personnel should have. Teachers integrate "Ideological and Political Construction of Courses" into the classroom education of "Financial Statement Analysis", which can not only cultivate students' comprehensive ability in the future practical work, but also complete the teaching goal of combining theory with practice required by the curriculum.

At present, in the teaching of Financial Statement Analysis, we attach importance to the teaching of theoretical knowledge, ignoring the cultivation of practical skills; Pay attention to paper scores, and ignoring the cultivation of ability and quality. Therefore, there are many problems in the traditional course teaching. Teachers simply teach, students passively learn, ignore the cultivation of students' patriotism, professional ethics, value guidance and other aspects, and ignore the cultivation of students' team consciousness and coordination ability. These are all aspects

that need to be paid attention to in the teaching reform.

In addition, in recent years, the cases of violations caused by the financial statements have often occurred. This requires that accounting practitioners should master the preparation, interpretation and analysis of financial statements, improve professional ability at the same time, cultivate love and dedication, be honest and keep your promise, equal emphasis on morality and law, adhere to the standards of professional quality. Therefore, how to integrate ideological and political factors into the course teaching of Financial Statement Analysis is a problem worth discussing.

2. THE WAY OF INTEGRATING IDEOLOGICAL AND POLITICAL FACTORS INTO THE COURSE OF "FINANCIAL STATEMENT ANALYSIS"

2.1 Integrating ideological and political factors into teaching objectives of "Financial Statements Analysis"

Analysis of financial statements, is to cultivate students through the analysis of financial information to improve the management level and management efficiency of an applied subject, mainly through the enterprise operating results, financial situation, financial credit, financial risk analysis and evaluation, make the students have the ability of reading statements, analysis and evaluation statements, application statements.

According to the "Guidelines for Ideological and Political Construction of Courses of Higher Learning" formulated by the Ministry of Education, combined with the talent training objectives of the "Analysis of Financial Statements", the integration into teaching objectives of ideological and political factors is mainly reflected in the following five aspects: 1. Social responsibility. Guide students to establish a correct outlook on life and values, love their jobs, master professional knowledge, and at the same time, have the sense of mission and social responsibility of accounting practitioners. 2. Professional ethics. Guide students to abide by professional ethics and professional norms, cultivate students' honest and trustworthy, adhere to the standards of professional quality. 3. Cultural education. Understand the

development history of financial statements analysis, learn the relevant theoretical knowledge and practice, understand the educational purpose and educational thought of this course, study the application of relevant cases, establish a sense of responsibility, cultivate patriotic feelings, so as to create value for enterprises and society in the future.

4. Team work spirit. Cultivate students' cooperative and communication ability, innovation ability and independent learning ability. Integrating the education mode of ideological and political education into professional courses can better promote students' self-development, but also be conducive to the establishment of students' sense of social responsibility, and promote the formation of students' correct values. 5. the concept of lifelong learning. Accounting professional talents, the quality is relatively high, the work should not only have rich professional theoretical knowledge and related professional skills, also need to be familiar with the relevant macro policies, laws and regulations and industry management method, so to establish the concept of lifelong learning, learning from two aspects of professional skills and vocational skills, constantly improve their comprehensive professional ability, such accounting professional life can step higher stand further.

2.2 The integration of ideological and political teachers in the course of "Financial Statement Analysis"

"Financial Statement Analysis" is a very comprehensive subject, its purpose is to train students to comprehensively apply the basic financial knowledge, analyze the financial data of enterprises, and then help enterprise stakeholders to make financial decisions, with comprehensive ability of financial analysis. "Financial Statement Analysis" talent training objectives and training program, put forward high requirements for the construction of teacher professional team. the ability of teachers determines the quality and ability of students. Only high-quality teachers can cultivate high-quality accounting professionals.

As the analysis of financial statements teachers, not only to have good solid financial knowledge, also need to be familiar with the enterprise stakeholders demand for financial

statements and concerns, can skillfully prepare enterprise financial statements, master the principle and preparation method, accurately grasp the connotation of financial statements, and can flexible use of enterprise financial ability (including single financial ability and comprehensive financial ability). Through scientific analytical methods and analytical means, analyze the three main tables of enterprises, to understand the enterprise's financial situation, operating results and cash flow.

As a teacher, we should set up the idea of combining education and teaching, set up good teacher ethics, put teaching and educating people in the first place, and do the whole process and all-round education in teaching. In teaching, we should pay attention to the construction of a strong curriculum ideological and political environment, create a platform for communication and integration with students, highlight the connotation of curriculum teaching and education, and constantly improve their own educational ability and educational level. In teaching, we dig deep into the ideological and political elements related to the course, start from ourselves, start from the classroom, start from the bit by bit, and integrate students' value guidance and ideological and moral education into the course of "Financial Statement Analysis", so as to realize the real integration of "teaching" and "education".

2.3 Integrating ideological and political factors into teaching content of "Financial Statements Analysis"

In the course design of "Financial Statement Analysis", ideological and political factors are integrated into each link through case teaching and video teaching, emphasizing the synchronization of professional learning and ideological and political education.

The Analysis of Financial Statements focuses on the basic theories and methods of financial statement analysis, and enhances the ability of students to find, analyze and solve problems through the introduction of typical practical cases in teaching.

The first part is an overview of the financial statement analysis. This part mainly tells about the concept, function, reading methods of financial statements. In combination with ideological and political elements, the

provisions of the Management Measures for Information Disclosure of Listed Companies through two warning letters of Guangdong Securities Regulatory Bureau can be learned to guide students to clarify the importance of learning financial statements. Students can be guided to clarify the harm of the fraud of financial statements to the society through the fraud of the financial statements of Lantian Shares. Guide students to abide by the bottom line of professional behavior, cultivate students to be realistic and serve the overall situation.

The second part is the financial statement analysis method. This part mainly tells about the five commonly used analysis methods of financial statement analysis, comparative analysis method, ratio analysis method, factor analysis method, structural analysis method, and trend analysis method. Combined with ideological and political elements, through the story of oil sellers scooping oil, it explains the truth of "practice makes perfect", and all skills can achieve the realm of excellence through long-term and repeated hard practice. It emphasizes the craftsman spirit of dedication, excellence, meticulousness and pursuit of excellence. With the educational concept of "knowledge teaching, skill training and value shaping", the organic integration of thinking and politics runs through the content teaching and skill training, so as to cultivate students patriotic feelings of loving the motherland and caring about current affairs, craftsman spirit of building dreams with ingenuity and moving forward with waves.

The third part is the analysis of the balance sheet, profit statement and cash flow statement. Analyze ideological and political elements according to different report items combined with different typical case.

Analyze the balance sheet. For example, when analyzing the current assets projects, the learning task is introduced through the fraud cases of Kangmei Pharmaceutical, inspiring students to think about the importance of enterprise balance sheet item analysis. When analyzing the debt project, through the trap of "campus loan", students are guided to rationally understand their consumption ability, avoid excessive consumption and speed-up consumption, and establish correct values and consumption concept.

Analyze the profit statement. Let the students establish the concept of "people's tax revenue". By letting students understand that China's tax revenue from the people, for the people, enhance students' patriotic feelings and system confidence.

Analyze the cash flow statement. Through the honest management of Baosteel, as the leader of the steel industry, to serve users with integrity, and play a decisive role in promoting the development of China from a big steel country to a big steel power. Guide the students to establish the integrity of the life, the integrity of the noble character.

The fourth part is the analysis of financial indicators. the teaching content mainly includes the use of profitability, solvency, operating ability indicators for financial statement analysis. Ideological and political factors according to the appropriate case analysis of different analysis indicators. For example, in the analysis of solvency, through Huiyuan juice debt management, students are taught to "Be cautious in managing income and expenses, ensuring that there is food to eat when hungry and clothing to wear when cold", and to guide students to establish a correct consumption concept and strive to be rational consumers.

2.4 The integration of ideological and political teaching methods in the course of "Analysis of Financial Statements"

The integration of ideological and political education in the course of "Financial Statement Analysis" adopts flexible and diverse teaching methods, and skillfully integrates ideological and political education into the whole process of teaching, which "moistens things silently". Heuristic teaching method, classroom teaching using courseware, video, animation, illustrations and other materials and media, pay attention to the political news, economic news, business management, social hot spots, focusing on the financial statements analysis of a concept or a theory, guide students to study, makes the teaching content more rich and colorful, intuitive, guide students to active participation, cultivate the students' ability to solve practical problems independently, set up the students' steadfast work style and rigorous work attitude. Project teaching method, guide students to select interested in company

instance, guide students to collect data, analysis, cultivate the students to bear hardships and stand hard work, constantly strive to become stronger, enhance the students' perceptual knowledge of financial statements analysis work content, train students to apply, improve the style of study. Case analysis method, which is the most commonly used teaching method used in the financial statement analysis course. When explaining the analysis methods, indicators and projects of financial statements, and analyzing them with the help of typical cases, the teaching effect will be better, laying a solid foundation for participating in related work in the future. Skills competition method, with the help of the network teaching platform to adopt the way of team competition, pay attention to the overall planning and team cooperation, promote the ideological and political education depth of the study and application in professional courses, can cultivate students' challenge spirit and teamwork spirit.

2.5 Integrating ideological and political into teaching evaluation of Financial Statements Analysis

The ideological and political administration of the course is mainly based on guiding students to establish correct values and cultivating students noble professional ethics and professional qualities. the teaching effect is difficult to be evaluated by the traditional examination paper method. At present, it can be mainly evaluated from the aspects of learning attitude, classroom performance and completion of homework. the integration of ideological and political elements into the curriculum evaluation needs to be further explored, and the teaching evaluation system should be further improved, so as to realize the ideological and political goal of real education. Higher education aims to "cultivate people by virtue", so " curriculum ideological and political" is a long way to go education project. This paper analyzes the importance of the integration of ideological and political elements in the course of financial statement analysis, and analyzes the ways of integrating ideological and political elements from the aspects of course objectives, course content and course evaluation, aiming to cultivate more high-quality and highly skilled accounting talents for the society.

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Factors Influencing the Willingness to Use Digital RMB and Configuration Paths

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Abstract: Digital Currency Electronic Payment (DCEP) is the digital legal tender issued by the People's Bank of China. To better promote and popularise DCEP, this paper investigates the influencing factors and configuration paths of the general public's willingness to use digital RMB.

Keywords: Digital RMB; Technical Security; Marketing Policies

1. INTRODUCTION

Currently, with the vigorous promotion of digital RMB by the central bank and active pilot implementations in various regions, coupled with substantial government subsidies in the form of red-envelope incentives, some achievements have been made. However, in terms of currency circulation, the use of digital RMB still requires broader markets and user bases. Therefore, there is a need for in-depth research on the factors influencing the willingness to use digital RMB and its configuration paths. This paper combines a literature review, expert opinions, and foundational theories discussed earlier to investigate the potential factors influencing willingness to use and configuration paths of digital RMB.

2. LEGAL REGULATIONS

In the case of emerging new forms of currency, the public pays close attention to aspects such as legal statutes, operational regulatory mechanisms, and foreign currency exchange mechanisms. the soundness of legal regulations directly influences public trust and acceptance of new currency forms. This paper prioritizes the study of legal regulations as a primary influencing factor, primarily because it is one of the key factors determining whether the public chooses to adopt this currency form [1].

Firstly, clear legal regulations can provide legal protection for the issuance and

circulation of digital currencies, ensuring that users feel safe and protected during their usage. Secondly, reasonable operational regulatory mechanisms can ensure the stable operation of the digital currency market, prevent financial risks, and maintain market order. Only with adequate legal protection and regulatory measures in these aspects can digital currencies gain wide recognition and use. Therefore, studying the impact of legal regulations on new forms of currency is not only a theoretical exploration but also a key practical approach to addressing real-world issues.

3. TECHNICAL SECURITY

From the perspective of currency circulation theory, the value of any form of currency can only be generated during the process of circulation. the core of circulation lies in transactions, and in the era of the internet and digital economy, the circulation of digital RMB has become one of the important research areas. the circulation of digital RMB not only involves convenience and efficiency but also requires in-depth research into its underlying security technologies, risk prevention technologies, and payment security technologies. These factors are crucial for the widespread adoption and stable operation of digital RMB [2].

Firstly, underlying security technologies form the foundation for ensuring the integrity and security of data during transactions of digital RMB. By employing advanced encryption algorithms and secure protocols, transaction data can be protected against tampering or theft, thereby safeguarding user privacy and fund security.

Secondly, the application of risk prevention technologies enables effective identification and response to potential risks such as network attacks and fraudulent activities, ensuring a stable and reliable transaction environment for

digital RMB. Through techniques like big data analysis and artificial intelligence, transaction anomalies can be monitored in real time, allowing for timely alerts and risk mitigation measures.

