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CROSS-CULTURAL COMMUNICATION STRATEGIES FOR ENGLISH TEACHING IN SPORTS MANAGEMENT UNDER THE CONTEXT OF GLOBALIZATION: THEORETICAL EXPLORATION AND EDUCATIONAL REFLECTION

ZiLin Cheng¹, Tao Luo^{2*}

¹Department of Management, Guizhou Vocational College of Sports, Huaxi 550025, Guiyang, China.

²School of Economics, Guizhou University, Huaxi District, Guiyang 550025, China.

*Corresponding Author: Tao Luo, Email: chewy_luo@163.com

Abstract: In the context of globalization, cross-cultural communication skills have become a crucial factor for the career success of sports management students. However, current English teaching strategies often fall short in fostering these skills, lacking systematic theoretical guidance and practical application. This paper aims to construct a theoretical framework of cross-cultural communication strategies to enhance the cross-cultural communication skills of sports management students within English teaching. Through a critical analysis of relevant educational and cross-cultural communication theories, the study proposes an interactive model integrating language strategies with cultural adaptation and explores how these strategies can be implemented in actual teaching. The findings indicate that cross-cultural communication strategies based on scenario simulation and interactive teaching methods significantly improve students' cultural adaptability and communication efficiency. This study provides specific guidance for curriculum designers and educators in higher education and offers insights for future educational policy development. The research contributes to deepening the application of cross-cultural communication theory and presents a practical strategic framework for sports management education in the context of globalization.

Keywords: Cross-Cultural Communication; Sports Management Education; English Teaching; Cultural Adaptation; Educational Strategies; Non-linear relationship

1 INTRODUCTION

In the context of globalization, sports management, as a highly internationalized field, faces increasingly significant challenges in cross-cultural communication. For students majoring in sports management, mastering cross-cultural communication skills has become a critical factor for their career development. Whether managing international sports events or operating global sports brands, students must be equipped with the ability to communicate effectively and adapt flexibly in diverse cultural settings. Cross-cultural communication skills extend beyond mere language proficiency; they represent a holistic competence that encompasses understanding and integrating into different cultural contexts[1]. This competency involves not only unidirectional language exchange but also cultural cognition, emotional adaptation, and non-verbal interaction. With the rapid globalization of the sports industry, cross-cultural communication skills have become essential for sports management students to succeed in their careers.

Despite the recognized importance of cross-cultural communication in sports management education, existing research has primarily focused on the manifestation and impact of cross-cultural communication abilities, with limited exploration of educational strategies. The application of cross-cultural education in actual teaching practice often lacks effective theoretical guidance and integration, limiting educational outcomes[2]. Therefore, this study aims to explore how to construct an effective set of cross-cultural communication strategies to help sports management students enhance this crucial ability in English teaching. Through this exploration, the study seeks to support curriculum design and educational reform and lay the foundation for future research in related fields.

The objective of this study is to propose a theoretical framework for cross-cultural communication strategies specifically tailored to the English teaching needs of sports management students. By developing this framework, the paper aims to provide concrete guidance for curriculum designers and educators in sports management programs to enhance students' cross-cultural communication abilities, preparing them for the challenges posed by globalization[3]. This research not only focuses on constructing a theoretical framework but also emphasizes combining these theories with real teaching scenarios to enhance the practicality and relevance of the educational strategies. Additionally, the study aims to provide reference points for policymakers in education to drive improvements and optimizations in teaching strategies.

To achieve this goal, this paper adopts a theoretical analysis approach. First, through a critical analysis of relevant theories, a theoretical framework for cross-cultural communication strategies is constructed. Then, the paper discusses how these strategies can be implemented in the English teaching of sports management programs and offers suggestions for improvement. Finally, the study reflects on the implications of the framework for educational practice and outlines directions for future research.

The structure of this paper is as follows: First, the core theories of cross-cultural communication are introduced and analyzed in the context of sports management education. Second, a theoretical framework for cross-cultural

communication strategies tailored to sports management students is proposed. Next, the paper reflects on these strategies based on current teaching practices and provides specific recommendations for optimization. Finally, the study concludes with a summary of the key findings and suggestions for future research directions.

2 LITERATURE REVIEW

2.1 Core Theories of Cross-Cultural Communication

The core theories of cross-cultural communication provide a foundation for understanding cultural differences and their role in communication. Cross-cultural communication involves more than just language exchange; it also includes cultural adaptation, understanding cultural backgrounds, and non-verbal communication[4]. Individuals from different cultural backgrounds are influenced by their cultural norms, values, and thought patterns during communication, making cross-cultural communication skills indispensable in the context of modern globalization. Particularly in fields such as management and education, cross-cultural communication theory has become a crucial topic for researchers and practitioners. Cross-cultural communication involves not only the cultural backgrounds of both parties but also the ongoing adjustment and adaptation to cultural differences, a dynamic process that is a key component of cross-cultural communication theory. Based on Gudykunst's theoretical model, cross-cultural communication emphasizes cognitive awareness of cultural differences and their adaptability in real-life interactions, providing a theoretical foundation for designing cross-cultural communication strategies.

2.2 Cross-Cultural Communication Needs in Sports Management Education

With the globalization of the sports industry, the need for cross-cultural communication in sports management education has become increasingly prominent. The management of global sports events, international sports brands, and operations of international sports organizations all require sports managers to possess high levels of cross-cultural communication skills[5]. In their future careers, sports management students will inevitably encounter multicultural work environments, making the cultivation of cross-cultural communication skills an important task in education. Research indicates that a lack of cross-cultural communication skills among sports managers can negatively impact work efficiency and project success when dealing with international teams, sponsors, media, and other stakeholders. Therefore, sports management education needs to incorporate cross-cultural communication strategies more deeply into curriculum design. Furthermore, cross-cultural communication needs extend beyond international operations and involve establishing effective internal communication within multicultural teams to improve management efficiency.

2.3 English Teaching and the Cultivation of Cross-Cultural Communication Skills

English, as a global lingua franca, plays a crucial role in the development of cross-cultural communication skills. English teaching is not only a process of imparting language skills but also a key step in fostering students' cross-cultural understanding and adaptability[6]. Particularly in sports management programs, English teaching should focus not only on language proficiency but also on cultivating students' communication strategies in multicultural contexts. By integrating English teaching with cross-cultural practices, students can enhance both their language abilities and their ability to meet communication needs in diverse cultural environments. Research shows that English teaching can effectively improve students' communication efficiency in international exchanges and enhance their ability to address cross-cultural challenges[2]. Therefore, incorporating cross-cultural communication strategies into English teaching has become a significant focus in educational research.

2.4 Current Teaching Strategies in Sports Management and Their Challenges

Although sports management education has recognized the importance of cross-cultural communication, current teaching strategies face various challenges in practice. Many sports management programs in universities have introduced the concept of cross-cultural communication, but they lack systematic teaching frameworks and practical methods[1]. Teaching content often remains at the theoretical level, with limited opportunities for students to apply cross-cultural communication skills in real-world scenarios, leading to a disconnect between theory and practice. Some studies have pointed out that current curriculum designs tend to focus on theoretical knowledge while neglecting the cultivation of practical communication skills. Additionally, the lack of diversity in teaching content and methods limits the development of students' cross-cultural abilities. Therefore, it is necessary to redesign teaching strategies by integrating both theory and practice to enhance students' cross-cultural communication skills.

Despite the valuable insights provided by existing research on cross-cultural communication strategies in sports management education, several shortcomings remain. First, most studies overly emphasize language skills while overlooking the comprehensive development of cross-cultural adaptability[5]. Second, existing research typically lacks a systematic theoretical framework, which limits the practical guidance of cross-cultural communication strategies in teaching[2]. The assessment methods for cross-cultural communication are relatively simplistic and do not fully reflect students' adaptability and communication skills in multicultural environments. Furthermore, the limitations of assessment methods make it difficult to comprehensively measure the effectiveness of cross-cultural communication training[6]. Future research should aim to develop a more comprehensive theoretical framework, create more effective

assessment tools, and explore ways to integrate cross-cultural communication strategies into sports management education to enhance students' overall cross-cultural competence.

3 THEORETICAL EXPLORATION AND FRAMEWORK DEVELOPMENT

3.1 Theoretical Foundations for English Teaching in Sports Management

3.1.1 Integrating educational theories with cross-cultural communication

The integration of cross-cultural communication and educational theories is crucial in sports management education. Educational theories such as constructivism and sociocultural theory emphasize students' construction of knowledge through interaction and cooperative learning, while cross-cultural communication enhances students' adaptability in multicultural environments. These theories provide a solid foundation for incorporating cross-cultural communication into English teaching, which helps improve students' cultural sensitivity and communication skills[4]. For example, Storm & Svendsen highlight the pivotal role of sports educators in cultural leadership, where they enhance students' cross-cultural communication abilities by designing purpose-driven activities and creating inclusive environments[7]. This cultural leadership extends beyond classroom teaching and guides students in responding to cross-cultural challenges in real-world work scenarios.

3.1.2 The role of english teaching in sports management education

English teaching in sports management education is not merely a language-learning process but a key component in cultivating students' cross-cultural communication skills. Borges et al. argue that the ability to communicate in cross-cultural environments is crucial for the career development of sports managers[5]. Therefore, English teaching should go beyond traditional language learning and focus on equipping students with communication strategies and adaptability in cross-cultural environments. The challenge of cross-cultural communication lies in the students' need to understand not only the language but also the cultural norms behind behaviors, which requires English teaching to incorporate more content from cultural contexts. English is not only the lingua franca in international sports management but should also serve as a bridge that helps students understand and adapt to different cultures.

3.2 Theoretical Framework for Cross-Cultural Communication Strategies

3.2.1 Interaction model between language strategies and cultural adaptation

In the context of cross-cultural communication, there is an interactive relationship between language strategies and cultural adaptation. Research shows that language is not just a communication tool but also a key factor in cultural adaptation[5]. For instance, in international soccer coach training, language strategies and cultural adaptation mutually reinforce each other, helping coaches integrate better into different cultural settings. This interaction model highlights the importance of combining language teaching with cultural adaptation strategies in cross-cultural education. This model is applicable not only to language learners but also provides direction for teachers to design more targeted strategies in cross-cultural teaching.

3.2.2 Framework for cross-cultural communication in sports management education

Constructing an effective cross-cultural communication framework requires the integration of language, culture, and adaptation strategies in a multicultural context[8]. propose a framework that integrates cross-cultural communication strategies in sports management, which includes multicultural understanding, the cultivation of communication skills, and the implementation of adaptation strategies. This framework provides theoretical support for sports management students to face cross-cultural challenges in the future globalized sports market. The framework not only helps students communicate in cross-cultural situations but also enhances their ability to resolve cultural conflicts in real-world work scenarios.

3.3 Educational Reflection and Strategic Analysis in the Context of Globalization

3.3.1 The impact of globalization on educational strategies

The impact of globalization on sports management educational strategies is reflected in the internationalization trends in curriculum design and teaching methods. Sports management education in the context of globalization needs to emphasize diversity and inclusivity to meet the demand for cross-cultural communication skills in the global market[6]. Globalization has not only changed the career development paths of sports management students but also raised higher requirements for their educational strategies, driving the innovation and implementation of cross-cultural educational strategies. For example, in the context of globalization, educational strategies should focus more on how students can take leadership roles in multicultural teams, which requires the incorporation of specific cross-cultural case studies in teaching design.

3.3.2 Specific educational strategies to address cross-cultural challenges

To address cross-cultural challenges, specific educational strategies should include cross-cultural communication scenario simulations, diverse teaching case studies, and the introduction of international collaborative projects[7]. These strategies can improve students' language proficiency and enhance their adaptability and communication skills in multicultural environments. For instance, by participating in the management of international sports events, students can better understand and address real cross-cultural communication issues, thereby improving their professional

competitiveness. Specifically, teachers should design multicultural scenario simulations in their courses to help students develop communication and adaptation skills in real cross-cultural challenges.

4 EDUCATIONAL REFLECTION AND TEACHING STRATEGY RECOMMENDATIONS

4.1 Reflecting on Current English Teaching Practices in Sports Management

4.1.1 *Issues and challenges in implementing cross-cultural communication strategies*

In the English teaching of sports management programs, implementing cross-cultural communication strategies faces numerous challenges. First, inadequate training of teachers in cross-cultural communication leads to a disconnect between theory and practice in teaching. Cross-cultural education often remains at the language level, neglecting the practical application of cultural adaptation and communication skills[9]. Additionally, the significant cultural diversity among students increases the complexity of teaching, as students from different cultural backgrounds vary in their ability to adapt in the classroom. To address these challenges, future curriculum design needs to integrate cross-cultural communication strategies more closely with practical application, ensuring the strategies are operational in teaching[10]. For example, teachers can use real-world work scenario simulations to help students better understand the impact of cultural backgrounds on communication, effectively bridging the gap between theory and practice.

4.1.2 *Summary of lessons learned from practice*

Despite the challenges in cross-cultural communication teaching, existing practical experiences provide valuable insights. Through scenario simulations and interactive teaching, many courses have successfully improved students' cross-cultural communication skills[11]. However, the effectiveness of teaching often depends on the flexibility of teaching methods and the contextual design of activities. Practice shows that teaching activities based on real cross-cultural situations are more effective in enhancing students' cultural adaptation and communication skills. Therefore, future courses should focus more on combining teaching activities with real work scenarios to ensure that students can apply the skills they have learned in different cultural contexts. Moreover, practical experience shows that regular course feedback and adjustment are crucial for improving teaching outcomes, and teachers should flexibly adjust teaching methods based on students' performance and feedback.

4.2 Optimizing Teaching Strategies for Cultivating Cross-Cultural Communication Skills

4.2.1 *Student-centered curriculum design and optimization*

Curriculum design should be student-centered, especially in the cultivation of cross-cultural communication skills, where it is necessary to consider students' diverse cultural backgrounds and career development needs. Research shows that case-based teaching methods and project-based learning can effectively enhance students' communication skills in cross-cultural situations. This design should not only cover cross-cultural scenario simulations and real-world cases but also flexibly adjust the course content to meet students' individualized learning needs. This student-centered curriculum design can help them better perform in future multicultural environments. For instance, teachers should customize learning paths based on students' cultural backgrounds and career goals to ensure the relevance and practicality of the course content. This student-centered curriculum design can help them better perform in future multicultural environments.

4.2.2 *Innovative teaching methods for cross-cultural communication skills development*

In terms of innovative teaching methods for practical learning, the integration of Information and Communication Technology (ICT) and international collaborative projects offers new avenues for the development of cross-cultural communication skills[10]. These technologies and projects allow students to collaborate with global peers through virtual platforms, enhancing their communication skills and cultural adaptability. Additionally, role-playing and cross-cultural communication simulations are effective teaching methods. These methods not only improve students' language proficiency but also help them practice cross-cultural communication skills in real situations, thereby better preparing them for challenges in their future careers[12]. These innovative teaching methods enable students to simulate cross-cultural exchanges in virtual environments, reducing cultural conflicts and communication barriers in real work scenarios.

4.3 Application and Future Development of Theoretical Strategies

4.3.1 *Implementation and practical validation of teaching strategies*

To ensure the effectiveness of teaching strategies, post-implementation evaluation and validation are essential. By integrating cross-cultural communication strategies with actual teaching, teachers can gradually test the effectiveness of these strategies in the classroom and continually adjust and optimize them based on student feedback[5]. This dynamic evaluation approach ensures that teaching strategies are applicable and feasible in different cultural contexts, helping teachers better understand the real effects of cross-cultural communication strategies and providing strong support for future curriculum development. Specifically, teachers should regularly assess students' performance in real cross-cultural situations and adjust course content accordingly, continually refining teaching strategies to meet the evolving demands of global education.

4.3.2 *Feasibility and future application of strategy promotion*

The promotion of cross-cultural communication strategies requires careful consideration of their feasibility and adaptability in different cultural contexts. Cross-cultural communication strategies can be promoted through modular teaching methods to accommodate the needs of different educational systems. Furthermore, these strategies require ongoing evaluation and improvement during the promotion process to ensure their wide application in a globalized context, providing practical solutions for enhancing cross-cultural communication skills[11]. Additionally, future research can explore how to promote these cross-cultural strategies through online learning platforms and international collaborative projects, offering new pathways for cultivating cross-cultural communication skills in the global education system.

5 CONCLUSION AND FUTURE RESEARCH

5.1 Research Summary and Theoretical Contributions

This study systematically explores the role of cross-cultural communication in English teaching for sports management programs and proposes relevant teaching strategies to enhance students' cross-cultural communication skills in a globalized context. By constructing a framework that combines cross-cultural theories with educational practice, this paper provides theoretical support for the cultivation of cross-cultural competence in sports management education. The main contribution of this research lies in deepening the understanding of cross-cultural communication and providing practical suggestions for effectively integrating these strategies into teaching[13]. This study not only expands the application of existing theories but also positively impacts educational practice by helping educators better address the challenges posed by cultural diversity in curriculum design. The theoretical framework of this study provides important references for constructing and applying cross-cultural communication strategies and lays the foundation for subsequent empirical research.

5.2 Implications for Future Educational Practice

This study offers several implications for future educational practice. First, educators should place greater emphasis on integrating cross-cultural communication strategies into curriculum design and utilize scenario simulation and interactive teaching methods to help students gain practical experience in multicultural environments[11]. Second, teachers need to flexibly utilize ICT tools to combine virtual platforms with cross-cultural education, thereby expanding the scope and impact of teaching[10]. Additionally, future course development should focus on students' diverse needs to ensure that cross-cultural communication strategies can adapt to different learning backgrounds and career goals. These insights are of significant guiding value for educational practice in the context of globalization and can help educators better cultivate professionals with cross-cultural competencies. Future educational practice should be more flexible in curriculum design, combining real-world work scenarios with student needs to ensure the effective implementation of cross-cultural communication strategies.

5.3 Future Research Directions and Empirical Suggestions

Although this study has made significant progress in theoretical construction and practical strategies, future research needs to delve deeper. First, future research can use empirical methods to validate the actual effectiveness of the cross-cultural communication strategies proposed in this paper across different cultural contexts. By collecting teaching data and conducting quantitative and qualitative analyses, researchers can better assess the effectiveness and applicability of these strategies[14]. Second, future research should focus on developing more universal cross-cultural communication assessment tools to better measure students' improvements in cross-cultural competence. Additionally, with the development of technology, future research can explore how to integrate more digital tools and innovative technologies into cross-cultural education to address the increasingly complex globalized education environment[15]. Future research should not only focus on the application outcomes of cross-cultural communication strategies but also explore how to promote the widespread implementation of these strategies through technological means and innovative approaches. Through ongoing research and practical improvement, cross-cultural communication education will play a more critical role in the future of sports management education.

COMPETING INTERESTS

The authors have no relevant financial or non-financial interests to disclose.

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RESEARCH ON INTELLECTUAL PROPERTY PROTECTION OF WORKS OF APPLIED ART IN CHINA

ZhenNi Zhang^{1*}, XuMin Ren²

¹Master's student at of Department of Translation and Interpretation & East Asian Studies, Autonomous University of Barcelona, Campus UAB, 08193 Bellaterra, Barcelona, Catalonia, Spain.

²School of International Law, China University of Political Science and Law, Haidian 100088, Beijing, China.

Corresponding Author: ZhenNi Zhang, Email: Zhenni.Zhang@autonoma.cat

Abstract: The development of human society is interwoven with the art, and people's aesthetic conceptions have also improved significantly with the progress of technology and the continuous emancipation of mind. Therefore, works of applied art have become more and more popular. This paper defines the concept of works of applied art, and expounds the differences between works of applied art, artworks and appearance designs. By referring to the laws and regulations of relevant countries, this paper emphasizes that works of applied art should have both practicality and artistry. Based on the analysis of the legal dilemma of works of applied art, such as the lack of clear legal provisions in legislation and the different judicial recognition standards, this paper puts forward some suggestions, such as the principle of selective protection of works of applied art, the application of copyright or patent protection to works of applied art, and standards of separation between practicality and artistry when revising the law.

Keywords: Works of applied art; Copyright; Patent right; Practicality and artistry

1 INTRODUCTION

In recent years, Kate Middleton has attracted a great deal of attention for the different and unique brooches she wears. The reason why people pay attention to the jewelry worn by Kate Middleton is not only because of the high international influence of her, but also because people favor practical and ornamental artworks. The works of applied art with dual characteristics are the mental labor of the designer while meeting the material and cultural needs of people. It is generally believed that such works should be protected by the intellectual property legal system, but how to protect them and which law should protect them are the core issues that scholars are currently discussing. In the face of the controversies in academic circles and the numerous cases in judicial practice, the exposure draft of the revision of the *Copyright Law* in 2014 explicitly introduced "works of applied art" into the scope of protection of this law.

2 THE DEFINITION OF WORKS OF APPLIED ART

Works of applied art is a type of work that is expressly protected by the *Berne Convention for the Protection of Literary and Artistic Works*[1]. With regard to the concept, WIPO has explained the following in the *Guide to the Berne Convention for the Protection of Literary and Artistic Works (Paris Act, 1971)* to describe the contribution of those who design and create clothing, furniture, wallpaper, jewelry, ornaments, gold and silverware in the field of art[2]. *The Guide* adopts the method of enumeration to express the concept of works of applied art. In the *Legal Glossary of Copyright and Neighboring Right* written by the World Intellectual Property Organization, a highly general approach is adopted to summarize the concept as follows: works of applied art include handicrafts and industrial manufactures[3].

As members of the *Berne Convention for the Protection of Literary and Artistic Works*, the United States, the United Kingdom, Germany, France, Italy, Russia, Japan, South Korea and other countries on all continents have provided legal protection for works of applied art. After entering the 21st century, China became a member of the World Trade Organization (WTO) and signed the WTO commitments including the *Agreement on Trade-Related Aspects of Intellectual Property Rights* (TRIPs), so it also became a member of TRIPs. TRIPs adopts the provisions of *Berne Convention for the Protection of Literary and Artistic Works* on the protection of works of applied art, and also includes works of applied art into the scope of legal protection. From the current situation of our country's legislation, the works of applied art have not been clearly defined by the intellectual property law, and there are different opinions on its concept in theory and practice. In the face of endless debates in academic circles, China stipulated "works of applied art" in the draft for comments on the revision of the *Copyright Law* in 2014. Although the revised draft endowed works of applied art with the legal concept, it was not passed in the legislation. This paper holds that in order to coordinate the orderly operation of various branches of the intellectual property legal system, it is necessary to clarify the protection of works of applied art in the form of legislation[4]. Clarifying the concept and content of "works of applied art" in the form of law will have positive significance for further clarifying the protection rules of copyright law and improving the predictability of law.

Comparing the current international understanding of the concept of works of applied art, it is found that the mainstream views include the following: some scholars point out that the necessary composition of works of applied art includes practical elements and artistic elements, which can only be called works of applied art if they have both elements at the same time. Take the provision of the *Berne Convention for the Protection of Literary and Artistic Works*

as a typical representative: only the intellectual creative achievements that have both artistic and practical elements of a work can be called a work of applied art[5]. In line with this view, common products that integrate external features and have aesthetic and practical properties, such as clothing, toys, furniture and other products closely related to human life. It is difficult to distinguish the external features determined by product functions and creative elements, so it is also complex to measure their legal nature. Some scholars point out that the relationship between the practical and artistic elements of a work of applied art is not inseparable, and only products with two elements separated are objects protected by law[6]. The U.S. *Copyright Act* is the most representative, defining it as: when designing and manufacturing a product with practical value, if the product has typical features in sculpture, carving and painting, and these features can be separated from the practical elements of the product and exist independently. This product can be called a work of applied Art. In line with this definition, it is common to see artworks printed on practical products, such as bedding with landscape paintings; or to directly make stereoscopic artworks into practical products, such as table lamps made of ancient beauty sculptures. Because the expression of practical value in such products can be separated from artistic creations, this method of judging legal attributes is relatively simpler compared to the previous one. Analyzing the above two understandings of the concept of works of applied art, this paper is more inclined to the first viewpoint, which states that only products with practical elements that cannot be separated from artistic elements can be called works of applied art[7]. To sum up, this paper explains the concept of "works of applied art" as follows: artworks with originality and fixed intellectual expression in some form, both aesthetic and practical, and their modeling can be stereoscopic or planar.

3 THE CHARACTERISTICS OF WORKS OF APPLIED ART AND THE DETERMINATION OF THEIR INDEPENDENT STATUS

Compared with the previous two amendments, it is a new concept endowed in the third amendment draft of Chinese *Copyright Law*. However, the independent status of "works of applied art" cannot be established because there is still no unified expression of meaning. This paper argues that it is necessary to use for reference the relevant foreign legislation and base on the basic principles of copyright law to distinguish it from other easily confused objects of intellectual property law, and objectively express the connection between the artistry and practicality of works of applied art.

3.1 Determination of the Independent Status of Works of Applied Art

Through the above interpretation of the definition of works of applied art, it is concluded that works of applied art protected by copyright law should first meet the following five conditions: "expressiveness", "originality", "scope" "replicability" and "legitimacy" (some scholars also call them "characteristics"[8]). At the same time, it has both practical function and aesthetic significance. The rich content contained in the concept, to a certain extent, is also the embodiment of the characteristics of works of applied art[9]. The feature discussed in this paper is to compare the works of applied art with the objects protected by the relevant intellectual property laws. On the basis of clarifying the confusing concepts, we can make a profound understanding of the connotation of works of applied art from a deeper perspective, and promote the continuous improvement of the legal protection system of the intellectual property law of domestic works of applied art.

First of all, by comparing works of applied art with artworks, it can be seen that artworks come from the creators' creative ability to show their perception and understanding of the world in the form of painting, which determines that they have a strong attachment to the creators. The nature of works is their natural attribute, which should be included in the protection scope of copyright law; however, from the perspective of judicial practice, the legal category of "artworks" is expanded[10], and then works of applied art are introduced into the protection scope of copyright law. As for the relationship between the two, some scholars point out that when defining the legal category of artworks in China, works of applied art are introduced into it, that is, into the scope of copyright law protection; Artworks can be divided into pure artworks and works of applied art. However, this paper believes that there is a connection between the two, but it is not limited to the inclusion relationship in the literal meaning. Regarding "artworks", China's *Enforcement Regulations of the Copyright Law* defines them as follows: calligraphy, painting and sculpture that present aesthetic value through the use of color, line and other means, and their forms can be three-dimensional or planar. It seems that works of applied art should be a kind of artworks, but in fact it is not. As a kind of spatial visual art, the fundamental value of artworks is to provide visual experience to the viewer, without the practical function that works of applied art have. In addition, referring to a document of the World Intellectual Property Organization and UNESCO in December 1986: artworks do not include architectural works, works of applied art, or photographic works. And the *Berne Convention for the Protection of Literary and Artistic Works* also juxtaposes works of applied arts with artworks, and sets the term of protection for works of applied arts at 25 years, distinguishing them from artworks in terms of protection period. In summary, although the current law has included artworks and works of applied art in the scope of protection and both are rich in aesthetic value, there is a fundamental, i.e., whether they are functional or not. International conventions and relevant documents have made it clear that the two are parallel rather than inclusive.

