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ENGLISH TRANSLATION AND DISSEMINATION OF GUANGXI CLOTHING CATEGORY INTANGIBLE CULTURAL HERITAGE

JinSheng Wang
School of General Education, Liuzhou Ploytechinc University, Liuzhou 545006, Guangxi, China.
Corresponding Email: 191520085@qq.com

Abstract: This study examines ethnic minority costumes collected by the Guangxi Zhuang Brocade Museum and Guangxi Ethnic Museum, employing field investigations, document analysis, and artifact authentication to investigate the technical characteristics of textile production, dyeing, embroidery, and craftsmanship in Guangxi's intangible cultural heritage of traditional attire. The research reveals that these costumes serve dual functions as identity markers—both distinguishing ethnic groups and symbolizing internal lineage divisions. Notably, certain techniques and patterns demonstrate cross-cultural integration through borrowing elements from other ethnic traditions. The successful translation of Guangxi's intangible cultural heritage in clothing-related fields will enhance regional branding and amplify the global dissemination of cultural symbols.
Keywords: Guangxi; Clothing; Intangible cultural heritage; English translation; Regional image; Communication

1 INTRODUCTION

The ethnic minority cultures of Guangxi are a microcosm of China's cultural diversity. The 12 indigenous ethnic groups have created a rich and colorful cultural heritage and ethnic symbols throughout their historical development and evolution. According to statistics, Guangxi boasts 70 national-level representative projects of intangible cultural heritage and 1,115 autonomous region-level representative projects, covering ten major categories: folk literature, traditional music, traditional dance, traditional drama, quyi, traditional sports, games and acrobatics, traditional fine arts, traditional crafts, traditional medicine, and folk customs [1]. Guangxi has always attached great importance to the protection and inheritance of intangible cultural heritage. Guidelines from Guangxi authorities set 2025-2035 development goals for protecting intangible cultural heritage. By improving five systems—investigation and documentation, representative projects, representative inheritors, regional holistic protection, and the construction of inheritance experience facilities—intangible cultural heritage in Guangxi plays a key role in shaping the regional image of Guangxi and building a strong cultural tourism region. To achieve this goal, Guangxi has not only established various levels of intangible cultural heritage protection institutions but also introduced research programs and specialized courses in intangible cultural heritage protection at the secondary and higher education levels, systematically cultivating professionals. This has transformed cultural preservation from static museum-style protection to dynamic integration into contemporary socio-economic life.

2 THE COMPOSITION TYPES AND MAIN CHARACTERISTICS OF GUANGXI CLOTHING CATEGORY INTANGIBLE CULTURAL HERITAGE

As the most distinctive cultural symbols with strong regional characteristics, the ethnic minority costumes of Guangxi are not only garments for warmth and protection for people of various ethnic groups, but also a concentrated embodiment of their cultural history, folk beliefs, social structures, and aesthetic tastes, earning them the titles of "history books worn on the body" and "wordless cultural symbols" [2]. Whether it is the Zhuang brocade, one of the "Four Famous Brocades of China," or the exquisitely patterned Dong brocade, the elegant Miao brocade, or the masterfully crafted Shui ethnic horsehair embroidery, all demonstrate the superb weaving skills of Guangxi's ethnic minorities. Each garment, hat, and skirt carries the collective memory and worldview of an ethnic group through its unique form, material, color, and patterns. Overall, the ethnic minority costumes of Guangxi exhibit characteristics of mutual integration: in terms of materials and colors, they predominantly use natural materials such as cotton, linen, silk, and wool, favoring subdued and durable colors like indigo and dark blue. The costumes balance practicality for daily wear with aesthetic appeal that harmonizes with the natural environment. In terms of craftsmanship, weaving, dyeing, embroidery, and carving are the core techniques, reflecting the artisans' superb manual skills and rigorous craftsmanship. By promoting the production techniques and artistic aesthetics of Guangxi's costume-related intangible cultural heritage to the world, more foreign readers can understand the cultural connotations embedded within, which helps in building Guangxi's regional image and enhancing the effectiveness of its cultural symbols in international communication.

2.1 The Composition Types of Guangxi Clothing Category Intangible Cultural Heritage

The development of ethnic minority costumes in Guangxi has spanned significant historical periods across both temporal and spatial dimensions, giving rise to a rich and diverse historical and cultural heritage through their

transmission and evolution [3]. Consequently, the composition of Guangxi's costume-related intangible cultural heritage exhibits comprehensive characteristics. It encompasses not only physical artifacts such as garments and production tools, but also traditional handicraft techniques and pattern textures associated with them, along with various unique cultural derivatives developed through historical changes and technological advancements. This study conducted field investigations at institutions including the Guangxi Zhuang Brocade Museum and Guangxi Ethnic Museum, analyzing the collected data on Guangxi's costume-related intangible cultural heritage. The analysis reveals that the Zhuang ethnic group has 5 items: brocade weaving, embroidery, and garment production. The Miao ethnic group has 4 items: embroidery and garment production. The Yao ethnic group has 3 items: embroidery, garments, and woven embroidery. The Maonan ethnic group has 1 weaving technique, while the Dong and Gelao ethnic groups each possess 1 embroidery technique. The Jing ethnic group has 1 garment production technique. The categorized types include: 6 garment production techniques, 5 embroidery techniques, 3 spinning (weaving) techniques, and 2 garment-making techniques (See Table 1).

Table 1 Types of Intangible Cultural Heritage of Clothing in Guangxi

project name	Related Ethnicities	Application region
Zhuang brocade weaving	the Zhuang nationality	Jingxi City
Yao Ethnic Costume	the Yao nationality	Hezhou City, Nandan County, Longsheng Autonomous County
Mao Nan flower bamboo hat weaving skills	Mao Nan	Huanjiang Maonan Autonomous County
Dong Embroidery	Dong Minority	Dong Autonomous County of Sanjiang
Gele embroidery	Gelo minority ethnic group	Luocheng Gelao Autonomous County
Zhuang Embroidery	the Zhuang nationality	Mashan County
Miao Embroidery	the Miao nationality	Miao Autonomous County of Rongshui
Xingan Yao Embroidery	the Yao nationality	Xing'an County
Jing ethnic costume making skills	the Jing nationality	Dongxing City
Miao costume making skills	the Miao nationality	Nandan County
Yao embroidery	the Yao nationality	Yao Autonomous County of Jinxiu
Miao bright cloth making skills	the Miao nationality	Miao Autonomous County of Rongshui
Zhuang costume making skills	the Zhuang nationality	Nanning City
Longlin Miao costume making skills	the Miao nationality	Multinational Autonomous County of Longlin
Nandan Zhuang Costume	the Zhuang nationality	Nandan County
The making of the Zhuang guan costume	the Zhuang nationality	Longlin Autonomous County

2.2 Technical Characteristics of Intangible Cultural Heritage of Clothing in Guangxi

The art of textile craftsmanship and embroidery holds a central position in Guangxi's intangible cultural heritage of ethnic costumes. These techniques are not merely garment-making skills, but living cultural codes that preserve history, narrate myths, and define identity, embodying profound cultural significance [4]. Zhuang brocade and Miao embroidery stand as the most representative treasures in this field.

Zhuang brocade, along with Yun brocade, Shu brocade, and Song brocade, is known as one of the "Four Great Brocades of China," being the only ethnic minority brocade. Its history dates back to the Han Dynasty and reached its peak during the Song Dynasty, becoming a tribute to the imperial court. Its rich cultural connotations and superb craftsmanship make it one of the most representative cultural symbols of Guangxi. According to the "Book of the Later Han: Biography of the Southern Barbarians," as early as the Han Dynasty, the ancestors of the Zhuang people had learned to weave colorful Zhuang brocade using cotton yarn as the warp and silk velvet as the weft. The bamboo loom was the primary equipment for weaving Zhuang brocade, employing the "continuous warp and intermittent weft" method. The bamboo flower cages at the top of the machine controlled the lifting of the warp threads, creating exquisite and intricate patterns. The patterns of Zhuang brocade are closely related to the daily life of the Zhuang people. These include natural motifs such as sun patterns, thunder patterns, and cloud patterns, symbolizing reverence and worship for nature. Animal and plant motifs like fish patterns, frog patterns, and floral patterns, where frog patterns symbolize "prosperity" and "favorable weather," representing the hope for a bountiful harvest. Geometric patterns, including continuous cloud patterns and swastika patterns, reflect the ancient and natural artistic aesthetics of the Zhuang people. Miao embroidery was developed by the ancestors of the Miao people during their migration, development, and adaptation to nature. The dyeing technique of Miao embroidery is the foundational craft of Miao embroidery production. Taking the Miao bright cloth technique as an example, every summer and autumn, artisans would crush, soak, and ferment the harvested indigo grass to make a deep blue dye. Then, they would repeatedly immerse their white woven fabrics in the dye vat, remove them for oxidation, wash, and dry until the fabrics showed a uniform bluish-black color. Miao embroidery predominantly employs the horse-tail embroidery technique and paper-cutting embroidery method. Its themes encompass not only the Miao people's migration history, war history, and development history, but also their labor history of harmonious coexistence with nature. The Miao ethnic costumes feature numerous simplified and highly generalized patterns, such as the Yangtze River, Yellow River, roads, mountain ranges, and city walls. These motifs reflect the Miao people's rich spiritual emotions and ancestral beliefs, serving as expressions of their collective unconsciousness [5].