Payment security technology is equally crucial, especially in ensuring the authenticity and non-repudiation of transactions during user payments. Technologies such as multi-factor authentication and dynamic passwords enhance the security of payment processes, preventing identity theft and payment fraud. Additionally, establishing a sound payment clearing system ensures that every transaction is promptly and accurately settled, which is also a critical aspect in enhancing the circulation security of digital RMB.

4. COGNITION

In consumer behaviour theory, cognition and motivation interact with each other. the higher the level of cognition, the stronger the motivation to use. Therefore, studying the public's cognition of the issuance of digital RMB is crucial for understanding and influencing the motivation to use it. Cognition refers to consumers' knowledge, understanding, and information grasp of digital RMB, while motivation refers to the internal drive that propels consumers to take action and use digital RMB.

Firstly, when consumers have a comprehensive understanding of the advantages, usage methods, and security of digital RMB, their motivation to use it will significantly increase. Understanding the convenience, security, and efficiency of digital RMB in transactions will encourage consumers to be more willing to accept and use this new form of currency.

Secondly, the formation of motivation is closely related to cognition. When consumers reach a certain level of understanding of digital RMB, their internal motivation will gradually strengthen. For example, consumers understand that digital RMB can provide higher security, faster transaction speeds, and more promotional policies during the payment process. These factors will stimulate their motivation to use it.

5. PRODUCT

In consumer behaviour theory, the degree to

which product characteristics match consumer needs directly influences their desire to choose. In other words, the better a product's features meet consumer needs, the stronger their desire to choose it. As a new form of currency, digital RMB possesses many unique and advanced features, which are highly attractive in the current era of electronic payments [3].

Firstly, the dual offline payment feature of digital RMB solves the problem of payments in environments without internet connectivity, making transactions more convenient and reliable. This functionality is particularly useful in areas with incomplete network coverage or unstable networks, meeting the demand of consumers to conduct transactions anytime and anywhere.

Secondly, the controllable anonymity feature of digital RMB protects user privacy while ensuring transaction transparency and traceability. This design balances privacy protection with regulatory requirements, enhancing consumer trust and security in digital RMB.

Additionally, the feature of multi-terminal usage allows digital RMB to be used on various devices such as smartphones, tablets, and smartwatches, greatly enhancing flexibility and convenience in payments.

6. TRANSACTION AND USAGE

From the perspective of intrinsic psychological factors in consumer behaviour, the convenience and user experience brought by the use of digital RMB profoundly impact their internal perception and emotions, thereby influencing the frequency and sustainability of digital RMB usage. These intrinsic psychological factors include satisfaction, trust, security, etc., which are crucial factors in determining whether consumers continue to use a product [4].

Firstly, convenience in daily life is a significant factor influencing consumers' use of digital RMB. the convenient payment methods of digital RMB can greatly simplify daily transaction processes, such as shopping and bill payments, making them faster and more efficient. When consumers experience this convenience while using digital RMB, their satisfaction and acceptance of digital RMB increase, thereby boosting usage frequency.

Secondly, if consumers encounter issues while using digital RMB that are promptly resolved, and if their usage experience remains consistently positive, their dependency and loyalty towards digital RMB will correspondingly increase.

7. MARKETING POLICIES

In consumer behaviour theory, the impact of marketing stimuli is significant and multifaceted, capable of exerting direct and indirect effects, especially crucial during the initial stages of promotion and development. As an emerging payment method, the promotion and adoption of digital RMB require effective marketing strategies to enhance public willingness and motivation to use it. Government subsidies or other marketing policies play a crucial role in this process, exerting a positive influence on the willingness of the public to use digital RMB.

Firstly, government subsidy policies can directly reduce the costs for consumers using digital RMB, thereby increasing its economic benefits. For example, the government can encourage the public to use digital RMB for consumption by providing cash rebates or consumer coupons. This direct economic incentive can quickly boost the usage rate of digital RMB, making more consumers willing to try and adopt this new payment method.

Secondly, government marketing policies extend beyond economic subsidies to include publicity, education, and user training. Through extensive promotional activities, raising public awareness and understanding of digital RMB can enhance willingness to use it. Additionally, user training and experiential activities can help consumers become familiar with the usage of digital RMB, address any issues they may encounter during initial use, and thereby improve its convenience and comfort of use.

Through effective policy incentives and market promotion, widespread adoption of digital RMB can be achieved, promoting its stable development in the digital economy era. By comprehensively considering various aspects such as legal regulations, technical security, product design, transaction and usage, and marketing policies, the widespread adoption and application of Digital Currency Electronic Payment (DCEP) can be better

promoted, thus achieving its extensive use in the payment sector.

Firstly, ensuring that Digital Currency Electronic Payment (DCEP) complies with national laws and regulations, including anti-money laundering, anti-terrorist financing, and data protection requirements, is the foundation for its promotion and application.

A comprehensive regulatory framework can provide the necessary policy guidance and protection, enhancing public trust in DCEP.

Secondly, technical security is key to the successful application of Digital Currency Electronic Payment (DCEP). By adopting advanced cybersecurity measures and encryption technologies, hacking and data breaches can be effectively prevented, ensuring the security of users' funds and information. Efficient and reliable technical safeguards will further enhance users' confidence and willingness to use DCEP.

In terms of product design, user experience is crucial. Developing intuitive and user-friendly interfaces and processes can attract more users to try and become accustomed to using Digital Currency Electronic Payment (DCEP). Additionally, offering diverse payment functions, such as online payments, offline payments, and cross-border payments, meets the needs of various scenarios, further enhancing the practicality and appeal of DCEP. The convenience of transactions and usage is also an important factor in promoting the widespread adoption of Digital Currency Electronic Payment (DCEP). By simplifying payment processes and reducing transaction costs, users can use DCEP conveniently and quickly in various scenarios. This not only enhances the user experience but also makes DCEP more competitive compared to traditional payment methods.

Lastly, effective marketing policies are equally important for promoting the adoption of Digital Currency Electronic Payment (DCEP). Through various promotional activities, public awareness and acceptance of DCEP can be increased. Additionally, offering incentives such as discounts and reward programs can attract more users and merchants to participate. Considering and implementing these strategies comprehensively will help achieve the widespread use and adoption of DCEP in the

payment sector.

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Architecture and Application Research of Data Synchronization Platform

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Abstract: Data synchronization platforms play an indispensable role in information systems, especially when multiple systems are independently deployed in enterprises, the consistency and integrity of data are crucial. This paper reviews synchronization technologies such as real-time synchronization, batch synchronization and hybrid synchronization. Its application scenarios are clarified through comparative analysis.

Keywords: Data Synchronization; Real-Time Synchronization; Batch Synchronization; Hybrid Synchronization

1. INTRODUCTION

In the modern enterprise environment, data is often distributed among different systems and databases. In order to ensure the consistency and integrity of data, an effective data synchronization mechanism is needed. Data synchronization involves not only the transmission of data, but also the transformation, verification and update of data. From the perspective of enterprises, the establishment of a data synchronization platform is of great significance, mainly reflected in the following aspects:

Data consistency: Ensure data consistency across all systems and applications, reducing errors and business decisions caused by data inconsistencies. This is essential to maintain the accuracy and reliability of the data.

Business Continuity: Improve business continuity and operational efficiency by supporting business processes across departments or locations through real-time or regular data synchronization to avoid business disruptions caused by data lag or loss.

Decision support: Provide timely and accurate data support to help management make more informed decisions. Data synchronization platforms can integrate data from different sources to provide a comprehensive view and

analysis of the business.

User experience: Improve user experience, especially in multi-channel and multi-platform environments, by synchronizing user data to ensure that users see the same information across devices, improve app usability and satisfaction.

Efficient collaboration: Promote collaboration across departments or teams, ensuring that all involved have access to and use the same version of data, reducing silos of information, and improving team efficiency.

Data Recovery and Backup: Provides data backup and recovery functions to protect data from the risk of loss or damage. Data synchronization platforms often include redundancy and backup mechanisms to enhance data security and reliability.

Compliance: Help organizations comply with data compliance requirements and industry standards, ensure data management meets regulatory and policy requirements, and reduce legal and compliance risks.

By establishing a data synchronization platform, enterprises can improve the quality and efficiency of data management, support rapid business development and innovation, and gain an advantage over the competition. This paper aims to explore the architecture and technology of data synchronization platform to help enterprises realize efficient data synchronization in complex system environment.

2. DATA SYNCHRONIZATION TECHNOLOGY

2.1 Real-Time Synchronization

Real-time synchronization means that when changes occur in the data source, these changes are immediately synchronized to the target system to ensure immediate consistency of data. Allowing data to be updated almost simultaneously between the source system and the target system is suitable for application

scenarios that require extremely high data consistency, such as online transaction processing, real-time monitoring systems, etc. Implementation method:

2.1.1 Event-based synchronization: Use an event triggering mechanism to immediately notify and synchronize data to other systems when changes occur. Common in message queuing systems such as Apache Kafka.

2.1.2 Data stream processing: Data streams are processed and synchronized in real time through a stream processing engine, such as Apache Flink or Apache Storm.

2.1.3 Database replication: the built-in real-time replication function in the database system ensures real-time consistency between the master database and the slave database, such as MySQL's master-slave replication.

2.1.4 API integration: Data synchronization is achieved through real-time API calls, which is suitable for scenarios that require instant data exchange with external systems.

2.1.5 Data gateway: the use of specialized data synchronization gateway, real-time transmission and conversion of data to the target system, such as IBM DataPower

2.2 Batch Synchronization

Batch synchronization is a way of synchronizing data in batches at specific time intervals. This method is suitable for scenarios where the frequency of data updates is low or a certain delay can be tolerated. Implementation is simple and low-cost, but the timeliness is poor.

Implementation method:

2.2.1 Regular batch processing: Perform data synchronization tasks within preset time intervals, such as data updates in the early morning every day. Commonly used for database backup and data migration.

2.2.2 Incremental loading: Only synchronize data that has changed since the last synchronization, reducing processing capacity. For example, use timestamps or version numbers to track data changes.

2.2.3 ETL (Extract, Transform, Load): Extract data from the data source, perform necessary transformations, and then load it into the target system in batches. Such as Kettle and RestCloud.

2.2.4 Data snapshot: Create a full snapshot of the data regularly and synchronize it to the target system, suitable for scenarios that

require regular backup and recovery.

2.2.5 File transfer: Data synchronization is carried out through batch file transfer technology (such as FTP or SFTP) to transfer data files from one system to another

2.3 Hybrid Synchronization

Hybrid synchronization combines the advantages of real-time synchronization and batch synchronization. It can reduce system load while ensuring real-time performance. Hybrid synchronization is suitable for scenarios where data consistency and performance need to be balanced across multiple systems.

Implementation method:

2.3.1 Real-time+batch processing mode:

Real-time synchronization: Handle real-time updates of important data to ensure instant synchronization of key data in the system. For example, transaction data in the order processing system is synchronized in real time. Batch synchronization: Handle regular updates of non-critical data or large data volumes to reduce system burden. For example, user activity logs are processed in batches every day.

2.3.2 Combination of incremental synchronization and full synchronization:

Incremental synchronization: Synchronizes data that has changed since the last synchronization in real time or near real time to ensure that some data updates are timely.

Full synchronization: Full data synchronization is performed regularly to ensure complete data consistency between systems. For example, a full data refresh is performed once a week.

2.3.3 Hierarchical synchronization:

High frequency data: Synchronize business-critical data (such as transaction records) in real time, ensuring the immediacy of high frequency data.

Low-frequency data: Batch synchronizes less volatile or less important data (such as user profiles or history), reducing system burden.

2.3.4 Combination of asynchronous processing and synchronous update:

Asynchronous processing: the data is processed asynchronously, and the data update is pushed to the target system through message queue and other mechanisms, which reduces the processing delay but the real-time burden.

Synchronous update: Synchronize updates

when necessary to ensure consistency of key data.

2.3.5 Distributed data synchronization:

primary-secondary replication: the primary database is updated in real time and the secondary database is periodically synchronized in batches to maintain data consistency.

Multi-active synchronization: Multiple active nodes use real-time synchronization to maintain data consistency and batch synchronization to supplement data consistency.

2.3.6 Combination of stream processing and batch processing:

Stream processing: Process and analyze data streams in real time for immediate response to critical data.

Batch processing: Periodically analyze and process large-scale data to supplement the shortcomings of stream processing

3. DATA SYNCHRONIZATION PLATFORM ARCHITECTURE

3.1 Architectural Overview

Architectural components of the data synchronization platform:

3.1.1 Data source interface

Function: Connect and access different data sources (such as databases, file systems, APIs, MQ, etc.).

Technology: Database connector (JDBC/ODBC), API integration (REST, SOAP), File transfer protocol (FTP, SFTP), MQ connection.