Second, through the comparison of works of applied art and appearance designs, it is found that the appearance design in the current domestic patent law is a work with color and graphics as the design object and specific products as the carrier. Bed sheets with exquisite patterns and lamps with elegant appearance are all appearance designs. However, the appearance design only stresses "beauty" and does not meet the requirements of modeling as a artwork. Therefore, it is

also a table lamp with beautiful shape. The table lamp sculpted into the shape of an ancient beauty meets the establishment conditions of works of applied art. It is also a curtain printed with beautiful patterns. The curtain printed with landscape paintings meets the establishment conditions of works of applied art. Because of their high artistic requirements, their shapes and patterns have met the requirements of artworks. In addition, the appearance designs of industrial products must be able to be manufactured repeatedly in batches through industrial production methods, but works of applied art including the handicrafts of skilled craftsmen are unique and cannot be mass-produced by industry. Through the comparison, it is found that compared with the appearance design, the conditions of works of applied art are higher, so after the legislator brings works of applied art into the protection scope, the future artists and designers can propose to obtain legal protection with works of applied art or appearance designs according to the different standards of the design creation. Considering that there is always a strong connection and similarity between the two, if works of applied art are defined in the copyright law, the provisions of the copyright law on the protection period of works should be observed (25 years from the date of publication). In this situation, it is bound to conflict with the appearance design protection period in the patent law (15 years from the date of application) and even the appearance design patent legal system.

To sum up, there are obvious differences between works of applied art, artworks and appearance designs, which cannot be simply classified into any one of them. Therefore, when discussing the legal protection of works of applied art, it is necessary to provide accurate provisions according to their characteristics[11].

3.2 The Differences between "Practicality" and "Artistry"

First of all, it should be clear that works of applied art are a kind of special works. Such works not only require the "five characteristics" of works protected by copyright law, i.e., they can become works protected by copyright law first. Based on the legal provisions, this paper summarizes scholars' discussions on the characteristics of works in the sense of copyright law, and believes that the characteristics mentioned by scholars are more appropriately referred to as the conditions for the establishment of works. The "five characteristics" should be the conditions for the establishment of works protected by copyright law.

Second, such works should have both practical functions. Compared with ordinary artworks, practical function is a higher requirement for artworks. Therefore, if "five characteristics" conditions are required for ordinary works to be protected by copyright law, then works of applied art need to have "six characteristics". The "practicality" is integrated with the artistic expression of artworks. For example, the practical function of a brooch in the shape of a branch is to provide decorative clothing for women, and its necessary carrier is the artistic shape. If the product loses its artistic shape, it will disappear, and its practical function will no longer exist. For ordinary products, the practical function is a certain use, useless products do not have the practical function. Under the theory that practical elements and artistic elements can be separated, the curtains with beautiful patterns belong to a kind of works of applied art, but it is not realized that there is no correlation between the practical function of the product and its patterns. Take brooches and curtains as examples. If someone files a lawsuit against the manufacturer of the product because the shapes and patterns used by the manufacturer are piracy and infringement, and the evidence is conclusive, the court will make the following ruling: for the brooch manufacturer, the court will terminate the continuous production, but for the window curtain manufacturer, the court will only prohibit the continuous use of patterns, and will not restrict its continuous production. That is to say, curtain manufacturers can continue production by changing patterns. It can be seen that there are differences in the object of litigation between the two. The former takes the brooch, a work of applied art integrating artistic elements and practical elements, as the object of litigation, while the latter takes the pattern, that is, the artwork printed on the curtain, as the object of litigation, rather than the work of applied art itself.

In the United States, based on the separation of artistic elements and practical elements, works of applied art are included in the scope of legal protection, which is inseparable from the type of legal sources of case law[12]. For a longer period of time, U.S. legislation did not protect works of applied art through copyright legislation, and the formal inclusion of functional works into the protection of copyright law was marked by the enactment of the U.S. *Copyright Act* (1949), and it was not until after the case of *Mazer v. Stein* (1954) that the principle of separation characteristics and independent existence was established[13]. As a case law country, the reason why the United States adopts the principle of separation of practicality and artistry to protect works of applied art is inseparable from the uniqueness of the objects protected by each separate law in the intellectual property law of the United States compared with other countries. In the provisions of "design patents," U.S. patent law does not explicitly include "practicality" as a requirement, which differs from the provisions of other countries. In the United States, the inventor of a new, original and decorative design relying on the product may apply for a patent right in accordance with the provisions of the *Patent Law*. It can be seen that the necessary conditions for U.S. patent law to grant a design patent are: product, creativity and decoration, but excluding the practical condition. In 1964, the court of customs and patent appeals made clear the following provisions through a judgment: if the design is mainly characterized by practicality rather than decoration, in this case, the design does not fall within the scope of patent law protection. Therefore, it can be inferred that the design protected by the U.S. patent law excludes the works of applied art from the protection scope of this law because it is not practical. Copyright law pays attention to the expression of ideas, and the expression needs to rely on a certain carrier. Works of applied art express artworks through practical products. Therefore, the United States Copyright Law stipulates that artistry and practical products must be separated, which is reasonable according to its own laws.

Third, through the application of language logic and grammatical conventions, if we make a grammatical division of "works of applied art", we will find that "works of applied art" itself is an inseparable noun. Such works can be called works of applied art only when they have the "six characteristics" discussed above and have both artistic elements and practical elements. However, if according to the provisions of the U.S. copyright law, the works of applied art defined by China's copyright law are divided into "practical" and "artworks", that is, practicality is only an attribute of artworks, as long as they are practical, the practicality is beyond question. Fundamentally, this kind of work exists only as a simple and pure artwork, and its use is limited to industrial manufacturing. If we classify them as simple and pure artworks, and also classify them as works of applied art, which undoubtedly expands the scope of legislation.

4 THE DILEMMA OF INTELLECTUAL PROPERTY PROTECTION OF WORKS OF APPLIED ART

With regard to the legislative protection of works of applied art, China still faces certain difficulties at the legislative level, which is due to the fact that the existing copyright laws and regulations in China only focus on artistic expressions and ignore the same legal attributes between pure artworks and works of applied art, and are influenced by the concept and practice of including works of applied art into the scope of copyright legal protection, while ignoring the different aesthetic attributes between the two, thus affecting the scientificity and rationality of legal protection policies.

4.1 Legislative Level-lack of Clear Legal Norms

At present, there are no specific provisions on the protection of works of applied art at the legislative level, and even the name of "works of applied art" is inconsistently used in Chinese laws and regulations and judicial practice: the State Council issues the "13th Five-Year Plan" notice on intellectual property protection and other administrative regulations use the wording of "works of applied art"; in the *Provisions on the Implementation of the International Copyright Treaties*, it is called "foreign works of applied art"; in practice, some judges are often confused about the use of concepts such as "works of applied art" and "practical artworks"[14].

At first, China joined the *Berne Convention for the Protection of Literary and Artistic Works* in 1992, but what conflicts with the convention is the *Copyright Law* (1990 edition) implemented at that time in China. Considering that it is not easy to distinguish from pure artworks, industrial designs and arts and crafts, it is not clearly stipulated that works of applied art should be listed as the object of copyright and protected, and the *Berne Convention for the Protection of Literary and Artistic Works* requires China to fulfill the obligation to protect such works.

In the absence of the legal basis protected by the *Copyright Law* (according to article 7 of The *Copyright Law* of China in 1990 edition, the application of industrial property law takes precedence over copyright law in the legal system for protection of scientific and technological achievements), some scholars even put forward the conclusion: the works of applied art cannot be protected by copyright law, and it is suggested to regulate them by *patent law*. However, among the three types of objects protected by the Patent Law, only the appearance design is related to the works of applied art. This law set for design of the protection period for 15 years, which is far from the minimum protection period (25 years) set by the convention. In view of this, in order to follow the convention and protect the legitimate rights and interests of copyright owners of foreign works, China has promulgated and implemented the *Provisions for the Implementation of the International Copyright Treaties* in 1992, which sets a protection period of 25 years for foreign works of applied art, starting from the date of completion of the work. Animation image design and other artworks as industrial products are excluded from application. Since then, China has included works of applied art into the scope of legal protection for the first time. However, according to the legislative purpose and content of this regulation, works of applied art created by Chinese nationals are still not protected and creators do not enjoy copyright.

In the process of the second amendment of the *Copyright Law*, it was considered whether to protect works of applied art through legislation. In the third amendment of the *Copyright Law*, works of applied were included in the scope of objects to be protected in the exposure draft. In response to the amendment of the *Copyright Law*, the *Copyright Law (Revised Draft for Examination)* promulgated in China in 2014 explicitly included works of applied art as a type of work in the form of enumeration, which indicated that the legislators were inclined to protect works of applied art by copyright[15]. But because it is difficult to clarify the relationship between the pure artworks and works of applied art, design and works of applied art, works of craft and works of applied art, and it is also difficult to distinguish works of applied art from designs and works of craft, so the issue of protection of works of applied art is still not clarified through legal forms in the *Copyright Law (The Third Amendment)* in 2020. In addition, the current *Copyright Law* in China lists the types of works that can be granted copyright, and the scope of protection does not include all the contents of the works. Facts, emotions, thoughts, rules and contents related to the public sphere are not included in the scope of protection.

4.2 Judicial Level-inconsistent Understanding in Practice

Although the legal protection of works of applied art is not clearly defined in the current legislation, there have been some disputes about such works in the judicial field in China. According to the relevant data of China Judgments Online, there were 180 court cases concerning works of applied art from 2014 to 2023, many of which were concluded in the second instance and the retrial procedure. It can be seen that since there is no relatively unified protection standard for works of applied art as the basis in China, the parties still have disputes over the verdict and even appeal or apply to the High Court for a retrial to resolve the disputes.

Those that attract social and media attention, such as "the case of Lego Company v. Guangdong Small White Dragon Toy Company for copyright infringement", "the case of Italian OKBABY Company v. Cixi Jiabao Company to children's commode copyright infringement" and "the case of Hu Sansan v. Qiu Haisuo and China Art Gallery for infringement of artistic clothing works". These cases emerge in endlessly, but due to lack of specific legal basis, the courts accepting this kind of cases have complicated reasons and different results. The dispute over the copyright of Lego and Coco Toy blocks in 2002 is the first time that the works of applied art created by foreign citizens are included into the scope of legal protection through judicial decision in the field of judicial practice in China, which is the concrete practice of the *Provisions of the Implementation of the International Copyright Treaties* in China. This case has a milestone significance in China's intellectual property disputes. According to the final verdict made by the court, it confirms the "super-national treatment" granted to the creators of foreign practical works of art by Chinese laws and regulations. However, in some specific cases, it was judged that the protection period of foreign works of applied art was only 25 years, which was based on the relevant provisions of the *Provisions on the Implementation of International Copyright Treaties*. This period was significantly less than the protection period of 50 years before the death of the author of the artworks, which violated the "national treatment" in the TRIPs, such as the Italian OKBABY children's commode case and the Hu Sansan clothing design case. The courts tried to avoid the judgment of works of applied art, took a detour, identified the works involved as artworks, and made a judgment. Most of the judgments are based on the relevant provisions of the Chinese *Enforcement Regulations of Copyright Law*, which classifies works of applied art as a kind of artworks[16]. "The case of Crosplus Company in Shanghai v. Beijing Zhongrong Hengsheng Industry Company. and Nanjing Mengyang Furniture Sales Center infringement of copyright dispute" is the 28th batch of guiding cases issued by the Supreme People's Court in 2021. After hearing the case, the court found that the "Tang Yun Cloakroom Furniture" of Crosplus Company, as a three-dimensional modeling artwork with both practical function and aesthetic significance, belonged to the artworks protected by the copyright law. The case clarifies that the copyright law protects the artistry rather than the practicality of works of applied art.

By analyzing the verdicts in the above cases, we conclude that at the present stage, the protection of works of applied art by domestic copyright law is relatively confusing, and in judicial practice, judicial officers are unable to accurately grasp the concept, connotation and protection mode of works of applied art, and their judgement criteria are mostly based on reasoning, thus making different verdicts for the same cases[17]. This is ultimately the result of inconsistent understanding of the concept of works of applied art by judicial officers, or they who do not distinguish between practical functions and directly examine the originality of artistic elements, or only focus on demonstrating the legitimacy of the incorporation of works of applied art into artworks. The paper holds that it is particularly important to clarify the concept and connotation of artworks and works of applied art in the process of hearing cases, and adopt differentiated protection strategies from the characteristics of the works. Unlike artworks which can be protected by copyright laws with their entire contents, the artistic elements in works of applied art should rightfully be included in the protection of copyright laws, and in addition to the originality element of artistic components of artworks, the practical functions possessed by works of applied art should also be examined. Therefore, in judicial practice, works of applied art should not be regulated according to the classification of artworks.

At the same time, from the perspective of the current legislative system, works of applied art of Chinese citizens have not been clearly defined in legal form, which makes domestic works and foreign works "double treated", frustrates the enthusiasm of domestic creators and damages the interests of Chinese intellectual property rights holders[18].

5 SUGGESTIONS ON IMPROVING THE INTELLECTUAL PROPERTY PROTECTION OF WORKS OF APPLIED ART

5.1 Apply the Principle of Selective Protection

As is stated above, works of applied art meet the conditions for the establishment of works protected by copyright law, and at the same time, they also have a typical characteristic that other works do not have, namely, practical value. Therefore, if they are only protected by copyright law, it seems to be against the characteristics of such works. However, if they are also protected through the application of the patent law, the creators can enjoy copyrights and patent rights at the same time and get the double protection. It will violate the principle of fairness and harm the interests of the others and even the public interests because of excessive protection[19]. Therefore, aiming at the problem of how to protect works of applied art, this paper proposes selective protection for works of applied art and gives creators the right to choose between copyright law and patent law.

For those who propose to be protected by copyright law in the form of works of applied art, the applicant shall submit a letter of commitment. The reason for the adoption of the letter of commitment is to consider the adoption of creative protectionism in the copyright law, that is, no registration is required, as long as the work is completed independently and meets the "five characteristics", the copyright can be obtained. Once the designer has made a written promise, it means that they enjoy the copyrights of their works, which indirectly eliminates the possibility of obtaining patent rights[20].

The reason why this paper adopts the letter of commitment is to consider that in reality, some copyright owners who have obtained copyright of works of applied art will apply for design patents before the expiration of the limited period of rights in order to obtain more benefits, so that their rights can be extended indefinitely.

For those who have proposed to protect the design patent by the patent law at the beginning, if it is found that the shape

meets the establishment conditions of the artworks after the application is submitted, they can apply to the Patent Office for revocation of the patent right before the patent is granted. And within one month from the date of issuance of the cancellation notice, designers shall be given the right to submit an application for a letter of commitment for works of applied art to the National Copyright Administration. Once submitted, the application for patent protection shall be deemed to be waived.

5.2 Applicable Situations of Copyright or Patent Protection

After the completion of works of applied art, this paper puts forward the following suggestions on the applicable situations of creators' copyright or patent protection for their works.

First, from the perspective of work types, if the work of applied art is mainly hand-made by the creator and designer, this paper holds that it is more appropriate to adopt the copyright law protection model. Because the creative activity is closely related to the state of mind of the creator at that time, the equipment used and the environment in which the creator is located, it is difficult for the creator to make a second identical practical handicraft, not to mention mass production. Therefore, it is suggested that the creator should consider using copyright law to protect the practical handicraft.

Second, in terms of the degree of originality, the creativity of a work protected by the copyright law only requires originality. Even if the creative degree of the work is not high, or there is a certain similarity with the existing work, as long as the designer completed the creation independently, the copyright law will protect it. The design patent protected by the patent law requires originality, which is the first design creation completed by the creator of works of applied art. And it is highly original, novel compared with the existing design, convenient for mass production in industry and can obtain the protection of the patent law[21].

Third, in terms of the strength of protection, under the protection mode of copyright law, works of applied art are protected from the date of their creation, without excluding other independent creators from completing the same creation. In contrast, the patent law protection of the design patent has exclusivity. Without the authorization of the patentee, no one has the right to manufacture, sell, import or offer for sell products with the same design. The difference in the strength of legal protection determines the protection period granted by law. As mentioned above, most foreign countries usually set the term of copyright protection for works of applied art as 25 years, and the starting date is the date of completion of the work[22]; while the design patent has a shorter period of protection. Chinese patent law provides for 15 years from the date of patent application. This requires the designer to weigh up and make reasonable choice.

5.3 Clear the Standards of Separation of Practicality and Artistry

In the judicial practice of our country, there is no specific legal basis for the continuous reform of the law. However this method does not fill the gap well, but produces different judgment standards. In the revision of the *Copyright Law*, we can bring the standard of works of applied art into the consideration of defining its concept. As the basic principle of Chinese *Copyright Law* is to protect only the form of expression, the significant difference between it and the *Patent Law* is that its scope of protection does not cover the subjective aspects such as the feelings and thoughts of designers. If it is only clear that a work of applied art has artistic elements and practical elements, but there is no corresponding standard of whether it is separated, it will result in the right concurrence or repeated protection in judicial practice.

For works of applied art, the laws of most European countries clearly stipulate that the condition of copyright or copyright protection for works is the integration of their artistic and practical characteristics. Meanwhile, the domestic academic research field also points out that if the two characteristics are separated, for the artistic elements of the works, they should be attributed to a kind of artworks to be protected. Therefore, the paper holds that, in order to prevent the practicality in the public domain from being affected by copyright protection, it is suggested that the specific provisions of Article 101 of the U.S. *Copyright Law* can be referred to, i.e., the standard of separating "practicality" and "artistry" should be taken as the legal basis for the specific identification of works of applied art in judicial practice. This is not only the development trend to adapt to judicial practice, but also will help to ensure that the court can make a fair judgment when handling infringement cases of works of applied art.

In addition, in judicial practice, it is not rigorous enough for the court to separate practicality and artistry without emphasizing whether these two characteristics can exist independently. However, if it is required that the practicality and artistry of works of applied art should be both separated and independent of each other, this too strict standard also does not conform to the basic principle that the scope of copyright protection does not include practicability. Whether the practicality can exist independently or whether the articles are also practical after separation are all issues that need to be studied in the further revision of the copyright law. In the case of introducing works of applied art into the protection scope of copyright law, we should specify the establishment conditions for the independent existence of artistic elements of works. In addition to the fact that artistry is separated from practicality and can exist independently in the "physical separation", it should also be shown that on the basis of separation, the artistic elements in works of applied art can continue to exist in other media or exist alone, which constitutes a complete separation process, and such a judgment standard is more reasonable.

6 CONCLUSION

The protection of intellectual property rights of works of applied art has always been a controversial issue, and it is also the problem to be solved in this paper. There is a great disagreement between China's theoretical and practical circles on the concept, characteristics, relationships with artworks and designs, as well as the independence of the status of the works themselves, which is obviously not conducive to the effective protection of works of applied art. In this regard, this paper proposes that works of applied art are intellectual expressions with originality and can be fixed in some form, which are both aesthetic and practical, and should be treated as independent objects for legal protection of intellectual property. On the other hand, in view of some problems in the legislation and judicial practice, this paper proposes to apply the principle of selective protection and to clarify the standard of separating practicality and artistry in the legislation.

On this basis, the following two factors should be considered in the future: the first is the standard of selective protection of works of applied art. Since double protection is against the principle of fairness, works of applied art should be protected by copyright or patent right. Therefore, it is particularly important to establish the judgment standard for selective protection. This paper only enumerates several common applicable cases, which should be combined with the actual situation of our country in the future to form a systematic applicable standard. The second is the standard of separating practicality and artistry. Separating the practicability and artistry of works of applied art can effectively avoid the occurrence of rights concurrence or repeated protection in judicial practice. In the future, we should take the general principles of intellectual property law as the starting point, fully consider the judgment basis in judicial practice and the principles of extraterritorial treatment, and strive to integrate a set of objective evaluation standards.

COMPETING INTERESTS

The authors have no relevant financial or non-financial interests to disclose.

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WHAT ARE DISEASE METAPHORS? A CRITICAL DISCOURSE ANALYSIS OF THE HEALTH COMMUNICATION OF "STROKE" IN SHORT VIDEOS

ZhiYuan Yang

*School of Journalism and Media, Southwest University, Beibei 400799, Chongqing, China.
Corresponding Email: 15736223713@163.com*

Abstract: From Susan Sontag's critique of the metaphors of tuberculosis, cancer, and AIDS to the fact that "stroke" has become the leading cause of death in China, the focus of disease metaphors has been shifting and changing. With the innovation and development of new media technology, "stroke" has been continuously constructed in the context of short videos, giving rise to new types of metaphors, which have been continuously shaped and strengthened with the progress of society and changes in media ecology. This study focuses on the text of "stroke" short videos and adopts Fairclough's framework of critical discourse analysis. At the textual level, it covers the two dimensions of vocabulary usage and textual structure to reveal the discourse mode of "stroke" short videos in the discourse of disease; at the level of discourse practice, it analyzes the user stickiness of the short videos through the user's critical discourse analysis. At the discourse practice level, we analyze the deep-seated motives of the formation of the "stroke" short video metaphor and its dynamic evolution through the analysis of user stickiness, the exploration of communication misunderstandings and the study of the phenomenon of communication generalization in a multi-dimensional way; at the social practice level, we reveal the discourse power structure behind the metaphor of "stroke" short video, and the discourse structure of "stroke" short video. At the level of social practice, the study reveals the discursive power structure behind the "stroke" short video metaphor, and puts forward a critique of the distortion of information dissemination on short video platforms. At the same time, this study explores the potential impact of such metaphors on the power structure of public health awareness, providing a new paradigm for understanding the social impact of disease metaphors in the new media environment.

Keywords: Stroke; Short videos; Metaphors of illness; Critical discourse analysis

1 INTRODUCTION

What is the disease metaphor for?

Going back in time, Susan Sontag, in her book *The Metaphor of Disease*, analyzes how tuberculosis, cancer, AIDS, etc., have evolved in social contexts to go beyond their physiopathological realm to function as moral judgments and social metaphors. She emphasizes the importance of confronting such "metaphors" and suggests that "disease is the dark side of life, a more problematic form of citizenship" [1] This phenomenon reveals that in the media environment, disease information is continuously metaphorized, and its original medical meaning is often deconstructed and reshaped by social discourse, leading to the socialization bias of information dissemination. For example, the social segregation and stigmatization encountered by cancer patients have highlighted the transformation of disease information from a scientific category to a social symbol, which contributes to the widespread perception that "cancer is a bad thing" and aggravates the "fear of cancer". This has contributed to the widespread perception of "cancer" and exacerbated the phenomenon of generalization in the spread of the disease.

Focusing on the present day, stroke is becoming increasingly significant as a highly fatal and sudden health threat, especially in the elderly population. Data from the China Stroke Prevention and Control Report 2019 and the Global Burden of Disease (GBD) study point out that China's lifetime risk of stroke tops the global list, making it the leading factor affecting the health and quality of life of adults in China. At the same time, the widespread dissemination of stroke on short video platforms not only demonstrates the rapid circulation of disease information, but also reflects the complex discourse construction and metaphorization trends in the information dissemination process. As a field where "UGC" (user-generated content) and "PGC" (professionally-generated content) are intertwined, short videos are not only a bridge for knowledge sharing, but also a hotbed for abuse of marketing tactics, which is filled with false advertisements and misleading information, challenging the boundaries of public perception and health information dissemination. It challenges the boundaries of public perception and the authenticity of health information dissemination.

In view of this, this study aims to apply Fairclough's critical discourse analysis framework to focus on the works of representative short-video bloggers, such as "Dr. Ding Xiang", "There is a technique in my heart", and "Wei Zi on the road of medicine". Focusing on the works of representative short-video bloggers such as "Dr. Ding Xiang", "The Art of Heart" and "Wei Zi", the study analyzes the specific forms and cultural meanings of the health communication of "stroke" in the short-videos. Following the analytic path of "text-discourse-practice-social practice", the study aims to explore the following questions: How do short videos present the content of "stroke" health communication? How is

this content constructed and metaphorized? What kind of communication logic and discursive power structure is implied behind this process?

In order to answer the above questions, this study used the Shake App platform to collect relevant video contents in the past year (April 6, 2023 to April 6, 2024) by using "stroke" as the keyword, and selected 546 short videos with high number of likes and comments after filtering and de-emphasizing, and then carried out detailed textual analysis in order to reveal the discourse mode of "stroke" health communication and its social impact in the short video context. After screening and de-weighting, a total of 546 short videos with high likes and comments were selected for detailed textual analysis, with the aim of revealing the discourse patterns of "stroke" health communication and its social impact in the context of short videos.

2 TEXTUAL ANALYSIS: THE SHORT VIDEO "STROKE" AS A METAPHOR IN THE DISEASE DISCOURSE

"The text dimension is concerned with the linguistic analysis of texts" [2]. Compared with the metaphorical mechanisms of cancer, AIDS and other diseases analyzed by Susan Sontag, the metaphorical performance of "stroke" on short video platforms presents a distinctive feature of the times, i.e., the formation and proliferation of this metaphor is closely dependent on the rapid development of media technology, especially the rise of short video as an emerging form of media. Therefore, when exploring the metaphorical construction of "stroke" short video, it is necessary to place it in the specific textual context of short video for examination and analysis. Through this approach, we can more accurately reveal the construction path of the short video discourse of "stroke", and understand how it gradually builds up a unique and complex metaphorical system under the impetus of media technology.