3 TRANSLATION STATUS OF GUANGXI CLOTHING CATEGORY INTANGIBLE CULTURAL HERITAGE

Translation, as an important means and pathway for language communication and cultural dissemination, must adhere to the principle of "three closenesses" in foreign publicity from the very beginning to achieve closeness to the actual development of China, closeness to the needs of foreign audiences for information about China, and closeness to the thinking habits of foreign audiences [6]. After long-term development, the translation of Guangxi's intangible cultural heritage in the field of clothing has achieved certain results. In terms of translation theory research, scholars have studied the translation and international dissemination of Guangxi's intangible cultural heritage clothing from perspectives such as ecological translation studies, ethnology, social communication studies, and semiotics.

3.1 Enhancing Text Readability by Integrating the Target Language Context

The translation of Guangxi's intangible cultural heritage costumes constitutes a "community of cultural dissemination," representing a dynamic process where translators internally adjust their perspectives while coexisting with external contexts [7]. Through continuous self-improvement, translators achieve holistic equilibrium between their translations and personal cultural refinement. The translation of Zhuang brocade weaving techniques, for instance, transcends mere cultural export—it embodies translators' pursuit of cultural authenticity and artistic perfection. Translators must exercise restraint in additions or omissions, maintaining fidelity to source texts while adopting context-specific strategies. When rendering the "Tongjing Duanwei" technique (a unique interlacing method), one might phonetically translate it as "Tongjing Duanwei" with the annotation: "This distinctive weaving procedure involves complete wrapping of cotton threads while silk weft threads only appear where required." Similarly, Miao embroidery's traditional batik process—where white fabric is dyed with mineral pigments to create blue or black hues, naturally sun-dried, and polished with pebbles—exhibits rustic elegance with exceptional colorfastness and dimensional preservation. For instance, when translating the production process, the text could be rendered as: "Its color is dyed through the traditional batik process. First, the white cloth is dyed blue or black using plant or mineral pigments. Then, it is polished with pebbles after air-drying." By adding transitional phrases like "firstly" and "then," the translation enhances logical coherence and helps readers better understand the Zhuang brocade dyeing process. When describing the production of Zhuang embroidery balls, the translator should arrange steps like pattern making, cutting, embroidery, stuffing, sewing, and bead threading in chronological order, accompanied by illustrations for clarity. When explaining the uses of Longlin Zhuang ethnic belts, the focus should be on their exquisite patterns and embroidered motifs—such as swords (for boys), gourds (for girls), hibiscus flowers, and pomegranate blossoms—showcasing elders 'care and blessings for children. When translating the craftsmanship of Rongshui Miao ethnic bird feather garments, attention should be paid to the hundreds of bird feathers and intricate embroidery, reflecting the Miao people's long-standing bird totem worship and ancestor veneration, thereby enriching the text's ethnic cultural depth.

3.2 Focus on Source Language Cultural Imagery to Ensure Translation Accuracy

The translation of Guangxi's intangible cultural heritage costumes represents the dissemination of Guangxi's cultural elements and symbols abroad. The translated text should adhere to the principle of ecological rationality in constructing a discourse communication system. On one hand, it must maintain the dynamic balance between the whole and parts of the translation; on the other hand, it should embody the ecological aesthetics of the translation, advocating diversity and unity within its form [8]. For instance, in the Tang Dynasty document "Youyang Zazu" introducing the origin of Zhuang brocade, there is a story about Ye Xian, a southern ethnic minority woman from the Qin-Han period: After her father's death, she suffered repeated abuse from her stepmother. On the Gan Dong Festival, her stepmother took her biological daughter to play while leaving Ye Xian to guard the fruit trees. With divine assistance, Ye Xian obtained beautiful brocade garments and embroidered shoes. She wore them and secretly attended the festival, only to flee hastily when discovered by her stepmother, accidentally dropping one of her embroidered shoes. This shoe was later found by a king who sent people to find Ye Xian and crowned her queen. The story was later spread to Europe by Arabs and French scholars during the Tang Dynasty. This demonstrates that Ye Xian serves as the prototype for the Western Cinderella fairy tale, with the origins of Cinderella-type stories rooted in the regions where the Zhuang people now reside in Guangxi. The Ye Xian story reflects the creativity, culture, and cultural interactions of the Tang Dynasty Zhuang people [9]. Given this context, when translating the Ye Xian story, a domestication strategy could be adopted, rendering it as "Ye Xian, Chinese Cinderella, a kind but poor girl in the folklore of the Zhuang ethnic group." By adding translations and inserting phrases, not only does it convey the cultural imagery of the Zhuang people, but it also makes the target language readers more receptive and understanding of the translation, while attracting readers to explore the story of China's "Cinderella".

4 DIFFICULTIES AND STRATEGIES OF INTANGIBLE CULTURAL HERITAGE OF GUANGXI CLOTHING IN EXTERNAL COMMUNICATION

In modern times, Guangxi's intangible cultural heritage of ethnic and regional clothing has undergone continuous evolution. Designers and inheritors have integrated traditional elements like brocade weaving and embroidery with modern innovations such as textile science, cutting techniques, design concepts, and product styles. This fusion has led

to the creation of numerous new products that not only preserve the traditional ethnic charm of garments but also resonate with younger generations, establishing these designs as significant symbols of Guangxi's regional identity.

4.1 Difficulties in the Dissemination of Guangxi's Clothing Category of Intangible Cultural Heritage

As Guangxi continues to integrate into the Belt and Road Initiative, the related products and cultural elements of Guangxi's intangible cultural heritage in the clothing category have also spread to countries along the Belt and Road through regional industries, products, and cultural dissemination, promoting the development and spread of Guangxi's intangible cultural heritage in clothing techniques. However, there are also certain challenges and difficulties in this process. First, the quality of translations needs improvement. Some texts are translated using strategies such as literal translation, transliteration, and free translation, which can lead to misunderstandings and misinterpretations when readers encounter information that requires supplementation or annotation. Second, the translation of cultural imagery containing the ethnic characteristics of Guangxi is inadequate. Due to the long-term migration and production processes of various ethnic minorities in Guangxi, they have developed unique labor and life wisdom, combined with continuous integration and development, forming cultural characteristics and belief symbols distinct from other regions. Some translators have not considered the acceptance level of target language readers and the characteristics of culturally loaded terms, resorting to abbreviated or expanded translation strategies, resulting in significant deviations from the original meaning. Third, the construction of a corpus based on Guangxi's intangible cultural heritage in clothing categories needs further deepening. Currently, most text translations still rely on manual translation or a combination of manual and software translation. There are inconsistent and varied situations in the translation of fixed expressions and proper nouns, greatly reducing translation efficiency and readability. Therefore, we can improve the external dissemination of Guangxi's intangible cultural heritage in clothing categories from the following three aspects.

4.2 Strategies for the International Communication of Guangxi's Costume Intangible Cultural Heritage

Firstly, focus on cultural imagery to preserve the uniqueness of Guangxi's intangible cultural heritage in traditional attire. Through the integration and development of various ethnic groups, Guangxi's ethnic costumes have evolved distinctive cultural imagery in craftsmanship, production techniques, and design styles. Translators should fully explore the cultural elements embedded in these garments and investigate the cultural symbolism behind them. When translating culturally significant terms, methods like annotations, contextual elaboration, and free translation can effectively convey Guangxi's unique ethnic culture to readers.

Secondly, To build dynamic archives that provide materials for the ongoing development of Guangxi's intangible cultural heritage (ICH) corpus in the clothing category. With the continuous advancement of technologies like artificial intelligence and machine learning, traditional manual translation practices can no longer meet the demands of information-era cultural communication. By establishing parallel corpora for Guangxi's clothing-related ICH and implementing large-scale machine learning applications, we can effectively enhance the efficiency and impact of regional image and cultural symbolism dissemination.

Thirdly, Enhance dissemination efforts to promote the living inheritance of Guangxi's intangible cultural heritage in the apparel sector. Utilize modern technology to document and share craft techniques and oral histories from inheritors. Through master-apprentice transmission, cultural study tours, and digital dissemination of intangible heritage, systematically address the talent gap in heritage preservation. Strengthen international promotion and intellectual property protection for Guangxi's heritage garments, boost brand development of distinctive products (e.g., Zhuang brocade, Miao embroidery, Dong embroidery), and create immersive cultural tourism experiences (e.g., Maonan ethnic bamboo hat weaving techniques, Yao ethnic embroidery skills) that allow domestic and international tourists to consume culture through experiential engagement.

5 CONCLUSION

The intangible cultural heritage of clothing in Guangxi is a treasure of the integration and development of various ethnic cultures in Guangxi. With the continuous advancement of the Belt and Road Initiative, the intangible cultural heritage of clothing in Guangxi has become an important regional cultural symbol and a business card for external exchanges, reaching overseas. Taking textile, dyeing, embroidery, production, and cultural connotation as research objects, I explore strategies for the international dissemination of the intangible cultural heritage of clothing in Guangxi. While preserving the cultural imagery of ethnic groups, this approach constructs a living archive to provide efficient linguistic support for the construction of a corpus of the intangible cultural heritage of clothing in Guangxi and its international dissemination. At the same time, as practitioners and researchers of cultural international dissemination, translators should also break free from the constraints of literal meanings in the source language, appropriately supplementing and extending the translation to enhance its readability and acceptability while ensuring the target readers can easily understand and accept it.