3.1.2 Synchronization engine

Function: Handle data extraction, transformation, and loading (ETL), Responsible for data synchronization logic, including data verification, cleaning and conversion, Technology: Data stream processing engine (Apache Flink, Apache Storm), Batch processing tools (Apache Spark, Hadoop), ETL tools (Kettle, RestCloud).

3.1.3 Data target interface

Function: Load the synchronized data into the target system, Handle data storage and update operations for the target system.

Technology: Database loading tools (such as SQL Loader), API interface is used for data push, Data warehouse loading mechanism.

3.1.4 Monitoring and management module

Function: Monitors the status and

performance of data synchronization tasks in real time,

handles errors and exceptions, Provides the log and report functions for data synchronization.

Technology: Monitoring tools (Prometheus, Grafana), Log Management System (ELK), Alarm System (PagerDuty, OpsGenie).

Data conversion and mapping Function: Perform data format conversion and field mapping. Ensure consistency and compatibility of data across different systems.

Technology: Data conversion tools (Apache Nifi, Talend). Data mapping technology (XSLT, JSON Schema).

Exception handling and retry mechanism

Function: Handle errors and failures in data synchronization. Provides automatic retry and recovery mechanisms to ensure the integrity of data synchronization. Technology: Error handling framework (Retry libraries). Transaction management and compensation mechanism.

Security and authority management Function:

Ensure data security and privacy protection during synchronization. Manage user rights and access controls. Technology: Encryption technology (TLS/SSL). Authentication and authorization mechanisms (OAuth, JWT).

3.2 Architecture design

The design of a data synchronization platform needs to consider the following factors:

3.2.1 Data consistency

Ensure consistency: Real-time and batch synchronization should ensure data consistency between source and target systems. Adopt data validation and conflict resolution mechanisms.

3.2.2 Performance and scalability

Processing capability: the platform shall be able to handle highly concurrent synchronous tasks and support large-scale data transmission and processing.

Scalability: the architecture needs to support horizontal scaling to handle data volume growth and system scaling requirements.

3.2.3 Reliability and fault tolerance

Fault tolerance mechanism: Redundancy and backup mechanisms are designed to ensure rapid data synchronization when the system fails.

Retry mechanism: Implements automatic retry and recovery to handle temporary failures or

network issues.

3.2.4 Delay and real-time

Real-time requirements: Select an appropriate synchronization strategy (real-time or batch) based on business requirements to meet the timeliness of data update.

Optimize latency: Reduce data synchronization latency using optimization techniques such as data compression and stream processing.

3.2.5 Monitoring and management

Real-time monitoring: Monitors data synchronization tasks in real time, and tracks the synchronization status and performance indicators.

Fault reporting: Establish effective log recording and alarm mechanisms to detect and handle exceptions in a timely manner.

3.2.6 Compatibility and integration System compatibility: Ensure that the platform is compatible with different data sources and target systems, and supports multiple data formats and protocols. Interface integration: Provides flexible interfaces and adapters for integration with other systems or services.

3.2.7 Monitoring and management Real-time monitoring: Real-time monitoring of data synchronization tasks and tracking synchronization status and performance indicators. Fault reporting: Establish an effective logging and alarm mechanism to detect and handle abnormal situations in a timely manner.

3.2.8 Data quality Data cleaning: Implement a data cleaning and verification process to ensure the accuracy and integrity of synchronized data. Data conversion: Handle data format conversion and mapping to ensure that the target system can correctly understand and use the data.

3.2.9 Cost and resource management Resource optimization: Optimize system resource use to control costs and improve efficiency. Budget control: Evaluate hardware, software and maintenance costs and develop a reasonable budget.

This paper establishes a data synchronization platform by introducing data synchronization technologies such as real-time data synchronization, batch synchronization, hybrid synchronization, data source interface, synchronization engine, data target interface, data transformation and mapping, data

consistency, data reliability and fault tolerance. It aims to solve the data inconsistency in the distributed system or multi-platform environment in the enterprise production process, data redundancy and conflict in the process of data synchronization, delay caused by network delay, bandwidth limitation or low processing efficiency, as well as the possible insufficient scalability of the system in the process of business growth and data volume increase, and security threats faced in the process of data synchronization. Such as data leakage, tampering and other problems. the data synchronization platform solves several key problems and brings significant value. By providing accurate, consistent and timely data support, you can help enterprise management make more informed decisions to drive business development and optimize strategic planning. Optimize business processes, reduce operational interruptions caused by data inconsistencies or delays, improve overall business efficiency and response speed, enhance enterprise operational capabilities, ensure customer data consistency across different channels and devices, provide a coherent user experience, enhance customer satisfaction and loyalty, and reduce the risk of business interruptions caused by data inconsistencies or system failures. Ensure business continuity and stability in all environments. Promote data sharing and collaboration between different departments and teams, break down information silos, and improve team cooperation efficiency and overall productivity. Through data encryption and compliance management measures, protect data security, meet legal and regulatory requirements, reduce compliance risks, and enhance the trust and credibility of enterprises. Support the horizontal and vertical expansion of the system, adapt to business growth and technological changes, and maintain the efficient operation and service quality of the system. Through standardized data formats and interfaces, the data exchange and integration between multiple systems are simplified, and the interoperability and integration efficiency of the system are improved. It has laid a solid foundation for the long-term development of the enterprise.

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Research on the Communication Strategy of Positive Energy Short Video

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Abstract: With the rapid development of mobile Internet technology and the popularity of smartphones, short videos have become one of the hottest and most influential ways of information dissemination nowadays. With its positive, healthy and optimistic content, positive energy short videos have spread rapidly on social media platforms, and have had a far-reaching impact on the public's ideology and behaviour. the purpose of this paper is to explore the communication strategy of positive energy short videos, analyse their characteristics and advantages in content creation, platform operation, user interaction, etc., and put forward corresponding optimization suggestions. Through in-depth research, this paper aims to provide valuable references for short video platforms and creators, promote the wide dissemination of positive energy content, and build a positive network ecology.

Keywords: Positive Energy Short Video; Communication Strategy; Content Creation; Platform Operation; User Interaction

1. INTRODUCTION

In today's digital era, short videos have rapidly become an important channel for public entertainment and information dissemination with their unique charm. Positive energy short videos, as a clear stream among them, not only convey positive information, but also have a positive impact on the social atmosphere. In this paper, we will explore the communication strategy of positive energy short video from multiple angles, with a view to providing valuable reference for its development in the future.

2. CONTENT PLANNING: SELECTING RESONANT TOPICS

2.1 Selection of subject matter

In order to produce a successful positive energy short video, the first thing that must be done is to plan the content. Creators need to

carefully select those topics that can cause strong resonance with the audience, such as inspirational stories, touching moments and events full of positive social energy. These themes are successful because they can touch people's deepest emotions and make them feel a sense of warmth and strength in just a few minutes of viewing time. This emotional resonance is the key to the rapid spread of positive energy short videos.

2.2 Real emotion

In the process of content creation, the injection of real emotion is crucial. the audience is often more easily moved by those real emotions, therefore, the creators should focus on digging deeper and truly show the scenes and characters in life. Through the delicate and subtle expression, the audience will have a strong resonance in the process of watching, so as to further enhance the communication effect of the short video. Only when the audience feels the authenticity of the content and the sincerity of the emotions, they will be willing to share and recommend these videos, making the spread of positive energy more widely.

3. CREATIVE EXPRESSION: KEEPING CLOSE TO THE PULSE OF THE TIMES AND THE EMOTIONS OF THE AUDIENCE

3.1 Creative innovation: in the field of short video communication, creativity is its core competitiveness. Creators should relentlessly pursue innovation and present positive energy content to the audience with unique and novel perspectives and expressions. For example, traditional culture and modern elements can be cleverly integrated, or a humorous way to convey profound truths, so as to attract the attention and love of more viewers. In this way, short videos can not only convey valuable information, but also leave a deep impression in the hearts of viewers.

3.2 Close to the audience: In the process of creative expression, creators need to understand the needs and preferences of the audience to ensure that the content of the short video can be close to the audience's life and emotions. By paying close attention to social hotspots, paying attention to the pain points of the audience, and giving positive responses and solutions in short videos, thus enhancing the audience's sense of identity and sense of belonging. Only when the short video content is closely linked to the audience's life, can we really touch their hearts and establish a deep emotional bond.

4. VISUAL EFFECT: CREATE A PROFESSIONAL, SIMPLE AND ATMOSPHERIC VISUAL EXPERIENCE

4.1 Improvement of screen quality

In the production process of short videos, visual effects play a crucial role in the communication effect. Creators should attach great importance to the improvement of picture quality, and create a professional, simple and atmospheric visual experience by adopting high-definition filming equipment and technology, as well as carrying out fine post-production editing work. In addition, the creators should also pay attention to the reasonableness of the colour scheme, as well as the clever handling of the light and shadow effects, which can effectively enhance the infectious force and attraction of the picture, so that the audience can be more immersed in the viewing process.

4.2 Music and picture perfect coordination

As one of the indispensable elements in the short video, the selection and matching of music play an important role in the overall visual effect and emotional communication. Creators should carefully select the music that matches the theme and emotional tone of the short video. Through the melody and rhythm of the music to create a suitable atmosphere, to further enhance the strength of emotional expression, so that the audience can be more engaged in the process of watching and moving. the perfect match between music and picture can make the overall effect of the short video more vivid and touching.

5. COMMUNICATION STRATEGY: MULTI-CHANNEL, MULTI-PLATFORM,

MULTI-DIMENSIONAL COMMUNICATION

5.1 Multi-channel dissemination

In order to further expand the scope of positive energy short videos, creators should make full use of various communication channels to achieve wider coverage. In addition to traditional social media platforms such as Weibo and WeChat, creators can also consider cooperating with traditional media such as TV stations and radio stations to disseminate content through TV shows and radio programmes. In addition, other communication methods such as offline activities and outdoor advertisements can also be used to enhance the exposure and influence of short videos through multi-channel communication, so that they can reach more viewers with different backgrounds and interests.

5.2 Multi-platform promotion

Different platforms have different user groups and characteristics, and creators should carry out targeted promotion according to the characteristics of each platform. For example, publish creative and interesting short video content suitable for young users on short video platforms such as Jittery Voice and Shutterbug, and publish in-depth and valuable short video content suitable for a wider user group on social media platforms such as WeChat and Weibo. In addition, we can also consider publishing high-quality video content on professional video platforms such as B Station and Youku to meet the needs of different user groups. Through multi-platform promotion to cover more potential audiences, to achieve the maximum dissemination effect of short video content.

5.3 Interactive feedback

Interactive feedback is an indispensable part of short video communication. Creators should actively interact with the audience to understand their feedback and opinions, and improve and optimise according to the feedback results. For example, they can communicate directly with viewers by replying to comments and private messages to understand their needs and suggestions. At the same time, audience participation and sense of belonging can be enhanced by setting up topic discussions and organising online activities. For example, online quizzes, polls and

challenges related to short video content can be organised on a regular basis to encourage viewers to actively participate and share their views and creativity. In addition, data analytics tools can be used to analyse viewers' viewing behaviours and preferences, so that content strategies can be adjusted more accurately and the communication effect of short videos can be improved. Through continuous interactive feedback and optimisation, creators can better meet the needs of the audience and establish a good audience relationship, thus achieving the long-term dissemination and influence of short-video content.

6. VALUE LEADERSHIP: UPHOLDING CORRECT VALUES AND CONVEYING A POSITIVE ATTITUDE TOWARDS LIFE

6.1 Promote socialist core values

Positive energy short videos should adhere to the promotion of socialist core values and convey positive and healthy attitudes and values. It guides viewers to establish correct values and outlook on life by showing outstanding people and deeds, and promoting social and professional ethics. These short videos should become a vehicle for spreading positive energy, and through vivid images and touching stories, the viewers will be infected and inspired in a subtle way, so as to establish the recognition and belief in socialist core values deep in their hearts.

6.2 Inspire thinking

In addition to conveying positive energy, creators can also use short videos to inspire viewers to think. For example, they can conduct in-depth analyses and discussions on hot issues in society, or guide viewers to think about life, emotions, interpersonal relationships and other issues by telling true stories. By inspiring thinking, it can enhance the audience's sense of identity and belonging, and promote the harmonious development of society. Creators should pay attention to the depth and connotation of short videos, not only staying on the surface of entertainment and funny, but also digging deeper social meaning and value orientation, so that viewers can get more thoughts and inspiration in the process of watching.

7. SUMMARY AND PROSPECT

In today's society, the study of communication strategy of positive energy short videos is particularly important and complex. Through careful planning of content, innovative and creative ways of expression, creating professional visual effects, formulating multi-channel communication strategies and insisting on correct value leadership and other efforts, we can significantly improve the communication effect and social influence of positive energy short videos. In the future, with the continuous advancement of digital technology and the emergence of innovative applications, the communication strategy of positive energy short videos will also continue to develop and improve. We look forward to and encourage more creators to actively participate in the creation and dissemination of positive energy short videos, and jointly contribute to the harmonious development of society. In this way, we can not only enrich people's spiritual and cultural life, but also further promote the positive energy of society, and add bricks and mortar to build a better social environment.