2.1 Vocabulary Expression: from "Medical Terminology" to "Social Interpretation"

"Discourse is a mode of organizing knowledge, thought, or experience rooted in language and its historical or institutional context, and a discourse system is both a discourse system and a context or paradigm." [3] Thus, the medical term "stroke" has continued to evolve within the historical medical language system, creating a unique discourse system and contextual framework within the specialty. Following Susan Sontag's point of view - "stripping away the meanings that cling to illness and letting illness present itself as illness" [4], we recognize that illness is essentially a direct reflection of the medical field, and a cornerstone of the patient's quest for self-knowledge and liberation. and the cornerstone of the patient's quest for self-knowledge and liberation. Further, given that "the producer of a text is always faced with the problem of choosing words and expressing meaning" [5], the analysis of the discourse of "stroke" focuses primarily on its lexical-textual dimension. Specifically, "stroke" was originally defined as "a clinical syndrome of delayed brain damage caused by hemorrhage from rupture of blood vessels in the brain parenchyma, surface, and ventricles due to hypertension and atherosclerosis" [6], which highlights the "sudden" and "sudden-onset" nature of the disease and the "sudden-onset" and "sudden-onset" nature of the disease. This definition highlights the "sudden" and "delayed" characteristics of the disease. However, in a rapidly changing technological and media environment, although "stroke" is still a sudden-onset disease, similar to the non-metaphorical "heart attack" disease according to Susan Sontag, it has gradually gained popularity due to the wide dissemination of the media and the high level of social attention. However, due to the wide dissemination of the media and the high attention of society, it has gradually acquired a new metaphorical dimension. The accelerated pace of society has shifted the disease metaphor from the individual moral level to the media level of multi-platform and matrix communication, and in this process, "stroke" has been metaphorically transformed.

With the development of media technology and the change of living conditions, "fast life" has become a social norm. Although the term "stroke" has always carried a medical concept since its birth and has not been separated from the medical field, the arrival of the visual era, especially the rise of short video platforms, has "created a visual climax at the fastest pace, even requiring a visual highlight that can catch people's eyes in a few seconds" [7], with the increasing number of patients suffering from "stroke" until it jumps to the top of the list of fatal diseases, related short videos are flooding the self-media platforms, and the vocabulary expression of "stroke" is utilizing diversified visual language and short-video narrative techniques to express the term "stroke" in a way that is more suitable for the public. The expression of the term "stroke" utilizes diverse visual languages and short video narratives to closely tie "stroke" to health issues. Through diversified visual language and narrative techniques, the short videos not only disseminate knowledge about the disease, but also construct a social metaphor for "stroke" in a subtle way. When the concept of health is expanded to include physical well-being, mental health, and "compatibility with the socio-cultural environment" [8], "stroke" in short videos has gone beyond the purely medical category to become one of the indicators of the comfort of the socio-cultural environment, and at the same time, the health point of the disease itself has been diluted. At the same time, the health point of the disease itself has been downplayed and turned into a metaphor for a more complex social interpretation and cultural critique.

2.2 Textual Structure: from "Pathologic Profiling" to "Flow Effects"

"The textual characteristics of online short videos are not only lighter than traditional graphics, but also more informative, expressive and intuitive" [9]. When exploring the communication text of "stroke" in short videos, it is necessary to analyze its text structure from the dimensions of information quantity, expressiveness and intuitiveness. In

view of the presentation of "stroke" under the new media technology, its original health issue has gradually expanded to a profound reflection on the social and cultural environment, realizing the leap from individual health metaphor to social health. Therefore, the analysis of the textual structure of the short video "Stroke" needs to transcend the single discourse boundary and consider multiple perspectives, such as information expression, visual presentation and intuitive display, in order to reveal its discourse connotation.

On the one hand, the health communication of "stroke" on the short video platform should be reflected as the popularization of pathological knowledge, disease warning and disease prevention publicity empowered by new media technology. Among them, "pathologic analysis", as the core component of discourse expression, constitutes the "origin domain" [10] of the discourse logic system. In view of the fast-paced nature of the current media environment, users tend to watch short videos in the mode of "double-speed viewing", which "improves the audience's viewing efficiency and pleasure by compressing the narrative time and acceptance time" [11], therefore, nowadays. Therefore, nowadays, "stroke"-related short videos almost always focus on capturing precise information in the first 2-3 sentences of the video. Taking the example of Joyo blogger "Lu Xiao's Emergency Diary", the opening of his video emphasizes that "the golden treatment time is generally 3-4.5 hours", which completes the basic popularization and publicity function in 4-5 seconds, showing how new media communication means can rapidly and effectively carry out the function of "stroke". This demonstrates how the new media communication means can quickly and effectively carry out "pathologic analysis". Further, this mode of communication not only reflects the users' demand for efficient information capture, but also implies a trend towards the dilution of disease vocabulary in the discourse of "stroke" in short-video platforms, emphasizing instead the rapidity of information transmission.

On the other hand, the "stroke" content on short video platforms not only maps the users' demand for quick pathological analysis at the content level, but also implies the phenomenon of communication generalization triggered by traffic orientation. Five High" characteristics of stroke, aiming to raise the public's awareness of the disease. However, scrutinized from Susan Sontag's theoretical perspective, this type of content has gone beyond simply conveying information about the disease and carries more of a function of attracting users' attention and driving traffic growth. It is worth noting that the blogger mentions in the opening of the short video that he "received three stroke patients in one night, two lived and one died", the nature of which deserves in-depth investigation: whether this is merely the popularization and dissemination of health knowledge, or whether there is a suspicion of using the death of a disease as a gimmick in the short video, disregarding the dignity of life, and touching upon the ethical and ethical issues of attaching metaphors to the information about diseases. It also touches on the ethical and moral considerations of the additional metaphorical treatment of disease information. Therefore, in the rapid development of the new media environment, it is particularly important to review and standardize the health communication content related to "stroke" in short videos. While strengthening the dissemination of knowledge about the disease itself, it is important to respect and honor the value of life and ensure the legitimacy and humanity of information dissemination.

3 DISCOURSE PRACTICE ANALYSIS: THE DEEP REASONS AND DYNAMIC ANALYSIS OF THE "STROKE" SHORT VIDEO METAPHOR

"The 'discursive dimension' vector The 'the discursive dimension' (the discursive practices) dimension specifically describes the nature of the process of text production and interpretation" [2]. The text is used to understand the basic situation of the short video "Stroke", and then its discursive practices are analyzed. In the media environment of short videos, the discourse of "stroke" realizes its own deconstruction and reconstruction through the process of practice, thus forming further metaphors of disease. From the perspective of discourse events, the construction of metaphors in the short video of "stroke" is closely related to three major elements, namely, user behavior, platform mechanism, and socio-cultural context. The details are as follows:

3.1 User Stickiness: High Prevalence of Disease and Emotional Attachment in Patient Populations

To explore the causes of the multiple metaphorical meanings in "stroke" short videos, we need to focus on the real-world context: the increasing number of "stroke" patients, the youthfulness of the patient population, and the popularization of the causative factors have contributed to the continuous attention of users of short video platforms to "stroke" content. "This phenomenon not only reflects the high prevalence of the disease, but also the fact that it is not only the most common cause of stroke, but also the most common cause of the disease. This phenomenon not only reflects the attraction of the high incidence of the disease to users' attention, but also reflects the platform's strategy of meeting users' needs through precise marketing, thus further deepening the metaphorical expression of the disease. In this process, users are gradually shifting from simple attention to in-depth reliance, viewing short videos as a new cognitive channel for obtaining information on disease prevention, treatment, and management.

First, user stickiness is evident in the strong connection between "people and short videos". The Internet is the cornerstone of human connection, and the rise of short videos has further deepened this connection, especially for the highly relevant content of "stroke", which has contributed to the "over-connection between people and content, and people and services," which on the surface seems to bring people more convenience and room for expansion. It has also forced people to face the 'weight' of connectivity, which is becoming increasingly difficult to bear" [12]. As the attention of "stroke" short video continues to rise, the user group gradually forms a solidified acceptance circle, and the platform achieves personalized content delivery through interactive behaviors such as liking, favoriting, retweeting, and

searching, thus enhancing user stickiness. Although this high-intensity interactive mechanism helps users to gain in-depth knowledge about the prevention and treatment of stroke in the context of short videos, excessive connectivity poses a double challenge: first, it may lead to the generalization of disease knowledge, weakening the in-depth understanding of the uniqueness of the disease; second, it may dilute the importance of stroke as a standalone disease; and second, it may dilute the importance of stroke as a stand-alone disease. Stroke" as a separate disease entity may be diluted and become part of a wider range of interactive content on the Internet as part of a universal message. Secondly, user stickiness is further reflected in the construction of "emotional dependence" in the phenomenon of "over-connection", which is a mechanism that "short video has opened up a brand-new space for users to express themselves and communicate with each other, and low-threshold video participation has made short video become a force for reconstructing the video ecosystem in just a few years with its high penetration rate and high stickiness. The low threshold of video participation has made short video become a force that reconstructs the video ecology in just a few years by virtue of its high penetration rate and high viscosity" [13]. With the continuous expansion of the audience size of "stroke" short videos, the solidification of the user group not only deepens the emotional dependence on this type of video, but also prompts a shift in the source of disease knowledge, from the traditional hospital doctor popularization of science to the doctor's popularization of science on short video platforms, although this change provides a more convenient way of acquiring knowledge, it is still a change to the "flow of traffic" in essence. Although this change provides a more convenient way to obtain knowledge, it is essentially a response to the "traffic-oriented" communication model. More importantly, the disease content represented by "stroke" has gradually transcended its medical scope and become a "communication symbol" on short video platforms, carrying more "medical opinions of net red V It has become a "communication symbol" on short video platforms, carrying more of the roles of "medical opinions of netroots V" and "rumor prevention on the Internet". Users frequently switch between such videos, upholding their deep concern for "health and life", and place their emotions in mobile short videos, expecting to obtain emotional comfort, social recognition, and support and attention from virtual communities through this medium. This process highlights the important role of short videos in the construction of emotions and social interaction, and also poses new challenges to the accurate dissemination of medical information.

3.2 Misconceptions of Communication: the Demand for Specialized Content and the Metaphor of Responsibility in the Context of "UGC"

As an important space for "UGC" content production, short video platforms are trying to return to "content is king" through the introduction of professional content production in the process of professionalization, but the rapid development of media technology has made it difficult to synchronize the enhancement of communication channels and the quality of content, which has led to the persistence of low quality content. Low-quality content still exists. Especially in the field of "stroke" short videos, platforms have failed to effectively curb the growth of false content in order to satisfy users' demand for high-quality professional content, and at the same time, it is difficult to strike a balance between entertainment and professional medical efficacy, which has triggered false propaganda, imbalance of values, and other communication errors, and has further deepened the complexity of the content metaphors.

On the one hand, it is difficult to guarantee the medical attributes of "stroke" video bloggers. Because of its "UGC" (user-generated content) characteristics, the short-video platform, "in the decentralized network media environment, the rise of individualism, which promotes the power of mass culture, and the progress of technological affirmative action to meet and express the public's need and love of self-presentation" [14], but also faces the challenge of qualifying publishers of medical content such as "stroke", it also faces the challenge of vetting the qualifications of publishers of medically specialized content such as "stroke". Nowadays, platforms tend to focus on avoiding obvious anti-social content such as pornography, violence, and gambling, while it is difficult to effectively identify the authenticity and professionalism of short videos with medical professional attributes, such as "stroke" related content. Given that short-video popular science content usually focuses on verbal explanations rather than on-site operations or professional treatment, this has lowered the release threshold to a certain extent, allowing "pseudo-experts" and "pseudo-doctors" the opportunity to enter and disseminate information. For example, the blogger "Mr. Wu Fei", who has not been officially certified on the Jieyin platform, has released a number of short science videos, including "stroke", without the professional qualification verification of the "V" label, and has accumulated a lot of popular science videos. Mr. Wu Fei" has published a number of short videos covering "stroke" without the "V" label of professional qualification verification, and although he has accumulated a certain number of fans, the authenticity and professionalism of his content are doubtful. The prevalence of such phenomena may not only mislead the public's correct understanding of health information such as "stroke", but also weaken the public's trust in the popular science information of professional doctors, and alienate the knowledge of disease and health into a tool for gaining attention and traffic, thus increasing the risk of misleading information dissemination.

On the other hand, there is a distorted relationship between the health popularization content of the "stroke" video and the inherent entertainment of the short video platform. As an entertainment-oriented new media platform, short videos facilitate the dissemination of content, but "in the process of dissemination through smartphones, there are value dilemmas such as the generalization of entertainment in the spirit, the shallow thinking under the stimulation of senses, and the non-subjectivization of network dissemination" [15]. In the process of dissemination of "stroke" short videos, disease information is wrapped up in advertisements, commercial activities and product-carrying behaviors, and is gradually alienated into a capital-driven content production tool in the ecology of entertainment and commercialization.

Specifically, while teaching medical knowledge, some bloggers use their professional image and user trust to embed commodity links, set up drug advertisements, or carry out paid live courses in their videos, which not only deepens the metaphorical nature of the content of "stroke" short videos, but also transforms the disease itself into a medium of communication, constructing a "disease-short-video-disease-commercialized-content-medium" that is not just about the disease, but also about the disease itself. This behavior not only deepens the metaphorical nature of the short video content of "stroke", but also transforms the disease itself into a communication medium, constructing a chain of "disease - short video - drug product", thus ignoring the social responsibility of health communication and weakening the medical nature of the disease. This phenomenon may lead users to "give up rational thinking and turn to blind purchasing behavior because they believe in experts and authorities" [16].

3.3 Communicative Generalization: Contexts and Symbols in the Context of Over-attention to Disease

In recent years, economic growth has led to an increase in public attention to health. This is the case with the focus on "stroke". The dissemination of "stroke" short videos has continuously constructed a short video context that pays excessive attention to the disease through short video narratives of disease discourses such as "high incidence of stroke and the nation's leading cause of death," and has made the disease a metaphor for an indispensable preventive object in daily life, leading to increased homogenization of short video content, and a large number of highly similar videos. Preventive objects, resulting in the intensification of the homogenization of short video content, a large number of highly similar video content repeatedly emerged, "the existence of a high degree of homogeneity of user-created content, coupled with the continuous increase in the length of time users use short videos, a long period of time immersed in homogeneous content, which is prone to lead to the user's aesthetic generalization and fatigue" [17], and produce generalized. The effect of health communication is generalized. The generalization of "stroke" short videos can be analyzed from the following two aspects.

First, with the continuous evolution of media technology and visual representation, there are opportunities for excessive attention to diseases. In view of the high incidence and fatality of stroke, the disease has gradually occupied a prominent position in this context. In this context, as a communication medium, short videos on stroke tend to diversify their expressions, forming a multimodal disease narrative system. Specifically, health science popularization short videos such as "Dr. Tree", "Crane Smoke and Rain" and "Art in the Heart" have integrated animation, scene reproduction, music and dance, all of which reflect the form of communication. Innovative communication methods that incorporate animation, scene reproduction, music and dance all reflect a broad expansion of the forms of communication. Although these diversified means of communication have effectively broadened the coverage of "stroke" information, the core content is still closely centered on the disease itself, and the knowledge about "stroke" is reiterated through different forms of expression. "The core content is still closely centered on the disease itself, reiterating the knowledge of stroke through different forms of expression. Whether it is popularized scientific content led by professional doctors or animated videos created by self-media bloggers, they all convey health information on short video platforms, and in the process, they inevitably deepen the public's fear of the disease, which further strengthens the construction of contexts that are overly concerned with the disease," said Dr. Kenneth K. Kennedy, "Stroke is a disease that binds people's lives together, and it has become an important part of their lives. "It has become an interface between life and media, influencing people's reality and media expression at the same time" [18].

Secondly, the short video narrative of "stroke" has transcended the scope of self-media health communication and transformed into a symbolic communication symbol, which "provides the basic soil and atmosphere for the mass production of visual spectacle" [19], and this kind of short video has gradually divorced the medical specialization of "stroke" as a disease and adopted generalized communication strategies such as popular science, propaganda and advertisement, metaphorically transforming "stroke" into a medical disease. Such short videos have gradually stripped away the medical specialty of "stroke" as a disease, and adopted generalized communication means, such as popularization, propaganda, and advertisement, to metaphorically transform "stroke" into "a disease that needs urgent attention" and "a cause for concern". It has become a symbol of "urgent attention" and "alarming" disease, and then solidified as a disease with "high mortality rate""frequent and common" "requiring high attention"and "requiring great care". and then solidified into the social consensus labels of "high mortality rate" "frequent and common" "need to attach great importance" and "prevention first". In addition, short-video platforms provide a convenient way for a wide range of user groups to create and participate in short-video content due to their low barriers to entry, and the content design often focuses on readability and comprehensibility to adapt to the short, flat, and fast mode of video consumption under the traffic-oriented mode. This characteristic is especially significant in the short video of "stroke". Given the complexity and suddenness of the disease, it is difficult for short videos to deeply analyze its deeper causes or elaborate on the demanding diagnosis and treatment process in a limited time. As a result, most of the communication content focuses on "prevention strategies" and "self-help methods", while there is a relative lack of discussion of the treatment and rehabilitation process, resulting in a simplified and simplified perception of "stroke as the leading cause of death". This has resulted in a simplified and patterned communication model of "stroke as the leading cause of death".

4 ANALYSIS OF SOCIAL PRACTICE: DISCURSIVE POWER AND SOCIAL CRITIQUE OF THE "STROKE" SHORT VIDEO METAPHOR

"The social practice dimension tends to focus on socio-analytical aspects such as the institutional and organizational context of discursive events, how discursive events constitute the essence of discursive practice, and how they constitute (as mentioned above) the constructive or constructive effects of discourse" .) the constructive or constructive effects of discourse" [2]. The metaphors of the short video "Stroke" are not only embodied in the text and discursive practices, but each instance of discourse is not just a mere representation, but also contains the change of social environment, the generation of real situations, and the dynamics of discursive power triggered by the online platform. Therefore, to analyze the metaphor of the short video "Stroke", we should start from the perspective of discursive power, deeply explore its extensive impact on society, and critically analyze it.

4.1 Analysis of Short Video Platforms to Disseminate Deformation and Health Information Review Mechanism

"Disease is not a metaphor, and the most honest way to think about it The most sincere way to look at the disease is to eliminate or resist metaphorical thinking as much as possible" [1]. When short-video platforms disseminate information about "stroke", their contents have gone beyond the disease itself and gradually evolved into a communication phenomenon with socialization and practice. Horrocks and Foucault define discourse as "not a language system or a mere text, they are practices" [20], so to read the discourse of the short video narrative of "stroke", we have to return to the corresponding social environment and the context of the times, read the complex relationship between the discourse and the social environment, and explore the relationship between the discourse and the social environment. Therefore, in order to understand the discourse of "stroke" short video narrative, we have to return to the corresponding social environment and the context of the times, read the complex relationship between the discourse and the social environment, and explore the real problems brought by the metaphorization of "stroke" short video. Therefore, in order to deeply understand the narrative discourse of the short video "Stroke", we need to place it in the corresponding social and contemporary context, analyze the interaction between the discourse and the social environment and its complexity, and then explore the real problems caused by the metaphorization of the short video.

On the one hand, short videos, with their short, novel and fast features, have raised the problem of rough, false and shallow video content, especially in health communication short videos. Such videos require a high degree of professionalism and authenticity when disseminating medical information, and carry the professional spirit of doctors to save lives and help people in distress. However, some bloggers who are not qualified as professional physicians take advantage of users' trust to post content that falsely advertises, exaggerates and creates panic, while at the same time implanting drug sales and commercial advertisements, transforming short videos originally intended to popularize health knowledge into a means of pursuing commercial interests. When these "stroke" short videos of varying quality flood the platform, it is difficult to ensure the professionalism and accuracy of the medical information, leading to the gradual blurring and generalization of the public's knowledge of "stroke" as a disease. It is difficult for the recipients of the information to grasp the key points, and the short video itself has gradually evolved into a symbol of communication, which "flows between different cultures. It is exchanged and understood through semiotic activity across cultural meta-language sets" [21]. Therefore, to understand the short video of "stroke", we need to critically analyze, culturally examine, and reflect on the value of the short video from the perspective of its characteristics and forms of communication.

On the other hand, not only should we criticize the transmission deformation of short videos, but we should also examine the review mechanism of health information on short video platforms, and we must pay attention to the social issues behind the dissemination of "stroke" short videos. As short videos have become a major channel for users to acquire knowledge, convey information, and express their ideas, whether their dissemination meets health information auditing standards has become an important way for users to take in knowledge. Therefore, the analysis of "stroke" short videos should go beyond the media level and be considered from the social level. Currently, the unprofessional, rough and low-quality nature of short videos reflects the public's real demand for knowledge intake, and has become the mirror image of users' dependence on the virtual society. "Discourse is not created out of thin air, it is nurtured in a specific social context, and is a mirror reflection of social reality" [10], and it is the public's reliance on the virtual space in the mirror image that has led to the weakening and degradation of the health auditing mechanism due to the public's reliance. In essence, the dissemination of health information on short video platforms requires continuous monitoring and management. Platforms should strictly comply with laws and regulations, enhance the sense of social responsibility, and improve platform awareness. In all aspects of short-video uploading, the access standards for health information dissemination videos should be raised, and bloggers without professional certification should be prohibited from posting health information, so as to improve the quality of the content and control it from the source. When videos are released, the review process should be refined to screen and reduce the dissemination of exaggerated or false content. In the process of video dissemination, real-time supervision should be implemented, and once problems are found, measures such as blocking or restricting sending should be taken immediately to cut off the dissemination of problematic videos.

4.2 The Impact of the Public Health Awareness Landscape and the Reconfiguration of Power

When short video platforms disseminate information about diseases such as "stroke", they reflect the rapid nature of current information consumption and impact on the power structure of public health awareness, "promoting a paradigm shift in the value model of the content industry, but the matching industrial operation mechanism is not yet sound. "[22] whether user-generated content (UGC) or professional-generated content (PGC), "stroke" short videos are presented in

mediatized form on self-media platforms. Even the short videos released by professional doctors have a significant impact on public health awareness due to their short, concise, and high-traffic dissemination characteristics, as well as the mixed dissemination of non-professional health information. In addition, the dissemination of "stroke" videos is a further metaphor for the weakening of public health awareness. From relying on doctors' authoritative opinions to turning to short video platforms, from "listening to doctors" to "searching", the gradual weakening of public health awareness is not only a deconstruction of traditional values, but also a process of constructing a new model of public health communication in the context of the continuous development of new media technology.

First of all, on short video platforms, there are many professional doctors among the publishers of "stroke" related videos. These doctors have shifted from the professional environment of hospitals to short-video platforms, from the traditional "sitting in on a clinic" to providing "life reminders". This shift undermines the public's understanding of disease to a certain extent, reflecting the trend of short-video platforms, which tend to metaphorize disease information. Specifically, doctors introduce professional discourse power into short video platforms, and their professionalism is overshadowed by the entertainment-oriented attributes of short videos. Doctors, as representatives of public health awareness, become the spokespersons of short video platforms, which further strengthens the metaphorical nature of diseases. Disease was used as an additional element of the short video content, which was disseminated through the discourse construction mode of the short video. In the process of dissemination, the discourse mode of short videos may emphasize the high-risk and accidental nature of the disease, and use the disease as a gimmick to attract viewers' attention, while ignoring the complexity of the disease. More importantly, "discourse cannot be separated from power when considering the construction of human society and even oneself" [23], and in the level of discourse power, the discourse power of short-video platforms exceeds the discourse power of health information such as "stroke". Short-video platforms can even deconstruct and reconstruct health information such as "stroke" to form content that is in line with the platform's discourse system, thus impacting the discursive power of public health awareness.

In addition, the self-presentation of professional doctors on short-video platforms, although a personal expression, may hide social discipline and potential manipulation behind it. The discursive construction of short-video texts is not an isolated phenomenon; the capital operation and traffic control behind it have a decisive influence on the dissemination of health information such as "stroke". As a commercial entertainment platform, the capital operation of short-video platforms determines the distribution of traffic, which in turn directly affects the direction of short-video content, "whether it can be seen by the audience, and how many audiences can see it directly determines the economic value of the media product, and further influences the future direction of the short-video producers" [24]. Therefore, the discursive construction of "stroke" short videos is not only based on the disease itself, but also influenced by factors such as user preferences, traffic trends, broadcast volume and attention. This kind of construction may lead to the weakening of the information about the disease itself, and at the same time, in order to meet the needs of users, false information and false propaganda may occur. More importantly, when commercial products appear in short videos, the dissemination of health information may shift from user-oriented to product-oriented. The characteristics of the product may determine the form of discourse in short videos, making disease information an accessory to capital, traffic and profit. This shift may lead to "discursive hegemony, loss of integrity in order to seize the discursive high ground, creation of false public opinion, extremization of the use of discourse, and discursive misconduct" [25].

5 CONCLUSION

Disease has to stop being a metaphor.

The purpose of this study was to respond to the question posed at the beginning of the article: what is disease a metaphor for? Through our analysis, we conclude that illness should cease to be used as a metaphor. Although the metaphor of disease continues to generate new discursive expressions, this trend gradually weakens the discursive mode of disease itself and poses real problems. Through an in-depth study of the short video "Stroke", this paper reveals the presentation of metaphorical color and its impact on medical terminology and social attributes in the rapid development of media technology. Although it is difficult to change the metaphorization phenomenon in the dissemination of "stroke" short videos, the public should have a positive attitude by criticizing the communication distortion of short video platforms, the review mechanism of health information, as well as examining the impact and reconstruction of the power pattern of public health awareness. In today's ever-advancing technology, not only should we encourage the producers of "stroke" short videos to improve the professionalism of their content, strengthen the construction of their own discourse, reduce the pursuit of traffic and interests, and call on platforms to change their capital- and traffic-oriented approach, but also the users should improve their ability to screen information, thus facilitating the return of the subjectivity of discourse.

COMPETING INTERESTS

The authors have no relevant financial or non-financial interests to disclose.

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LASER POINT CLOUD TECHNOLOGY ENABLING THE TEACHING OF HUIZHOU VERNACULAR DWELLING MAPPING COURSES IN HIGHER EDUCATION

Lei Zhang¹, Xin Huang^{2*}, XiYue Zeng¹

¹*Department of Architecture, Anhui Jianzhu University, Hefei 230601, Anhui, China.*

²*Department of Architecture, Tongji Zhejiang College, Jiaxing 314051, Zhejiang, China.*

Corresponding Author: Xin Huang, Email: huangxin@tjzj.edu.cn

Abstract: This paper explores the application of laser point cloud technology in reforming the teaching of Huizhou vernacular dwelling mapping courses in architectural education. By reviewing existing literature and conducting empirical research, this study aims to propose an innovative teaching model that integrates laser point cloud technology into traditional surveying and mapping methods. The proposed model addresses the challenges faced in teaching ancient architectural mapping and aims to enhance students' skills in utilizing digital technologies while preserving the cultural heritage of Huizhou vernacular dwellings. The paper concludes with a discussion on the effectiveness of the proposed model and suggests future directions for research and teaching practices.