COMPETING INTERESTS

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

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A CORPUS-BASED ANALYSIS OF GUANGZHOU'S CITY IMAGE IN THE *Global Times* DURING THE COVID-19 PANDEMIC

ZiHan Zhao, Fei Deng*
School of Foreign Studies, South China Agricultural University, Guangzhou 510642, Guangdong, China.
Corresponding Author: Fei Deng, Email: faydra@126.com

Abstract: City image is the spirit and appearance of the city as a whole, the all-round and global image of the city, including the overall style and appearance of the city, and the overall values, mental outlook and educational level of the city residents. It is of great significance to shape a good city image for the progress of the city and the promotion of foreign exchanges and cooperation. With the acceleration of globalization, the shaping and dissemination of city image on the global stage has become more and more important. Especially in the context of the Covid-19 pandemic, a global public health crisis, how cities around the world responded to the pandemic and how their images were presented in the international media has become a focus of attention for all sectors of society.
As a significant first-tier city in China, Guangzhou gained extensive attention from domestic and international media during the Covid-19 pandemic due to its positive performance and the effect it brought in the prevention and control of the Covid-19 pandemic. *Global Times*, a Chinese comprehensive newspaper with national circulation and the only one that conveys general news to foreign countries in line with China's basic national conditions. It conveyed information to the world about Guangzhou's fight against the Covid -19 pandemic and shaped Guangzhou's city image through its international communication platform during the pandemic.
In this paper, we adopt the corpus method to analyze the discourse characteristics of *Global Times*' news reports and Guangzhou's city image during the Covid-19 pandemic from the perspectives of keywords and high-frequency words, and explore the factors affecting the shaping of Guangzhou's city image based on critical discourse analysis. The study finds that *Global Times*' news coverage of Guangzhou focused on three major themes: current events around Guangzhou, the Covid-19 pandemic and transportation; and emphasized the views and attitudes of authorities such as the government and experts; and used positive words to portray Guangzhou as a cosmopolitan city that is pragmatic, hardworking, people-centered, people-serving, and open and friendly. This paper argues that these images are related to the idea of China's development, the purpose of *Global Times* and Guangzhou's urban culture.
Keywords: Covid-19 pandemic; *Global Times*; Guangzhou; City image

1 INTRODUCTION

1.1 Research Background

City image is the spirit and appearance of the city as a whole, the all-round and global image of the city, including the overall style and appearance of the city, and the overall values, mental outlook and educational level of the city residents. Shaping a good city image can stimulate the sense of responsibility and pride of all citizens, encouraging them to contribute to the economic development and social progress of the city; strengthen the role of international communications, promoting the opening up of the city to the outside world and exchanges and cooperation; and improve the competitiveness of the city in the market economy. Papers should be written in comprehensible academic English. We strongly recommend to attentively check the spelling and get your paper proofread by a native English speaker.
Guangzhou is one of the first historical and cultural cities in China. As one of the earliest open cities among the coastal cities in China, Guangzhou is also an important port city for foreign trade, and is known as "the business capital of the millennium" with the spirit of "daring to be the first in the world". The outbreak of Covid-19 pandemic in December 2019 has brought about profound impacts and changes to people's life safety and health, as well as social development. Against this background, Guangzhou, as the capital of Guangdong Province, actively responded to the states appeal to take scientific and precise control measures to cope with the sudden attack of the pandemic. The news reports during the Covid-19 pandemic conveyed the response and real-life stories of countries and even cities, and expressed the affection and attitudes towards the events, which showed the image characteristics of each country and city during this period; at the same time, each country and city was also able to enhance its international influence and prestige through these news reports.
Global Times is the second English-language comprehensive newspaper circulated nationwide in China, and is the only one that conveys comprehensive news to foreign countries in line with the basic national conditions of China. The pplication of vocabulary or sentence structure in the news is of vital importance for reflecting social concerns and presenting China's image, which creates the necessity for China to demonstrate its domestic development and disseminate cultural to the world. As one of the representatives of China's foreign publicity media, *Global Times* conveyed the message of Guangzhou's prevention and fight against the Covid-19 application of vocabulary or

application of vocabulary or sentence structure in the news is of vital importance for reflecting social concerns and presenting China's image, which creates the necessity for China to demonstrate its domestic development and disseminate cultural to the world. As one of the representatives of China's foreign publicity media, *Global Times* conveyed the message of Guangzhou's prevention and fight against the Covid-19 pandemic to the world through its international communication platform during this period, and it also shaped Guangzhou's city image. Therefore, we can utilize this feature of *Global Times* to study the vocabulary application of news reports during the Covid-19 pandemic, mainly keywords and high-frequency words, to explore the discourse characteristics and the city image of Guangzhou.

1.2 Research Purpose and Significance

The purpose of this study is to explore how *Global Times*' coverage during the Covid-19 pandemic shaped Guangzhou's city image through corpus analysis methods, revealing the discourse features and the social and cultural factors reflected behind the coverage. This study not only helps to understand how the media shapes the image of a local city through discourse, but also provides a reference for future research on city image and a basis for Chinese foreign media to optimize their communication strategies.

By collecting and analyzing a large amount of data from news reports, social media comments, etc., we are able to present a more objective and comprehensive picture of the process of constructing Guangzhou's city image and the factors influencing it, which helps to understand how the media shapes the image of a city through discourse. In addition, this study will also pay more attention to cross-cultural communication under the global perspective, especially how the city shapes its image through outreach media under global crises (e.g., the Covid-19 pandemic), which will serve as a reference for future research on city image and provide a basis for Chinese outreach media to optimize their communication strategies.

1.3 Thesis Structure

The paper is divided into six parts. The first part is the introduction, which mainly explains the background, purpose, significance, content, method, and structure of this study. The second part is a literature review, which summarizes and analyzes the research on city image at home and abroad. The third part is the theoretical framework, which contains an introduction of Critical Discourse Analysis Theory and Corpus-assisted Critical Discourse Analysis. The fourth part is the research design, presenting research questions, collection, tool, method and procedure. Chapter five is a data analysis which contains keyword analysis, high-frequency word analysis, socio-cultural factors in shaping city image. The sixth part is the conclusion, which summarizes the data of this study and concludes the findings, significance, and limitations of this study.

2 LITERATURE REVIEW

2.1 Previous Research on City Image at Home

The research on city image in China mainly focuses on two aspects that are multimodal discourse analysis of city image construction and the research on English translation of city image.

The multimodal discourse analyses of city image construction include analyses of advertisements, posters, and news media discourse, e.g., Lv Rongrong and Duan Cuixia, from the perspective of systemic functional linguistics of accessibility, used English reports on Harbin from China Daily since July 2023 as the corpus of the positive discourse analysis, to explore the way of presenting Harbin's city image in the media reports and its linguistic characteristics[1]. Researches on discourse construction of city image in social media are also substantial, for example, Shen Bingkun analyzed the textual resources and visual resources on the official Olympic Twitter accounts @Beijing2022 and @Tokyo2020, and analyzed and compared the city brands constructed in terms of the ideational meaning, interpersonal meaning, and textual meaning. In addition, there is also a discourse analysis of the city's image publicity films[2]. For example, Li Zhenyu discussed and analyzed the realization of the representational meaning, interactive meaning and compositional meaning of visual shots in the promotional film of "Lanzhou", the distribution characteristics of the main multi-modal modes, and the main relationship between the main forms of modalities, based on the theory of visual grammar of Kress and Leeuwen and the comprehensive analysis framework of the forms and relations of different modes of multimodal discourse of Zhang Delu[3].

The studies of English translation of city image include English translation of foreign publicity videos, such as Li Qiong and Rong Chen Yu took the video of "The Hometown of Poetry Saints, River Gongyi" as an example, and analyzed the English translation strategy of the video under the guidance of Skopos theory, so as to contribute to the study of translation of foreign publicity videos[4]; English translation of foreign publicity books city image, such as Feng Ling and Lei Cai took the Chinese and English version of the book "Magnificent Guangxi" as an example, and based on Newmark's communicative translation theory, they analyzed the English translation of the text from the method of deletion, addition of words, phonetic annotation, and deconstruction and reorganization, with the aim of exploring translation methods and techniques suitable for the English translation of the city image, hoping to provide reference for the research on the English translation of the city image[5]; Han Le's study on the translation of the tagline of the city image, for example, to explore the English translation of the tagline of the city image under the perspective of the three-dimensional transformation of Eco-translatology, through the interpretation of the meaning of the

three-dimensional conversion of Eco-translatology, he put forward the current problems of the translation of city's image taglines, and made it clear that the quality of the English translation of the city's image tagline could have a direct impact on the city's image and the construction of the cultural soft power[6].

In addition to the above studies, there are also quite a number of studies on Guangzhou's urban image. For example, Wang Xingguang studied the characteristics of Guangzhou's city image in Chinese mainstream English-language media and compares them with the characteristics of Guangzhou's city image in overseas media[7]; Xie Jie analyzed the problems in the translation process of the public notices of some scenic spots in Guangzhou based on the situation of the public notice language in Guangzhou and puts forward a strategy for translating the scenic spots' public notice language with a view to promoting the enhancement of the image of Guangzhou's city tourism[8].

In terms of research methodology, a number of studies at home are based on the corpus method to analyze city image. Yin Bochun, based on the NOW corpus and the discourse analysis theory, conducted a quantitative and qualitative investigation of Changsha's international image[9]; Gao Angzhi analyzed the research results in targeted corpuses under the comparative perspective of "self-shaping" and "others'-shaping", so as to reveal the differences of Hangzhou's image in the field of public opinion in Chinese and foreign medias[10]; Shen Nan and Yan Rui selected news reports on Xi'an on the official mainstream English media China Daily Global Edition from 2018 to 2022 as research samples for content analysis, strengthening the image of Xi'an as a "tourist city with a rich historical and cultural heritage"[11].

2.2 Previous Research on City Image Abroad

Foreign researches on city image cover the shaping of urban image, factors affecting urban image, the impact of urban image and other aspects, involving a variety of fields such as tourism, media, architecture, sports and so on.