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Investigation and Development Countermeasure of Leisure Sports in Taishan District of Tai'an City

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Abstract: Along with the social development of our country, the economic situation is getting better and better, people's lives richer, more and more leisure time, for the development of leisure sports provides a good social condition. This paper focuses on the research of the current situation of leisure sports development in Taishan District of Tai'an City, investigates the basic forms of leisure sports development, finds the basic problems existing in the development process, and puts forward corresponding development countermeasures in view of the existing problems, in order to provide reference for future development.

Key words: Tai'an City; Taishan District; Sports leisure; Current situation; Counterplan

1. INTRODUCTION

The development of leisure sports is the product of social development to a certain stage, which is essentially different from competitive sports and school sports. It is carried out in a relaxed and pleasant way, emphasizing the self-regulation and relaxation of body and mind. It is the product of a new stage of social and sports development. In the process of leisure sports, people can improve image and realize the self, improve sports ability, lay a good foundation for lifelong physical education. the development of leisure sports has obvious regional characteristics and characteristics. the research area of this paper is Taishan District, Tai'an City, which is located at the foot of Mount Tai, the exclusive of the five Mountains. the present situation and existing problems of the development of leisure sports are studied in order to provide good suggestions and countermeasures for future development.

2. RESEARCH OBJECT AND METHOD

2.1 Research object

Taking the current situation of leisure sports development in Taishan District of Tai'an city as the research object, the community communities of Huayuan Community, Dai Dong Street community, Shengping Street community, Lijing community, Donghu community, Mosque community, Sanlian community, Qingshan Street community, Keshan community, Leyuan Community community, Nanhu community community and other communities in different areas were selected as the research objects. A questionnaire survey was conducted randomly each community residents.

2.2 Research Methods

2.2.1 Literature method

Through the Internet, CNKI and other network media, I consulted the latest papers and journals on leisure sports research, and analyzed and summarized the relevant literature and materials, and had a better understanding of the latest achievements on leisure sports research in China, which laid a good theoretical foundation for the research of this paper. At the same time, it also studies the geographical environment characteristics of Taishan District of Tai'an City and the income of residents, which lays a realistic foundation for the study of this paper.

2.2.2 Questionnaire survey method

This paper studies the present situation of leisure sports development in Taishan District of Tai'an City, specially designs the relevant questionnaire, and tests the validity and reliability of the questionnaire, which meets the basic requirements of the questionnaire. 400 residents in the above communities were

randomly selected to send questionnaires. 389 questionnaires were recovered, with a recovery rate of 97.3%, and 380 valid questionnaires, with an effective rate of 95%, which met the relevant provisions of the questionnaire.

2.2.3 Interview and investigation method

To the residential community to talk with residents, but also to the place of leisure sports field visits, so as to obtain first-hand information and information.

3. MATHEMATICAL STATISTICS

Results of data analysis and finishing, and using Excell and related software system analysis.

4. RESEARCH RESULTS AND ANALYSIS

4.1 Age analysis of residents participating in leisure sports

Table 1: Age distribution statistics(N=380)

Age (years)	Number of people (persons)	Proportion (%)
<20	43	11.3%
21~30	37	9.7%
31~40	47	12.4%
41~50	65	17.1%
51~60	87	22.9%
>60	101	26.6%
total	380	100

From table 1 shows: leisure sports participation of residents, the elderly over the age of 60(26.6%), 51 to 60 years old (22.9%), 41 to 50 years old (17.1%), 31-40(12.4%), 21-30 years old (9.7%), under the age of 20, 11.3%. It can be seen that over 51 years old is the main force of leisure sports participation. the reason why, with the increase of age, physical skills appear to decline, and more and more attention is paid to physical exercise; Moreover, the elderly over the age of 60 have more leisure time after retirement, and physical exercise has become the main form of leisure and entertainment. 31-50 years old is in a critical period of work, work pressure and life pressure, relatively little leisure time. 21-30 years old this age group, there are school, in the school to participate in more sports activities. the main is that college students less than 20, mainly is to participate

in school sports activities.

4.2 Analysis of exercise frequency and time of residents participating in leisure sports

Table 2: to exercise the number TAB(N=380)

Times/week	Number of people (persons)	Proportion (%)
0	38	10.0%
1 time	40	10.5%
2 time	91	23.9%
3 time	101	26.6%
>3 time	110	28.9%
total	380	100.0

As can be seen from Table 2, 10% of the surveyed people do not exercise every week, 10.5% of them exercise once, 23.9% of them exercise twice, 26.6% of them exercise three times, and 28.9% of them exercise more than three times. Nearly 50% of the total population exercised more than three times a week, meaning that half of the surveyed population met the standard of exercising more than three times a week for the physical education population.

Known from the analysis of the questionnaire, the investigation of the population of less than 1 hour exercise every time accounted for 28.7%, 50% of the 1 hour to 2 hours, 2 hours to 3 hours of 12.9%, more than 3 hours of accounted for 8.4%; Visible, survey the crowd, exercise time within 2 hours of close to 80% of the population, the majority of the people.

4.3 Leisure sports Sports projects and activity places that participate in residents' exercise

According to the questionnaire analysis, 18.7% of respondents chose Taijiquan, 28.4% mountaineering, 20.8% swimming, 20.3% square dancing, 6.8% running and 5% other events. It can be seen that mountaineering, swimming and square dancing are the first three items selected, which have a greater relationship with the geographical location of Taishan area. At the foot of Taishan, there are rich water resources in summer, so more people choose mountaineering and swimming. It can be seen from the questionnaire analysis that in the choice of exercise places, 39.5% choose park square as exercise places, 23.4% of community activity places, 20.8% of sports

centers, 11.1% of sports venues and 5.3% of other places. Proximity, free and convenient are the main reasons for the choice of exercise places.

4.4 Forms of recreational sports participation in residents' exercise

From the questionnaire analysis, we can see that in the choice of exercise organization form. 28.4% participated in group exercise, 25.3% exercised with friends, 22.9% exercised with family members, 17.1% exercised alone, and 6.3% were not sure. It can be seen that in the choice of participation forms, cluster exercise is the main form of exercise.

5. CONCLUSIONS AND SUGGESTIONS

5.1 Conclusion

5.1.1 recreational sports participation of residents, over 50 residents is the main recreational sports participation, occupy 49.5% of the surveyed people, nearly half. the relatively small proportion of young people is directly related to their age, the nature of their participation in work and the amount of leisure time.

5.1.2 survey of the population of close to 50% of the people to exercise three times a week or more, on the exercise time, exercise time in 1 to 2 hours (50%), the comparison with the definition of sports population in our country.

5.1.3 In terms of the choice of exercise items and exercise places, it fully conforms to the geographical environment characteristics of Taishan District, and relatively many people choose hiking and swimming; Places are also mainly public places such as parks.

5.1.4 In terms of the choice of exercise organization, 80% of the surveyed residents chose the form of exercise with partners, including group, with friends and family.

5.2 Suggestions

5.2.1 In view of the problem that there are

fewer young people among the people who participate in exercise, it is necessary to publicize and launch more campaigns to enhance the awareness of young people to exercise, and devote half an hour to an hour a day to physical activities.

5.2.2 on the choice of exercise time, should follow the basic laws of physical exercise, combined with their own physical condition, establishing reasonable physical exercise time, meets the requirement of scientific exercise.

5.2.3 The choice of physical exercise places should take into account the geographical environment of the place, their own physical conditions, their own economic status, and make a reasonable choice. In the choice of exercise forms, it is still encouraged to choose with partners, which can discuss with each other and prevent accidents from happening.

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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 unclear 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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The Representation, Origin and Influence Of "Circle " Of Youth Network

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Abstract: In the Internet era, under the multiple support of technology, capital and culture, young people gather on the network platform to seek the satisfaction of belonging, security and self-realization, and the phenomenon of network "circle" arises at the historic moment. the "circle" of the network can meet the individual needs and self-identity of young people to a certain extent. However, under the influence of algorithm technology, the information obtained by young people from the "circle" is "customized" oriented by demand and interest. Be alert to the risks of information cocoon, group polarization, isolation from reality and communication barriers caused by "stratification".

Key words: Circle layer; Young people; Ideological and political education

1. INTRODUCTION

The white paper of Chinese Youth in the New Era states: " the Internet has become an indispensable lifestyle, growth space and 'sixth sense' for contemporary teenagers. Chinese youth have increasingly become the main information producers, service consumers and technology promoters in cyberspace, which have exerted a profound influence on the trend of Internet development. "As a generation growing up in the Internet era, young people are highly dependent on the Internet for information acquisition, thought exchange and social entertainment. the Internet has virtually shaped and influenced their ideology, moral concepts, behavior habits and lifestyle. Under the catalysis of network information technology, the youth group and network culture are integrated and inseparable, and the phenomenon of network "circle layer" emerges at the historic moment. Therefore, it is an important topic to be solved in the new era to clarify the concept and classification of the network, to study the

influence of the network "circle" on the youth, and to set up the risk of ideological and political education in the new era.

2. THE CONCEPT AND CLASSIFICATION OF NETWORK "CIRCLE LAYER"

Network "circle layer" is a special cultural symbol popular in the youth group with the network as the carrier. Young people with common interests, values and emotional needs seek a sense of belonging and identity in cyberspace, form links through communication and interaction, and converge into hierarchical cultural circle groups. Specifically, the network "circle" refers to the group in the Internet age, the youth in the network as a platform, with interest, emotion, demand as the link for communication and contact, through independent choice and aggregation of mutual identity hierarchy of network group, with closed, privacy, filtering, niche.

As for the classification of circles, the white paper "Marketing Methodology of Youth circles 2021" published by the youth marketing consulting agency makes a very detailed division. the report defines the circle with individual cultural identity as the core, and summarizes 8 categories, 32 sub-categories and about 169 cultural circles covering the pan-secondary dimension, star-chasing, fan culture, games, sports, music, art, cultural lifestyle and identity. China Business Data Center (CBNData) was jointly released by Tmall and Huya. the investigation and analysis point out that the representatives of the five circles in China's Z era are: e-sports circle, second yuan circle, national wind circle, model play hand circle, and hardcore technology circle. It can be seen that commercial institutions have realized the economic value behind the phenomenon of

youth stratification, and take this as the entry point to expand the consumer market of youth groups. the ideological and political education work should capture timely and accurately this phenomenon, and deeply study the influence of stratification on the thought and behavior of the youth, so as to provide guidance for the effective development of the network ideological and political work, and grasp the initiative of the network ideological and political work.

3. THE GENERATION MECHANISM OF THE NETWORK "CIRCLE LAYER" PHENOMENON

The phenomenon of circle stratification has a long history, and in the past, it was mainly influenced by blood, regional and economic factors. With the development of Internet technology, the "circle circle" of youth network is gradually derived and developed from the interaction of youth groups and the network. Internet and the rapid development of the recommendation technology, for the generation of network "circle" provides technical conditions and interaction field, by providing personalized network information push and network social environment, provides a platform for communication for similar groups, makes a common interests, personality needs and cognitive mode of people to converge into the network community.

The formation of the phenomenon of network "circle layer" is also inseparable from the promotion of commercial capital and media. the profit-driven nature of capital urgently needs to dig deep and gather the people with the same interest and purchase needs. Fan circle, e-sports circle and other hot behind the operation of commercial capital. In addition, the interweaving of multiple culture is an essential condition and foundation for the phenomenon of "stratification". Behind the formation of Hanfu circle, opera circle and Chinese cartoon circle, we can see the explosion of traditional culture; the emergence of KPOP circle, JK circle and baby circle is the product of foreign cultural input.

Circle culture is the deep connection of circle participants relying on the cultural carrier, and in essence is the pursuit of identity by young people. Technology empowerment, interest-

driven and cultural collision are the external factors and conditions for the formation of network "stratification". What really determines the formation and development of "stratification" is the need of young people to seek a sense of belonging and identity. No one is an island. In the online world, young people constantly find circles and positions that fit their own interests, emotional needs and self-development needs, and create and define their own circle culture.

4. THE INFLUENCE OF THE NETWORK "CIRCLE LAYER" ON THE YOUTH

Everything has two sides, so we need to look at the influence of network "circle" on youth dialectically. the positive influence of "stratification" on youth can be analyzed from the perspective of demand level theory. According to Maslow's hierarchy of needs theory, "stratification" to some extent helps young people to meet the needs of safety, belonging and love, respect, cognition, aesthetics and self-realization. Specifically, "circle circle" promotes knowledge circulation and sharing, makes knowledge acquisition and communication more convenient, facilitates the study and life of young people; enhances interpersonal interaction, expands communication scope, meets personalized needs, promotes individual development; and makes young people gain sense of identity and belonging in self-expression and collective consensus.