Keywords: Higher education; Teaching; Laser point cloud technology; Huizhou vernacular dwelling

1 INTRODUCTION

Huizhou vernacular dwellings, renowned for their unique architectural style and historical significance, are important subjects in architectural education. However, traditional teaching methods in architectural mapping courses often struggle to adequately capture the intricate details and spatial characteristics of these ancient structures. The advent of laser point cloud technology presents new opportunities for teaching reform, enabling more accurate and efficient mapping of complex architectural features. This study aims to explore how laser point cloud technology can be integrated into the teaching of Huizhou vernacular dwelling mapping courses to enhance students' learning experiences and skill sets.

Recent research has highlighted the importance of reforming architectural mapping courses to adapt to the evolving demands of the profession. Min Zhou and Haihui Yang (2021) provide a multidimensional perspective on the reform of ancient architectural mapping courses. They emphasize the significance of these courses in architectural education and propose a series of reform methods, including the compilation of internship guidebooks, setting teaching objectives, adjusting teaching organization, and implementing diversified teaching assessments. These methods aim to clarify professional characteristics and expand the scope of mapping to align with the three-dimensional digitization trend in architectural education. Haiyan Gu et al. (2020) further emphasize the necessity of teaching reform in architectural mapping courses at local universities in the context of informationization and digitization. They argue that teaching reform should adopt an interdisciplinary approach, integrating local characteristics to cultivate architectural mapping talents who can adapt to the development of the times. Hongyu Zhu (2019) specifically discusses the mapping method that combines digital technology with traditional means. Through the mapping practice of three churches in Macao's historic urban area, he proposes a set of mapping teaching methods suitable for undergraduates, which effectively solve some technical problems in traditional mapping. Zheng Sun and Huayu Guo (2019) present the reform practices in the ancient architectural mapping course at Nanjing Tech University from the perspective of teaching reform. They stress the importance of the rationality of mapping techniques and propose a teaching mode that combines laser scanning, photogrammetry, and other optical measurement technologies to improve students' mapping skills and graphic expression abilities. Zhimin Zhang (2015) focuses on the application of three-dimensional scanning technology in the teaching of ancient architectural mapping. He explores how to combine this emerging technology with traditional mapping techniques to enable students to meet the basic requirements of ancient architectural mapping internships while mastering the basic principles and skills of digital technology. Yue Zou et al. (2009) provide ideas for constructing a teaching platform for architectural digital design. They propose that by relying on Building Information Modeling (BIM), adjusting teaching content and curriculum systems can play a greater role in students' design practice. [1-13]

In addition, Zhong and Xu (2024) explore the application of digital technology in the protection of traditional Huizhou architecture, taking the wooden carved buildings in Lu Village, Yixian County, as an example. Through three-dimensional information mapping and field investigation, they construct a three-dimensional information model of the wooden carved buildings, providing basic data and technical support for their protection and restoration. Jiaqi Zhang's (2023) doctoral thesis discusses the method of constructing volume roaming of traditional villages in Jilin Province based on point cloud big data. He proposes a new way to protect and display traditional villages using three-dimensional laser point cloud technology and virtual reality technology. Wenhua Zhou (2022) focuses on the virtual reconstruction of buildings in traditional villages in Jilin Province under laser point cloud big data. He uses BIM

technology software to conduct virtual reconstruction and drawing of traditional village buildings, summarizes the characteristics of different ethnic buildings, and completes the architectural digital archives of traditional villages in Jilin Province. Jinhu Li et al. (2021) explore the method of establishing digital archives of traditional villages using non-contact mapping technology. They argue that by establishing a complete three-dimensional model of traditional villages, a complete electronic archive can be formed, providing accurate scientific basis for the research, restoration, reconstruction, and cultural and creative product development of traditional villages. [4-16]

2 METHODOLOGY

The development of the proposed teaching model was a multifaceted process, involving a combination of literature review, case studies, and empirical research. The literature review provided valuable insights into existing teaching methods and challenges in architectural mapping courses. It examined various approaches to teaching architectural mapping, including traditional methods such as manual measurement and drafting, as well as more recent incorporations of digital technologies. [1] The review highlighted the need for a comprehensive teaching model that not only emphasizes technical skills but also cultural sensitivity and preservation ethics.

Case studies were conducted to analyze successful applications of laser point cloud technology in architectural mapping. These studies focused on projects where laser scanning had been used to create accurate digital representations of historical buildings and sites. [2] By examining these cases, the research team identified key factors contributing to the success of laser point cloud technology in architectural mapping, including equipment selection, data processing techniques, and integration with other digital tools.

Empirical research involved implementing the proposed teaching model in an actual architectural mapping course and collecting data on students' learning experiences and outcomes. The course was designed to accommodate a diverse group of students, including those with prior experience in architectural mapping and those who were new to the field. Data collection methods included surveys, interviews, and assessments of students' projects, providing a comprehensive understanding of the effectiveness of the teaching model. [3]

3 TEACHING MODEL

The proposed teaching model consists of four main components: theoretical instruction, practical training, project-based learning, and technology integration. Each component is designed to build upon the previous one, providing students with a well-rounded educational experience in architectural mapping using laser point cloud technology.

3.1 Theoretical Instruction

Students are provided with a solid foundation in traditional architectural mapping techniques and principles. This includes instruction on manual measurement methods, drafting techniques, and the historical context of architectural mapping. Students are also introduced to the basics of laser point cloud technology and its applications in architectural mapping. The theoretical instruction component emphasizes the importance of understanding the underlying principles of both traditional and digital mapping techniques, enabling students to make informed decisions when selecting and applying technologies in their projects. [4]

The theoretical instruction component of the teaching model is designed to provide students with a strong foundation in both traditional architectural mapping techniques and the principles of laser point cloud technology. The curriculum begins with an overview of the historical context of architectural mapping, tracing its evolution from manual methods to digital technologies. [5] Students learn about the various tools and techniques used in traditional architectural mapping, such as tape measures, theodolites, and drafting instruments. They also study the theoretical underpinnings of architectural mapping, including the principles of perspective, proportion, and scale.

In addition to traditional mapping techniques, students are introduced to the basics of laser point cloud technology. They learn about the principles of laser scanning, including how the technology works, its advantages and limitations, and its applications in various fields, such as architecture, engineering, and cultural heritage preservation. Students also study the different types of laser scanning equipment available, considering factors such as accuracy, range, and portability when selecting equipment for specific projects[6].

To complement the theoretical instruction, students participate in discussions and debates about the ethical considerations involved in architectural mapping and cultural heritage preservation. They explore topics such as the importance of cultural sensitivity, the role of architects and conservationists in preserving historical buildings, and the potential impacts of digital technologies on cultural heritage sites. These discussions are designed to foster critical thinking and encourage students to consider the social and cultural implications of their work as architects.

3.2 Practical Training

Following the theoretical instruction, students engage in hands-on training sessions where they learn how to operate laser point cloud scanning equipment and software. These sessions are designed to be interactive and experiential, allowing students to practice scanning and processing point cloud data to create accurate three-dimensional models of architectural features. The practical training component focuses on developing students' technical skills in using laser

scanning equipment and software, ensuring that they are proficient in generating high-quality point cloud data for architectural mapping[7].

The practical training component of the teaching model focuses on developing students' technical skills in using laser point cloud scanning equipment and software. Students begin by learning how to set up and operate the scanning equipment, including calibration procedures and data capture strategies. They practice scanning various architectural features, such as walls, roofs, and ornamental details, to develop proficiency in generating high-quality point cloud data. In addition to scanning, students also learn how to process the point cloud data using specialized software. They learn about data cleaning techniques, such as removing noise and outliers, as well as methods for aligning multiple scans to create a complete three-dimensional model of the architectural feature. Students also study techniques for extracting measurements and creating two-dimensional drawings from the point cloud data, allowing them to produce accurate architectural plans and elevations.

Throughout the practical training component, students receive guidance and feedback from instructors and technical experts[8]. They participate in group discussions and critiques, where they share their experiences and challenges in using the laser scanning equipment and software. These discussions provide opportunities for students to learn from each other and develop problem-solving skills in a supportive and collaborative environment.

3.3 Project-Based Learning

Students work on real-world projects where they apply their knowledge and skills in architectural mapping using laser point cloud technology. They are tasked with mapping specific Huizhou vernacular dwellings, focusing on capturing intricate details and spatial characteristics. This project-based learning component allows students to work in teams, simulating a professional environment where collaboration and communication skills are essential. Students are encouraged to think critically about the best approaches to mapping the dwellings, considering factors such as equipment selection, data capture strategies, and ethical considerations related to cultural heritage preservation.

The project-based learning component of the teaching model allows students to apply their knowledge and skills in architectural mapping using laser point cloud technology in real-world projects. Students work in teams to map specific Huizhou vernacular dwellings, focusing on capturing intricate details and spatial characteristics. They are responsible for selecting appropriate equipment, developing data capture strategies, and processing the point cloud data to create accurate three-dimensional models of the dwellings.

To ensure that students are prepared for the project-based learning component, they receive guidance and support from instructors throughout the process. They participate in workshops and seminars where they learn about best practices in architectural mapping, including equipment selection, data capture techniques, and ethical considerations related to cultural heritage preservation. Students also have access to technical resources, such as tutorials and online forums, where they can seek assistance and share their experiences with other students and professionals.

During the project-based learning component, students are encouraged to think critically about the best approaches to mapping the Huizhou vernacular dwellings[15]. They consider factors such as the architectural features of the dwellings, the equipment available, and the intended use of the three-dimensional models. Students also engage in discussions about the ethical implications of their work, considering the potential impacts of their mapping projects on the cultural heritage of the dwellings and the communities associated with them.

3.4 Technology Integration

In the final component of the teaching model, students are encouraged to explore and integrate other digital technologies, such as Building Information Modeling (BIM) and virtual reality, into their mapping projects. This allows them to develop a comprehensive skill set in utilizing digital tools for architectural mapping and preservation. Students learn how to leverage the strengths of different technologies to create immersive and interactive representations of the Huizhou vernacular dwellings. [10] They also consider the potential applications of these technologies in architectural design, conservation planning, and public engagement.

The final component of the teaching model focuses on encouraging students to explore and integrate other digital technologies into their mapping projects. Students learn about the potential applications of technologies such as BIM and virtual reality in architectural mapping and preservation[11]. They study the principles of BIM, including how it can be used to create digital representations of buildings and their components, and how it can support decision-making in architectural design and conservation planning.

Students also learn about the principles of virtual reality and its potential applications in architectural mapping. They study techniques for creating immersive and interactive representations of architectural spaces using virtual reality technologies, such as VR headsets and software. Students learn how to create virtual reality experiences that allow users to explore and interact with the three-dimensional models of the Huizhou vernacular dwellings, providing new perspectives on these historical structures.

Throughout the technology integration component, students are encouraged to think creatively about the potential applications of digital technologies in architectural mapping and preservation[12]. They participate in discussions and workshops where they explore the strengths and limitations of different technologies, considering how they can be used to enhance the understanding and preservation of cultural heritage sites. Students also have the opportunity to work with

professionals and experts in the field, gaining insights into the practical applications of digital technologies in architectural practice and conservation.

4 IMPLEMENTATION AND EVALUATION

The proposed teaching model for architectural mapping, integrating laser point cloud technology, was implemented in an undergraduate course at Anhui Jianzhu University in China. This innovative approach aimed to enhance students' practical skills in architectural mapping while fostering their understanding of advanced technologies. The implementation and evaluation of this model involved several key steps, each designed to ensure the effectiveness and success of the teaching strategy.

4.1 Implementation Plan

4.1.1 Course preparation

Prior to the commencement of the course, extensive preparation was undertaken to ensure that all necessary resources were available. This included securing laser point cloud scanning equipment and software, as well as developing a comprehensive curriculum that integrated theoretical knowledge with practical applications. The curriculum was designed to cover topics such as the principles of laser scanning, data processing techniques, and the integration of point cloud data into architectural mapping projects.

4.1.2 Student grouping and project assignment

To facilitate collaborative learning and practical application, students were divided into groups of four to six members. Each group was assigned a specific Huizhou vernacular dwelling as the subject of their mapping project. This approach allowed students to work on real-world projects, enhancing their engagement and motivation.

4.1.3 Training and familiarization with technology

At the beginning of the course, students received training on the use of laser point cloud scanning equipment and software. This training was conducted by experienced instructors who provided hands-on demonstrations and guided practice sessions. The goal was to ensure that students were proficient in using the technology and could apply it effectively in their mapping projects.

4.1.4 Guided project execution

Throughout the course, students worked on their mapping projects under the guidance of instructors. Regular check-ins and feedback sessions were scheduled to monitor progress and address any challenges or questions that emerged. This ongoing support was crucial in helping students integrate laser point cloud technology into their mapping process and refine their skills.

4.1.5 Evaluation criteria

To assess the success of the proposed teaching model, clear evaluation criteria were established. At the end of the course, students' projects were evaluated based on the accuracy and completeness of their three-dimensional models. Additionally, their ability to effectively integrate laser point cloud technology into their mapping process was assessed. This holistic evaluation approach ensured that students were not only proficient in using the technology but also able to apply it in a meaningful and practical context[13-16].

4.2 Evaluation Process

4.2.1 Project evaluation

Each group's final project was evaluated by a panel of instructors and industry experts. The evaluation focused on the technical accuracy of the three-dimensional models, the completeness of the mapping, and the innovative use of laser point cloud technology. This rigorous evaluation process ensured that students received fair and constructive feedback on their work.

4.2.2 Student feedback

In addition to evaluating the final projects, student feedback was also collected to assess the effectiveness of the proposed teaching model. Students were asked to provide their perspectives on various aspects of the course, including the usefulness of the laser point cloud technology, the quality of instruction, and the overall learning experience. This feedback was invaluable in identifying areas for improvement and refining the teaching model for future iterations.

4.2.3 Instructor observations

Instructors also provided their observations and insights on the implementation of the teaching model. They noted any challenges or successes encountered during the course and offered suggestions for how the model could be further enhanced. These observations were combined with student feedback to create a comprehensive evaluation of the teaching model.

4.3 Outcomes and Insights

4.3.1 Improved technical skills

The implementation of the proposed teaching model resulted in significant improvements in students' technical skills in architectural mapping. Students demonstrated a high level of proficiency in using laser point cloud scanning equipment and software, and their final projects exhibited a strong understanding of data processing and integration techniques.

4.3.2 Enhanced practical application

By working on real-world projects, students were able to apply their theoretical knowledge in a practical context. This hands-on experience was invaluable in helping them develop a deeper understanding of architectural mapping and the role of technology in this field.

4.3.3 Positive student feedback

Student feedback on the course was overwhelmingly positive. Students appreciated the opportunity to work with advanced technology and felt that the practical projects had significantly enhanced their learning experience. Many students also commented on the effectiveness of the instructors' guidance and feedback throughout the course.

4.3.4 Areas for improvement

While the overall evaluation of the teaching model was positive, several areas for improvement were identified. Some students felt that the initial training on the laser point cloud technology could have been more comprehensive, and that additional practice sessions would have been beneficial. Instructors also noted that the time constraints of the course limited the depth of some topics and suggested that future iterations could be expanded to allow for more in-depth exploration of specific areas[12-16].

4.4 Future Directions

Based on the outcomes and insights from the implementation and evaluation of the proposed teaching model, several future directions have been identified.

4.4.1 Enhanced training and support

To address the feedback regarding the initial training on the laser point cloud technology, future iterations of the course will include more comprehensive training sessions and additional practice opportunities. This will ensure that students are fully proficient in using the technology before they begin their mapping projects.

4.4.2 Expanded course content

To allow for more in-depth exploration of specific topics, the course content will be expanded in future iterations. This may involve extending the duration of the course or incorporating additional modules that focus on specific aspects of architectural mapping and laser point cloud technology.

4.4.3 Incorporation of industry collaboration

To further enhance the practical application of the course, future iterations will seek to incorporate industry collaboration. This may involve partnering with architectural firms or other relevant organizations to provide students with real-world projects and feedback from industry professionals.

4.4.4 Ongoing evaluation and refinement

The proposed teaching model will continue to be evaluated and refined based on student feedback and instructor observations. This ongoing evaluation process will ensure that the course remains relevant, effective, and aligned with the evolving needs of the architectural mapping field.

5 RESULTS AND DISCUSSION

The results of the empirical research indicate that the proposed teaching model effectively enhanced students' skills in utilizing laser point cloud technology for architectural mapping. Students were able to create accurate three-dimensional models of Huizhou vernacular dwellings, capturing intricate details and spatial characteristics that would have been difficult to capture using traditional mapping methods.

Furthermore, students reported positive learning experiences, stating that the hands-on training and project-based learning approach helped them develop practical skills and apply theoretical knowledge in real-world contexts. They also appreciated the opportunity to work with advanced digital technologies and explore their potential applications in architectural preservation.

6 CONCLUSION

This study proposes a teaching model that integrates laser point cloud technology into the teaching of Huizhou vernacular dwelling mapping courses. The model addresses the challenges faced in traditional teaching methods and aims to enhance students' skills in utilizing digital technologies while preserving the cultural heritage of these ancient structures. The empirical research conducted in this study demonstrates the effectiveness of the proposed model in enhancing students' learning experiences and outcomes.

COMPETING INTERESTS

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INNOVATIVE APPLICATION OF DIGITAL MEDIA ART IN SMART AGRICULTURE: TAKING LUOHANGUO PLANTING IN GUANGXI AS AN EXAMPLE

Lei Qiu

Digital Media Art Design, Nanning College for Vocational Technology, Nanning, Guangxi 530008, China.
Corresponding Email: 895372941@qq.com

Abstract: This paper deeply discusses the innovative application of digital media art in smart agriculture. Taking Luohanguo planting in Guangxi as a specific case, it systematically analyzes the role of digital media art in improving agricultural production efficiency, optimizing resource allocation, promoting product marketing, strengthening agricultural education and cultural inheritance. By combining modern information technologies such as the Internet of Things, big data, and artificial intelligence, this article constructs a smart agriculture solution based on digital media art, aiming to promote the intelligence, precision, and efficiency of agricultural production. The research results show that the innovative application of digital media art in Guangxi *Siraitia grosvenorii* planting not only significantly improves the production efficiency and management level, but also promotes the inheritance and innovation of agricultural culture. The innovation proposed in this article lies in the deep integration of digital media art and smart agriculture, providing a new perspective and path for agricultural modernization.

Keywords: Smart agriculture; Digital Media Art; Guangxi *Siraitia grosvenorii* planting; Big data; Agricultural production efficiency

1 INTRODUCTION

1.1 Research Background and Significance

With the rapid development of technology, smart agriculture has gradually become an important direction for the development of modern agriculture. Smart agriculture has achieved intelligence, precision, and efficiency in agricultural production through the use of modern information technology, biotechnology, IoT technology, and other means. Digital media art, as a combination of technology and art, is increasingly being applied in the agricultural field with its unique visual experience and information dissemination methods. Integrating digital media art into smart agriculture can not only improve agricultural production efficiency, but also promote the inheritance and innovation of agricultural culture. Taking the cultivation of *grosvenor grosvenorii* in Guangxi as an example, this paper deeply discusses the innovative application of digital media art in smart agriculture, with a view to providing new ideas and methods for agricultural modernization.

1.2 Research Objectives and Issues

The purpose of this study is to explore the innovative application of digital media art in smart agriculture. Taking Luohanguo planting in Guangxi as an example, this study analyzes its role in improving agricultural production efficiency, optimizing resource allocation, promoting product marketing, and strengthening agricultural education and cultural inheritance. Meanwhile, this study will also explore the challenges faced by digital media art in agricultural applications and propose corresponding solutions.

1.3 Research Methods

This study adopts methods such as literature review, case analysis, and empirical research. Firstly, through literature review, the relevant theories and development status of smart agriculture and digital media art are sorted out; Secondly, taking Guangxi *Siraitia grosvenorii* planting as an example, this paper discusses the specific application of digital media art in smart agriculture through case analysis; Finally, based on empirical research results, summarize the effectiveness and shortcomings of digital media art in agricultural applications, and propose corresponding countermeasures and suggestions.

2 THE DEVELOPMENT OF SMART AGRICULTURE AND DIGITAL MEDIA ART

2.1 Development Process and Characteristics of Smart Agriculture

Smart agriculture is an important symbol of agricultural modernization, and its development process can be traced back to precision agriculture in the 1970s. With the continuous maturity of technologies such as the Internet of Things, big data, and artificial intelligence, smart agriculture has gradually achieved precise control and optimized management of

the entire agricultural production process. Smart agriculture has the following characteristics: firstly, data-driven approach, which collects and analyzes a large amount of agricultural data to provide scientific basis for agricultural production; Secondly, precision management is achieved through intelligent perception and control systems to achieve precision in agricultural production; The third is efficient collaboration, which improves agricultural production efficiency and quality through information sharing and resource integration[1].

2.2 Advantages of Applying Digital Media Art in Agriculture

Digital media art has significant advantages in the application of agriculture due to its unique visual experience and information dissemination methods. Firstly, digital media art can visually display the growth process of crops and various stages of agricultural production, providing farmers with intuitive learning materials; Secondly, digital media art can utilize modern information technology to achieve rapid dissemination and popularization of agricultural knowledge; Finally, digital media art can be combined with creative design to create agricultural brand images with local characteristics and enhance the market competitiveness of agricultural products[2,3].

3 Innovative Application of Digital Media Art in Guangxi Siraitia grosvenorii Planting

3.1 Growth Simulation and Decision Support System

In Guangxi Siraitia grosvenorii planting, digital media art is widely used in the construction of growth simulation and decision support system. Through digital image and animation technology, the growth environment, growth process and occurrence of diseases and pests of Siraitia grosvenorii are simulated to provide intuitive visual experience for growers. At the same time, combining big data and artificial intelligence technology, a decision support system is constructed to provide scientific planting suggestions and management strategies for growers based on real-time monitoring of environmental parameters and crop growth data. The application of this system not only improves the decision-making ability of farmers, but also reduces the risks and costs of agricultural production.

3.2 Virtual Farm Construction and Education Training

Using virtual reality (VR) and augmented reality (AR) technology, Guangxi Luohanguo Virtual Farm is created to provide farmers with an immersive learning experience. The virtual farm not only simulates the real planting environment and management process, but also incorporates interactive teaching elements, allowing farmers to conduct practical operation training in the virtual environment. This teaching mode not only reduces the risks and costs in practical operation, but also improves the practical operation ability of growers and their ability to deal with complex problems. In addition, online courses such as Siraitia grosvenorii planting technology and smart agriculture application are provided through online education platform, so that growers can learn at any time and anywhere and improve their professional knowledge and skills.

3.3 Brand Building and Marketing Strategies

Digital media art has played an important role in the brand building and marketing of Guangxi Siraitia grosvenorii. The unique charm and medicinal value of Siraitia grosvenorii are displayed by making exquisite promotional videos, pictures and web pages to attract consumers' attention and purchase. At the same time, social media and e-commerce platforms were used for online promotion and sales, which broadened the market channels of Siraitia grosvenorii. In addition, the brand awareness and market share of Siraitia grosvenorii will be further improved by holding online and offline brand promotion activities, such as agricultural product fairs, online live broadcast with goods, etc. In terms of marketing strategy, combining the visual impact of digital media art and modern marketing theory, formulate targeted marketing plans to improve the market competitiveness of Siraitia grosvenorii[4].

3.4 Cultural Inheritance and Innovative Development

The application of digital media art in Guangxi Siraitia grosvenorii planting is also reflected in cultural inheritance and innovative development. Record and display the planting history, cultural connotation and innovative application of siraitia grosvenorii in modern agricultural development through digital media art means, and promote the inheritance and innovation of agricultural culture. For example, film and television works such as historical documentaries and cultural propaganda films of Siraitia grosvenorii planting can be produced to show the unique charm and cultural heritage of Siraitia grosvenorii to the public; At the same time, the brand image and packaging design of Siraitia grosvenorii with local characteristics are created through creative design to enhance the added value and market competitiveness of products.

4 CASE ANALYSIS AND DATA SUPPORT

4.1 Case I: Intelligent Transformation of a Siraitia Grosvenorii Planting Base

Taking a Luohanguo planting base in Guangxi as an example, the base has achieved intelligent and accurate planting

management by introducing digital media art and smart agricultural technology. Deploy IoT sensors to monitor the temperature, humidity, light and other parameters of *Siraitia grosvenorii* growth environment in real time, and upload the data to the smart agriculture cloud platform. Researchers use the visualization techniques of digital media art to transform data into intuitive images and animations, providing farmers with scientific planting advice and management strategies. At the same time, the yield and quality of *siraitia grosvenorii* were improved through precision irrigation, precision fertilization, precision pest control and other precision agricultural operations. After intelligent transformation, the output of *siraitia grosvenorii* in the base has increased by 20%, and the quality has also been significantly improved.

4.2 Case II: Momordica Grosvenorii Brand Marketing and Promotion Activities

In terms of brand marketing and promotion, a Luohanguo enterprise in Guangxi has carried out a series of innovative activities by means of digital media art. The company has produced exquisite promotional videos and image materials, and promoted and sold them online through social media and e-commerce platforms. At the same time, the company also held multiple online live streaming sales events, inviting well-known anchors to promote and sell their products. In addition, the company also expands its brand influence through organizing agricultural product exhibitions and other activities. These activities not only improved the brand awareness and market share of *Siraitia grosvenorii*, but also promoted the development of local agricultural economy.

5 CHALLENGES AND COUNTERMEASURES OF DIGITAL MEDIA ART IN AGRICULTURE

5.1 Challenges Faced

Although the application of digital media art in agriculture has brought many benefits, it still faces some challenges. Firstly, the speed of technological updates is fast, making it difficult for farmers to keep up with the pace of technology. This requires farmers to constantly learn new technologies and knowledge, improve their technical level and application ability. Secondly, the application of digital media art technology requires a certain amount of cost investment, which may pose economic pressure for some growers. This requires the government and enterprises to increase their support and provide preferential policies such as technical support and financial subsidies[5].