Metaxas explored the Madrid Nuevo Norte Project (MNNP), focusing on its adherence to sustainability principles and its role in shaping Madrid's sustainable urban identity. The study also examined marathon races as key urban activities, analyzing how a city's image influences participants' perceptions of branded marathon events[12]. SEO and PARK compared different stakeholders' views on colonial cultural heritage in urban settings, highlighting how these perspectives contribute to a more complex and layered city image[13]. Cecília et al. investigated how local communities perceive event-related imagery and its impact on a city's overall reputation, as well as their willingness to promote both the events and the city as tourist destinations[14]. Additionally, Yeol et al. assessed the influence of city image on residents' attitudes and the bidirectional effects (top-down and bottom-up) of sporting events on host cities[15]. Regarding researches about Guangzhou, Qu Huimin et al. employed web scraping techniques to collect 370,000 social media posts referencing "Guangzhou City" from 2019 to 2023. The researchers applied three text analysis approaches—Term Frequency-Inverse Document Frequency (TF-IDF), Latent Dirichlet Allocation (LDA), and Sentiment Analysis (SnowNLP)—to identify key features of Guangzhou's urban image[16]. Meanwhile, Xi et al. proposed a framework to evaluate how pre-travel promotional campaigns affect city branding and tourists' intentions to visit[17].

2.3 Summary

In addition to the above studies, the study of Guangzhou's city image based on corpus method has also been abundant in recent years. These studies include Ren Chaowang and Luo Jiawen, who obtained the frequency of "Guangzhou" and the frequency lists of various collocations based on corpus-critical discourse analysis, and discussed Guangzhou's city image in a large-scale online corpus, NOW, between 2010 and 2020[18]; Yang Kai and Chen Yingjun, selecting "Guangzhou" as the subject word, used Python to automatically crawl a self-constructed corpus of tweets related to Guangzhou on overseas social platforms from 2010 to 2019, and took advantage of corpus analysis software to analyze the related words in terms of word frequency, collocations, index lines and sentiment words[19]; Li Zhiying et al. based on two self-constructed corpora of Chinese and American news, extracted high-frequency words using the corpus search software AntConc3.4.3, analyzed their semantic preference and semantic prosody, and combined with critical discourse analysis to compare the different international images of Guangzhou city portrayed by Chinese and American media[20].

It should be pointed out that the above researches have studied and analyzed Guangzhou's urban image from different perspectives by using corpus research methodology, obtaining fruitful results in the areas of image shaping, presentation of media characteristics, and media strategies. However, the study of Guangzhou's city image against the background of Covid-19 pandemic is still insufficient. And as an important topic affecting people's lives in recent years, the Covid-19 pandemic is of great significance and research value for enriching Guangzhou's urban image and exploring the media's strategies of shaping the city's image in various aspects. In addition, there are fewer studies on city image targeting *Global Times*, which as an important Chinese foreign publicity media, plays an indispensable role in spreading the city image. Therefore, this paper chooses *Global Times* as a specific Chinese foreign publicity media, and selects news reports about Guangzhou from 2020 to 2022 as the news corpus during the Covid-19 pandemic to analyze and study the discourse characteristics of *Global Times*' news reports, and the shaping of Guangzhou's city image.

3 THEORETICAL FRAMEWORK

3.1 Introduction of Critical Discourse Analysis Theory

Critical linguistics emerged in the 1970s and 1980s, and was echoed by some scholars in European countries such as the Netherlands and Austria. Some representative researchers, like Fairclough, stood out. From the late 1970s to the early 1980s, CDA developed into an emerging branch of modern linguistic research. At the end of the twentieth century, the study of critical linguistics made significant progress in Europe, gradually forming a global research boom. In 1989, Fairclough published the book Language and Power where "Critical Discourse Analysis (CDA)" was first introduced as a professional term. He mentions that discourse is a social practice and the relationship between language and society is intrinsic[21]. Therefore, he defines CDA as a theory and methodology that explores the relationship between discourse, society and cultural development under different social conditions[22].

Critical discourse analysis reveals the relationship between language, culture and power. Critical discourse analysis believes that language not only reflects society, but also shapes it. It advocates the analysis of language structure so as to clarify the social meanings expressed by language, and establish and protect the social power relations through language, emphasizing the linguistic analysis of texts to reveal the ideology embedded therein, and the clarification of how the ruling class uses language to implement ideological control and to maintain its position of power[23].

Taking critical discourse analysis as the theoretical basis, this study explores *Global Times*' news focus on Guangzhou and analyzes its shaping of Guangzhou's image on the basis of analyzing the discourse language characteristics of Chinese foreign media, and then summarizes the characteristics of *Global Times*' news reports about Guangzhou. According to critical discourse analysis, language is a social practice and an intervening force in the social process. Therefore, we can analyze the linguistic structure of *Global Times*' news reports about Guangzhou through critical discourse, so as to explore the social concerns and image of Guangzhou and analyze the causes of image building.

3.2 Introduction of Corpus-Assisted Critical Discourse Analysis

Corpus linguistics is an interdisciplinary field that emerged in the 1980s. It is a science that studies language based on real-life examples of language use. It uses the automatic and interactive technology of computers to collect, store, process, and statistically analyze text, combining quantitative and qualitative analysis techniques. It integrates linguistic theory, mathematical thinking patterns, and computer technology to comprehensively and completely describe language in a new objective scientific way. Corpus linguistics takes real natural language texts as the research object, investigates large-scale language usage patterns, and explores universal conclusions. It extracts language high-frequency reproduction patterns with significant statistical significance from a large number of discourses by conducting topic frequency statistics and index line analysis on representative corpus texts, which is a typical feature of corpus empirical research. Corpus focuses on the functionality and meaning of real-life texts[24]. In this sense, it is common with critical discourse analysis and systemic functional linguistics that focus on real language phenomena. Previous studies have shown that using corpus analysis methods can effectively reveal the ideology hidden in discourse texts[25].

Hardt Mautner was the first to integrate linguistic qualitative research on corpus with critical discourse qualitative analysis. He believes that independent critical discourse analysis lacks sufficient, systematic, and objective language explanations or evidence, and is also controversial and critical. Therefore, it is necessary to combine corpus linguistics techniques to enhance the persuasiveness and objectivity of discourse interpretation in CDA so that revealing the relationship between language, ideology, and power. The corpus-assisted critical discourse analysis is based on large-scale corpus sampling surveys. That means scholars can use the rich language retrieved from corpora to objectively and comprehensively study the thematic vocabulary in language materials, making discourse content, style, and source analysis more efficient. In addition to the theme vocabulary, there are also various ways of analyzing, such as the degree of collocation, frequency of vocabulary display, and indexing function, which can provide a lot of effective evidence for critical discourse analysis. The combination of corpus and critical discourse analysis greatly enhances the objectivity of related research, making the research results highly scientific, systematic, and authoritative.

Therefore, based on corpus-assisted critical discourse analysis, this study conducts quantitative and qualitative research on the news reporting of *Global Times*. We use corpus to analyze keywords and high-frequency words in *Global Times*' news reports, providing objective data support for exploring the discourse characteristics of news reports. Based on this, we use critical discourse analysis, exploring image shaping reflected in news report language and the impact factors of Guangzhou city image, explaining the ideology behind language, and demonstrating the relationship between language, society, and cultural development.

4 RESEARCH DESIGN

4.1 Research Questions

This paper answers the following questions:

(1) What are the discourse characteristics of *Global Times*' news reports about Guangzhou during the Covid-19 pandemic?

(2) What kinds of image of Guangzhou have *Global Times* shaped through its news reports during the Covid-19 pandemic?

(3) What are the factors affecting the image of Guangzhou?

4.2 Data Collection

Using “Guangzhou” as the search term, we search for all *Global Times* news reports about Guangzhou and manually filter them to create a self-constructed corpus of *Global Times* news reports about Guangzhou from 2020-2022, with a total of 159 reports, 52011words.

4.3 Research Tool

This study adopts a combination of quantitative and qualitative research methods. AntConc4.0 is used as the analysis tool, and the corpus is utilized for quantitative research and analysis. Through AntConc4.0 software, we study the *Global Times* news reports about Guangzhou from 2020 to 2022 in the corpus, and analyze the vocabulary collocation or syntactic structure in the news corpus from the perspective of keywords and high-frequency words, and explore the *Global Times*’ shaping of the Guangzhou city image.

4.4 Research Method and Research Procedure

First, we use AntConc 4.0 software to extract the top 20 keywords from the self-constructed corpus to make a word list, and carry out subject word analysis to explore the focal points of those news reports and reveal the city image of Guangzhou reflected through these points.
Secondly, we extract the top 20 high-frequency content words in the *Global Times* news corpus about Guangzhou during 2020-2022 to make a word list, mainly nouns, verbs, adjectives and adverbs, etc., and analyze the frequency of the application of these words, their collocations and index lines. From the perspective of the collocation and semantic prosody of the words, the characteristics of *Global Times*’ news reports and the image of Guangzhou portrayed by them are reflected.
Finally, based on the theory of critical discourse analysis, combined with the data collection and literature reading, we discuss and summarize the image of Guangzhou portrayed by *Global Times* and the causes of its construction. We also provide some strategies for news report on structuring city image.

5 DATA ANALYSIS AND RESULTS

5.1 Keyword Analysis

Keywords are words that appear significantly more frequently in one text or corpus than in another comparable, larger reference text or corpus[26]. Using AmE06 as the reference corpus, the top 20 keywords were extracted, as shown in Table 1. In order to ensure that the selected keywords are related to the research topic of this paper, we screened out the stop words such as “photo”, “information” and so on.