The influence of "stratification" on the negative youth can be analyzed from the characteristics of "stratification" itself. the closure of "circle layer" is easy to make young people have circle layer dependence, Tend to access information and social entertainment within the circle, Accept only the people of the same circle, Lead to circle layer barriers and "information cocoon room"; the privacy of "circle layer" is convenient for young people to hide their identity, To indulge in online social networking and entertainment, To weaken the social interaction and judgment skills, Causing physical and mental anxiety and behavioral blindness, Personality alienation and group polarization may occur; the filtering nature of the "circle layer", Lead to homogenization, one-sided views and pan-

entertainment, fragmented information filled, Immerse youth in the information world of self-preferences, It is easy to lead to the solidification of youth value cognition and the narrowing of vision; the niche of "circle layer", For young people to prefer "personalized" and "encrypted" expressions, Limited the improvement of youth language organization ability and written expression ability, It leads to a communication barrier and a digital divide between outsiders.

In 2016, the "Facebook" incident clearly reflected the influence of network "circle" on the behavior of young people, on the one hand, it stimulated the patriotism and experienced the sense of belonging of national community; on the other hand, the use of network symbols such as expression and personalized self-expression caused communication barriers, eliminated the seriousness of the issue, and made the discourse and action lose the effectiveness of communication.

5. CONCLUSION

As for the phenomenon of "circle layer" of youth network, we should neither blindly deny nor allow it to develop. We should dialectical analyze, take advantage of the situation, guide them to play a positive aspect and avoid bad influence. For ideological and political

education workers, to pay attention to the circle of the influence on youth thought, behavior, on the basis of respecting the youth growth law and development demand guide youth rational view "circle", prevent value cognition curing and extreme behavior, set up the correct world outlook, the outlook on life and values.

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New Era Automotive Intelligent Detection and Maintenance Technology Thoughts and Research

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Abstract: Automobiles are a vital mode of transportation for people, helping to save time and enhance their quality of life. With the rapid development of intelligent technology, society as a whole has imposed stringent requirements on automotive detection and maintenance technology. To meet the needs of automotive detection and maintenance in the new era, it is imperative to ensure the gradual development of these technologies towards intelligence and automation. Prolonged use of automobiles can easily lead to malfunctions. Ensuring driving safety necessitates regular fault detection and maintenance, which requires a clear understanding of intelligent detection and maintenance technologies, as well as a comprehensive grasp of the design and application of automotive intelligent detection and maintenance systems. By innovating detection methods and enhancing maintenance efficiency, we can reduce errors caused by traditional manual work and ensure the full application value of automotive intelligent technology.

Keywords: Automotive Industry; Intelligent Technology; Detection and Maintenance Technology; Safety

1. INTRODUCTION

Against the backdrop of the rapid development of intelligent technology, incorporating this technology into the actual process of detection and maintenance is necessary. By developing scientific and comprehensive detection and maintenance plans, we can enhance the safety of automotive driving, ensuring long-term safe and stable operation. Considering the complexity of modern automotive systems and the increasing number of in-vehicle electronic devices, users have ever-growing requirements for the automotive experience,

particularly in special situations where faster and more efficient fault detection is crucial. Based on accurate diagnoses of the causes of automotive malfunctions, risks can be reduced, averting potential safety incidents. During the actual detection and maintenance process, we must integrate intelligent technology with automotive driving and equipment operation status, ensuring that automobiles are not damaged while driving the automotive industry towards intelligent development. This paper starts with an overview of automotive intelligent fault detection technologies and comprehensively explores the efficient design and application of intelligent detection and maintenance systems in the new era.

2. AUTOMOTIVE INTELLIGENT FAULT DETECTION TECHNOLOGIES

1.1 Neural Network Fault Technology

This type of intelligent technology boasts strong nonlinear processing capabilities and high fault tolerance, enabling rapid and accurate classification and identification of automotive faults. However, technicians applying this technology may encounter drawbacks such as the need for large learning sample sizes and long training times, resulting in relatively poor reasoning capabilities. As the automotive industry enters the new era, BP neural networks have become the primary application form, requiring the application of various methods such as adaptive parameter adjustment for innovation and improvement.

1.2 Fault Tree Technology

To meet the requirements of automotive detection and maintenance in the new era, fault tree technology should be fully utilized. Its graphical structure is simple and convenient, even facilitating efficient component optimization. Prior analysis by

professional technicians is necessary due to the complexity of the system and slow reasoning speed. Therefore, to fully leverage fault tree technology, it should be combined with other methods.

1.3 Case-Based Reasoning Technology

Case-based reasoning technology allows technicians to address current automotive issues by leveraging past knowledge, particularly through technical improvements and implementing hierarchical retrieval to enhance fault detection accuracy. Furthermore, optimizing organizational structures and retrieval algorithms based on an intelligent technology-based case database can improve the learning and operational capabilities of automotive detection and maintenance personnel, a crucial technology for efficient detection and maintenance in the new era.

1.4 Rule-Based Reasoning Technology

Rule-based reasoning technology, also known as "RBR diagnosis technology," closely resembles human thinking. By indexing rules, it can accurately and quickly find applicable rules, ensuring matching efficiency meets standards. However, it has limitations in resolving complex structures and non-uniform rules.

3. DESIGN AND APPLICATION OF AUTOMOTIVE INTELLIGENT DETECTION AND MAINTENANCE SYSTEMS

2.1 Design Plan for Automotive Intelligent Detection and Maintenance Systems

Given the stringent requirements of the new era for automotive detection and maintenance, a well-designed intelligent detection and maintenance system is essential. Adopting a modular design approach and incorporating various modules ensures convenient and efficient maintenance while enhancing scalability. The system should include modules for settings, knowledge management, fault diagnosis and repair, and case learning. Given the low educational backgrounds of some technicians despite their wealth of experience, the system must be simple to operate and user-friendly, ideally resembling a mobile phone interface and catering to technicians' usage habits.

In addition, the intelligent detection and maintenance system for automobiles must

possess strong reliability and safety. By integrating new and advanced systems such as the Internet of Vehicles (IoV), it can detect the internal and external environments of automobiles more accurately and efficiently. By employing a three-tier C/S architecture and utilizing Visual Studio (VS), the environmental development work can be effectively implemented. Furthermore, the integration of advanced technologies such as Virtual Reality (VR) enables the effective simulation of automobile faults, thereby fully meeting the requirements for the repair and replacement of automobile components. During the design of intelligent detection and maintenance systems for automobiles, it is also necessary to make full use of cloud computing technology in the new era. After creating a favorable open environment, a large number of relevant cases can be collected and added to the database, which is of great significance in reducing the dependence of maintenance personnel on experts. To ensure that the intelligent detection and maintenance system for automobiles fully exerts its application value, it is also necessary to integrate GPS technology, robot vision technology, and key component safety control technology. While innovating technologies and optimizing system functions, this will enhance the level of automobile detection and maintenance. By combining intelligent systems with VR technology and effectively connecting to the case database, after clarifying the occurrence, principles, and maintenance processes of each fault case, they can be vividly presented through VR videos. These videos should also be uploaded to the cloud platform to provide assistance for subsequent improvements in automobile intelligent maintenance efficiency.

3.2 Application Strategies for Innovative Technologies in Intelligent Automobile Fault Detection and Maintenance

Under the development trend of the new era, automobile fault diagnosis technology is gradually shifting towards network connectivity. To implement these efforts, it is necessary to approach from multiple angles and break through the constraints of traditional automobile detection and maintenance technologies. This includes building a comprehensive electrical structure

and network architecture for the entire vehicle, reasonably introducing domain controllers, and conducting T-GW expansions. With the assistance of these new technologies, the operating conditions of automobile components can be more accurately diagnosed. By using CAN as the backbone network, scientific and reasonable diagnostic requirements can be proposed in full conjunction with the operating conditions of automobile components.

For example, traditional automobile maintenance required the dashboard to report faults before the vehicle could be taken to a repair shop. If the dashboard did not report faults in a timely manner, the driver could only repair the vehicle after experiencing obvious faults. However, after the research and application of new technologies such as "intelligent diagnostic platforms," faults can be automatically identified, and targeted emergency handling methods and nearby repair points can be recommended to drivers. If the vehicle cannot be driven to a nearby repair point, it is also possible to connect with human experts online to propose emergency handling measures with reference value. As the automobile industry develops, more non-dismantling methods will be added to automobile fault detection work in the future, such as accurately identifying faults through image recognition and sound frequency judgment. Intelligent maintenance primarily refers to the utilization of robots to replace manual labor in the repair of automobiles, encompassing tasks such as painting, installation, and maintenance. Furthermore, to innovate intelligent maintenance technology, it is essential to focus on intelligent disassembly techniques while ensuring that

the dismantled parts are environmentally friendly and energy-efficient. This approach not only meets the requirements of the low-carbon automotive industry but also facilitates the recycling of automotive components during actual intelligent maintenance operations.

4. CONCLUSION

In conclusion, the new era has imposed stringent requirements on the development of China's automotive industry. To fully harness the potential of intelligent vehicle inspection and maintenance systems, it is essential to meticulously categorize intelligent technologies and devise a comprehensive design for automotive intelligent inspection and maintenance systems. This approach not only mitigates the limitations of traditional technologies but also revolutionizes automotive inspection and maintenance methods, ensuring safe vehicle driving. As the automotive industry gradually evolves towards intelligence, incorporating diverse cutting-edge technologies into inspection and maintenance work is vital. This enhances efficiency while providing technological support for the long-term growth of China's automotive industry.

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The Role and Integration of Different Film Genres in Pulp Fiction

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Abstract: Quentin Tarantino's Pulp Fiction is a seminal work that masterfully integrates multiple film genres, including gangster, comedy, satire, and heroism. This paper explores how these diverse genre elements are woven together to create a complex and layered narrative that defies traditional genre classification. By analyzing the role and interaction of these genres, the paper highlights Tarantino's innovative approach to filmmaking and his commentary on genre conventions. The study demonstrates how Pulp Fiction not only entertains but also challenges audiences to reconsider the boundaries and definitions of cinematic genres.

Keywords: Pulp Fiction, Quentin Tarantino, Film Genres, Genre Blending, Gangster Film.

1. INTRODUCTION

Genre theory provides a useful framework for understanding how films can adhere to or deviate from established genre conventions. Genres are often defined by their thematic content, narrative structure, character archetypes, and visual style. However, Pulp Fiction complicates this traditional understanding by weaving together multiple genres, each contributing to the film's overall impact.

Tarantino's approach to genre in Pulp Fiction can be seen as both homage and subversion. By drawing on recognizable genre conventions while simultaneously deconstructing them, the film invites viewers to reconsider the boundaries and functions of genre in cinema. The following sections will explore the specific genres present in Pulp Fiction and their roles within the film's broader narrative.

2. GANGSTER FILM ELEMENTS

At its core, Pulp Fiction is deeply rooted in the gangster film genre. Tarantino weaves together a story filled with violence, crime,

and a distinct set of moral codes that define the world of the gangsters portrayed in the film. The following aspects highlight how Pulp Fiction embodies the characteristics of a gangster film:

2.1 Violence and Gunfights

A hallmark of the gangster genre is the frequent depiction of violence and gunfights. Pulp Fiction features numerous scenes of violent confrontations and shootouts that underscore the brutality and ruthlessness of the gangster world. For example, the shootout between Vincent and Jules and their adversaries, Butch's violent escape from the clutches of Marsellus, and the accidental shooting of Marvin by Vincent all showcase the pervasive violence within this world.

2.2 Gangster Etiquette and Rules

Gangster films often depict a unique set of rituals and codes that govern the lives of the characters. In Pulp Fiction, this is evident in the professional demeanor and ritualistic behavior of Vincent and Jules as they prepare for their mission. Additionally, the secretive deal between Marsellus and Butch reflects the intricate web of rules and contracts that define the gangster lifestyle.

2.3 Dignity and Betrayal

Themes of dignity and betrayal are central to many gangster films, and Pulp Fiction is no exception. The film's narrative is driven by these themes, particularly in the relationship between Butch and Marsellus. Butch's initial betrayal of Marsellus, followed by his act of saving him from a dire situation, underscores the complex interplay of dignity and redemption in the gangster world. The evolving dynamics between the characters reflect their growth and the consequences of their choices. Through its portrayal of violence, adherence to gangster codes, and exploration of dignity and betrayal, Pulp Fiction firmly establishes itself within the gangster genre. These elements not only heighten the film's tension

and drama but also provide a vivid portrayal of the moral complexities that define the lives of its characters.

3. COMEDY ELEMENTS

Despite its dark and violent themes, Pulp Fiction is infused with a significant amount of comedy, making it a unique blend of genres. the film's comedic elements are woven into its dialogue, character interactions, and absurd situations, creating a distinctive tone that sets it apart from traditional gangster films.