5.2 Response Strategies

In response to the above challenges, this article proposes the following strategies: firstly, strengthen government guidance and policy support to promote the popularization and application of digital media art technology in the agricultural field; Secondly, carry out technical training and guidance services to enhance the technical level and application ability of farmers; The third is to explore ways and methods to reduce costs, such as sharing costs through cooperation and other means; The fourth is to strengthen scientific research and innovation, as well as technological research and development efforts, and promote the deep integration and development of digital media art technology and agricultural production[6].

6 RESEARCH CONCLUSION AND PROSPECT

6.1 Research Conclusion

Taking the cultivation of *grosvenor grosvenorii* in Guangxi as an example, this paper deeply discusses the innovative application of digital media art in smart agriculture. The research results indicate that digital media art plays a significant role in improving agricultural production efficiency, optimizing resource allocation, promoting product marketing, and strengthening agricultural education and cultural heritage. By combining modern information technologies such as the Internet of Things, big data, and artificial intelligence, digital media art provides new ideas and methods for the development of smart agriculture. Meanwhile, this article also points out the challenges faced by digital media art in agricultural applications and proposes corresponding solutions.

6.2 Research Prospects

In the future, with the continuous advancement of technology and the deepening development of digital media art, its application in the field of agriculture will become more extensive and profound. On the one hand, with the continuous maturity and improvement of technologies such as the Internet of Things, big data, and artificial intelligence, digital media art will be able to better integrate with these technologies, providing more accurate, efficient, and intelligent solutions for agricultural production; On the other hand, with the continuous improvement of consumers' requirements for the quality and brand of agricultural products, as well as the increasingly fierce competition in the agricultural market, the role of digital media art in shaping agricultural product brands and marketing will become more prominent. Therefore, the government, enterprises, and farmers should work together to strengthen policy guidance, technical training, and cost reduction to promote the wider application and development of digital media art in the agricultural field.

COMPETING INTERESTS

The authors have no relevant financial or non-financial interests to disclose.

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US-CHINA STRATEGIC COMPETITION AND THE INEVITABLE THUCYDIDES TRAP

Raheel Khan¹, Shakir Ullah^{2*}, Muhammad Suliman¹, Muhammad Sheraz Naveed¹

¹*Department of Political Science, Government Post Graduate College Timergara, University of Malakand, Lower Dir District, Khyber Pakhtunkhwa 18800, Pakistan.*

²*Visiting Lecturer and Research Supervisor, Department of Political Science at GPGC Timergara, University of Malakand, Lower Dir District, Khyber Pakhtunkhwa 18800, Pakistan.*

Corresponding Author: Shakir Ullah, Email: shakirullah0003@gmail.com

Abstract: The ongoing competition and rivalry between the United States of America and the People's Republic of China is the defining issue of the 21st century in international relations. Both the great powers have been engaged in a strategic competition often referred to by some scholars as the New Cold War. The US wants to maintain its status quo with it as the world's sole superpower. However, China's rise has challenged the United States' hegemony as well as its 'New World Order', and is in favor of a multi-polar world order where it could have also the same level of influence. The competition between the two powers encompasses various domains from trade and technology to military and influence. When a rising power challenges the hegemony of an existing power the dilemma it creates is known as Thucydides' Trap. The Indo-Pacific region is the center of competition between both the great powers. Key issues between both the countries in the Indo-Pacific region include the South China Sea Disputes, the Taiwan Issue, and China's growing assertiveness. The intense competition between both the great powers and various maritime and territorial disputes between China and several other US allies such as Taiwan can potentially lead to a military conflict between the US and China. This qualitative research focuses on all those factors that could potentially lead to a military conflict between the US and China in the Indo-Pacific region under the theoretical framework of Thucydides' Trap. An instance of Germany and Britain is used to prove that the current rivalry between the US and China has the potential to lead to a military conflict between them.

Keywords: US-China; Strategic competition, South China Sea; Possible war; Indo-Pacific; Thucydides' Trap

1 INTRODUCTION

The ongoing competition and rivalry between the United States of America and the People's Republic of China is the defining issue of the 21st century in international relations. The rise of China challenges the global hegemony of the USA would lead to all-out war or conflict between the two giants. China's rapid economic military power building and its struggle for global reach whereas, USA's 'gunboat diplomacy' specifically in the South China Sea is translated into Thucydides Trap. Historically, relations between both countries were not good due to the Cold War polarization of global politics and China's strategic alliance with the USSR. The events that mainly exacerbated US-China rivalry; were the communist revolution in China in 1949, the Sino-Soviet nexus, the US policy of containment of Communism, US intervention in the Korean and Vietnam War, and finally its refusal to recognize the People's Republic of China in favor of the Republic of China based in Taiwan. Relations between both countries started improving after US President Nixon visited China in 1972. On 1 January 1979, the US formally established diplomatic relations with the PRC by recognizing it as the sole legitimate government of China.

Napoleon Bonaparte once said, "China is a Sleeping Giant. Let her sleep, for when she wakes up, she will shake the world". Today, China's rise has shaken the whole world, particularly the United States. Since the 1980s, China has been one of the fastest-growing powers in terms of military, economic, and technological in the world. Today China is the second largest economy after the US and is now a regional power. Its rise has challenged US hegemony and its New World Order. It is second to Russia that poses an existential threat to the United States, its position as the global policeman and guardian of the post-Cold War international order. The United States of America sees China as its strategic rival and considers it a great threat to its interests in the Indo-Pacific Ocean. When a rising power challenges the hegemony of the existing superpower, the dilemma it creates is known as the Thucydides Trap as explained by Greek historian Thucydides. This rivalry between both powers has raised concerns about the possibility of a disastrous military conflict, which could have profound geopolitical repercussions.

Since the normalization of relations in the 1970s, the relationship between both States has been marked by several issues such as the political status of Taiwan, China's claim over the South China Sea, etc. Both countries have been engaged in a new competition (often named by some scholars as the New Cold War) to dominate the Indo-Pacific region. The competition between the two powers encompasses various domains from trade and technology to military and influence. The US wants to maintain its status quo with it as the world's sole superpower. However, China's rise has challenged its hegemony and is in favor of a multi-polar world order where it could have also the same level of influence. The center of competition between both countries is the Indo-Pacific region, a place where the emerging power and increasing influence of China is an area of concern for the US.

The first decade of the twenty-first century saw significant shifts in the geopolitics of the Indo-Pacific region. The Indo-Pacific Ocean has a great deal of value particularly the South China Sea because of its strategic position, political movement, economic volatility, and historical culture. The Indo-Pacific region has not only great importance for The United States of America and China. But it has also importance for other regional powers like Japan, India, and Australia as well as other countries around the South China Sea. The Indo-Pacific region is a major driver of the world economy. It is home to numerous strategic choke points like the Strait of Malacca as most of the key maritime routes pass through this region. Furthermore, approximately two-thirds of the global trade passes through this region which makes it a global economic center. Because of its prominence, it has become an area of competition between the US and China. Strategic competition among major powers is increasing day by day in the region with China as a major threat to the US hegemony in the region. Both countries want their hegemony in the Indo-Pacific Region because those who control the region will gain the status of superpower shortly. To counter China and balance power in the region, the US is making alliances with the major powers of the region such as Japan, India, Australia e.g., QUAD AUKUS, and other South Asian countries. It has strengthened ties with China's traditional rivals India and Japan. The US National Security Strategy document of 2017 has labeled China as a strategic competitor. Since then, trade wars, technological wars, and strategic competition between both powers have escalated.

Recently, tensions between both countries have escalated in the region over the disputed territories of the South China Sea and the political status of Taiwan as China is claiming over both. The United States of America has great influence and interest in the Indo-Pacific region and it can do anything to preserve its hegemony and achieve its interest in the region. If both the great powers have to go to war with each other to achieve their objectives and national interests, they will not hesitate. This research paper aims to analyze the current US-China strategic competition in the Indo-Pacific region and the possibility of a military conflict between them.

Furthermore, there is a huge stock of literature on the problem some works are very sophisticated and undoubtedly very credible such as "*Destined for War*" Graham Allison[1], argued that the impact of a rising China on the United States and the global order under American hegemony are leading these two nations toward an unavoidable violent clash, which neither one wants, because they risk falling into what the author calls "Thucydides Trap". Allison describes the Thucydides Trap as a dangerous dynamic that occurs when a rising power threatens to displace a ruling power or challenge its hegemony. He argued in his book how the rise of China has threatened US hegemony generally in the world and particularly in the Indo-Pacific Ocean. He gave the example of 16 cases in his book in the past five hundred years in which an ascending power challenged an established power. In such background conditions, war is the most likely outcome (12/16cases) but an inevitable one (4/16 cases). He argued that China's disruptive rise creates conditions in which accidental, otherwise inconsequential events, could trigger a large-scale conflict. However, he certainly presents the South China Sea as a great point of tension between the US and China today[2].

In another prominent work: "*The Tragedy of Great Power Politics*" John J. Mearsheimer argued that "the inherent structure of the international system and the relentless pursuit of power by states often lead to great power conflicts. When major powers like the United States and China are locked in a competitive struggle for dominance, smaller nations like Pakistan find themselves caught in the crossfire, facing the profound implications of such power struggles on their security and national interest"[3]. "John Mearsheimer is also among those who perceive China's rise as the most immediate threat to the US supremacy. Mearsheimer's theory of offensive realism predicts intense security competition between China and its rivals and the threat of war among these competing powers. He foresees China and the US becoming adversaries as China's power increases"[4]. The world's power is gradually shifting from west to east. China is involved in disputes in the East and South China Seas which can undermine the future of China in the region as well as in the world. Great powers have no reason to fight each other but their uncertainty about their survival forces them to seek power[3].

2 THEORETICAL MODEL

In this research "Thucydides's Trap" theory presented by Graham Allison an American political theorist who derived from Greek historian Thucydides has been used as a theoretical framework. According to Graham Allison, "Thucydides's Trap refers to the natural, inevitable discomobulation that occurs when a rising power threatens to displace a ruling power". In this theory, Graham Allison postulates about the likelihood of war when a rising power challenges the status quo of an existing superpower. In this case, China as a rising power has challenged the United States' hegemony and superpower status. The United States, in turn, has taken several measures to contain China. The US wishes to avoid Chinese control in the region and is unwilling to hand over regional hegemony to China. This increases the likelihood of a major power conflict erupting between the two nations. It is difficult for both the countries to escape the Thucydides's Trap and war is more likely in the future because war is Inevitable in such situations. When a rising power challenges the hegemony of an existing superpower the dilemma it creates is known as Thucydides Trap as explained by Greek historian Thucydides. To prove Thucydides' trap between the USA and China the author has discussed sixteen cases in which a rising power possessed a great threat to the existing power. In these sixteenth cases, twelve ended in a military conflict. This was the same case when a rising Germany challenged the superpower status of Great Britain before World War I.

3 METHODOLOGY

Methodology is a crucial part of the whole research process. It is the specific procedures or techniques used to identify, select, collect, process, and analyze relevant data about a topic or a problem. This research study is mainly qualitative. As only qualitative data have been collected, we used the document analysis method for data collection because our work only relied on secondary data. A detailed and systematic review of research papers, reports, books, and newspapers related to US-China relations and strategic competition between both countries in the Indo-Pacific region, disputes in the region, and its foreign policies is conducted. A thematic analysis of the data has been used. For investigation of the problem some cases as instances were studied to drive in-depth and systemic investigation. Besides this, this research is non-experimental in design because it is a social science research and the nature of the problem.

4 DOWNWARD SPIRALS OF US-CHINA RELATIONS

The bilateral relationship between the United States of America and the People's Republic of China is the most complex comprising the features of conflict and cooperation. Relations between the two countries have not been good since the beginning. However, it became worse since the start of the twenty-first century "The United States has just entered the fourth phase of its relationship with China since the end of World War II. In phase one, Mao Zedong's decision to go to war with the United States in Korea in 1950 produced a long period of antagonistic interaction. Phase two saw Richard M. Nixon and Henry Kissinger open up the relationship to better meet the global Soviet threat and, they hoped, end the Vietnam War on honorable terms. In phase three, Washington sought to bring Beijing ever more into the international system, hoping it would eventually become a "responsible stakeholder" and accede to U.S.-fashioned rules of domestic and international order. Now in Phase Four, the United States is beginning to fully digest the aggressive elements of Chinese power projection and take initial actions to deal with it"[5].

During the Cold War era both the US and China relations had been influenced by numerous international developments. In the initial phase of the Cold War, the relationship between the US and China had been characterized by antagonism and confrontation. The United States of America has tried to destabilize the newborn communist government of Mao Zedong.

The Korean War (1950-53) and the Taiwan Strait Crises of 1954 and 1958 further deteriorated the relationship between the US and China. It increased the bilateral hostilities between the US and China and brought both countries into a direct military confrontation, particularly in the Korean War. The Sino-US armies fought face-to-face in the Korean War. Besides this, to stop the spread of Communism, the US entered into two crucial defense treaties in Asia namely CENTO (1954) and SEATO (1955). "From 1953 to 1960, Sino-US relations remained strained on the issue of China's UN membership, trade imbalance and repatriation of the US citizens stranded in China since the Korean War"[6].

Sino-US relations remained hostile during the period of Jhon. F Kennedy. From 1960-70, Sino-U.S. relations have been characterized by several issues including the Vietnam War, Cuban Missile Crises, Sino-Indian War, and China's Nuclear Tests. After China's nuclear tests, both countries started talks to ease tensions between themselves and not to use nuclear bombs against each other. This was the time when the Sino-Soviet relations deteriorated over border and ideological issues.

The relationship between the US and China started improving in the Cold War era for the first time in the 1970s when Secretary of State Henry Kissinger made a secret trip to China. After this visit, the People's Republic of China secured a permanent seat in the United Nations Security Council. Later in 1972, President Nixon to China changed the 22-year-old US foreign policy of the containment of China. "Richard Nixon as a presidential candidate in his famous Foreign Affairs article published in October 1967 stated that, 'we simply cannot afford to leave China outside the family of nations'"[7].

In 1973, formal diplomatic relations were established between the US and China. "The ping-pong diplomacy finally melted the thaw. Mao threw the debate onto the public to ask whether China should invite an American team for a visit. Finding public support, Zhou Enlai, the Chinese premier, reiterated China's willingness to receive a special envoy from the US via Pakistan. The US reduced military operations in Korea and agreed to halt bombing in Vietnam as a goodwill gesture. In Henry Kissinger's secret mission facilitated by Pakistan in 1970, a broad agenda was developed to reflect on Sino-U.S. pragmatic issues. Kissinger's announcement of a visit to China on July 15, 1971, amazed the international community, and it allowed China to escape international isolation"[6]. United States President Jimmy Carter granted full diplomatic and de-jure recognition to China and adopted the One China Policy. Jimmy Carter and his counterpart: the former President Deng developed a partnership that helped stabilize US-China relations from 1976-89.

In the post-Cold War era, the United States of America faced a crucial strategic question of whether to pursue a policy of engagement with the rising China or to adopt a containment strategy to counter China's growing economic and military power. The post-Cold War era reflects the unique dynamics of Sino-US relations. It marked significant developments in global politics including the disintegration of the Soviet Union, the emergence of the United States as the only superpower, and the establishment of the New World Order.

The post-Cold War relations between the United States and China have been characterized by limited cooperation and extreme rivalry as China's rise poses a threat to the US hegemony in the world. "The most prominent characteristics of post-Cold War US-China relations, despite summitry and periodic improvement in relations, is persistent animosity and friction and constant threats to continued cooperation. Despite recent US-China summitry and greater cooperation, the relationship remains turbulent and subject to recurring conflict, with implications for regional peace and stability"[8].

Relations between the US and China during Clinton's presidency (1992-2000) were characterized by the US strategic engagement with China, driven by the belief that it would promote US interests. President Clinton's policy of

comprehensive engagement with China aimed at the gradual transformation of China into a democratic state and integrating China into the New Liberal World Order. “Despite the various divergences between the US and China, due to the large gap in power positions, status quo perceptions, and China’s effort to participate in the US-led liberal economic system, the US government adopted an engaging China policy during Clinton’s two terms”[9]. However, several issues strained relations between the US and China. These issues included; the rise of China, the Tiananmen Square Crises, and the Taiwan Strait Crises of 1996, when China conducted military exercises in response to the Taiwanese leader's visit to the US.

Unlike Clinton’s administration, the Bush administration (2001-2009) viewed China as a Strategic Competitor before the September 11 attacks. “In an interview with CNN in August 1999, the then-governor of Texas George Bush criticized Clinton’s constructive strategic partnership with China and argued that such perception of China was a major strategic miscalculation. Three months later, George Bush delivered a speech in the Ronald Reagan Presidential Library to elaborate his foreign policy vision of “American internationalism”, emphasizing that China was a strategic competitor rather than a partner. To Bush’s perception of China, the election program modified its vision of US-China relations, considering China the first challenger in Asia”[9]. However, the September 11 attacks dramatically changed the Bush administration’s foreign policy towards China, seeking major power cooperation (including China) against the global ‘war on terrorism’. Furthermore, during the Bush administration, both countries held high-level communications by establishing strategic dialogue mechanisms in 2005 and strategic economic dialogue in 2006 with frequent meetings to address bilateral, regional, and global issues.

The first three years of Barack Obama’s administration were cooperative between the United States and China. Besides the global financial crises, China witnessed immense economic growth ultimately overtaking Japan as the second-largest economy after the United States. Due to Chinese economic growth, the US-China power gap rapidly narrowed. However, the Obama administration viewed China as a status quo power and wanted to build more constructive relations with it. China’s economic growth did not stop in the upcoming years raising concerns for the United States as the US-China power gap further narrowed.

In 2014, China saw the emergence of a new leader President Xi which has dramatically transformed China’s foreign policy challenging the United States’ hegemony and superpower status. Under the leadership of President Xi, China has become more ambitious, authoritative, and aggressive. Since the rise of President Xi, rivalry and strategic competition between the United States of America and the People’s Republic of China has immensely increased. Instability arose in the US-China relations due to several issues including China's rise, first as a regional and now global power, ideological differences, disputes in the South China Sea, the Taiwan issue, and economic, political, and strategic interests.

China’s emergence as a major power in economic, military, and political dimensions in the twenty-first century has turned the face of US-China relations. Currently, both the United States and China are the greatest competitors and strategic rivals in the world. Today US-China relations resemble some dimensions of the Cold War era. Due to this, some scholars called the US-China rivalry and competition a New Cold War. China’s rise has challenged the superpower status of the US and its new world order. The United States of America sees China as a major competitor and threat to its hegemony and new world order. “In December 2017, the Trump administration unveiled its National Security Strategy report, which proposed that the United States is entering a new era of major power competition. The report labeled China as a ‘revisionist power’ and ‘strategic competitor’ that wants ‘to shape a world antithetical to US values and interests.’ In addition, the Summary of the 2018 National Defense Strategy issued by the US Department of Defense stressed that the ‘central challenge’ to the Pentagon was how to tackle ‘the reemergence of long-term, strategic competition’ with China and other rival states”[10]. “The Biden administration’s National Security Strategy recognizes China as the only state with the intent to reshape the international order and the economic, diplomatic, military, and technological power to do so. The administration takes seriously China’s efforts to surpass the United States in technology, increase the world’s dependence on China’s supply chains, ramp up regional military operations, and align more closely with Iran, North Korea, and Russia.”[11].

5 KEY DIMENSIONS OF THE NEW GREAT GAME

“Great-power competition is back. With the post-Cold War unipolar moment over, the United States and China now jostle over trade and technology, compete in a controversial and nuclear arms race, and seek to counter the other in various hot spots”[12]. The current rivalry and strategic competition between the United States of America and the People’s Republic of China is complex and multifaceted. It encompasses economic rivalry or trade war, technological competition, geopolitical rivalry, and military rivalry, which shapes the relationship between both global powers. These dimensions of rivalry are associated with the race for global hegemony and domination.

5.1 The Great Economic Rivalry

The Economic Rivalry or Trade War between the United States of America and the People’s Republic of China formally began in July 2018 under the Trump administration when the United States of America imposed trade tariffs on Chinese goods. Since then, the US and China have been engaged in a trade war imposing trade tariffs and economic sanctions on each other. The United States of America is facing an economic rival in the shape of China. China’s immense economic growth is a major concern for the United States of America. The United States of America and the European Union employ trade policies, tariffs, and negotiations to counterbalance China’s economic influence, driven by concerns over

unfair trade practices, market access, and intellectual property rights. “The vision of its absolute dominance in the global economy in the US has come into conflict with the growing imbalance in bilateral trade with China, increasing competitiveness of high-tech companies based in the PRC, and an increase in China’s investments exports. The US officials state that China is pursuing unfair trade policies, exploiting the benefits of trade liberalization and WTO membership, while at the same time keeping its domestic market safeguarded against foreign competition by providing subsidies and facilitating export through currency devaluation. The US accuses China of stealing scientific and technical knowledge and technologies from American companies, violating intellectual property rights, and neglecting environmental protection requirements”[13].

5.2 The Great Technological Rivalry

The technological rivalry between the United States of America and the People’s Republic of China has further deepened the ongoing competition between both countries. China’s advancing technological prowess is transforming the global technological and economic landscape. Beijing’s goals extend beyond merely adopting innovative technologies; it also aims to establish itself as a leader in setting international technology standards. This dynamic sets the stage for a prolonged period of economic and technological rivalry between the United States and China, as they compete for influence and dominance in the global arena. “The technology war is much more serious than the trade/economic war because whoever wins the technology war will probably also win the military wars and all the other wars. The US and China are now the dominant players in the world’s big tech sectors and these big tech sectors are the industries of the future. The Chinese tech sector has rapidly developed domestically to serve the Chinese in China and to become a competitor in the world market. At the same time, China remains highly dependent on technologies from the United States and other countries”[14]. The future of warfare will be shaped by technological advancements, with nations engaging in intense competition to develop game-changing military capabilities. The US and China are locked in a race for economic and technological dominance in the long term.

5.3 The Great Geopolitical Rivalry

The United States of America and the People’s Republic of China are great geopolitical rivals of the twenty-first century. The ongoing geopolitical competition between the United States and China is transforming the global economy, global power relations, and governance. “The complex interaction between the US and China, which has developed into a real confrontation, greatly affects global politics and economics, significantly influencing the geopolitical situation. The political behavior of most countries, delicate geopolitical balance, and the solution to global problems are now directly dependent on changes in US-China relations”[15]. China’s rise at the geopolitical level is a major concern for the United States. “At the opening session of the 19th National Congress of China in October 2017, President Xi declared that China would become a ‘socialist modern powerful country’ by the mid-21st century. Meanwhile, the Trump administration has vowed to make America great again and reaffirmed its resolve to maintain America’s global leadership. US Secretary of State Mike Pompeo defined the mission as ‘rallying the noble nations of the world to build a new liberal order.’”[10]. China is attempting to better serve its interests by reshaping the international system’s institutions and rules through its expanding political and economic power. It has raised concerns for the United States of America. The United States of America is trying to counter China’s growing geopolitical influence through several strategies.

5.4 The Great Military Rivalry

Besides the great economic, technological, and geopolitical rivalry, the US and China are great military rivals as well. However, the great military rivalry between the US and China is limited to the Indo-Pacific region, particularly to the South China Sea. “Rising powers always concentrate on building up their abilities and powers. They build up their military capability to increase their influence. China is consistently enhancing its power and influence in the world. It is enhancing its military capability with time. In 2017, China increased seven percent of its military spending and secured the position of second-largest global military expenditure after the US. China wants to extend its military influence in the South China Sea (SCS) and strengthen its influence in the Spratly Islands”[16]. China’s rapid militarization in the Indo-Pacific region has positioned it as a dominant force, boasting an impressive arsenal of weapons, including newly commissioned aircraft carriers, enhanced airpower, and a significant expansion of military infrastructure in the South China Sea (SCS). The People’s Republic of China is modernizing its People’s Liberation Army (PLA) which has raised concerns for the United States. “China’s ongoing military modernization efforts, aimed at countering American intervention in any conflict related to Taiwan or disputes in the South China Sea, have prompted the US national security community to debate the military strategy required. These discussions have focused on ways to deter aggressive Chinese behavior and, if necessary, to prevail in a conventional armed conflict”[17]. China is the largest naval power in the world comprising several aircraft carriers, as well as advanced surface combatants, precision-guided munitions, and a fleet of stealth fighter jets and long-range bombers, which pose a significant concern for the United States. China’s increasing aggressiveness in the region prompted the United States to take action. The US has increased its military presence in the region to show its presence and influence, hoping to counterbalance China’s power and maintain stability in the region.

6 INDO-PACIFIC: EPICENTER OF US-CHINA STRATEGIC COMPETITION

The Indo-Pacific (IP) region has become the center of strategic and geopolitical competition between the United States of America and the People's Republic of China. There has been constant competition for primacy in the Indo-Pacific region, particularly in the South China Sea between rising China and the predominant player the United States. Prominent scholars and analysts see the Indo-Pacific region particularly the South China Sea (SCS) as a tipping point for a military conflict between the US and China, as intense power competition grows day by day. China's rise has threatened the sovereignty of other Indo-Pacific countries and challenged the United States' interests in the region. Both the US and China seek to increase and exercise their respective influence and power in the Indo-Pacific region. "In the 21st century, the Indo-Pacific region developed as a center of power politics given its geopolitical and geostrategic importance. It remains a hub because of its maritime connectivity between the Pacific and Indian regions Meadows"[18].

The Indo-Pacific region has great significance for both the United States and China. Both countries want their maximum influence in the IP region. "Hillary Clinton in her article published in November 2011 highlighted the importance of the Indo-Pacific, calling it the key driver of global politics and the next arena of the US' interest and investment. The article highlighted the new change in the US strategic thinking towards the Pacific. The stretch of water from the Indian Ocean to the Pacific runs through the busiest and most vibrant energy and trade corridors. Unlike the Pacific, the Indian Ocean is home to four of six maritime chokepoints, the Mozambique Channel, the Strait of Hormuz, Bab al-Mandeb, and the Strait of Malacca. The US in its effort to ensure its sovereignty in the South China Sea and to curtail the expansion of China has joined hands with nations like Australia, India, Japan, and South Korea. For the US, the main objective of such a strategy is to bolster strategic and economic partnership to limit China's flexing."[19].