Table 1 Top 20 Key Words

Number	Key Word	Frequency	Keyness
1	guangzhou	1036	6283.443
2	china	684	3654.346
3	guangdong	317	1909.806
4	province	328	1856.205
5	Covid	221	1340.408
6	south	287	1121.867
7	nucleic	144	873.183
8	epidemic	157	851.695
9	cases	204	729.864
10	acid	139	701.661
11	city	230	590.155
12	district	142	580.689
13	quarantine	89	528.696
14	testing	101	466.024
15	Chinese	108	437.874
16	railway	71	412.296
17	airport	103	386.334
18	prevention	82	360.157
19	infections	79	356.145
20	measures	104	352.481

On the whole, the top 20 keywords can be divided into three categories. The first category indicates location, including the keywords “guangzhou” “china”, “guangdong” “province” “south” “city” and “district” which are ranked in the top 4, 6, 11, and 12, respectively, to describe the geographic location of Guangzhou, highlighting Guangzhou as a topic of news coverage, and detailing not only an overall report on Guangzhou, but also includes attention to current events in individual districts. More statements describing the geographical location of Guangzhou, such as “south China’s Guangdong Province”, can be found in the relevant news texts. The second category is related to the Covid-19 pandemic, including the keywords “Covid” “nucleic” “epidemic” “cases” “acid” “quarantine” “testing” “prevention” “infections” “measures” which accounted for fifty percent of the top 20 keywords, reflecting that the Covid-19

pandemic was the top priority of the news reports in these three years. The last category of keywords is other vocabulary, such as "Chinese" "railway" and "airport". These three words could reflect that, in addition to the "epidemic", transportation is also the key topics of concern.

Corpus linguistics is essentially a contextual theory in which words must be studied in context, and this can be achieved using indexing analysis in corpus[27]. Index line analysis, as one of the core parts in corpus linguistics, helps to discover many important linguistic forms in texts [28]. In this paper, we further summarize the main concerns of *Global Times* during the Covid-19 pandemic by analyzing the contexts of significant collocations and related index lines of the top20 key words, so as to analyze the image of Guangzhou presented in *Global Times* news reports.

5.1.1 Index line analysis for keywords indicating location

A search of all the index lines indicating locations reveals that the words "Guangzhou" "china" "Guangdong" "city" and "south" are mainly collocated with each other. In addition to "Guangzhou, south China's Guangdong province" mentioned above, there are also expressions like "Guangzhou, capital of South China's Guangdong Province", as shown in the Figure 1. These expressions emphasize Guangzhou's geographic location "in the south of China" and its status as the "provincial capital". The main contents include the development of Guangzhou city and the epidemic situation, depicting the positive image of Guangzhou like example 1.

	File	Left Context	Hit	Right Context
31	Global ...	a fruit cake at Chimelong Safari Park in Guangzhou, south	China'	s Guangdong Province, Aug. 10, 2020. (Xinhua/Liu Dawei) <Some roads
32	Global ...	gushes out of wells on a street in Guangzhou, south	China'	s Guangdong Province, Aug. 26, 2020. Some roads in Guangzhou were
33	Global ...	stabbing incident occurred Monday near a kindergarten in Guangzhou, South	China'	s Guangdong Province, leaving five people injured. The suspect
34	Global ...	kilometers an hour — debuted in Guangzhou, the capital of South	China'	s Guangdong Province, on Friday, according to media reports.
35	Global ...	fun at Chimelong Safari Park in Guangzhou, capital of south	China'	s Guangdong Province, Sept. 28, 2020. Twin cubs of South China
36	Global ...	posted by The Paper A high school in Guangzhou, South	China'	s Guangdong Province, recently made headlines after discovering a
37	Global ...	marks Halloween, police in Guangzhou, the capital city of South	China'	s Guangdong Province, banned scary Halloween makeups and ghost-
38	Global ...	flowers at Haizhu Wetland Park in Guangzhou, capital of south	China'	s Guangdong Province, Nov. 3, 2020. (Xinhua/Liu Dawei) A tourist
39	Global ...	flowers at Haizhu Wetland Park in Guangzhou, capital of south	China'	s Guangdong Province, Nov. 3, 2020. (Xinhua/Liu Dawei) <Painting exhibition
40	Global ...	works kicked off at the Wenlifang Gallery in Guangzhou, South	China'	s Guangdong Province, on Saturday. An artist belonging to
41	Global ...	News Service) People enjoy a light show in Guangzhou, South	China'	s Guangdong Province, Nov. 18, 2020. The 10th Guangzhou International Light
42	Global ...	the China Import and Export Fair Complex in Guangzhou, south	China'	s Guangdong Province, Nov. 20, 2020. The ten-day exhibition opened
43	Global ...	the China Import and Export Fair Complex in Guangzhou, south	China'	s Guangdong Province, Nov. 20, 2020. The ten-day exhibition opened
44	Global ...	the China Import and Export Fair Complex in Guangzhou, south	China'	s Guangdong Province, Nov. 20, 2020. The ten-day exhibition opened

Figure 1 Part of Index Lines of Collocations of "Guangzhou" "China" "Guangdong" "City" and "South"

Example 1: Guangzhou, the capital city of South China's Guangdong Province, has seen a limited impact on logistic and trade so far thanks to the local government's launch of dynamic epidemic control measures to bring down the possible impact of the outbreak and quick reining of the virus to stop it from further spreading, industry experts told the *Global Times* on Sunday (from *Global Times*, November 06, 2022).

In addition to descriptions of locations, the related expressions of the words "city" and "district" also cover other news focuses. Therefore, the following is an analysis of the index lines for these two words.

Apart from the meaning of "Guangzhou city" and relation with the topic of "city epidemic", the index line analysis with "city" also includes the nouns "health" "supply" "business" "economic" "financial" etc.(see Figure 2), which reflect the concern for people's livelihood protection and economic construction in the context of the Covid-19 pandemic, demonstrating Guangzhou's image as a city that is people-centered and emphasizes economic development. The example 2 is from the self-constructed corpora.

	File	Left Context	Hit	Right Context
1	Global ...	treatment methods. On Friday's press conference, officials from the	city'	s health commission said as of Thursday midnight, a
2	Global ...	the intensive care unit. When the outbreak first occurred, the	city'	s health commission prepared to expand the number of
3	Global ...	well as closed and controlled management areas from Monday. The	city'	s health commission released a list of places where
4	Global ...	s largest scale nucleic acid testing city, data from the	city'	s health commission showed. Mass nucleic acid testing is
5	Global ...	situation in three years, as the deputy director of the	city'	s health commission Zhang Yi told a press conference
6	Global ...	found during screening of close contacts at quarantine hotels, The	city'	s health authority announced on Monday. From May 21 to
7	Global ...	at home and take virtual classes until further notice, the	city'	s authorities announced in a news conference on Sunday
8	Global ...	in the latest outbreak since it started on May 21. The	city'	s authorities imposed transportation restrictions on Sunday night to
9	Global ...	provincial capitals, and five cities reviewed in the report. "A	city'	s business environment can be evaluated in many aspects,
10	Global ...	is another important factor that researchers use to evaluate a	city'	s business environment, Liu said, adding that it's
11	Global ...	of the year, indicating the resilience and vitality of the	city'	s economic operation. Chen said that the city will
12	Global ...	of the year, indicating the resilience and vitality of the	city'	s economic operation. Chen said that the city will
13	Global ...	regulations were announced by Yang Bingsheng, deputy director of the	city'	s Public Security Bureau. One confirmed case in Panyu
14	Global ...	Transportation Bureau on Monday said this can effectively streamline the	city'	s public transportation scheduling and save the route's

Figure 2 Part of Index Lines of "City"

Example 2: Officials said that the city has sufficient supplies of daily necessities with stable prices and called on the citizens to not panic (from *Global Times*, April 09, 2022).

Analyzing the search lines of "district", the most expressive expressions are those about the prevention and control of the epidemic in various districts (see Figure 3), reflecting the city image of Guangzhou's districts' efforts and unity in preventing the Covid-19 pandemic. Here is an example:

Example 3: A staff member of a property management company (R) hands over the online shopping goods ordered by residents under home quarantine to a volunteer at a residential area at Liwan District of Guangzhou, capital of south China's Guangdong Province, June 1, 2021(from *Global Times*, June 03, 2021).

	File	Left Context	Hit	Right Context
1	Global ...	resident for nucleic acid test at a community in Liwan	district	of Guangzhou, South China's Guangdong province. Photo: Xinhua
2	Global ...	their information registered before COVID-19 nucleic acid testing in Liwan	District	of Guangzhou, south China's Guangdong Province, June 8, 2021. A
3	Global ...	Nanfang Hospital collect samples for nucleic acid tests in Liwan	District	of Guangzhou, south China's Guangdong Province, May 27, 2021. Liwan
4	Global ...	their information registered before COVID-19 nucleic acid testing in Liwan	District	of Guangzhou, south China's Guangdong Province, June 8, 2021. A
5	Global ...	from a resident for COVID-19 nucleic acid testing in Liwan	District	of Guangzhou, south China's Guangdong Province, June 8, 2021. A
6	Global ...	their information registered before COVID-19 nucleic acid testing in Liwan	District	of Guangzhou, south China's Guangdong Province, June 8, 2021. A
7	Global ...	their information registered before COVID-19 nucleic acid testing in Liwan	District	of Guangzhou, south China's Guangdong Province, June 8, 2021. A
8	Global ...	their information registered before COVID-19 nucleic acid testing in Liwan	District	of Guangzhou, south China's Guangdong Province, June 8, 2021. A
9	Global ...	their information registered before COVID-19 nucleic acid testing in Liwan	District	of Guangzhou, south China's Guangdong Province, June 8, 2021. A
10	Global ...	Residents shop at a bus-based mobile market in Liwan	District	of Guangzhou, south China's Guangdong Province, June 19, 2021. Guangzhou
11	Global ...	from a resident for COVID-19 nucleic acid test in Liwan	District	of Guangzhou, south China's Guangdong Province, May 27, 2021. Photo:
12	Global ...	from a resident for COVID-19 nucleic acid testing in Liwan	District	of Guangzhou, south China's Guangdong Province, June 8, 2021. A
13	Global ...	Nanfang Hospital collect samples for nucleic acid tests in Liwan	District	of Guangzhou, south China's Guangdong Province, May 27, 2021. Liwan
14	Global ...	of the National Archives of Publications and Culture in Conghua	District	of Guangzhou, south China's Guangdong Province, July 30, 2022. (Photo:

Figure 3 Part of Index Lines of "District"

5.1.2 Index analysis for keywords related to Covid-19 pandemic

The words related to the Covid-19 pandemic all show an emphasis on the topic of epidemic prevention and control.