3.1 Humorous Dialogue

Tarantino is renowned for his sharp and witty dialogue, and Pulp Fiction is no exception. the film is filled with humorous exchanges that lighten the otherwise dark tone of the narrative. For instance, the banter between Vincent and Jules is filled with irony and humor, adding a layer of comedy to their violent undertakings. Similarly, the conversation between Vincent and Mia at the restaurant is both lighthearted and entertaining, showcasing Tarantino's ability to blend humor with deeper thematic content.

3.2 Absurd and Ridiculous Situations

Many of the film's scenes are characterized by absurdity and ridiculousness, which serve to both amuse and unsettle the audience. A prime example is Mia's accidental overdose on heroin, which leads to a chaotic and darkly humorous sequence as Vincent desperately tries to save her. the restaurant robbery by Pumpkin and Honey Bunny, while serious in nature, is also laced with absurdity, particularly in their bumbling execution of the crime.

3.3 Satire of Culture and Pop Culture

Tarantino often uses humor to satirize elements of culture and pop culture, and Pulp Fiction is rife with such instances. the film's references to classic characters like Zorro and Marilyn Monroe in the restaurant scene, along with the presence of old movie posters, create a playful and nostalgic atmosphere. These references not only entertain but also critique the way pop culture permeates everyday life, adding a layer of satire to the film.

Through its use of humor, Pulp Fiction transforms what could have been a straightforward gangster film into a genre-bending experience. the comedic elements provide a counterbalance to the violence and

darkness of the narrative, making the film both entertaining and thought-provoking.

4. SATIRICAL CRIME ELEMENTS

Although Pulp Fiction is often categorized as a crime film, it subverts the traditional expectations of the genre, functioning more as a satire than a straightforward crime narrative. Tarantino's approach to crime in the film highlights the absurdity and trivialization of criminal acts, challenging the conventions of the crime genre.

4.1 Normalization of Crime

In typical crime films, criminal behavior is depicted as a serious and often tragic deviation from social norms. However, in Pulp Fiction, crime is portrayed as a mundane and almost routine aspect of the characters' lives. Acts of robbery, murder, and drug use are depicted with a casualness that strips them of their usual gravity. For instance, the robbery of the restaurant by Pumpkin and Honey Bunny is treated with a nonchalant attitude, as is the execution of their victims by Vincent and Jules. This normalization of crime serves to satirize the genre's traditional moral seriousness.

4.2 Dramatization of Crime

While crime is treated casually, it is also exaggerated to the point of absurdity, further emphasizing the satirical nature of the film. the accidental shooting of Marvin in the car by Vincent is a darkly comedic moment that highlights the randomness and unpredictability of crime. Similarly, the various criminal mishaps, such as Vincent's heroin overdose and Marsellus's assault in the pawnshop, are portrayed with a sense of irony and dark humor, making them more farcical than frightening.

4.3 Critique of Social Norms

By depicting crime in such a trivial and exaggerated manner, Pulp Fiction also serves as a critique of societal norms and the concept of justice. the film presents a world where criminals operate with impunity, and law enforcement is either absent or corrupt. For instance, the only portrayal of a police officer in the film is as an accomplice in a horrific act of violence, further undermining the idea of a moral or just society. Tarantino uses crime as a vehicle to satirize the contradictions and hypocrisies of social order and justice.

Rather than simply depicting crime, Pulp

Fiction uses the crime genre to explore broader social themes and to critique the conventions of the genre itself. the film's satirical elements highlight the absurdity of crime and the moral ambiguities that often accompany it, making Pulp Fiction a unique and complex addition to the crime film genre.

5. HEROISM ELEMENTS

Despite the chaotic and crime-ridden world depicted in Pulp Fiction, the film can also be seen as a hero's journey, albeit an unconventional one. Tarantino redefines the notion of heroism by focusing on characters who seek redemption and moral clarity, rather than those who embody traditional heroic virtues.

5.1 Moral Choices and Redemption

Heroic narratives often involve protagonists who face moral dilemmas and seek redemption. In Pulp Fiction, several characters undergo such transformations. Jules, for example, experiences a profound moral awakening after a near-death experience, which he interprets as a sign from God. He decides to abandon his life of violence and crime in search of a more meaningful existence. This decision marks a significant moral shift, aligning Jules with the archetype of the redeemed hero.

5.2 Acts of Rescue

Another hallmark of heroism is the act of rescuing others, a theme that is subtly woven into the fabric of Pulp Fiction. Butch's decision to save Marsellus, despite their animosity, exemplifies this trait. In a moment of bravery, Butch risks his life to rescue Marsellus from a dire situation, showcasing the inherent goodness that still exists within him. This act of rescue not only redeems Butch but also redefines him as a hero within the context of the film.

5.3 Forgiveness and Growth

Heroic narratives often explore the themes of forgiveness and personal growth. In Pulp

Fiction, the characters of Butch and Marsellus both undergo significant development in this regard. After being saved by Butch, Marsellus forgives him for his earlier betrayal, signaling a moment of mutual growth and understanding. This forgiveness represents a departure from the cycle of violence and revenge that typically characterizes gangster films, offering a glimpse of hope and redemption.

In Pulp Fiction, heroism is not about grand gestures or traditional notions of justice. Instead, it is about the personal journeys of the characters as they confront their pasts, make moral choices, and seek redemption. Tarantino's portrayal of heroism is complex and nuanced, challenging the audience to rethink what it means to be a hero in a world where moral boundaries are often blurred.

6. CONCLUSION

Quentin Tarantino's Pulp Fiction is a masterclass in genre blending, incorporating elements of gangster films, comedy, satire, and heroism to create a film that is both entertaining and thought-provoking. By subverting genre conventions and infusing the narrative with multiple layers of meaning, Tarantino challenges the audience to engage with the film on a deeper level.

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The Selection and Placement of Plants Inhome Interior Space

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Abstract: In the decoration design of home interior space, plant placement and display is an indispensable part. According to the biological characteristics and ornamental characteristics of various kinds of plants, this paper introduces some ornamental plants suitable for indoor display, and according to the different characteristics of home interior space, the plants suitable for living room, dining room, bedroom and balcony display are rationalized recommendation, for the reference of interior decoration practitioners and owners.

Keyword: Plant Selection; Interior Space

1. INTRODUCTION

Nowadays, people living in cities are deeply aware of the importance [1] of indoor environment to the quality of life and physical health. As the place of People's Daily life and living, the pursuit of beautiful and practical space design and higher quality is always an important issue of interior space design. In addition to all kinds of decorative materials, electrical appliances, furniture and decorations, plants are also an important part of home interior space, which can not only play the role of decoration and separation, but also improve indoor air quality to a certain extent, regulate the indoor environment, and make the occupants physically and mentally happy [2]. the practice of using plants to decorate indoor space has existed in ancient times, but which plants are suitable for indoor furnishings, and what kind of space environment are they suitable for? At present, it is still a topic worth discussing.

2. THE FUNCTION AND FUNCTION OF PLANTS IN HOME INTERIOR SPACE

2.1 Beautification and decoration

Choose suitable ornamental plants according to the decoration style of the home interior space, and match them reasonably according

to their ornamental characteristics and specifications to form a rich indoor plant landscape that echoes the theme. In addition to the plants themselves, the cultivation containers are also an important part of the indoor plant landscape, and the flowerpots that conform to the decoration style complement each other with the plants, and better beautify the indoor environment [3].

2.2 Divide the indoor space

Different interior Spaces can be separated by walls, cabinets, screens, etc., or plants can be used to separate them. For example, the use of climbing brackets combined with planting climbing plants to separate the indoor space, or vertical arrangement of plants to form a planting wall separation space, and all kinds of flower

boxes, flowerpots with high and low, dense plants can also form an effective division [4] of the space.

2.3 Soften the indoor space

In the interior space design of the home, although it is inevitable that there will be stiff and indigestible corners, the use of hard veneers or paved floors in some Spaces will give residents a sense of cold and alienation. At this time, the soft lines of green plants placed here will eliminate this feeling and improve the comfort of the living environment.

2.4 Improve the indoor environment

Green plants can absorb such as formaldehyde and other common toxic and harmful gases in the indoor environment, can release oxygen through photosynthesis, its transpiration can improve the indoor air humidity, reduce the temperature, some green plants flower fragrance, or can release volatile aromatic oil through the glands, has a certain improvement on the indoor environment.

3. SUITABLE FOR HOME INDOOR SPACE PLACED PLANTS

There are many kinds of ornamental plants, but due to their different ecological and biological characteristics, not all plants are suitable for indoor environments. Plants suitable for indoor display often have the following characteristics: 1. Smaller plants or slower growth rate; 2. the soil requirements are not strict, can adapt to a variety of cultivation media; 3. Strong adaptability to weak light environment. According to the different ornamental characteristics of the plant, it can be divided into the following categories:

3.1 Foliage plants

The main object of viewing is the leaves or the whole plant, which often have oddly shaped or colorful leaves, or the plant can be easily trimmed into a beautiful shape. However, their flowers and fruits are often unimpressive, or they are difficult to produce in indoor environments.

In domestic indoor Spaces, these plants often include: *Ficus lyrata*, *Ficus elastica*, *Heptapleurum arboricola*, *Pachira aquatica* (trade name Money tree), *Cinnamomum kotoen* (trade name Peace Tree), *Radermachera sinica* (trade name Happiness Tree), *Dyopsis lutescens*, araceae plants (which are the most common genera of *Arum*, *Spathiphyllum*, *Aglaonema*, *Monstera*, *Syngonium*, etc.) and arum plants, including the related varieties of the above species, genera and families.

3.2 Flowering plants

Such plants take flowers as their main ornamental objects, and their flowers may be large and showy, or have strange shapes; Or the flower period is long, or the flowers are many; Some kinds of flowers are very fragrant. In domestic interior Spaces, such plants often include: *Gardenia jasminoides*, *Jasminum sambac*, *Camellia japonica*, *Camellia sasanqua*, *Anthurium andraeanum*, *Kalanchoe blossfeldiana* Part *Rhododendron* plant, part *Oxalis* plants and some orchids, containing related varieties under the above species, genera, and families.

3.3 Fruit-bearing plants

Its fruits are the main ornamental objects, and most of them have strange appearance or bright colors. Some of the fruits of plants have edible value.

In domestic indoor space, such plants often include: *Citrus japonica*, lemon (*Citrus × limon*), bergamot (*Citrus medica* 'Fingered'), *Ardisia crenata* and so on.

3.4 Polypulpy plants

Such plants, which often have thick leaves or stems, vary in shape and color, have small plants and occupy less land, and have been favored by urban residents in recent years.

In the indoor space of the home, such plants often include: seidaceae, cactus family, Euphorbiaceae, phlox family of all kinds of pulposus plants, including a large number of artificial varieties under them.

4. PLANT ARRANGEMENT IN DIFFERENT INDOOR SPACES IN THE HOME ENVIRONMENT

In the design of home interior space, the selection of plants for decoration should be flexible according to the different space environment.

4.1 Selection and arrangement of plants in the living room

The living room is often used as a meeting, leisure and entertainment space, and its use frequency and space size are in the primary position in the indoor space of the home. In the living room for green decoration, you can choose a larger size of potted flowers, according to the lighting conditions and decorative style furnishings.

If the living room has better lighting conditions, you can choose the *Ficus lyrata*, *Ficus elastica*, *Heptapleurum arboricola*, *Pachira aquatica*, *Cinnamomum kotoense* and *Radermachera sinica* and other plants, according to different decoration styles, with different styles of flowers to decorate; If the living room lighting conditions are poor, you should choose shade-tolerant arisaaceae, arrowroomaceae plants for arrangement, Such as *Philodendron melanochrysum*, *Thaumatococcus bipinnatifidum*, *Calathea zebrina*, etc., to ensure that potted flowers can grow normally and play their due decorative role.

4.2 Plant selection and arrangement of the restaurant

Potted flowers can add color to the dining environment, and the restaurant is suitable for placing shade-resistant, smaller potted flowers. At the same time, in order to avoid the

pollution of the environment caused by the overflow of the cultivation medium when watering, hydroponics is a very suitable planting method.

Spathiphyllum lanceifolium of the Araceae family and *Dieffenbachia fournieri* and *Dieffenbachia leopoldii* of the genus *Dieffenbachia* have strong negative tolerance. Flower or leaf ornamental value is high, hydroponic growth is good, are suitable for the beautification of restaurants.

4.3 Plant selection and arrangement for bedrooms

As a place for rest, the bedroom should not be placed too many plants, but the right amount of potted flowers is conducive to beautifying the bedroom environment and pleasing the body and mind. In the selection of plants should avoid the selection of branches or leaves with thorns, in order to prevent injury. Pungent or floral plants, such as gardenias, should also be avoided in the bedroom. In addition, some people are concerned about the competition for oxygen caused by the respiration of plants at night, which can be overcome by the physiological properties of pulpy plants that absorb carbon dioxide at night and form malic acid through carboxylation, which is stored in large vacuoles inside the plant cells.