The United States of America has adopted several strategies to contain China's rise in the Indo-Pacific region. The US has made strategic alliances i.e. Quad and AUKUS with regional countries such as India, Japan, Australia, Philippines, South Korea, and many others to contain China in the region. "The actions taken by the United States have dragged other regional actors such as Australia, India, Japan. The four countries secretly formed the Quadrilateral Security Dialogue or "Quad". This security dialogue is an informal dialogue to coordinate security and military policies in favor of China covertly. The existence of the Quad defense dialogue indicates the efforts of the four-nation group to balance China's security in the South China Sea and control the Indo-Pacific region"[20]. The United States strategically considers the Indo-Pacific region as a key component of its global grand strategy, aiming to maintain its influence in this rapidly growing region. Besides joining hands with regional powers and increasing defense cooperation with them, the United States is maximizing its military presence in the region securing its interests, and acting directly in an emergency-like situation.

China's multi-billion dollar project known as the Belt and Road Initiative (BRI) is also a major concern for the United States. The United States believes that China is expanding its sphere of influence through BRI. It has taken several measures to counter China's Belt and Road Initiative in the region. One of them is the India Middle East-Europe Corridor (IMEC) which was recently announced in a G-20 Summit held in Delhi, India. "The first worthwhile counter initiative to BRI surfaced in 2019, i.e. Blue Dot Network – a multi-stakeholder initiative launched by the US, Australia, and Japan. This may be because of the miscalculation of the West, which considered BRI too ambitious a venture with a low probability of success. However, in 2019, serious efforts to counter BRI became evident. IMEC, therefore, is yet another endeavor in a series of such efforts"[21].

Chinese leaders are well aware of the United States' strategies against China. To counter the United States' influence and to promote its interest in the region, China has been pursuing alternative strategies. Such strategies aim to promote China's economic, political, and military influence in the Indo-Pacific region while countering the United States' presence and influence. In response to United States military aggression and defense cooperation with other South Asian countries against itself, China has adopted a confrontational stance to demonstrate its military prowess and deter potential US threats. Chinese leaders claim that removing obstacles will be necessary to achieve their nation's objectives. To do this, China intends to employ a three-pronged strategy in the near term: create a hostile foreign environment to concentrate domestic interests; lessen China's dependency on the US while increasing its reliance on other nations; and increase China's influence abroad. "In turn, the Chinese strategy is based on the desire to become the most considerable economic and military power, shifting the hegemony of the U.S. Based on the geopolitical competition between the two countries for political values and institutions that established the post-Cold War world order, China has seen American institutions and values as an obstacle to itself and a deterrent to growth. Therefore, to politically and economically counter U.S. global influence, China has actively begun to join regional and international institutions"[15].

To counter the US's influence in the region, China has also taken several steps such as modernizing its military by upgrading its capabilities including advanced weapon systems, and enhancing its naval and airpower. Furthermore, China is focusing on alternative international institutions such as the Asian Infrastructure Investment Bank (AIIB), Shanghai Cooperation Organization (SCO), etc. to increase its influence. Besides this, China is building artificial islands in the South China Sea (SCS) to increase its area of influence. "China is building artificial islands on the Spratly archipelago and upgrading the military base on Woody Island. These developments have helped China to have a strong military presence in the SCS. The central purpose behind these constructions of artificial islands is to enhance its influence in the SCS. The Paracel and Spratly Islands both are strategically important places in the South China Sea. These islands are located in very strategic positions and half of the world trade passes through them. Woody Island and China's new seven artificial islands on the Spratly Islands have enhanced China's military and economic influence in

the region”[16]. It is strengthening its ties with North Korea and Russia against the United States in the region. Besides Russia and North Korea, it is also strengthening its relations with the South Asian nations.

7 UNAVIODABILITY OF THE TRAP

The evolving geo-political landscape in the Indo-Pacific region has become a focal point of international discourse, with the potential for heightened tensions between the United States and China casting a shadow over regional stability. As the US-China relationship continues to oscillate between Indo-Pacific cooperation and competition, the specter of a potential military confrontation looms large, raising critical questions about the implications of such a conflict for countries in the region.

John Mearsheimer in his book "Tragedy of Great Power Politics" asserts that big powers are compelled to maximize their security and power, which might result in an ongoing fight for supremacy. Because states may use force to defend or further their interests, this unrelenting quest for dominance has the potential to turn into conflict. Because there is no central authority, the international system is by its very nature chaotic and unstable, which feeds competition. The pursuit of power is a zero-sum game in which the gain of one power is the loss of another and great powers are primarily driven by self-interest rather than ideology or benevolence. "The main causes of war are located in the architecture of the international system. What matters most is the number of great powers and how much power each controls. A system can be either bipolar or multi-polar, and power can be distributed more or less evenly among the leading states. The power ratios among all the great powers affect the prospects for stability, but the key ratio is that between the two most formidable states in the system"[3].

Currently, the United States of America and the People's Republic of China stand in the same position, where one country's rise (China) is a zero-sum game for another (America). The international system is still anarchic in which states fear each other and maximize their power at the expense of each other. The fundamental nature of global politics hasn't changed in the 21st, with states remaining the primary actors and no higher authority to regulate their behavior. The collapse of the Soviet Union altered the global power balance, but it didn't transform the underlying anarchic system. As a result, great powers continue to operate in a competitive and self-interested manner, similar to past centuries, with no indication of a significant shift in behavior on the horizon. Policymakers, academics, and strategists are becoming more and more concerned about the prospect of a war between the United States and China, which was previously thought to be unlikely. A possible conflict has become more likely due to the two global superpowers' growing tensions, which are being fuelled by rivalry in geopolitics, conflicting interests, and ideological disagreements. An atmosphere of suspicion and animosity has been fostered by the issues surrounding the South China Sea, tensions with Taiwan, trade wars, and technology rivalries.

8 POTENTIAL FACTORS

The Strategic competition and rivalry between the United States of America and the People's Republic of China has raised the prospects of potential military conflict in the Indo-Pacific region. The potential factors that could lead to a military conflict in the Indo-Pacific region are discussed as under.

First, China's remarkable rise has triggered an intense rivalry with the United States, as China's growing economic and military prowess challenges America's long-held dominance. Having established itself as a regional power, China now aspires to attain superpower status, seeking to rival the US globally. Muhammad Saaida in his article 'The Rise of China as a Global Superpower and its Implications for International Relations' argued that China's rise has various implications including military conflict with the US. "the rise of China could lead to increased conflict in the Asia-Pacific region. China has territorial disputes with several countries in the region, including Japan, the Philippines, and Vietnam. These disputes could escalate into conflict if China's rise continues". Historically, whenever a rising power has challenged the hegemony of an existing dominant power, it has often led to conflict, and in some cases, war. This phenomenon is known as the "Thucydides Trap," named after the ancient Greek historian Thucydides, who observed that the rise of Athens and the fear it instilled in Sparta led to the Peloponnesian War.

Second, In the past year, the strategic rivalry between the US and China has escalated significantly. The US government has adopted a more assertive approach to China, with the 2017 National Security Strategy explicitly identifying China as a revisionist power seeking to alter the global order. The Trump administration's efforts to reduce the trade deficit led to the imposition of tariffs on billions of dollars, worth of Chinese goods, sparking a trade war that has continued to intensify. "Over the past year, the US-China strategic rivalry has intensified. The US government is taking a significantly harder line in its approach to China policy. In December 2017, the US National Security Strategy labeled China a revisionist power seeking to change the international order. The Trump administration, in an attempt to reduce the US trade deficit, subsequently imposed tariffs on hundreds of billions of dollars of Chinese goods, leading to a spiraling trade war"[22]. The United States and China, the two major global powers, are engaged in an intense strategic rivalry, seeking to expand their influence worldwide, particularly in the Indo-Pacific region. Both nations are also competing technologically, particularly in areas like 5G, Artificial Intelligence, and Cyber Security, which may intensify the rivalry and increase the risk of conflict.

Third, The South China Sea (SCS) has emerged as a significant flashpoint in the escalating tensions between the United States and China. Graham Allison in his book "Destined for War", presented the South China Sea as the great point of tension between the US and China today. China's build-up and militarization of artificial islands and increasing naval

presence have heightened concerns, prompting the US to strengthen its military presence in the region. China has significantly expanded its naval and air capabilities, particularly in the South China Sea, by developing reclaimed islands and enhancing its land-based missile force. This strategic move aims to deny US forces access to the region, making it difficult for them to support Taiwan, South China Sea partners, and East China Sea allies. China is unilaterally altering the status quo in the South China Sea by constructing artificial islands, installing missile defense systems, and building airbases, thereby establishing a strategic foothold that poses increased risks to US military operations and freedom of navigation in this vital waterway. Through these actions, China is creating new geopolitical realities that challenge US influence and threaten the stability of the region. "In sum, as long as developments in the South China Sea are generally moving in China's favor, it appears unlikely to use military force. But if trends in the correlation of forces should shift against it, particularly at a moment of domestic political instability, China could initiate a limited military conflict, even against a larger, more powerful state like the US"[2].

China's claims on the one hand and its actions on the other hand have deepened tension in the region with the United States raising prospects of disastrous military conflict. "The *Indo-Pacific Strategy Report* released by the United States Department of Defense in 2019 affirmed "the enduring U.S. commitment to stability and prosperity in the region through the pursuit of preparedness, partnerships, and the promotion of a networked region." Yet, China has continued to improve many islands within the South China Sea (SCS) Beijing claims as China's sovereign territory without regard for overlapping claims and the exclusive economic zones of the other countries in the region. China's expansionist actions, combined with an uptick in Chinese naval activity and its ongoing militarization of the SCS, risk further escalation of tension within the region"[23].

The Fourth potential factor and flash point is Taiwan. China's territorial ambitions extend beyond the South China Sea, as it also views Taiwan as its integral part, despite Taiwan's self-governance and distinct identity. China's "One China" policy asserts that Taiwan is a province of China, rather than a sovereign state, and has repeatedly threatened to use force to bring Taiwan under its control. This stance has led to tensions with Taiwan and its allies, particularly the United States, which has committed to supporting Taiwan's defense. By considering Taiwan an internal part, China aims to eliminate any recognition of Taiwan's sovereignty and ultimately absorb it into the People's Republic of China. China views Taiwan as a breakaway province that must reunify with the mainland under the One-China principle. While China prefers peaceful unification, it reserves the right to use force if necessary, emphasizing its commitment to territorial claims over Taiwan. By declaring Taiwan's status as non-negotiable, Chinese leaders aim to assert their authority, deter any challenges to their claims, and ultimately, pave the way for Taiwan's eventual absorption into the People's Republic of China. "China also insists that it has been preoccupied with maintaining its national territorial integrity. Hence its positions in Tibet, and Xinjiang, and its policies toward Taiwan, as well as the reinforcement of its historical claims both in the East China Sea and the South China Sea. And China would also assert that this is nobody else's business apart from its own"[24].

John J. Mearsheimer in his book referred to Taiwan as a flashpoint between the United States and China. He argued that "Taiwan is another dangerous place where China and the United States could end up in a shooting war. Taiwan appears determined to maintain its de facto independence from China, and possibly to gain de jure independence, while China seems equally determined to reincorporate Taiwan into China. China has left little doubt that it would go to war to prevent Taiwanese independence. The United States, however, is committed to helping Taiwan defend itself if it is attacked by China, a scenario which could plausibly lead to American troops fighting with Taiwan against China"[3].

The Last but not the least potential factor is Alliances. Alliances are one of the major causes of wars. It has been a significant factor in the outbreak of wars throughout history, particularly in the twentieth century. Historically, It has led the world towards two major world wars in the twentieth century, i.e., World War I and World War II. The complex web of alliances between nations can create a domino effect, where a small conflict between two countries can quickly escalate into a larger, global conflict. The system of alliances creates a tense situation in which small conflicts can have the potential to lead to a wider conflict, and regional tensions can escalate into global crises.

Recently, the world has witnessed an alliance-like situation in the Indo-Pacific region. On one side, the US has formed close bonds with like-minded nations in the region, which includes Japan, Australia, India, Singapore, Taiwan, and many others to counter and encircle China. Clear examples of such alliances are the Quad and AUKUS. Meanwhile, China is doing the same, building strong ties with Russia, North Korea, and many others through initiatives like the Belt and Road. "In the past decades, the US has formed a few alliances in the Indian and Pacific Regions like QUAD, AUKUS, I2U2, IPEF, etc. QUAD consists of the USA, India, Japan, & Australia. The Quad intends to acquire a rules-based global direction, freedom of navigation, and a liberal exporting system. It will also provide debt financing to Indo-Pacific countries. But the basic role of QUAD is to contain strategic dominance of China across various regions like those of South China Sea, Eurasia, and the Indian Ocean"[25]. The US is supporting its allies both militarily and economically so that they can compete with China in the region. The United States has taken steps to strengthen its alliances in the Indo-Pacific region, amid a perceived security threat from China.

9 CONCLUSION

To conclude, the rise of China poses a significant challenge to the United States' long-standing hegemony and superpower status, sparking an intense rivalry between the two nations. The US-China rivalry has several aspects including—economic, military, technological, and geopolitical. The Indo-Pacific region particularly the South China Sea is the center of competition between both great powers. The US is actively seeking to counter China's growing

influence in the Indo-Pacific region, while China continues to expand its global reach. Both countries recognize the strategic importance of the Indo-Pacific region and are vying to maximize their influence, setting the stage for a potential military conflict. The intensifying rivalry between the United States and China is increasingly interpreted through the theoretical framework of the Thucydides Trap. This concept, rooted in historical analysis, posits that when a rising power, such as China, threatens to displace an established hegemon like the United States, the probability of conflict escalates dramatically. The Thucydides Trap suggests that as China's power continues to grow, the likelihood of a strategic confrontation with the United States becomes more plausible, reflecting a historical pattern where the incumbent power reacts to the rising power's challenge, often leading to war. This phenomenon is not merely a speculative theory but is grounded in numerous historical precedents where similar power dynamics led to war. This research has unveiled several critical findings that underline the complexity and potential dangers of the US-China rivalry. It has become clear that the competition extends far beyond mere economic or technological rivalry; it permeates strategic military postures and geopolitical alliances, especially in the Indo-Pacific region. The South China Sea has emerged as a significant flashpoint, where China's assertive territorial claims and the U.S.'s commitment to freedom of navigation could easily lead to confrontation. Taiwan remains another potential trigger, with China's insistence on reunification and the U.S.'s ambiguous defense commitments creating a volatile situation.

COMPETING INTERESTS

The authors have no relevant financial or non-financial interests to disclose.

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THE CURRENT SITUATION AND THINKING OF SHORT VIDEO ENABLING SOCIAL PARTICIPATION IN THE ELDERLY

YanYang Zhao*, JinJun Zheng, ShaoQi Xu, Jing Shao
Zhejiang International Studies University, Hangzhou310023, Zhejiang, China.
Corresponding Author: YanYang Zhao, Email: 2033232460@qq.com

Abstract: Faced with the absence of work-related social roles, older people may fail to adapt to the new social roles, living environment and lifestyle and fall into the dilemma of loneliness, emptiness and helplessness. This paper explores keyword the current situation, problems and future of the elderly's participation in short videos for social activities through case analysis and field survey. The study found that short video provides a convenient path for the elderly to participate in society, but there are still problems such as insufficient social incentives, limited hardware support, and difficult to bridge the technology gap. Therefore, it is necessary to seek countermeasures from policy support, social incentive and self-adjustment.

Keywords: Short video; Elderly people; Social participation; Community

On the morning of January 17, 2024, The State Council Information Office held a press conference, saying that China's population aged 60 and above is 296.97 million, accounting for 21.1 percent of the country's population. China has entered a moderately aging society, the number of elderly population is gradually increasing, and the demand in life, health and spirit continues to grow [1]. With the development of technology, the popularity of mobile Internet terminals is increasing, and the per capita holding is increasing. Video editing software such as cut and cut is available to everyone, and the threshold is lowered, which is very friendly to the elderly in cognitive decline. At the same time, the development of science and technology has provided strong support for the elderly to participate in social isolation through short video platforms, and provided a lot of convenience for the elderly to transform from short video platform users and short video viewers to short video creators.

In this context, this study, starting from the cases and interviews, explores the current situation of the elderly exposure to short videos and the process of short videos enabling the elderly social participation, in order to help the elderly to reshape social identity in social participation through short videos, and contribute to the construction of an old-social two-way friendly society.

1 LITERATURE REVIEW

In the context of social aging and new media popularity, academia pays more and more attention to short videos and the research of elderly groups. At present, the domestic academic circles believe that short video is a double-edged sword for the psychological and emotional support of the elderly, which has both advantages and disadvantages. On the one hand, short video can play the role of companionship and social interaction to make up for the lack of emotional [2] in the life of the elderly. At the same time, some scholars point out that the rural elderly try to ease the sense of estrangement, edge and distance in the family space and social field through the use of short videos, and use their original commodity meaning to eliminate loneliness, and drive psychological interaction [3] in the form of digital interaction. In addition, some scholars have realized the role of short video media in the social integration and social participation of the elderly, and believe that short video media, as an important channel for the elderly to obtain information, meet the spiritual needs of the elderly to understand social changes, and promote the social integration of the elderly into [4]. We call to see that "seniors who retire from work and those with illness or disabilities can remain active contributors to their families, relatives, communities and the country" and that "their skills, experience and resources are a mature, fully integrated and noble social development" [5].

Foreign research on new media and middle-aged and elderly groups is much earlier, generally using quantitative research methods, mainly focusing on the relationship between new media and middle-aged and elderly people, social isolation problems and health problems. For example, through data analysis, the access gap, use gap and knowledge gap of digital divide are found in the gap in the adoption rate of new media, the degree of use and the level of knowledge acquired with the help of new media [6]. Found that despite increasing Internet use among older adults, they tend to be more committed to familiar media practices, and at most exhibit selective migration [7]. This may be related to different cultural environments, and it may be necessary to explore this as a background.

To sum up, foreign studies on the relationship between the elderly and new media are earlier than those in China, and there are many quantitative microscopic studies, but the lack of research results on the relationship between short video use and social participation in the elderly. Domestic scholars' research on the elderly and short videos focuses on psychological emotion, social integration, digital divide and other aspects. This paper chooses a more specific perspective of social participation for the elderly to explore the role and influence of short videos in it.

2 SELECTION OF STUDY OBJECTS AND METHODS

2.1 Subject Investigated; Object of Study

The research object of this paper is the elderly-friendly community in Hangzhou: G community, G community is located in Xihu District, Hangzhou city, Zhejiang Province, with a long history and beautiful environment. The community now has 42 houses, about 2 146 households, a population of about 5 250 people, and a large number of elderly people. With party building as the leader and community service as the focus, the community provides various types of training and services for the elderly in the community. G community was rated as a national model elderly-friendly community in 2022.

2.2 Research Technique; Research Method

1. Case analysis method. In this paper, —— G channel, a short video organization in G community, was selected as a research case. "G Channel" has been established for seven or eight years. It is a community organization with the elderly spontaneously formed by the elderly. Channel G organizes shooting activities regularly or irregularly, and its topics combine with current events and follow the main social line. In recent years, he has created and filmed videos with the themes of "fraud prevention for the elderly", "insurance for the elderly", "cheongsam show for the elderly" and "Asian Games".

2. Fieldwork method. From January to April 2023, the researchers went to the field investigation in G community, visited the streets and the party and mass service centers of G community, and obtained many first-hand information, including but not limited to the basic information of G channel, original short video content materials of G channel, and content communication materials of G channel, etc.

3. In-depth interview method. This paper conducted face-to-face in-depth interviews with older people in channel G from February-March 2023 with a duration of 30 minutes to 1 hour for each respondent.

The information of the interviewees is as follows:

(1) Li, male, head of channel G, age 70, retired chengguan; (2) Zhu, female, G community secretary, currently employed; (3) Zheng, female, deputy secretary of G community, currently employed; (4) Zhang, female, G participant, aged 65, retired teacher; (5) Gu, male, age 63, retired staff of state-owned enterprises; (6) Shang, male, age 64, retired workers; (7) Hu, female, age 65, retired teachers.

3 RESEARCH FINDING

3.1 Short Videos Provide a Convenient Path for the Social Participation of the Elderly

The elderly groups have learned new skills and developed new thinking through short video shooting. In the process of creation, from discussion, shooting, performance, editing to broadcast, G channel groups maintain the collision of thinking, which helps the elderly to keep their thinking active degree, enrich their spiritual life, and improve the happiness of the elderly while social participation. As the G community secretary said: *For sure, I tell you, not only your happiness, but also my ability. Nowadays, many young people do short videos, but few old people do so. Let's try first. Then I think since our community can do this thing, then other communities can also do it, to enrich the spiritual life of our old people.*

Short videos enable the elderly to promote positive energy, gain a sense of belonging and identity in the process of social participation [8]. Channel G has directed, performed and taken many short videos related to traditional cultural knowledge and social hot spots. The topics are including but not limited to fraud prevention for the elderly, community civilization creation and ecological civilization construction, etc., which are conducive to carrying forward the socialist core values, transmitting positive energy and improving social influence. *With provincial radio, Hangzhou television, west lake, small strong hotline, G channel is just a name, is a name, not tall, is different from the formal social organizations (media), we from the early stage of the writing, late filming is our miss li, more grassroots, promote positive energy, socialist values.*

Short video shooting also helps to enhance the sense of belonging and identity of the elderly in the society, and enhance community cohesion. The originally "scattered" elderly people in the community naturally "connect" with each other, cooperate and support each other by shooting short videos. *From the beginning we shoot some simple community content broadcast, to now write and direct, to cultivate their own actors, shooting propaganda videos, cheongsam show, before also shot fraud prevention... before our community old people play at home, now also become the people in the video, we play together, increased the connection.*

3.2 Short Videos Empower the Elderly in the Process of Social Participation

In the era of new media, short video rely on its popularity, convenience, simplicity characteristics can assign the elderly social participation, G community of the elderly through short video, improve the participation, learning new skills, enhance the sense of identity and belonging, but it is undeniable that the short video in fu to the process of social participation in the elderly still faces some problems.

3.2.1 Lack of self and social motivation

In the process of research, we found that the aesthetic differences, language and cultural differences between the elderly will affect their enthusiasm for short video creation and social participation. On the premise that it is difficult to

resonate with each other, the mode of mutual understanding and cooperation between the elderly is often unbalanced, affecting the progress of creation. *Old people, is not the right and wrong too much, for a while to this, for a while and that, clap short video, the heart of comparison ah, we than who wear good-looking, contradiction produced ah.*

The elderly on channel G mainly achieve diverse social participation through self-selfie, self-directed and self-acting short videos. On the basis of community support, the elderly spontaneous form community organizations, respectively in the process of video creation implementation self presentation and role play: responsible for the filming of the elderly planning, shooting, in the elderly is responsible for the camera, rendering, the division of labor of creation mode can make more community in the elderly involved, widely can assign the theme of social participation. However, in the actual operation process, due to the lack of financial incentives, it affects the overall participation of the elderly. *There is no incentive system, the capital is limited, this piece of engage, do, do not have extra money ah, unless everyone is very high, have to make it, just can have, generally won't have some.*

In addition, the whole society has limited attention to the creation of short videos for the elderly. Many elderly people try to create short videos, but they often cannot get the expected attention and recognition due to the lack of support and promotion at the social level. *Just watch their short videos, watch cooking, shoot granddaughter's video, can't shoot, difficult to shoot, want to shoot cooking, shoot not good, no one to watch! No one shot good, no one likes, don't want to shoot, we won't shoot.* Even some elderly people were subjected to Internet fraud and malicious attacks in the process of creating short videos, which also significantly reduced their enthusiasm and enthusiasm for participation. *I don't get those things, I build a group everybody chat, you think strange good, send short video, cheater come up, nutrition, supplements, money are cheated. You are still scolded by others, people see you old people make up, face smear, want to say you.* The personal experience of the elderly when creating short videos also appears in the content production of G channel. In order to gain social recognition, the participants of G channel need to pay more energy.

The lack of family encouragement is also one of the reasons that prevent the elderly from using short videos to implement social participation. After retirement, the children and grandchildren should consider the physical conditions and family conditions of the elderly, and hope that they can use their energy to the family [9]. Elderly people usually play the family role such as taking care of grandchildren and housework. They often do not have enough time to communicate with their neighbors, let alone devote themselves to their interests and hobbies. *My family mainly want to take grandson, I have time to shoot, I want to pick her up from school, immediately go back to cook to eat, I want to do something, but time does not allow ah, my son, my daughter does not want me to do, worried that I will be cheated.* Older people in channel G also quit because of family responsibilities.

3.2.2 Limited hardware support

Community is a small social unit, which occupies an important position in the construction of an age-friendly society. The elderly can improve their quality of life and enrich their spiritual and cultural life by using the existing resources in the community. At present, the community is "powerless" in the reality of meeting the multifaceted needs of the elderly. Old community facilities and equipment, the site is old, not as good as the new community, we three old community public a place. The restrictions of the shooting site and the environment are also very obvious at this stage. *Our community has a waist drum team, waist drum are bought, but there is a problem, the community has no park, can not rehearse, this is the problem of the old community, the old community, conditions do not allow ah, singing voice is too big, can not shoot, will be complained. The same is true for short videos, where much movement is too allowed.* In addition, due to limited community resources, limited hardware resources and financial support are often available for the G channel elderly. The lack of advanced shooting equipment affects the video quality of the elderly in the production process of short video production. In addition, due to the limitations of age, vision and operation ability, the elderly need efficient aging equipment, which puts higher requirements for the hardware support of all parties. As Mr. Li, the head of G Video, said: *Unlike young people who have shooting things, we say, not too much equipment, the effect is not good.*

3.2.3 The technological gap is hard to bridge

New media literacy is a person's ability to acquire, understand and use information in the new media era. Compared with young people, the elderly live in the traditional media environment for a long time, and their new media literacy is relatively low, so it is difficult for them to quickly adapt to the information communication and communication mode in the new media era like young people [10]. one side, Short-term video production requires a certain amount of skill, Some short video application software has complex operation interfaces and various functions, Older people take a long time to learn to master, besides, Some software lacks user-friendly designs for older adults, Such as font size, operation tips, etc., These greatly increase the difficulty of the elderly to use; on the other hand, Content is more difficult to produce, Short video production requires a certain amount of creativity and shooting skills, Some older adults may lack filming experience, It is difficult to master the right shooting Angle, light, sound and other elements, The quality of the short video, Some elderly people may lack the knowledge and skills in video editing and post-production, Difficulto complete high quality short video clips and special effects.