First, "Covid" "cases" and "infections" are used to reveal the situation of new cases of Covid-19 pandemic in Guangzhou. "Covid" is used to denote "Covid-19", and the index line result totals 221. Among them, the most collocations with "cases", totaling 39, are shown in the Figure 4. It is mainly used to express the new cases in Guangzhou. The indexed lines of "cases" are analyzed, and the expressions mainly include "reported cases" "new cases" "sporadic cases" "confirmed cases" "imported cases" and so on, reflecting the condition of new cases in Guangzhou, as shown in the Figure 5. It is worth noting that "new cases" are connected with words like "surge" and "raise", which indicates the increase in the number of cases, reflecting the fact that the outbreak of the Covid-19 pandemic is not to be underestimated, and Guangzhou, as an international metropolis, is even more profoundly affected by the epidemic due to its large population and high degree of openness to the outside world. Similar to the usage of "cases", "infections" is mostly used to report new infections (see Figure 6), showing Guangzhou's real-time follow-up and attention to the prevention and control of the epidemic, as well as its concern for infected patients, reflecting the city's image of actively preventing the Covid-19 pandemic.

	File	Left Context	Hit	Right Context
1	Global ...	ngzhou, South China's Guangdong Province, reported 18 local confirmed	COVID-19 cases	on Monday, of whom 14 patients were previously diagnosed
2	Global ...	a local rebound. The manufacturing hub reported 527 locally transmitted	COVID-19 cases	on Sunday and it has dealt with a
3	Global ...	is lifted, the report said. Guangzhou reported four new domestic	COVID-19 cases	on Sunday, the local government said on Monday.
4	Global ...	and nine medium-risk areas, and reported four locally transmitted	COVID-19 cases	on Sunday. A total of 102 cases have been
5	Global ...	na News Service Guangdong Province reported 7 new locally-transmitted	COVID-19 cases	on Thursday, 6 of which are from Guangzhou City.
6	Global ...	Xinhua) Guangzhou, South China's Guangdong Province detected no new	COVID-19 cases	on Tuesday - the first time since the recent
7	Global ...	far. According to the local health commission, Guangzhou reported 8,761	COVID-19 cases	on Wednesday and 16 of them were detected at
8	Global ...	staff to screen and monitor their situations, Liu said. <Imported	COVID-19 cases	in Guangzhou raise local transmission concerns> By Globaltimes.
9	Global ...	the world have an immunity barrier. Global Times <Surge in	COVID-19 cases	in Guangzhou traced to one transmission chain> By
10	Global ...	spread to schools. The mutated variant Delta had triggered clustered	COVID-19 cases	in Guangzhou and Shenzhen the past few weeks.
11	Global ...	rcent, the CAAC said. <Guangzhou cancels 888 flights after detecting 527	COVID-19 cases	in a single day> By Global Times Published:
12	Global ...	the Communist Party of China (CPC). Experts say the sporadic	COVID-19 cases	in small areas of China will not have
13	Global ...	ses, and seven were asymptomatic patients. <Guangzhou reports no new	COVID-19 cases	for first time since recent resurgence, risk levels
14	Global ...	PM Photo:Xinhua South China's Guangzhou reported no new	COVID-19 cases	for the first time since the recent resurgence

Figure 4 Part of Index Lines of Collocation of "Covid" and "Cases"

	File	Left Context	Hit	Right Context
1	Global ...	have imposed stricter epidemic prevention measures as the newly reported	cases	in the city record a new high over the
2	Global ...	ou have imposed stricter epidemic prevention measures after newly reported	cases	in the city recorded a new high over the
3	Global ...	s health authorities reported that the virus strain on new	cases	in the city was not homologous to previously detected
4	Global ...	one district - Haizhu, accounting for over 95 percent of the daily	cases	in the city. In response to the surge in
5	Global ...	the epidemic, there is still some possibility of subsequent sporadic	cases	in the coming days, and we still need to
6	Global ...	facing severe challenges. Guangdong Province, which currently has the most	cases	in the country, reported 592 new locally confirmed cases and 2,611
7	Global ...	between Saturday morning and Sunday afternoon, raising the tally of	cases	in the latest outbreak to 23. <Guangzhou renovates key fair
8	Global ...	from Monday until Friday as there were 384 new local confirmed	cases	in the province on Sunday, including 296 in Guangzhou, and 7,885
9	Global ...	to schools. The mutated variant Delta had triggered clustered COVID-19	cases	in Guangzhou and Shenzhen the past few weeks. Since
10	Global ...	to screen and monitor their situations, Liu said. <Imported COVID-19	cases	in Guangzhou raise local transmission concerns> By Globaltimes.cn
11	Global ...	world have an immunity barrier. Global Times <Surge in COVID-19	cases	in Guangzhou traced to one transmission chain> By Global
12	Global ...	he CAAC said. <Guangzhou cancels 888 flights after detecting 527 COVID-19	cases	in a single day> By Global Times Published: Nov 01, 2022 12:45
13	Global ...	place in October 22. Moreover, the new local infections amounted to 1,325	cases	in a single day on Saturday, reaching a record
14	Global ...	migrant workers. So far, the city has reported zero infection	cases	in its designated medical institutions, zero deaths, zero infections

Figure 5 Part of Index Lines of "Cases"

	File	Left Context	Hit	Right Context
10	Global ...	the first locally transmitted asymptomatic case on May 21. The recent	infections	in Shenzhen were related to the city's Yantian
11	Global ...	obstacles for normal economic communications when the real source of	infections	in this wave has not yet been identified, experts
12	Global ...	a situation where imported cases from Nigeria caused five domestic	infections	in two cities. The Nigerians were confirmed infections during
13	Global ...	the Guangzhou government on Sunday. On Saturday, nine new domestic	infections	were reported in the city, including six confirmed cases
14	Global ...	faster nucleic acid detection methods, Wang added. A total of 94	infections	were reported in Guangzhou during the latest resurgence as
15	Global ...	up its citywide nucleic acid testing, as a total of 94	infections	were reported during the latest resurgence as of Saturday,
16	Global ...	with November. A total of 2,338 confirmed cases and 8,477 asymptomatic	infections	were reported on the Chinese mainland on Saturday, with 39,391
17	Global ...	since October 22. A total of 2,370 cases, or 64 percent of the 3,732	infections,	were discovered in the Haizhu district, Zhang Yi, deputy
18	Global ...	to Guangzhou Center for Disease Control and Prevention. After the	infections	were found, the local authorities have closely worked together
19	Global ...	; according to experts. Epidemiological investigations showed that the two	infections	were highly likely to have contracted the virus through
20	Global ...	with a total of 260 COVID-related incidents since October 1. "COVID-19	infections	were imported through various ways such as by air,
21	Global ...	Guangzhou Municipal Health Commission announced on Sunday night. The	infections	were likely to have been caused by accidental exposure,
22	Global ...	Baiyun and Huangpu immediately launched nucleic acid testing after the	infections	were spotted. As of 8 am on Wednesday, all the 6.64
23	Global ...	y press conference. According to Zhang, Guangzhou city reported 746 local	infections	on Friday, among which eight are discovered in local

Figure 6 Part of Index Lines of "Infections"

In addition, "Covid" and "epidemic" are paired many times with "prevention" "control" and "measures", involving topics such as epidemic cases, control and protection, as shown in the Figure 7 and Figure 8. These expressions, like the one in example 4, reflect the strong awareness of Guangzhou and its people in epidemic prevention and control. Besides, these also show that Guangzhou was actively fighting against the epidemic, and the people of Guangzhou are tenacious, taking many measures to prevent and control the epidemic, and defending the health and safety of Guangzhou together.