The bedroom is suitable for placing medium and small potted flowers. When decorating the bedroom, if the bedroom lighting conditions are good, the polyplasmic plants can be arranged in the windowsill. Such as the rhododendron family *Echeveria runyonii*, *Echeveria desmetiana*, *Graptopetalum paraguayense*, etc., if the lighting conditions are general, you should avoid choosing polyplasmic plants, otherwise the plants are easy to grow. Which will seriously affect their ornamental value. Insufficient light bedroom can choose araceae plants for decoration, such as the white taro mentioned above, can also choose arrowroot pilophylla, etc., in addition, many plants of begonia family are also suitable for the beautification of the bedroom environment.

4.4 Selection and arrangement of plants for balconies

Balcony as clothes drying, both leisure function of the home space, its lighting conditions are often superior, suitable for plant growth, various types of plants can be placed on the balcony, for its color. It is necessary to pay attention to plants born in a moderate shade environment, such as: arisaaceae, arrowroot plants, in order to avoid sunburn should be placed in a corner without direct light or moderate shade. Hardy potted flowers placed on open balconies should be moved indoors in winter.

The balcony space is not sufficient, it is appropriate to put small and medium-sized potted flowers, the use of various types of flower shelves can save space, suitable for placing on the balcony of a wide variety of flowers, mentioned in the previous article all kinds of foliage plants, flowering plants, fruit plants and pulpy plants can be displayed on the balcony for viewing.

5. CONCLUSION

Plants can add color to indoor space and improve indoor environment to some extent. According to the characteristics of different indoor Spaces, combined with the biological characteristics and ornamental characteristics of various ornamental plants, the selection of suitable potted flowers for decoration is conducive to improving the quality of its space environment and benefiting the physical and mental health of residents.

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A Study on Project-Based Learning in the College English Listening and Speaking Course for Art Majors

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Abstract: Based on the “Guidelines for College English Teaching” (2020 edition), effective teaching methods should be employed to activate students with different learning styles in the class. Hence, this paper applies Project-Based Learning (PBL) approach to the college English listening and speaking course for art majors who were reluctant to express themselves in the traditional teaching. With the use of PBL, these students collaborated with teammates, designed posters and videos for the projects, and presented their reports to the class all in English. the PBL method motivated art students to create and design, practiced their spoken English abilities, and enhanced their teamwork and negotiation capabilities at the same time. Through communication and discussion, the learning atmosphere and learning effects were greatly improved, thus achieving the goals for the English listening and speaking course.

Key Words: Project-Based Learning, College English Listening and Speaking Course, Art Majors

1. INTRODUCTION

The “Guidelines for College English Teaching” (2020 edition) emphasizes that college English teaching should fully consider students’ individual differences and learning styles and use appropriate and effective teaching methods, including task-based, cooperative, project-based and inquiry-based approaches, so that the class is student-oriented and the teaching process can be transformed from focusing on “the purpose of teaching” to “the needs of learning”, characterized by teachers’ guidance and students’ active participation.

PBL (Project-Based Learning), is a problem-centered and problem-solving teaching

approach (Li, 2023). Compared with traditional teaching methods, PBL helps to stimulate students to explore, analyze, and think independently, thereby strengthening English learning ability. At the same time, students communicate and learn from each other through group cooperation, and achieve mutual growth and progress together. In addition, the traditional teaching of college English listening and speaking is usually centered on listening, and students have few opportunities to practice speaking. By contrast, PBL can mobilize students’ enthusiasm to practice speaking, and by solving the problems and tasks raised by teachers, students will naturally express English, build language confidence and provide more motivation for future learning (Pan, 2023).

2. PREVIOUS RESEARCHES ON PBL AND COLLEGE ENGLISH LISTENING AND SPEAKING COURSE FOR ART MAJORS

The PBL method was put forward in 1970 and has been widely used in the teaching of English courses in western countries, while PBL is still in the first stage in the teaching of English in China. At present, there are a few studies on the integration of PBL into English listening and speaking course in Chinese universities. Most of the studies focus on college English reading and writing course, and rather few concern different majors, and therefore the study involving art majors is rare. Chen (2024) discussed the impact and application of the PBL method on art majors in college English classrooms, and argued that art students are usually more inclined to practice and create instead of learning theories, and the PBL model provides opportunities for them to use English in the process of problem solving. Through the art projects in the class,

students had a deeper understanding of the use of English in the art field, and learned English more actively.

Guo (2023) took art students as the research subjects and compared the college English reading scores of two classes. One class, the experimental group, adopted the project-based learning method, and the other, the control class, adopted the traditional teaching method. Research results showed that the PBL method could improve the English reading scores and enhance the art students' motivation of English reading.

Jiang (2023) explored the teaching of college English listening and speaking course based on project-based learning, and found the PBL had outstanding advantages in the speaking class as students could deeply understand the target knowledge in the discussion and exploration with their peers, which further consolidated and improved their comprehension ability, and at the same time stimulated their interest and motivation in learning.

Other PBL researches focus on the integration of college English reading and writing course and blended teaching methods. Qi (2023) took the New Horizon College English Reading and Writing Course as an example to explore the blended teaching design of college English based on the PBL model, and found that the student-centered PBL model adopted diversified teaching activities, which effectively activated the classroom atmosphere. Yang (2023) adopted the PBL and blended teaching model in college English class, which not only improved students' English language ability, but also cultivated students' sense of self-recognition, academic ability, communication ability and teamwork ability.

3. PBL PRACTICE IN THE COLLEGE ENGLISH LISTENING AND SPEAKING COURSE FOR ART MAJORS

In the traditional class of college English listening and speaking for art majors of a ceramic university in central China, more time was allocated to listening tasks due to the limited class hours and the large number of students. Therefore, Students had fewer opportunities for speaking practice. At the same time, students were not confident in their

oral English; they usually remained silent in class, and even if they were given the chance to talk, they were reluctant to give long statements.

In order to mobilize students' enthusiasm for spoken English, the teacher integrated the PBL method into the class and designed some art projects according to the topic of each unit. For example, when talking about the theme of "Water", the teacher raised the issue of water pollution with a large amount of plastic piled up near the ocean. Students were required to discuss in small groups to observe and present the use of plastics on campus with PowerPoint or videos, and give reports to the class in English. the project activated students' participation, improved students' oral English skills and learning effects, and at the same time strengthened students' awareness of environmental protection and sense of social responsibility.

Here's an example of one group of art students who recorded how college students frequently used plastic products in cafeterias, supermarkets, etc., with the following scripts: *Most college students always pack up food from the canteen and go back to dormitory for dinner. So a large amount of plastics are consumed every day. And many students like to take more pairs of chopsticks, which is a huge waste since they take more than what they need and tend to throw the excessive ones away. What's worse, most students like bottled drinks a lot, resulting in a large number of plastic bottles on campus. And when they go to the cashier in the supermarket, they often ask for a plastic bag to take the drinks and snacks away, which is convenient for the consumers but extremely harmful for our environment because all the plastic bags will end up in the trash and most of them are not disposable.*

When it comes to the topic of "Food", the teacher proposed a restaurant project, and students were asked to present the restaurant's unique theme, food and atmosphere with posters so that fund could be raised to open the restaurant. the project once again combined English with art design. By poster design, students were mobilized to participate in the activity, and at the same time, in the process of group discussion, they learned the vocabulary and expressions on food. When they presented

the posters and ideas about the restaurant to the class, their confidence in spoken English were greatly enhanced, and traditional Chinese food and culture was spread simultaneously.

Here is one example of a poster with the theme of "Cantonese Cuisine" restaurant, and the report for the poster is as follows:

My restaurant is located in the bustling area of the porcelain city, a place not only beloved by ceramic enthusiasts but also a hub for food lovers. We specialize in authentic Cantonese cuisine, blending tradition with innovation in every dish we serve.

I am committed to selecting the freshest ingredients and employing traditional cooking techniques to ensure that every bite offers a taste of home. Our special dishes include steamed fish and a variety of dim sum that are not just classics of Cantonese cooking but also cater to quality and flavor. Our steamed fish, prepared with care and served with our house-made sauce, highlights the natural sweetness of the fish, while our dim sum -- from shrimp dumplings to pork buns -- are all handmade, guaranteeing both quality and taste.

The design of our restaurant is warm and inviting, providing a relaxing atmosphere for our guests. Whether you're enjoying a family gathering, catching up with friends, or hosting a business event, we strive to cater to your needs. Our aim is to share the charm of Cantonese culture and our passion for excellence through the medium of food. We welcome you to my restaurant for a culinary journey to remember!

4. CONCLUSION

Art students usually have strong creativity and practical ability. With the PBL method, students need to design and present English posters, videos and PowerPoint, Through communication with group members and the teacher, students can improve their English listening and speaking skills, and enhance teamwork and negotiation capabilities. Su (2023) proposed that teachers should recognize the advantages of the PBL approach over the traditional teaching methods, and at the same time learn to understand what high-level PBL teaching is. Students experience the joy of exploring knowledge in the classroom, and acquire the connection between

knowledge and reality, that is, students learn not only abstract knowledge such as English words and grammar in the class, but also explore themselves why it is better to use such expressions. Through PBL, students' self-directed learning ability, analytical and problem-solving ability, classroom participation, language application ability, and innovation ability are all improved to a certain extent (Li, 2024).

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Discussion on the Innovation of College Employment and Entrepreneurship Education Model Under the Background of Digital Transformation

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Abstract: In the context of digital transformation, in order to better respond to the call of "mass entrepreneurship and innovation", colleges and universities should strengthen employment and entrepreneurship education for college students, and actively innovate education models to improve students' entrepreneurship and employability. This paper expounds the significance of college employment and entrepreneurship education, analyzes the current situation of college students' employment and entrepreneurship under the background of digital transformation, and puts forward innovative strategies of college employment and entrepreneurship education model under the background of digital transformation.

Keywords: Digitalization; Employment and entrepreneurship; Educational model

1 INTRODUCTIONS

The heavy responsibility of talent is to ensure that the cultivated talents can adapt to and lead social development, which requires changing the education model and cultivating more new era talents. College employment and entrepreneurship education plays an important role in promoting students' growth and development. Innovating this educational model will help cultivate more high-quality talents that meet the needs of social development. How to utilize the advantages of digitization to optimize the curriculum system and methods, and enhance the effectiveness of employment and entrepreneurship education, has become an important issue that universities urgently need to solve, which is of great significance for promoting the development of higher education.

2. THE SIGNIFICANCE OF EMPLOYMENT AND ENTREPRENEURSHIP EDUCATION IN UNIVERSITIES

2.1 Help College Students Adapt To Role Change

College employment and entrepreneurship education can enable college students to transition from campus to workplace roles. Through the education of employment and entrepreneurship, students can get in touch with the workplace culture in advance and have a deep understanding of the working environment and the expectations of enterprises on employees, which not only helps students adjust their mentality in advance and make psychological preparations from learning to work, but also enables students to clarify their role in future work and know their responsibilities and obligations. It can be seen that employment and entrepreneurship education in universities can help students smoothly transition from being students to professionals in the workplace, making them more confident and confident in facing their future careers.

2.2 Improve the Comprehensive Quality Of College Students

In the process of carrying out employment and entrepreneurship education in universities, students often develop their communication skills, teamwork skills, innovative thinking, and problem-solving abilities through rich courses and practical activities based on their professional skills. By enhancing students' comprehensive qualities, they can not only be more adept in their future careers, but also cultivate their leadership and innovative

thinking, thus better coping with various complex situations and challenges. Therefore, employment and entrepreneurship education in universities is an important way for students to develop comprehensively and enhance their overall literacy. [1]

2.3 Can Expand Employment Thinking

By conducting employment and entrepreneurship education in universities, students can be exposed to and understand the job content and job requirements of different industries, thereby breaking down their inherent understanding of traditional professions. In addition, this education also encourages students to explore emerging career fields and diverse employment models, such as remote work, freelance work, etc., enabling students to have a more open and diverse perspective on future career development. And enable students to have a clearer understanding of their interests and strengths under the employment and entrepreneurship education model, and thus find career directions that match their own characteristics.

3 Current Situation of College Students' Employment and Entrepreneurship Under the Background of Digital Transformation

Digitalization itself has strong universality and convenience, and its application in college education and teaching can not only affect the teaching level of teachers, but also affect the learning quality of students. Especially for college students' employment and entrepreneurship, the development of digitalization has both positive and negative impacts on them. the current situation of employment and entrepreneurship of college students mainly presents the following characteristics:

3.1 College Students Have High Enthusiasm for Self-Employment

With the rapid development of digital technology and the strong support of national policies for innovation and entrepreneurship, the enthusiasm of contemporary college students for self-employment has been greatly enhanced. In the digital context, college students are not only keen to try and explore new business models, but also actively use digital technology to promote and realize their entrepreneurial dreams. This entrepreneurial

enthusiasm not only reflects the spirit of innovation and challenge of college students, but also brings new vitality and creativity to the society.