However, there are not many public welfare training for the technical level of photography, editing and post-production for the elderly, and there is also a lack of lectures and activities to encourage and guide the elderly to use new technologies and create video works. Many elderly people can only rely on their own research, exploration and learning of the shooting and creation of short videos, with low efficiency and poor results. I used to do chengguan, not specialized in camera, I started to do ps contact camera, but later static boring, made premire, we all rely on their own bit by bit groping, buy books to see, look on the Internet. In the process of short video promotion, there will also be a dilemma of "many elderly people do not have smart phones, so this thing can not be promoted" . In this case, short

video is difficult to play its due role in enabling the social participation process of the elderly.

3.3 Exploration of the Path of Short Video to Enable the Social Participation of the Elderly

3.3.1 Policy support

On the road of short video to enable the social participation of the elderly, the policy support is very necessary. Starting from the top-level design, relevant departments at all levels can be encouraged to cooperate with universities or new media companies, increase investment in digital skills training for the elderly, and provide public welfare digital skills courses and resources for the elderly. The government can also introduce relevant policies to encourage enterprises and social organizations to provide financial resources for short video creation for the elderly, or to provide venues, clothing, training and other support for [11]. For example, Hangzhou G community encourages the elderly to carry out "micro-venture capital" and apply for relevant funds. We old people can do micro venture, micro venture is to see the size of the project, 1,000 yuan, 2,000 yuan, government funding, social organizations can apply for themselves, he will give you money, self entertainment to make a film. Our street, micro venture capital we are the first to do up, is also the first in Hangzhou, because it is with very little money to support, the elderly organization. The support of various policies and projects can effectively encourage enterprises and social organizations to promote the technical social participation of the elderly in various ways.

3.3.2 Community incentives

The community can create a creative atmosphere that encourages, supports and guides the elderly to guide, perform and operate independently, assist in the establishment of different levels of social organizations for the elderly, and attract the elderly to use new technologies to realize communication and interaction and social participation. Communities can also interact with each other. Through short video creation competitions and online sharing meetings, the elderly can have the opportunity to learn from each other, exchange experience and share results, and take this as an opportunity to improve their creative level and enhance their creative enthusiasm. In addition, the community can also provide various opportunities to the elderly, encourage the elderly, as G channel old man experienced: their regular and irregular (activities), regularly for example in a few times a year, not regular activities, civilization, large activities, we will increase, we have on a regular basis, irregular activities, have shooting project, mainly according to the residents themselves. In addition, the community should also strengthen the publicity and promotion of video works related to the elderly, improve the popularity and influence of short videos for the elderly, enhance the confidence and sense of achievement of the elderly, and further enhance the ability of short videos and further expand their influence.

Community can also strengthen the resources, for the elderly with the necessary equipment, technology and training resources, and cooperate with local universities, with the help of college students volunteer behavior to establish the elderly digital assistance center, for the elderly to need technical support and guidance, bridge the technical gap between the young and the elderly, further enhance the efficiency of social participation of the elderly.

3.3.3 Self-correction

To break the dilemma of short video creation for the elderly, it not only requires one party to make efforts, but also needs the linkage of the government, communities, enterprises and individuals. The self-adjustment of the elderly is also particularly important. First, encourage the elderly to build up confidence. The elderly may feel inferior and uneasy because of their age, physical and technical knowledge, and dare not try new social communication methods. They should be encouraged to actively seek help, believe that they have the ability to create short videos, and actively overcome the strangeness and discomfort in the learning process.

Elderly people also need to actively adapt to new technologies and adapt to the new environment. In the era of new media, the operation technology of short video plays an important role in daily life, although many elderly people do not *"The work before retirement has nothing to do with this, and it is all considered, edited and shot"*, but the short video creation activity is indeed an effective way to make the elderly enhance their sense of social participation, which is worth vigorously promoting.

4 PERORATION

In this paper, on the basis of case study, field investigation, in-depth interview, with short video creation for incision, to explore the role of the elderly social participation, short video in the process of promoting the elderly social participation difficulties, and thus summarizes a series of countermeasures and Suggestions, in order to promote the short video in can assign the elderly social participation, the elderly friendly community construction play a positive role. However, the conclusion of this study is based on typical cases in a single community in Hangzhou, which lacks certain universality. In the future, the scope of research needs to be further expanded to investigate the current situation and difficulties of social participation of the elderly with short videos in the middle of different regions and different groups, in order to draw more profound countermeasures and conclusions.

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EXPLORATION OF CROSS-BORDER E-COMMERCE TALENT TRAINING MODE BRIDGING THEORY AND PRACTICE -- AN EXAMPLE FROM THE UNDERGRADUATE MAJOR OF CROSS-BORDER E-COMMERCE IN GUANGDONG UNIVERSITY OF SCIENCE AND TECHNOLOGY

Ping Peng, TuLi Chen*

School of Management, Guangdong University of Science and Technology, Dongguan 523083, Guangdong, China.
Corresponding Author: TuLi Chen, Email: summer0788@126.com

Abstract: This document explores the innovative talent training model for the undergraduate program in Cross-border E-commerce at Guangdong University of Science and Technology. Its objective is to develop comprehensive capabilities in cross-border e-commerce professionals through an integrated educational system that effectively bridges theory and practice. With the rapid expansion of the cross-border e-commerce industry, the demand for skilled professionals -- particularly those possessing a robust theoretical foundation and practical experience -- has surged. The university employs the "Five Forces Collaborative Education Model, integrates Teacher's Guiding Power, Student's Learning Power, Practice Application Power, Innovation Driving Power, and Value Shaping Power. This model is designed to align with industry needs and cultivate high-quality, innovative cross-border e-commerce talent.

Keywords: Cross-border E-Commerce; Talent development; Theory-practice integration; Five forces collaborative education model

1 INTRODUCTION

With the continuous development of the cross-border e-commerce industry, cross-border e-commerce enterprises are selling a more diverse range of product categories and reaching more sales markets. Simultaneously, the demand for e-commerce talents in enterprises is also increasing. The current talent training model has not fully kept pace with the rapid development of the industry, and the significance of integrating theory and practice has become increasingly prominent. Only by strengthening the integration of theory and practice can we nurture cross-border e-commerce professionals with a strong theoretical foundation and practical skills to meet the increasing demand for talent in the industry, thereby supporting the high-quality development of the cross-border e-commerce sector.

The cross-border e-commerce program at Guangdong University of Science and Technology (GDIST) is the first batch of cross-border e-commerce undergraduate talent training programs in China and the first in Guangdong Province. The program explores a cross-border e-commerce talent training model that bridges theory and practice by constructing a comprehensive education system, enhancing the integration of industry and education, promoting practical participation, and establishing a continuous feedback and evaluation mechanism. It will provide innovative and applied high-quality cross-border e-commerce talents for 'Dongguan Smart' and industrial upgrading, and promote the sustainable and healthy development of the industry.

2 THE FOUNDATION OF CROSS-BORDER E-COMMERCE PERSONNEL TRAINING

2.1 'New Trend' of Cross-border E-commerce Development

With the growing consumer demand for personalized and diversified goods, cross-border e-commerce platforms have become an important bridge connecting global consumers and merchants. Cross-border e-commerce companies provide consumers with a more convenient and enriched shopping experience through the use of advanced digital technologies and innovative business models. At the same time, cross-border e-commerce breaks the geographical limitations of traditional trade, enabling merchants to enter the global market more easily and achieve globalized sales and exchanges. In order to better meet the needs of consumers in different regions, cross-border e-commerce enterprises have begun to focus on localized operations, including language localization, product localization, and marketing localization. This localization strategy not only enhances consumers' shopping experience but also boosts enterprises' competitiveness in the local market.

2.2 Requirements for 'New Talents' in Cross-Border E-commerce

Talent is a scarce resource in the field of cross-border e-commerce. At present, the structure of cross-border e-commerce talent is primarily composed of individuals with basic skills, lacking senior management and technical expertise. Additionally, there is also a high turnover rate among cross-border e-commerce professionals. The industry's need for new talent focuses on skill level and overall quality, encompassing not only solid professional knowledge and skills but also language proficiency, cultural adaptability, innovative thinking, technology utilization, teamwork, and various other aspects.

3 BUILDING A CROSS-BORDER E-COMMERCE TALENT TRAINING MODEL THAT BRIDGES THEORY AND PRACTICE

In order to nurture new talents in cross-border e-commerce who can adapt to the current development situation, the goal of the cross-border e-commerce undergraduate program at Guangdong University of Science and Technology (GDIST) is to be 'based in Dongguan and oriented towards the Greater Bay Area'. The program is based on the principle of 'cultivating people with moral integrity', adopting the teaching method that combines online and offline elements, and focusing on developing students' entrepreneurial practice abilities. Teaching methods mainly utilize the 'five forces collaborative teaching mode', incorporating case study teaching, simulation training, practice, and other teaching methods. Competition is used to enhance teaching and learning.

According to the development of the industry and enterprise talent demand, a demand-oriented curriculum system has been established, known as the 'Five Forces Collaborative Education Model' (Five Forces Collaborative Education Model), as shown in Figure 1. This model consists of Teacher's Guiding Power, Student's Learning Power, Practice Application Power, Innovation Driving Power, and Value Shaping Power.

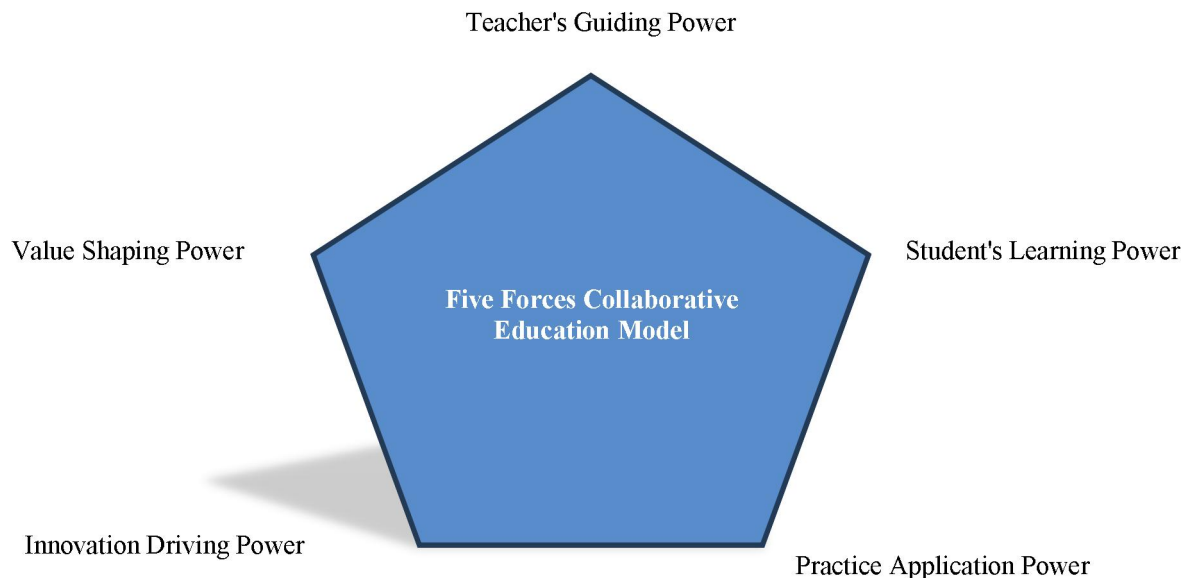


Figure 1 Diagram of the Five Forces Collaborative Teaching Model

3.1 Teacher's Guiding Power (TGP)

Teachers, as knowledge transmitters and guides of students' growth, play a vital role in cultivating cross-border e-commerce talents. With the support of school and social platforms, teachers in this field continuously update their knowledge base and enhance their teaching skills. They achieve this through collective seminars, attending and evaluating lectures, collaborative lesson planning, receiving feedback from supervisors, and participating in teaching competitions to prepare for their daily classes. Simultaneously, they enhance their guidance abilities by utilizing their free time for both online and offline training sessions on campus and off-site, focusing on teaching techniques, methods, and professional skills. They also engage in knowledge exchange with representatives from other educational institutions and businesses, as well as gain practical experience by visiting various enterprises.

3.2 Student's Learning Power (SLP)

As learners of knowledge and skills, students need to actively participate in learning, take the initiative to absorb and understand new knowledge, and develop the ability to learn for life. In teaching and practice, attention is paid to stimulating students' interest and enthusiasm in learning and cultivating their independent learning ability and innovative spirit. Throughout the process of designing the talent training program, from the syllabus to lecture plans, lesson plans, course evaluation, and assessment, the focus is on making 'learning the center' and emphasizing the development of students' learning power.

3.3 Practice Application Power (PAP)

As a bridge between theory and practice, practical teaching provides students with the opportunity to transform theoretical knowledge into practical operation and deepen their understanding of knowledge. The cross-border e-commerce undergraduate program places great emphasis on cultivating practical application skills. It not only offers practical operation opportunities through a diverse curriculum and university-enterprise cooperation projects but also encourages students to engage in project-driven learning and competition activities. This approach aims to

comprehensively enhance students' practical abilities, innovative thinking, and industry adaptability, ensuring that graduates can swiftly integrate into and contribute to the development of the cross-border e-commerce industry.

3.4 Innovation Driving Power (IDP)

The curriculum design and teaching methodology emphasize the development of individual and team innovation, providing students with a platform to transform their ideas into entrepreneurial opportunities. This stimulates their drive for innovation, enabling them to adapt to the ever-changing global e-commerce environment.

3.5 Value Shaping Power (VSP)

The teaching process fully implements the three-pronged education approach. Through various practical activities and case studies in the curriculum system, students' values are shaped. They learn how to create and deliver values, becoming cross-border e-commerce talents with high moral character and excellent abilities, capable of leading the industry's development.

4 CONCLUSION AND PROSPECTS

The new trend of cross-border e-commerce industry gives rise to new requirements for cross-border e-commerce talents. The cross-border e-commerce undergraduate program at Guangdong Institute of Science and Technology is closely aligned with the industry's development and enterprise requirements. It continuously explores innovative ways to train cross-border e-commerce talents. In the future, the program will focus on designing effective teaching evaluations, emphasizing the assessment process, and strengthening employer feedback mechanisms. This will support the development of the cross-border e-commerce industry and meet enterprise needs, delivering high-level, applied, and innovative cross-border e-commerce talents for the Greater Bay Area.

COMPETING INTERESTS

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EFFECTS OF HIGH-INTENSITY INTERVAL TRAINING ON BODY COMPOSITION AND PHYSICAL FITNESS IN UNIVERSITY STUDENTS LIVING WITH OBESITY

Cheng Ma^{1*}, DaXi Mou², FangFei Kuang³

¹Department of Physical education, University of Shanghai for Science and Technology, Shanghai 200093, China.

²College of Publishing, University of Shanghai for Science and Technology, Shanghai 200093, China.

³College of Foreign Languages, University of Shanghai for Science and Technology, Shanghai 200093, China.

Corresponding Author: Cheng Ma, Email: macheng@usst.edu.cn

Abstract: This present study explored the effects of a twelve-week body-weight-based high-intensity interval training (HIIT) program on body composition and physical fitness in obese university students. Methods: Sixty-one participants completed a total of 36 sessions of weight management classes over twelve weeks. Each intervention session included 40 seconds of 14 sets of high-intensity exercises at 85%-90% of H_{rmax} (such as burpees, mountain climbers, etc.), with 20 seconds of recovery in between. Body composition, Cooper 12-minute run, 50-meter sprint, and standing long jump were measured before and after the intervention. Results: Participants showed significant reductions in weight, BMI, and TBF% after the intervention, with statistical significance ($p < 0.05$). Besides, participants showed significant improvements in the Cooper 12-minute run and 50-meter sprint. However, there was no significant change in the standing long jump performance ($p > 0.05$), suggesting that the impact of HIIT on lower body power may be limited. Conclusion: High-intensity interval training (HIIT) shows positive effects on body composition and physical fitness in obese university students, demonstrating its potential application as a university physical education program.

Keywords: Body-weight based HIIT; Intervention; Obesity; Physical fitness; Young adult

1 INTRODUCTION

Obesity is a growing global issue, particularly among young people, and has become a significant factor affecting health and quality of life. University students are in the early stages of adulthood, and lifestyle changes during this period have important implications for long-term health [1]. Hence, effective interventions for obese university students, especially in weight management and physical fitness improvement, are crucial. In recent years, high-intensity interval training (HIIT) has gained considerable attention as an effective strategy for weight management, largely due to its time efficiency and its benefits in improving metabolic health [2].

HIIT combines short bouts of high-intensity exercise with intervals of recovery and can achieve high energy expenditure in a short period, showing significant effects in weight control and cardiovascular health improvement. Previous studies have shown that HIIT can not only effectively reduce body fat but also enhance cardiorespiratory fitness and improve metabolic health, particularly in obese and overweight populations [3]. Also, HIIT can further enhance its weight management effects by increasing insulin sensitivity and basal metabolic rate [4].

Body-weight-based HIIT, in particular, is suitable for promotion in university physical education programs as it does not rely on special equipment and is more flexible and adaptable to different settings and student fitness levels. This training format not only has all the advantages of HIIT but also reduces psychological stress during training and lowers the risk of injury [5].

Further studies are necessary to explore the long-term application of HIIT as an intervention for obese university students in university physical education courses, despite extensive research on its effects on weight management. Furthermore, personalized HIIT program designs tailored to different fitness levels and individual differences are also urgently needed. Therefore, this study aims to evaluate the effects of a twelve-week body-weight-based HIIT program on body composition and physical fitness in obese university students, providing scientific evidence for obesity management in university physical education.

2 MATERIALS AND METHODS

2.1 Participants

Participants of this study who volunteered to attend the weight management course were recruited from a local university. Inclusion criteria were as follows: 1) Age 18-23 years old; 2) Body fat percentage $\geq 30\%$; 3) A sedentary lifestyle: no regular exercise and a sedentary time of more than 8 hours a day; 4) Self-reported weight has been stable within ± 2 kg for the past 3 months; 5) All questions on the physical activity readiness questionnaire are answered negatively. After fully understanding the purpose and requirements of this study, the participants signed a written informed consent.

2.2 Study Procedure

After screening, 61 eligible participants were included in this weight management course. Each participant completed a twelve-week exercise intervention course and received testing before and after the training intervention, including height, weight, body fat percentage, and physical fitness testing; All assessments, except for body composition, are scheduled for the afternoon. Participants are required to complete three times a week for a total of 36 training sessions during the twelve-week intervention program.

2.3 Testing Protocol

Before pre-intervention assessments, the subjects were invited to the laboratory to familiarize themselves with all testing and training procedures and to sign the written informed consent. The baseline assessments were completed in three days, with a minimum interval of 24 hours between each test. All tests are completed at least 72 hours before the training course begins. The test contents are as follows.

2.3.1 Measurement of body composition

On the day of body composition measurement, subjects were required to come to the laboratory in the early morning and ensure that they had fasted for at least 12 hours before the test and did not engage in strenuous exercise for 48 hours. When measuring height and weight, the subjects wore light clothes with no footwear and were measured using a standard method with a stadiometer (accurate to 0.1 cm) and an electronic scale (accurate to 0.1 kg). The calculation of body mass index is to divide the weight in kilograms by the square of the height in meters. The same operator used bioelectrical impedance analysis technology (Tanita MC-980 PLUS MA, Tokyo, Japan) to measure the body fat percentage of the subjects. Before the measurement, the palms and soles of the feet were kept dry, and the torso was kept upright during the measurement, with an angle of 15 degrees between the upper limbs and the torso.

2.3.2 Physical fitness test

Standing Long Jump In the standing long jump, participants should begin with their feet naturally shoulder-width apart, knees bent, and arms swinging to generate momentum. During take-off, both feet must push off the ground simultaneously to maximize horizontal distance. The jump distance is measured from the take-off line to the heel of the farthest landing point. Each participant is allowed two attempts, with the best result recorded to the nearest 0.1 cm.

50-meter sprint The 50-meter sprint is conducted on the straight segment of a standard 400-meter track. Participants begin from a stationary position behind the starting line and sprint towards the finish line at maximum effort when they hear the starting signal. Timing is recorded from the start signal until the moment the participant crosses the finish line. Each participant is allowed two attempts, with the best result recorded to the nearest 0.1 second.

Cooper test: The Cooper 12-minute run test is conducted on a 400-meter standard track. During the test, the subject tried to cover as much distance as possible within the specified time. At the end of 12 minutes, the tester immediately recorded the total distance meters the subject had run. Based on the recorded distance, evaluate their aerobic endurance level.

2.3.3 Exercise training

HIIT sessions utilized body-weight-based exercises, accompanied by music rhythms. Each training session consisted of two cycles, each containing seven movements. Each exercise was performed at 85%–90% HR_{max} for 40 seconds at high intensity, followed by a 20-second recovery period. After completing a full cycle, repeat the cycle. During the training process, the Polar HR (Polar Team Pro, Finland) was used to monitor the heart rate to ensure the safety and effectiveness of the training. The training course standardized the warmup and cooldown, with a 10-minute warmup and a 5-minute cooldown. Throughout the course, participants are free to drink water if they need to.

2.4 Statistical Analysis

The data were presented as mean \pm standard deviation and analyzed using SPSS 26.0 (Chicago, IL, USA). The normality of the data was assessed using the Shapiro-Wilk test. Paired *t*-tests were used to compare the results before and after the intervention. The level of significance for all statistical tests was set at $p < 0.05$.

3 RESULTS

3.1 Participants

In this study there were a total of 61 participants, including 27 females and 34 males. Baseline data prior to the intervention showed that the average weight for females was 81.0 ± 12.2 kg and for males was 96.1 ± 19.1 kg, with corresponding body mass index (BMI) of 28.4 ± 4.8 kg/m² and 33.9 ± 7.1 kg/m², respectively. The overall TBF (%) was 40.2 ± 9.6 for females and was 35.6 ± 9.1 for males (Table 1).

Table 1 Characteristics of the participants

	Females(n = 27)	Males(n = 34)
Age(years)	19.5 \pm 0.9	19.4 \pm 0.7
Height(cm)	169.2 \pm 8.8	168.6 \pm 8.3

Body mass(kg)	81.0±12.2	96.1±19.1
BMI(kg/m ²)	28.4±4.8	33.9±7.1
TBF(%)	40.2±9.6	35.6±9.1

Observed values are expressed as means \pm standard deviation. BMI: body mass index, TBF(%): total body fat percentage.

3.2 Body Composition and Physical Fitness

Throughout the intervention period, HR and RPE were continuously monitored during each training session. All participants completed 14 sets of 40-second bodyweight-based HIIT exercises at 85%-90% HRmax, with 20 seconds of recovery between sets. The outcomes for body mass, BMI, TBF%, standing long jump, 50-meter sprint, and the Cooper 12-minute run, both before and after the intervention, are presented in Table 2.

After twelve weeks of high-intensity interval training (HIIT), participants showed improvement in body composition and physical fitness. Overall, there was a significant decrease in body mass ($p < 0.05$), and BMI also significantly decreased ($p < 0.05$). Although the reduction in TBF% was small, it still showed significant changes ($p < 0.05$).

The physical fitness tests revealed significant improvements in some fitness indicators. Particularly, the Cooper 12-minute run and 50-meter sprint were improved significantly ($p < 0.001$). However, there was no significant change in the standing long jump ($p > 0.05$). The specific percentage of change is displayed in Table 2.

Table 2 Outcomes before and after twelve weeks of HIIT

	Pre	Post	<i>p</i>
Body composition			
Body mass(kg)	89.4±17.9	87.2±16.9	0.002
BMI(kg/m ²)	31.5±6.7	30.6±6.1	0.002
TBF(%)	37.6±9.5	37.1±9.1	0.018
Physical fitness			
Standing long jump(cm)	174.3±30.9	175.4±30.1	0.560
50 m sprint(s)	11.1±1.7	9.1±1.4	<0.001
Cooper 12-minute run(m)	1523.8±242.2	1615.2±321.3	<0.001

Observed values are expressed as means \pm standard deviation. BMI: body mass index, TBF(%): total body fat percentage.

4 DISCUSSION

The results of this study indicate that obese young adults achieved significant improvements in weight, BMI, TBF%, and certain physical fitness tests (such as the 50-meter sprint and Cooper 12-minute run) after a twelve-week body-weight-based HIIT intervention. The implementation of body-weight-based HIIT in university physical education programs, particularly for obese populations, demonstrates multiple advantages, including clear positive effects on weight management and significant importance for fitness improvement.

Firstly, the significant decrease in body mass and BMI is consistent with the conclusions of existing studies. Some studies in recent years have shown that HIIT has obvious advantages in weight control, especially in obese and overweight people. This may be related to the high-intensity nature of HIIT, which can significantly increase energy expenditure in a short period of time and also continuously increase metabolic rate after training [6]. In addition, HIIT can further support effective weight management by improving insulin sensitivity and increasing basal metabolic rate [7]. Although the reduction in total body fat in this study was relatively small, this change was statistically significant, suggesting that HIIT may affect TBF% by adjusting body fat distribution or increasing lean body mass. Previous studies have also shown that HIIT can help reduce visceral fat and thereby reduce cardiovascular risk.

Secondly, in terms of physical fitness improvement, the significant improvements in the 50-meter sprint and Cooper 12-minute run results further demonstrate the effectiveness of body-weight-based HIIT. Not only does the improvement in physical fitness show up in aerobic capacity, but it also significantly enhances anaerobic exercise performance, a crucial factor in the daily activity capacity of obese students [5]. As a high-intensity interval training mode, HIIT can comprehensively exercise various major muscle groups of the body through diverse self-weight movements such as jumping jacks, high-stepping, and burpees, thereby improving power and speed. In this study, the significant improvement in the 50-meter sprint performance reflects the enhancement of speed and agility of obese individuals; moreover, the improvement in the Cooper 12-minute run demonstrates the enhancement of aerobic capacity [5, 8].

However, the intervention did not significantly increase the standing long jump performance, possibly because body-weight-based HIIT training primarily focuses on improving overall aerobic and anaerobic endurance, with less direct impact on lower extremity muscular strength. Nevertheless, body-weight-based HIIT still has significant

advantages in university physical education courses, as it does not require special equipment, making it simple to implement in various settings and suitable for students of different physical abilities. For obese students, this equipment-free training method not only reduces psychological stress but also reduces the risk of injury during the training session. Body-weight-based HIIT, based on a combination of music and rhythm, further enhances the fun and interactivity of training, increasing students' adherence and enjoyment of regular exercise.