	File	Left Context	Hit	Right Context
58	Global ...	News Service <Aerial view of traffic flow in Guangzhou after	COVID	control eased> By ecnsphotos Published: Dec 04, 2022 10:22 AM Drone phot
59	Global ...	comprehensively and accurately implement the ninth edition of China's	COVID-19	control protocols and further optimize 20 prevention and control measures,
60	Global ...	comprehensively and accurately implement the ninth edition of China's	COVID-19	control protocols and further optimize the epidemic prevention and
61	Global ...	s Guangdong Province and London for two weeks due to	COVID-19	control measures. It is the first airline in the
62	Global ...	tests for COVID-19, according to Tuesday's government press conference.	COVID-19	control work is aimed at safeguarding both Chinese and
63	Global ...	disease expert Zhong Nanshan Photo: VCG The first wave of	COVID-19	infections in Guangzhou, South China's Guangdong Province, is
64	Global ...	for daily life. This comes after a surge in fresh	COVID-19	infections in the city. According to a statement published
65	Global ...	gnant women in the area under closed management. Guangzhou reported 22	COVID-19	infections between Saturday morning and Sunday afternoon, raising the
66	Global ...	fast and strong, local health authority said. Guangzhou's fresh	COVID-19	infections have spread to a neighbor city. Nanhai district
67	Global ...	nucleic acid testing to more residents. After a surge in	COVID-19	infections this week, Yantian district of Shenzhen on Saturday
68	Global ...	dealt with a total of 260 COVID-related incidents since October 1. "	COVID-19	infections were imported through various ways such as by
69	Global ...	not yet available at boarding due to the requirements of	COVID-19	prevention and control measures. <In pics: giant pandas at
70	Global ...	and shifting to home quarantine for seven days. The upgraded	COVID-19	prevention and control measures were implemented ahead of the 130
71	Global ...	to keep warm and safe. "China has performed well in	COVID-19	prevention and control." said Yang. What we need to

Figure 7 Part of Index Lines of "Covid"

	File	Left Context	Hit	Right Context
31	Global ...	amid rising infections. Several districts in Guangzhou have imposed stricter	epidemic	prevention measures after newly reported cases in the city
32	Global ...	one in Zhanjiang. Several districts in Guangzhou have imposed stricter	epidemic	prevention measures as the newly reported cases in the
33	Global ...	total of 52,888 students have sat the gaokao exam under strict	epidemic	prevention measures in Guangzhou, South China's Guangdong Province,
34	Global ...	the country, many places in China have also implemented flexible	epidemic-	prevention measures to prioritize people's lives, livelihoods and
35	Global ...	cleaned and disinfected its office areas according to the latest	epidemic	prevention measures, and may resume on-site work in
36	Global ...	of flare-up driven by the Delta variant. With effective	epidemic	prevention measures, the city ended the outbreak in late
37	Global ...	directly linked to the severity of the local epidemic," an	epidemic	prevention expert told Caixin. Under the current epidemic situation,
38	Global ...	and parks, in a bid to ensure the supply of	epidemic	prevention materials and living materials. Additionally, the city vowed
39	Global ...	COVID-19. Some Chinese netizens expressed concerns over the efficacy of	epidemic	control and prevention measures adopted by Starbucks. One netizen,
40	Global ...	was downgraded to a low-risk area, according to the	epidemic	control and prevention headquarters of the city, while the
41	Global ...	far thanks to the local government's launch of dynamic	epidemic	control measures to bring down the possible impact of
42	Global ...	far thanks to the local government's launch of dynamic	epidemic	control measures to bring down the possible impact of
43	Global ...	by Guangzhou are effective. In the future, the city's	epidemic	control group should just be guided by this experience
44	Global ...	uangzhou increased by 2.5 times after the announcement of lifting temporary	epidemic	control measures, domestic online travel agency Qunar.com said,

Figure 8 Part of Index Lines of "Epidemic"

Example 4: For those depart from Shenzhen, a result with 72 hours is required, according to the relevant epidemic prevention and control measures (from *Global Times*, June 10, 2021).

The word "nucleic" "acid" and "quarantine" have fewer index lines and are all used to indicate the main specific measures for epidemic prevention and control, where nucleic and acid are used to indicate "nucleic acid testing" and "quarantine" has more index lines expressed as "under (home) quarantine" (see Figure 9 and Figure 10).

	File	Left Context	Hit	Right Context
1	Global ...	disinfected by the disease control department. The results of wide	nucleic	acid testing in some districts have been released. "Since
2	Global ...	n 09, 2021 07:02 PM People have their information registered before COVID-19	nucleic	acid testing in Liwan District of Guangzhou, south China'
3	Global ...	n 09, 2021 08:36 AM People have their information registered before COVID-19	nucleic	acid testing in Liwan District of Guangzhou, south China'
4	Global ...	worker collects a swab sample from a resident for COVID-19	nucleic	acid testing in Liwan District of Guangzhou, south China'
5	Global ...	n 14, 2021 12:46 PM People have their information registered before COVID-19	nucleic	acid testing in Liwan District of Guangzhou, south China'
6	Global ...	n 14, 2021 09:48 AM People have their information registered before COVID-19	nucleic	acid testing in Liwan District of Guangzhou, south China'
7	Global ...	n 15, 2021 02:59 PM People have their information registered before COVID-19	nucleic	acid testing in Liwan District of Guangzhou, south China'
8	Global ...	n 16, 2021 11:00 PM People have their information registered before COVID-19	nucleic	acid testing in Liwan District of Guangzhou, south China'
9	Global ...	worker collects a swab sample from a resident for COVID-19	nucleic	acid testing in Liwan District of Guangzhou, south China'
10	Global ...	be put into operation in 2023. (Photo: Xinhua) <Guangzhou launches mass	nucleic	acid testing in three districts after four infections discovered>
11	Global ...	VCG Guangzhou in South China's Guangdong Province launched mass	nucleic	acid testing in three districts on Thursday after discovering
12	Global ...	with populations of 1.2 million and 1.7 million respectively, both started mass	nucleic	acid testing on Sunday. The testing will last until
13	Global ...	s Guangdong Province, launched mass screening of all residents with	nucleic	acid testing on May 30. People queued to get tested
14	Global ...	nucleic testing within two days. "Since the launch of the	nucleic	acid testing on May 26, as of 12 pm on Saturday,

Figure 9 Part of Index Lines of "Nucleic"

	File	Left Context	Hit	Right Context
1	Global ...	in stable condition. Their close contacts have been put under	quarantine,	and all have returned negative nucleic acid testing results.
2	Global ...	man who tested positive for COVID-19 refused to undergo medical	quarantine	and assaulted a nurse, beating her and biting her
3	Global ...	risk flights have been moved from their homes to central	quarantine	and have taken nucleic acid tests. The city reported
4	Global ...	ensure that people in high-risk areas, isolation sites, home	quarantine	and health monitoring in their jurisdiction can seek medical
5	Global ...	d out management and control, epidemiological investigations, transfer and	quarantine	and nucleic acid testing during the initial 24-hour golden
6	Global ...	by the article, saying the cases' close contacts are under	quarantine	and people with high risk of exposure have been
7	Global ...	Each district has at least one designated hospital for medical	quarantine,	and the hospital will conduct nucleic acid testing when
8	Global ...	measures. Haizhu district will allow close contacts to implement home	quarantine,	and Tianhe, Conghua and Huadu districts will lift restrictions
9	Global ...	in and around the hospital, and the suspect is undergoing	quarantine	and treatment under police supervision. The case will be
10	Global ...	handling. For foreigners who refuse to undergo the required checkup,	quarantine	and treatment, public security will assist health authorities in
11	Global ...	company deliver online shopping goods ordered by residents under home	quarantine	at a residential area at Liwan District of Guangzhou,
12	Global ...	volunteer registers online shopping goods ordered by residents under home	quarantine	at a residential area at Liwan District of Guangzhou,
13	Global ...	October 20. All international arrivals will have to go through 21-day	quarantine	at isolation centers arranged by Guangzhou, instead of staying
14	Global ...	medium-high risk areas in China to go through 14-day	quarantine	at isolation centers. Epidemic prevention and control work at

Figure 10 Part of Index Lines of "Quarantine"

5.1.3 Index analysis for keywords of other words

The words with "Chinese" include "Chinese mainland" "Chinese airport" "Chinese citizens" "Chinese painting" "Chinese companies" etc. (see Figure 11). The expressions cover a wide range of topics such as epidemic, technology, economy, culture and so on, showing the development of Guangzhou in various aspects. Among them, "Chinese citizens" and "other foreigners" are juxtaposed to show Guangzhou's city image of treating both domestic and foreigners equally and being tolerant and fair during the Covid-19 pandemic. The following is an example:

	File	Left Context	Hit	Right Context
1	Global ...	ranked on the list. Foreign direct investment (FDI) on the	Chinese	mainland is another important factor that researchers use to
2	Global ...	test for Starbucks, which has about 4,200 outlets across the country.	Chinese	mainland is the second-largest market for the coffee
3	Global ...	China's Guangdong, has become the second city on the	Chinese	mainland to detect the Omicron variant due to an
4	Global ...	COVID-19 control measures. It is the first airline in the	Chinese	mainland to make such a move regarding the UK.
5	Global ...	Virgin Atlantic each operate two flights a week, and four	Chinese	mainland airlines – Air China, China Eastern Airlines and China
6	Global ...	January 7. Currently, there are eight non-stop flights between the	Chinese	mainland and the UK every week, as British Airways
7	Global ...	enterprises, particularly those businesses run by individuals. FDI into the	Chinese	mainland expanded 11.8 percent year-on-year to 70.36 billion yuan ($9.94
8	Global ...	not believe this will happen. The vaccination rate in the	Chinese	mainland has reached 68.86 percent, which is not enough but
9	Global ...	,338 confirmed cases and 8,477 asymptomatic infections were reported on the	Chinese	mainland on Saturday, with 39,391 confirmed cases still under medical
10	Global ...	an unexpected COVID-19 resurgence. As the only city in the	Chinese	mainland that currently has high-risk areas for COVID-19,
11	Global ...	Courtesy of the Pakistani Embassy to China Published: May 22, 2022 05:51 PM	Chinese	State Councilor and Foreign Minister Wang Yi (right) and
12	Global ...	and China. Photo: Courtesy of the Pakistani Embassy to China	Chinese	State Councilor and Foreign Minister Wang Yi (right) and
13	Global ...	on Sunday. Photo: Courtesy of the Pakistani Embassy to China	Chinese	State Councilor and Foreign Minister Wang Yi (right) presents
14	Global ...	)al Times Published: May 24, 2022 11:56 AM Updated: May 24, 2022 11:50 AM	Chinese	State Councilor and FM Wang Yi met with UN

Figure 11 Part of Index Lines of "Chinese"

Example 5: Chen Yongqiu, deputy director of the Guangzhou public security bureau, said the city used the same nucleic acid test measures for African people as it did for Chinese citizens and other foreigners, and provided the same designated hotels for their quarantine(From *Global Times*, April 14, 2020).