3.2 The Number Of College Students Starting Businesses Is Increasing Year By Year

With the progress of the Times and the continuous improvement of the entrepreneurial environment, the employment and entrepreneurship of college students have increased greatly. Coupled with the support of national policies, the number of college students starting businesses has shown an increasing trend year by year. In addition, under the guidance of digitalization, more college students are willing to devote themselves to entrepreneurship and open up a career development path of their own through their own efforts and wisdom.

3.3 College Students Have a Low Success Rate Of Entrepreneurship

Although the enthusiasm of college students for entrepreneurship is increasing day by day, their success rate in entrepreneurship is generally not high. After investigation and analysis, it is found that the main reason for this phenomenon is that college students face various challenges in the process of entrepreneurship. Due to the lack of necessary business experience among college students, it is difficult to cope with the complex and ever-changing market; In addition, insufficient funding is also a key issue affecting entrepreneurial success, as many entrepreneurial projects will not be able to sustain development due to funding shortages; College students also face difficulties in accessing market resources, which further increases the difficulty of entrepreneurship. Even if college students have a strong entrepreneurial passion, their success rate is not optimistic.

3.4 College Students' Entrepreneurship Competitiveness Is Low

Compared to mature enterprises with rich experience, college student entrepreneurship projects are clearly at a disadvantage in market competition. This is mainly due to the common problems faced by college students in the early stages of entrepreneurship, such as lack of management experience, shortage of funds, limited technical level, and unsmooth

market channels. Based on the existence of these problems, it is difficult for college students' entrepreneurial projects to form strong market competitiveness in a short period of time, which in turn leads to difficulties for college students to succeed in the fierce market competition.

3.5 College Students Are Seriously Divorced From Their Major In Employment And Entrepreneurship

In the current wave of employment and entrepreneurship, the rapid changes in market demand and the rise of emerging industries have made the job market for some traditional majors relatively narrow, resulting in some college students' career choices not matching their university majors. In addition, some students choose their majors more out of interest or family advice, without fully considering the employment prospects of the major, resulting in a disconnect from the chosen major in employment and entrepreneurship. This not only leads to a decrease in the return on investment in education, but also poses certain difficulties and challenges to students' career development. This is not only a problem in the allocation of educational resources, but also a problem that needs to be further considered in students' career planning.

4. INNOVATIVE STRATEGIES OF COLLEGE EMPLOYMENT AND ENTREPRENEURSHIP EDUCATION MODEL UNDER THE BACKGROUND OF DIGITAL TRANSFORMATION

4.1 Build a Digital Curriculum System

With the continuous advancement of digital technology, it has driven another profound transformation in higher education. In order to meet the learning needs of students in the new era and adapt to the rapid changes in industry development, universities need to actively build a digital curriculum system, deeply integrate traditional course content with digital technology, rather than simply stacking technology, in order to create a more vivid, interactive, and efficient learning environment. In the construction of digital curriculum system, colleges and universities should combine traditional teaching and Internet technology to create an online education platform that is convenient for students to

learn and provide more flexible and personalized learning paths for students. the emergence of blended learning mode allows students to no longer be limited by time and location, and can choose suitable resources according to their own pace and interests. In addition, students can also improve their practical skills through offline laboratories and workshops. This model not only enhances students' learning outcomes, but also cultivates their self-learning ability and innovative thinking. In addition, with the support of multimedia teaching resources such as videos, animations, interactive charts, etc., the course content can be greatly enriched, making abstract and complex concepts intuitive and easy to understand. the combination of visual and auditory senses can not only enhance students' interest in learning, but also deepen their understanding and memory of knowledge points.

4.2 Construction Of a Trinity Of Employment And Entrepreneurship Education Model

In the era of digital transformation, college education is facing great challenges and opportunities. In order to better cultivate the comprehensive quality of students, especially to enhance the ability of employment and entrepreneurship of students, colleges and universities need to actively build a new education model integrating theoretical teaching, practical operation and innovation and entrepreneurship. In the process of constructing this education model, colleges and universities need to do the following work: pay attention to theoretical teaching, strengthen practical operation teaching, and strengthen innovation and entrepreneurship education. [2]

4.3 Create a Digital Classroom

In the digital age, creating digital classroom has become an important direction of college education reform. Universities can use digital technology to build an interactive and engaging teaching environment, thereby increasing students' interest and motivation. Start from the following aspects. First of all, rationally introduce multimedia teaching resources, teachers can use multimedia such as pictures, videos, and audio to enrich teaching content, making abstract knowledge points vivid and easy to understand. For example,

when telling historical events, students can play relevant historical video materials to more intuitively feel the historical atmosphere and deepen their impression of the knowledge points. The second, establish online discussion and real-time feedback mechanism, through a real-time feedback system, students can raise questions or suggestions in a timely manner, and teachers can provide targeted answers and adjust teaching content, thus forming a good teaching interaction cycle. the third, apply big data technology to teaching classroom, teachers can gain a deeper understanding of students' learning situations and needs by analyzing their learning data, such as learning duration, answer accuracy, and interaction frequency. [3]

4.4 Strengthen the Construction of Practical Education Platform

In order to train talents to meet the development needs of the digital age and further improve the overall level of employment and entrepreneurship education, colleges and universities need to pay attention to the teaching of students' theoretical knowledge and strengthen the training of students' practical ability and professional quality. Therefore, colleges and universities should pay attention to the construction of practical education platforms. In this process, universities should not only establish laboratories or practice bases on campus, but also conduct in-depth cooperation with external partners such as enterprises and industries to jointly create a real and challenging practice environment. Starting from the following aspects: colleges and universities should actively seek cooperation with enterprises, colleges and universities

should strengthen practical training and establish virtual practice platform.

5 CONCLUSIONS

In summary, under the background of digital transformation, universities not only face new development opportunities but also new challenges in carrying out employment and entrepreneurship education. In this context, if universities want to seize development opportunities, overcome numerous difficulties and challenges, and achieve innovation in employment and entrepreneurship education models, they need to fully utilize digital technology, build digital teaching resources and platforms, and cultivate more high-quality and innovative talents to better adapt to the development trend of the digital age. This will further promote the development of universities in the context of digital transformation and cultivate new era talents who lead social development.

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Knowledge Graph Empower the Construction of First-Class Courses in University Mathematics and Teaching Practice

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Abstract: This article discusses the construction of a knowledge graph based on first-class university mathematics courses, and the crucial role of knowledge graphs in the construction and teaching practice of first-class courses. Based on the knowledge graph, establish an effective teaching organization model, provide intelligent education services in a hierarchical and classified manner, and create new paths for independent learning for students at different levels, which is conducive to achieving the goal of cultivating outstanding talents.

Keywords: Knowledge Graph; First Class Courses; University Mathematics; Teaching Practice

1. INTRODUCTION

Currently, the world is in the period of the third industrial revolution driven by information technology and digital technology, and knowledge graph is an important branch technology of artificial intelligence. the State Council pointed out in the "Development Plan for the New Generation of Artificial Intelligence" that it is necessary to focus on breaking through technologies such as knowledge graph construction and learning, knowledge evolution and reasoning, and to achieve intelligent education by establishing a learner centered educational environment. At present, the teaching of university mathematics courses mainly adopts the traditional teaching mode, that is, teachers teach basic concepts, derive formulas, prove theorems, and explain typical examples. There are pain points such as overly abstract

knowledge points, outdated teaching methods, and insufficient class hours.

The concept of knowledge graph was first formally proposed in 2012, and its development can be traced back to semantic networks in the 1960s. In recent years, knowledge graphs have also been applied to some course construction. For example, Wang Fang and others have built a C++programming course system based on knowledge graphs [1], Guo Hongwei has built a knowledge graph for the Chinese medical history course [2], Tu Jianhua and others have built a calculus knowledge graph [3], and Yang Wenxia and others have empowered smart education with knowledge graphs using linear algebra as an example [4].

The course resources of first-class university mathematics courses provide a guarantee for building a knowledge graph, and the construction of a knowledge graph will also provide new ideas and methods for the construction of first-class courses, and provide new ways for talent cultivation in universities. Relying on the National Virtual Teaching and Research Office, research results can be promoted and radiated to other cooperative and similar universities, with a leading and demonstrative role.

2. BUILD A KNOWLEDGE GRAPH AND DESIGN A TEACHING PLAN BASED ON THE KNOWLEDGE GRAPH

2.1 Construct a course ontology system

Firstly, based on the positioning and requirements of the course in the students' graduation requirements, compile the teaching

syllabus and the course objective ontology system, establish the relationships among various objectives, and use them to guide and determine the ontology scope of the course. Secondly, summarize the core knowledge modules of this course and design the categories under the core knowledge modules, such as definitions, properties, theorems, applications, etc. Finally, establish the connections among the core knowledge modules and the various categories under them (including, predecessor, association, parallel, intersection, etc.).

2.2 Develop teaching resources for core knowledge modules

The development of teaching resources can help learners better consolidate course knowledge and expand their thinking, while also meeting the needs of "gender diversity and inclusivity" and supporting course objectives. The main development content includes teaching videos, courseware, knowledge point management exercises, homework, mathematical experiments, extended practical training, mathematical history, engineering applications, etc. These resources are associated with course objectives and course knowledge, ensuring that course objectives, course knowledge, and course resources complement each other.

2.3 Designing teaching plans based on knowledge graphs

The knowledge graph establishes a bridge between teaching resources, learning processes, and evaluation. Based on the concept of "three learning" and the principle of "one gender, one degree", the knowledge graph is used to design teaching, allowing students to learn more actively and efficiently. Based on the learning feedback in the application of the knowledge graph, the curriculum resources and teaching methods are continuously updated and improved, ultimately finding a reasonable and effective teaching organization method.

2.4 Explore new evaluation methods to cover the entire learning process

Knowledge graph covers a large amount of course resources and can also achieve deep mining of knowledge points and internal relationships, from knowledge background to theorem definition to professional application and development, meeting the personalized

needs of students. Based on students' learning records, it enriches the process evaluation methods and comprehensively evaluates whether students' course learning meets the requirements of course objectives.

3. THE IMPORTANCE OF BUILDING A KNOWLEDGE GRAPH

By constructing a knowledge graph, it is beneficial to improve the construction level of first-class mathematics courses in universities, achieve talent cultivation goals, promote teaching work, and have significant implications for improving teaching quality.

3.1 Digitizing and intelligentizing knowledge carriers through knowledge graphs is beneficial for improving the construction level of first-class courses.

Knowledge graph is a student-centered technique that constructs a knowledge network to structure and standardize linear algebra knowledge, while linking teacher experience with subject knowledge. Conducive to the digital transformation of knowledge, it is the most important carrier and tool for education and teaching, conducive to achieving deep integration of modern information technology and linear algebra education and teaching, and conducive to improving the construction level of first-class linear algebra courses.

3.2 Linking fragmented teaching resources through knowledge graphs, expanding knowledge capacity, and highlighting the advanced and innovative nature of first-class courses.

Knowledge graph builds a bridge between fragmented resources such as teaching resources, learning processes, and assessment and evaluation. Helps with deep learning by linking course knowledge points with background knowledge outside of the course, greatly expanding the limited knowledge capacity carried by a course. It is conducive to cultivating high-level applied talents with solid theoretical foundations, outstanding professional skills, and comprehensive application abilities.

3.3 Establishing personalized learning resources through knowledge graphs and providing intelligent education services through hierarchical classification is conducive to creating a new path for students

at different levels to learn independently and achieve the goal of cultivating outstanding talents.

Knowledge graph deeply explores knowledge points and their internal relationships, from knowledge background to definition theorems to professional applications and development. It can automatically mine academic terms and associations, and construct a vocabulary knowledge graph with knowledge points as the core. We can recommend learning resources that meet students' learning requirements based on their interests and learning situation. In addition, personalized learning paths and exercises can be provided for students based on their learning progress and understanding level. Creating a learner centered learning environment is conducive to creating a new path for students to learn independently, cultivating their ability to learn independently, and achieving the goal of cultivating outstanding talents.

4. CONCLUSION

The constructed knowledge graph of university mathematics courses includes course objectives, course content, and course resources, and establishes the relationship between the three to support each other, making the course ontology system more comprehensive and course resources more complete, which is conducive to improving course quality. Based on the knowledge graph, establish an effective teaching organization model, provide intelligent education services in a hierarchical and classified manner, and create new paths for independent learning for students at different levels, which is conducive to achieving the goal of cultivating outstanding talents.

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