5 LIMITATION

The results of this study further verify the effectiveness of body-weight-based HIIT as a weight management and physical fitness improvement strategy for obese university students. However, there are still some limitations. Firstly, the sample size of this study is relatively small, and the research subjects are limited to a specific group of university students. Hence, it should be cautious when promoting and applying this to a broader population. Furthermore, the intervention period in this study was twelve weeks, and the long-term effects of body-weight-based HIIT could not be assessed. Future research should expand the sample size and include participants of different ages, genders, and health statuses to improve the universality and extrapolation of research results. Meanwhile, future research should also focus on changes in other physical fitness indicators, such as muscular strength and flexibility, and explore how to optimize this training regimen in the curriculum so that body-weight-based HIIT can better meet the needs of different groups, ensuring that they can obtain the best benefits from training.

6 CONCLUSION

In conclusion, young obese adults showed significant improvements in weight, BMI, body fat percentage, and certain physical fitness indicators after a twelve-week body-weight-based HIIT intervention program, demonstrating this program's positive impact on improving the physical fitness of obese university students and its potential as a type of physical education course in universities.

COMPETING INTERESTS

The authors have no relevant financial or non-financial interests to disclose.

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CREDIT MEASUREMENT OF RURAL INTERNET CONSUMER FINANCE BASED ON BLOCKCHAIN CLUSTERING AND FUSION MODELS

HaoYang Tan^{1*}, Lei Hu²

¹College of Economics, Hunan Agricultural University, Changsha 41000, Hunan, China.

²College of Finance and Statistics, Hunan University, Changsha 41000, Hunan, China.

Corresponding Author: HaoYang Tan, Email: tlltwork@163.com

Abstract: This paper focuses on the empirical analysis of personal credit assessment of online lending platform from the perspective of personal credit, and the security of credit privacy data can be guaranteed by blockchain classification model. This paper is mainly based on the chain security encryption operation and decentralized data classifier training model, blockchain storage credit data between the ecological nodes through the transmission of transaction decision data return beacons, to achieve the data retrieval, use, confirm the rights and rewards, and at the same time the use of clustering learning algorithms combined with the decentralized training model to build a unique algorithmic training system, through the machine learning to backtrack all the transaction records, the sharing of the After data processing of credit data information, the fiducial correction fitting model using feedback from data samples, thus opening the modeling method of blockchain and clustering algorithm combined application in the field of credit. In the final analysis, the research on the application of blockchain technology in the credit collection industry should not stop at guaranteeing the security and traceability of data, but rather apply the "pre-credit review", "credit monitoring" and "post-credit management" to the entire credit collection industry. "Instead, it should be applied to the entire credit collection process, and used to guide Internet credit bureaus in their daily credit collection activities. Blockchain technology mainly solves the problem of credit trust and security, for this reason, it is necessary to construct a complete set of methods for analyzing, verifying and measuring Internet credit data. This paper combines the blockchain and the clustering algorithm in machine learning, and empirically analyzes the credit data of Internet consumer financial institutions under this framework.

Keywords: Blockchain; Clustering and Fusion Models; Credit Measurement; Rural Internet Consumer Finance

1 INTRODUCTION

Traditional classification models have their own advantages for data processing, and their applicability has been continuously proved by relevant research. However, each model is more or less insufficient for specific problems, and no one model can solve all problems well. Applying integrated learning to the analysis and processing of credit data before uploading, using integrated algorithms to integrate multi-party data processing, and uploading the model parameters of the model training phase to the blockchain and synchronizing them quickly, the blockchain-oriented clustering and fusion algorithms improve the security of the training phase and storage phase of the credit data, reduce the cost of the credit data storage and the transmission of the model parameters, and improve the security of the credit data. It reduces the cost of credit data storage and model parameter transmission, and improves the application system chain of credit data screening, analysis, storage and transaction synchronization. It also reduces the risk of credit data leakage due to model gradient update before uploading. The empirical analysis results in the later section show that it can improve the security of data and model while ensuring the accuracy of the model. Compared with the traditional data classification model, the blockchain clustering fusion model will improve the effect of Internet credit data analysis.

The blockchain clustering and fusion model utilized in this paper mainly starts from three aspects: credit data feature fusion, data segmentation and integrated learning. At the feature level, a new feature set is formed by extracting the social relationship information of credit users and quantifying the text description content information to supplement the basic features. The use of user soft and hard information at the same time promotes the richness and accuracy of the feature types of the dataset, which improves the quality of the dataset and makes the final assessment more realistic and reliable.

2 LITERATURE REVIEW

2.1 Blockchain Clustering Fusion Algorithm

K-means is one of the most classical clustering algorithms and is widely used in blockchain data analysis. The clustering center keeps changing with each iteration and eventually the center of the new round coincides with the previous round or is less than a certain threshold, then the clustering is complete. Numerous scholars have conducted studies to try to determine the optimal K value. Hongzhi Liu proposed an automatic fusion algorithm SCDP-MI based on credit data to automatically find the optimal number of fusions, which calculates the distance between the samples and stores them in a matrix, and then calculates the local density P of each data point as well as finds all the

other points whose local density is greater than the point, and finds the minimum distance from these data points that satisfy the conditions to the point is set as δ . After normalizing P and δ , the 2D vector is mapped onto a 1D straight line, and finally the points on the straight line are sorted, and then the proper threshold is found to split the centroid of each cluster to get the optimal number of fusions, which is the K value[1].

The fusion algorithm clusters the data and divides the samples under different sample spaces. This improves the similarity of data within the same sample space, and classification models under the same sample space tend to get better classification results. The use of blockchain fusion analysis models and parameters to segment credit samples is the beginning of the problem, and the subsequent way of processing data under each sample space needs to be improved by other data processing techniques.

2.2 Application of Integrated Learning to Consumer Finance Data

Integration learning is a research hotspot in the field of machine learning, and the combination with blockchain technology can better handle massive credit data. Unlike ordinary machine learning algorithms that use only one classifier for decision determination, integrated learning generates and uses a set of classifiers, and then outputs the final decision result through a certain decision fusion method, thus obtaining better data generalization ability and classification accuracy.

The generation of base classifiers is the first part of integrated learning, the key is the overproduction of base classifiers that have diversity among each other. According to Fu Bin, in order to maximize the diversity among base classifiers and improve the classification performance of classifier combinations, researchers proposed the strategy of over product and select to assist in the design of multi-classifier combinations[2]. Obtaining different base classifiers can be done either by changing the data used during model training or by changing the parameters of the model itself.

Chekauer divided a dataset with 119 attributes into several feature subsets and manually trained the neural network model on different feature subsets while also varying the size of the neural network, obtaining 32 different combinations of neural network classifiers, with improved final classification results[3]. In addition, Turner conducted experiments using the same approach on a training set with 25 features and exceeded expectations by decreasing the classification effectiveness of the final classifier combinations even when only a small number of features were removed at a time, saving the vast majority of the features to be used to train the classifiers[4]. These two experiments illustrate that the method of manipulating feature values to train base classifiers achieves better results only on datasets with more feature values.

In order to get a better classification effect, many scholars have carried out research on how to select different feature values, such as through the random subspace method or the use of more complex genetic algorithms, as well as the diversity value of the combination of base classifiers as the objective function as a more direct method to select a subset of attributes. Among them, Pairwise Measures is a classical way to measure the diversity among classifiers, which is based on the principle of calculating the diversity values between any two classifiers in a classifier set, and then averaging the diversity values of all the combinations, and taking the average value as the overall diversity value of the set; whereas unpaired measures calculate the overall diversity of a number of base classifiers at one time. In comparison, the unpaired metric is slightly more efficient and not inferior to the paired metric in terms of performance [5].

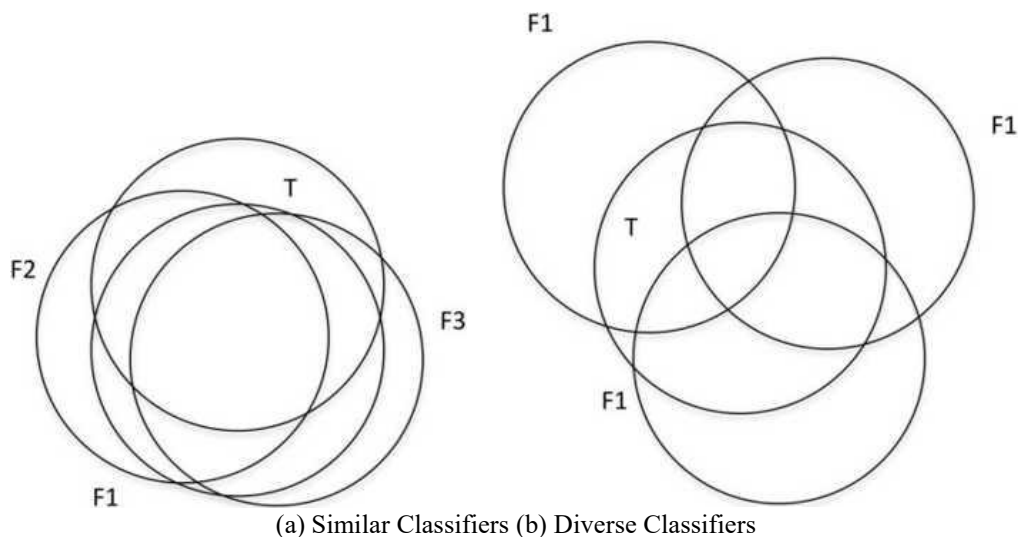


Figure 1 Venn Diagram of the Concept of Classifier Diversity.

Kuncheva experimented with and summarized a variety of diversity measures, exploring the diversity of base classifier combinations under different datasets and the diversity of base classifier combinations generated using different strategies under the same dataset, recording the diversity values as well as the model accuracy. The results of this study conclude that the diversity of classifier combinations generated by Boosting method is greater than the diversity of classifier combinations generated by Bagging method, which is also related to the base classifier training strategy of Boosting method, which makes the differences between classifiers larger and complementary by changing the training sample set[6]. Experiments have confirmed that there is a correlation between diversity and accuracy, but there are also some empirical results that show that

model accuracy is decreasing as diversity increases. It also shows that the current diversity metric is not perfect enough. When selecting the optimal subset of base classifiers, it is necessary to comprehensively consider various metrics and not only rely on the size of the diversity of the classifier combination.

3 SAMPLE SELECTION AND DESCRIPTIVE STATISTICS

3.1 Data Sources

In recent years, China's consumer finance market has transformed from the former traditional offline credit card model to the current Rural Internet Consumer Finance credit products, and credit consumption behaviors such as buying a house, education and training, and medical and aesthetic care have promoted the development of the Internet credit system. Therefore, the Internet credit data object used in this paper is Rural Internet Consumer Finance companies, and the analysis software is Weka, an open-source software based on JAVA environment, which is used to assist the research in the field of consensus algorithm and data fusion analysis.

There are many Rural Internet Consumer Finance platforms, but the degree of information disclosure varies from platform to platform, and this paper obtains the small amount of borrowing and lending data from Rural Internet Consumer Finance platforms from Jetson Consumer Finance Company (Homecredit). In addition, taking into account that borrowing and repayment is a cyclical process, it needs to go through a longer period of time in order to make a more realistic evaluation of the customer's credit situation, and it is not possible to discern the customer's goodness or badness immediately after the loan is issued to the applicant, so it is selected to pay back customers with a length of time of more than 12 months.

There are about millions of borrowing data in the whole Rural Internet Consumer Finance platform. According to the empirical data of sampling in mathematical statistics on the total number of samples and the number of samples sampled in random sampling, with a confidence level of 95%, when the overall sample is larger than 20,000 inches, it is sufficient to take 400 samples. Considering that the data of Rural Internet Consumer Finance is highly variable, as much data as possible is needed for modeling and validation, and, the larger the data sample size, the better the accuracy of modeling is supposed to be. Therefore, this paper obtains 24014 customers with repayment length of 12 months or more from the third-party platform as samples.

The information contained in the sample is: customer code, history of repayment, gender, education, age, marital status, whether he/she owns a house, whether he/she has a mortgage, whether he/she owns a car, whether he/she has a car loan, whether he/she has a credit card, whether he/she has a child, nature of the organization, where he/she resides, salary, years of working experience, type of occupation (whether he/she has a job or not), total amount of the loan, amount repaid in each installment, type of the borrowing, term of the loan, whether he/she has had a history of borrowing, etc.

The output of the model is to determine whether a customer is a "good customer" or a "bad customer". The data obtained in this paper is the history of the customer's repayment for each installment, so based on the customer's history of repayment, the customer is categorized as a "good customer" or a "bad customer".

Category 1, Bad Customers: Borrowers who are seriously delinquent within 12 months of the arrival of the loan will be determined to be bad customers. Serious delinquency is defined as having one installment of a loan that is more than 90 days delinquent or having two or more installments of a loan that are more than 60 days delinquent.

Category 2, good customers: those without the above are considered good customers.

After determining the discriminatory conditions of "bad customers" and "good customers", this paper categorizes the sample data according to the borrowers' historical repayment records. In this paper, the original sample data are screened and an equal number of good and bad customers are extracted. Because the number of bad customer samples is limited, so get all the 1594 bad customer samples, and then randomly selected 1594 good customer samples, the chaotic combination of these samples is a complete sample for analysis and modeling. The results of screening the samples are shown in Table 1.

Table 1 Percentage of Modeled Data Classifications

	good customer	proportions	bad customer	proportions
pre-sampling	22419	93.40%	1594	6.60%
post-sampling	1594	50%	1594	50%

3.2 Analysis and Selection of Characteristic Variables

Each sample contains the following information: gender, education, age group, marital status, whether or not they have a house, whether or not they have a mortgage, whether or not they have a car, whether or not they have a car loan, whether or not they have a credit card, whether or not they have children, nature of the organization, location of residence, salary, years of experience, type of occupation, total amount of the loan, amount of the loan repayment per installment, type of the borrowing, loan tenure range, and whether or not they have had any historical borrowing.

The following is an explanation of the terms used in the modeling process of this paper: "characteristic variable" is equivalent to the "independent variable" in the credit scoring model; "whether the customer is a bad customer/probability of bad customer" is the "dependent variable" in the credit scoring model. The "probability that the customer is a bad customer" is the "dependent variable" in the credit scoring model. Each piece of information in the sample may become a

"characteristic variable" for modeling, so each piece of information is called an "alternative indicator". Alternative indicators are analyzed, and if an alternative indicator is effective in predicting the outcome, then that "alternative indicator" becomes a "characteristic variable", and vice versa.

3.2.1 Selection of alternative indicators

The selection of alternative indicators is crucial to the construction of the model, and the alternative indicators for personal loans of commercial banks with more mature development generally contain basic personal information, occupational information, assets and liabilities information, and so on.

If there is a significant difference in the credit behavior of customers between the values taken in the same alternative indicator, it can be filtered as a characteristic variable. For example, in the indicator of stable occupation or not, if the credit situation of people with stable occupation is better than that of people without stable occupation, and they can accurately distinguish good and bad customers with a high probability, this alternative indicator is considered to have a high degree of differentiation, and it can be a characteristic variable. The alternative indicators after grouping were analyzed using the indicator Information Value (IV), which is commonly used in statistics. The IV values of the alternative indicators for each variable are shown in Table 2:

Table 2 Alternative Indicator IV Values

variable name	IV value
ivloanlife	1.371645554
ivpayamount	0.280030079
ivloanamount	0.265127812
ivlendhis	0.024939962
ivloantype	1.211117758
ivjob	0.001154599
ivworkyears	0.022754313

3.2.2 Modeling training set and validation set establishment

After defining the characteristic variables as well as the dependent variables of a credit scoring model, modeling and analysis can be performed. After the modeling is completed, it is necessary to objectively determine whether a model is valid or not, or to compare the advantages and disadvantages of different models. A common method is to sample the original samples as the "training set" and the remaining samples as the "validation set". The training set is used to solve the parameters of the model, and the validation set is used for simulation to check the correctness of the predictions. Since the training set for solving the parameters does not contain the information of the validation set, it is fair and reasonable that all models are tested with the validation set. Considering the sample size, a larger training set is needed for adequate training, so random sampling is used to draw 25% to be used as the test set and the remaining 75% as the training set. The sampling results are shown in Table 3:

Table 3 Number and Percentage of Samples in the Training Set and Validator

	No. of good clients	No. of bad customers	add up the total
training set	1182	1194	2376
Percentage within sample	49.75%	50.25%	100%
validation set	402	390	792
Percentage within sample	50.75%	49.24%	100%

The data used in this paper to empirically study the credit assessment model of Rural Internet Consumer Finance network credit comes from the open dataset of Gitzo (homecredit). This open data set in the form of a database consists of seven tables, and the relevant data can be directly imported into the database for the researcher to analyze and organize.

This dataset contains user borrowing records between 2019 and 2021, and all loan records during this time period have now been confirmed as repaid or in default, with a relatively complete record for analytical research. This database contains a wealth of personal information, including basic credit information, bidding information, loan application information and other hard information, but also includes relationship information with other users on the platform, guarantee relationship and friend relationship information and other soft information, in addition to the current market information and some macro-economic information, etc., the data cleaning and pre-processing of this table to obtain the original data used in this experiment. The original data set used in this experiment is obtained by data cleaning and preprocessing of this table. After the statistics, there are 20,106 records available for the experiment during the three-year period, of which 10,666 are default records and 18,440 are trustworthy records, and the ratio of default and

trustworthiness is 1:1.73.

4 EXPERIMENTAL RESULTS

4.1 Cross-Validation Assessment

The processed Gitzo (homecredit) dataset is randomized into 5 copies, and 1 copy is selected in sequential order as the test dataset 2 and the remaining 4 copies are used as the training dataset. Then 5 training test dataset pairs are generated and used to perform 5-fold cross-validation analysis. All accuracy comparisons of model classification performance in the subsequent experimental results were performed using the mean value of the 5-fold cross-validation.

Table 4 Single Classifier 5-fold Cross-Validation Classification Accuracy

classification model	model parameter	accuracy (essential features)	accuracy (after feature fusion)	Categorization effect
Na Bayes	default (setting)	68.24%	63.26%	1
Random Forest	default (setting)	69.57%	69.74%	T
logistic	default (setting)	69.69%	71.21%	t
	C0.01	69.38%	69.82%	T
	c0.10	69.24%	67.70%	1
	C0.20	68.36%	64.84%	1
J48	default (setting)	67.86%	65.48%	1
	C0.30	67.01%	64.67%	1
	u	64.82%	63.14%	1
	R	68.73%	68.34%	1
	default (setting)	69.51%	69.61%	T
BP	H1	68.53%	67.47%	1
	H2	68.84%	70.23%	T
	H3	68.82%	69.58%	T
	T0	69.42%	63.88%	1
SVM	T2	69.67%	64.93%	1
	T3	60.52%	52.32%	1

As shown in Table 4, some classical single classification models provided by the Weka platform are used in the experimental process to first evaluate the credit assessment effect under the 15 basic features, and then use the more comprehensive credit data set with more comprehensive information obtained from feature fusion to evaluate the classification effect.

Analyzing the results of the experiment, it can be seen that with the dataset having 15 basic features, the accuracy reached 69.69%. The other classification results are slightly worse, but most of them reach more than 68%, which is overall favorable. Through blockchain feature layer fusion, a dataset with 115 features was obtained, including both hard and soft information. This more informative dataset was then used to evaluate the classification effect of the classical classification models mentioned above, and the experimental data showed that the Logistic model exhibited the highest classification accuracy of 71.21%.

Comparing the data from the two rounds of experiments before and after, it can be seen that the classification effect of SVM and NaiveBayes model decreases significantly, the classification effect of logistic regression model and random forest model rises, the classification effect of BP neural network model under some parameters is improved, and the accuracy of decision tree model is improved only when the confidence factor is very small. The performance of the NaiveBayes model and the support vector machine is very dependent on the quality of the features of the data set, so they do not incorporate some noise features in the analysis process. The performance of NaiveBayes model and Support Vector Machine is very much dependent on the quality of the features in the dataset, and they do not do any filtering of the features used in the analysis process, so the incorporation of some noisy features reduces the classification effect. In contrast, the logistic regression model and the decision tree model filter the noisy features by setting feature weights and pruning, respectively, which can differentiate between features of different quality. Combining the classification principles of each model and further analyzing the experimental results, it can be found that after the feature layer fusion, some of the newly incorporated 100 features are effective and can significantly improve the data quality, while some are useless features that will increase the misclassification rate of the model. Therefore, in order to achieve the best classification results, these noisy features need to be screened.

The best performing classification model in this round of experiments was the logistic regression model, which achieved the highest classification accuracy of 71.21% for a single classifier, and the improvement over the previous round of experiments (15 features) is shown in Table 5.

Table 5 Classification Accuracy of Logistic Regression Models

Different sets of features	Maximum accuracy
Basic features (15)	69.69%
Post-fusion features (115)	71.21%
Experimental gains	+1.52%
Different sets of features	Maximum accuracy

Credit soft information such as descriptive text and social relationships and hard information mined based on credit information expand the number of feature vectors in the credit dataset can complement the amount of credit data. The experimental results strongly suggest that if this new dataset is slightly filtered with features, then the classification effect of the model can be improved. In addition, the best single classifier for both rounds of experiments is the logistic regression model, which further validates the reason why logistic regression models are widely used in the field of credit assessment, which can better deal with the credit assessment problem and provide a certain degree of interpretability for the decision-making results by feeding back the model parameters. The above data analysis illustrates that in the field of Rural Internet Consumer Finance network lending, the soft information of borrowers will improve the information asymmetry phenomenon, and the feature fusion part of the model in this paper can improve the accuracy of credit assessment is clearly verified.

4.2 Assessment of the Effectiveness of Data Segmentation

The K-Means clustering algorithm is selected for data segmentation, and the K-value, an important parameter of the clustering algorithm, is assisted by the SCDP-MI algorithm. Then, several candidate K-values are further tested to find the optimal K-value that is suitable for the dataset. The following method is used here to evaluate the appropriateness of the K-value:

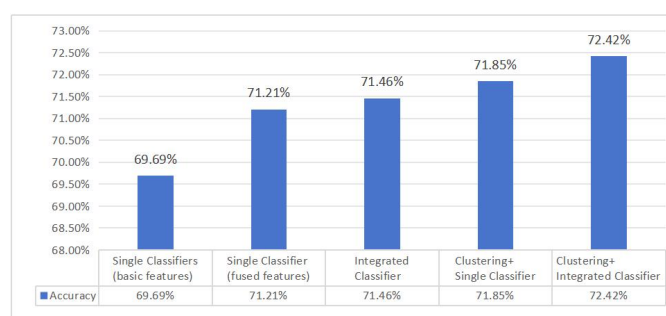
In the first step, a certain value of K is set to train the K-Means classifier, and then the training dataset is clustered in order to get K different sample spaces.

In the second step, a number of classifiers are obtained using different single classification models trained using data under each sample space.

In the third step, the test data is inputted, and the test data is divided onto different feature spaces using the above trained K-Means classifier, and then the sample is classified using the classifier that performs the best in that feature space, and the classification accuracy is finally counted.

4.3 Overall Effectiveness Evaluation

From the above experimental results, it can be learned that the credit assessment model based on credit data fusion proposed in this paper step by step improves the credit assessment accuracy rate of Rural Internet Consumer Finance online credit through the three major links of feature fusion, data segmentation and fusion learning. The overall classification accuracy of the assessment model is cross-validated with 5 folds, and the results are shown in Figure 2:

**Figure 2** Multi-Classifier Clustering Fusion Effect

From the figure, it can be learned that after the feature layer fusion, the amount of data information has been greatly improved, and the evaluation effect of the optimal single classifier has been improved from 69.69% to 71.21%. After using the clustering algorithm to subdivide the data and then using the single classification model, the classification effect has been improved to some extent, and a classification accuracy of 71.85% has been achieved. On the basis of data segmentation, after completing the credit assessment of the samples under different sample spaces using the fusion learning method, the model classification effect reaches the best, and the accuracy is improved to 72.42%. After feature layer fusion, data segmentation, and decision layer fusion, the assessment effect of the information fusion-based assessment model proposed in this paper is improved from 69.69% to 72.42%, and the assessment accuracy is improved

by 2.73%, which obtains a sizable improvement in classification effect.

Through the above analysis of the experimental data, not only a preliminary description of the classification effect of the model, but also concluded that: first of all, after clustering the training data set, a number of disjoint sub-training sets are obtained. It is worth noting that not all sub-training sets are suitable for fusion, for example, the effect of the fusion model made based on the differences in user features used in this paper is not as effective as the single classification model under the third type of feature space. Again, the selection of base classifiers should not only consider the degree of diversity of the combination, nor should it only consider the performance of the base classifiers, and the two need to be considered for screening to obtain the optimal set of base classifiers.

5 CONCLUSION

In this paper, we design a block fusion-based credit data evaluation model and empirically test it. According to the results, we recommend the following actions.

First, the "soft information" should be more fully utilized to improve the information asymmetry phenomenon and to increase the amount of information in the information assessment dataset. In the context of the big data era, the explosive growth in the amount of information brings many opportunities for credit assessment. As people's use of the Internet and social platforms increases, personal information becomes more and more transparent, and it is increasingly important to make full use of the data from third-party websites, as well as to mine the user's social relationship information and analyze the text description information. Because this kind of "soft information" can alleviate the information asymmetry between lenders and lending platforms, and between lenders and investors, thus improving the accuracy of credit assessment, accelerating the speed and volume of transaction, completing the economic deployment more rationally, and improving the speed of social and economic development. The blockchain fusion model proposed in this paper realizes the extraction of various types of "soft information" in the decision-making layer fusion, including soft information based on text description and social relationship information based on social networks. This kind of "soft information" is rich in variety and comes from a wide range of sources, which can improve the amount of data information and mitigate the negative impact of information asymmetry in Rural Internet Consumer Finance lending.

Second, based on the fact that different credit users have different characteristics and preferences, borrowers are clustered and analyzed and divided into different categories. "Things are grouped together and people are divided into groups", and the same group of people tends to have certain commonalities. The process of cluster analysis further extracts such commonalities within groups and differences between groups, which is a complement to traditional population division indicators such as income level and education level. The design of different credit assessment models for different groups can improve the classification effect of the models, and the diversified use of models for different groups also makes up for the shortcomings of the traditional single model, which is too "middle-of-the-road".

This paper starts with the description of the data set, introduces the characteristics of the data set as well as the data processing methods, and explains how the data set required for the experiment was obtained from the original data set. Then, the experimental process as well as the experimental results are described in detail, explaining the reasons for the design of each step of the model and its benefits, and verifying the significance of the model for solving the personal credit assessment of Rural Internet Consumer Finance network credits.

COMPETING INTERESTS

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