Indexing analyzing "railway", it is found that news reports mostly focus on the construction and operation of high-speed railways between Guangzhou and other cities, including Beijing-Guangzhou High Speed Railway, Guiguang-Guangzhou High Speed Railway, Guangshan High Speed Railway and so on (seen Figure 12).

	File	Left Context	Hit	Right Context
1	Global ...	tunnel on Rongjiang-Congjiang section of Guiyang-Guangzhou High-speed	Railway	in southwest China's Guizhou Province, Sept. 3, 2020. (Xinhua/Liu
2	Global ...	tunnel on Rongjiang-Congjiang section of Guiyang-Guangzhou High-speed	Railway	in southwest China's Guizhou Province, Sept. 3, 2020. (Xinhua/Liu
3	Global ...	tunnel on Rongjiang-Congjiang section of Guiyang-Guangzhou High-speed	Railway	in southwest China's Guizhou Province, Sept. 3, 2020. (Xinhua/Liu
4	Global ...	work on Rongjiang-Congjiang section of Guiyang-Guangzhou High-speed	Railway	in southwest China's Guizhou Province, Sept. 2, 2020. (Xinhua/Liu
5	Global ...	tunnel on Rongjiang-Congjiang section of Guiyang-Guangzhou High-speed	Railway	in southwest China's Guizhou Province, Sept. 3, 2020. (Xinhua/Liu
6	Global ...	AM Construction vehicles enter the Futoushi Tunnel of Guangzhou-Shanwei	Railway	in Huidong County of Huizhou, south China's Guangdong
7	Global ...	at the construction site of Futoushi Tunnel of Guangzhou-Shanwei	Railway	in Huidong County of Huizhou, south China's Guangdong
8	Global ...	photo shows an exit of Futoushi Tunnel of Guangzhou-Shanwei	Railway	in Huidong County of Huizhou, south China's Guangdong
9	Global ...	at the construction site of Futoushi Tunnel of Guangzhou-Shanwei	Railway	in Huidong County of Huizhou, south China's Guangdong
10	Global ...	on the Congjiang section of the Guiyang-Guangzhou high-speed	railway	in Congjiang County, southwest China's Guizhou Province, March 4, 2020. (
11	Global ...	derstand the situation. <Congjiang section of Guiyang-Guangzhou high-speed	railway	in Guizhou> By Global Times Published: Mar 05, 2020 12:09 PM A
12	Global ...	seen on Rongjiang-Congjiang section of Guiyang-Guangzhou High-speed	Railway	in south China's southwest China's Guizhou Province,
13	Global ...	A bullet train stops at the platform of Beijing West	Railway	Station in Beijing, capital of China, Dec. 26, 2022. A total
14	Global ...	Passengers are seen on a bullet train at Beijing West	Railway	Station in Beijing, capital of China, Dec. 26, 2022. A total

Figure 12 Part of Index Lines of "Railway"

Example 6: The Futoushi tunnel of Guangzhou-Shanwei Railway was drilled through on Friday (from *Global Times*, April 23, 2022).

The indexing analysis of "airport" reflects the concern for Guangzhou Baiyun Airport, like example 7, showing that Baiyun Airport has become an international transportation hub with large flow of people, which reflects the international image of Guangzhou as an open international metropolis (see Figure 13).

Example 7: Airports across the country saw widespread flight cancellations on Wednesday, with some airports even reaching a flight cancellation rate of 98 percent according to flight information provider Flight Master (from *Global Times*, November 09, 2022).

	File	Left Context	Hit	Right Context
1	Global ...	COVID-19 cases nationwide. As of 10:00 am on Wednesday, Guangzhou Baiyun	Airport	in South China's Guangdong Province had cancelled 1,163 flights,
2	Global ...	provider VariFlight and the airport statement. Guangzhou Baiyun International	Airport	in South Chinas Guangdong Province, on Wednesday night detected
3	Global ...	Qi added. In 2019, a total 71.17 million passengers used Incheon International	Airport	in South Korea, of while 70.58 million were international passengers,
4	Global ...	ernational Airport handled 43.77 million passenger trips, becoming the busiest	airport	in the world for the year. But Wang told
5	Global ...	al Airport handled 43.77 million passenger trips in 2020, becoming the busiest	airport	in the world for the year. Global Times <Guangzhou
6	Global ...	ranking. The data broke the record of the Atlanta International	Airport	in the US after 22 years. Baiyun airport, one of
7	Global ...	Customs officers inspect an inbound flight at the Capital International	Airport	in Beijing, capital of China, March 18, 2020. (Xinhua/Chen Zhonghao)
8	Global ...	Southern Airlines flight CZ3001 takes off at the Daxing International	Airport	in Beijing, capital of China, Sept. 25, 2019. File photo:Xinhua
9	Global ...	to fill in an arrival card at Qingdao Liuting International	Airport	in Qingdao, East China's Shandong Province on March 5.
10	Global ...	to fill in an arrival card at Qingdao Liuting International	Airport	in Qingdao, East China's Shandong Province on March 5.
11	Global ...	landed in Guangzhou safely, Mahan Air noted. The Baiyun International	Airport	in Guangzhou said later Monday they initiated emergency response
12	Global ...	porters Published: Sep 15, 2021 06:48 PM The Guangzhou Baiyun International	Airport	in Guangzhou, South China's Guangdong Province Photo: VCG
13	Global ...	bus to greeters upon their arrival at Guiyang Longdongbao International	Airport	in Guiyang, southwest China's Guizhou Province, March 20, 2020. Medical
14	Global ...	exceed 100 billion yuan ($15.5 billion) by 2025, with the commodity value of	airport	in relation to cross-border e-commerce exceeding 300 billion

Figure 13 Part of Index Lines of "Airport"

To sum up, by analyzing the top 20 keywords, we can find that *Global Times*' news coverage of Guangzhou focuses on three major themes: current affairs around Guangzhou, the Covid-19 pandemic and transportation, specifically including the cases of the Covid-19 pandemic, preventive and control measures, the protection of the livelihood of the city's residents, the construction of economy and culture, as well as the construction and operation of the transportation infrastructure. It shows the image of Guangzhou as a cosmopolitan city with active resistance to the epidemic, economic and cultural prosperity, and openness and inclusiveness.

5.2 High-Frequency Word Analysis

Word frequency is one of the most important data types in corpus research. The frequent use of high-frequency words in news reports can leave a deep impression on readers, thus affecting their emotional attitudes towards the reported things; at the same time, high-frequency word analysis of news report texts can reveal the deeper meanings in the news and summarize the linguistic features. Therefore, removing some words with no practical meaning, we extract the top 20 high-frequency real words, mainly verbs, nouns, adjectives and adverbs, and analyzes the uses of these words are applied and their collocations. The details are shown in Table 2.

Table 2 Top 20 High Frequency Words

Number	High frequency word	Frequency
1	guangzhou	1036
2	china	684
3	province	328
4	said	325
5	be	322
6	guangdong	317
7	south	287
8	city	230
9	Covid	221
10	cases	204
11	epidemic	157
12	nucleic	144
13	district	142
14	acid	139
15	high	138
16	local	134
17	international	129
18	people	123
19	new	118
20	health	117

We analyze the high-frequency content words in the table 2 and they are broadly classified into the following 4 categories: agents, verbs, topic words related to Covid-19 pandemic and adjectives.

5.2.1 Analysis of agents

Firstly, the first category points to the agents. In these three years "Guangzhou" "china" "province" "Guangdong" "south" and "district" were used many times in the news reports, and respectively ranked 1st, 2nd, 3rd, 6th, 7th, and 13th among the high-frequency words. They emphasize the central location and object of the report - Guangzhou City, Guangdong Province, China. In addition, the word "city" is ranked in the 8th position, most of which were combined with authorities and health committee (see Figure 14), which not only emphasizes the principle position of Guangzhou, but also elaborates the related contents including the position, attitude, and measures of the city government authorities and the city health committee. In the news, City's health committee was a way to acquire the latest information of Covid-19 pandemic. The following is an example.

	File	Left Context	Hit	Right Context
1	Global ...	treatment methods. On Friday's press conference, officials from the	city'	s health commission said as of Thursday midnight, a
2	Global ...	the intensive care unit. When the outbreak first occurred, the	city'	s health commission prepared to expand the number of
3	Global ...	well as closed and controlled management areas from Monday. The	city'	s health commission released a list of places where
4	Global ...	s largest scale nucleic acid testing city, data from the	city'	s health commission showed. Mass nucleic acid testing is
5	Global ...	situation in three years, as the deputy director of the	city'	s health commission Zhang Yi told a press conference
6	Global ...	found during screening of close contacts at quarantine hotels, The	city'	s health authority announced on Monday. From May 21 to
7	Global ...	at home and take virtual classes until further notice, the	city'	s authorities announced in a news conference on Sunday
8	Global ...	in the latest outbreak since it started on May 21. The	city'	s authorities imposed transportation restrictions on Sunday night to
9	Global ...	provincial capitals, and five cities reviewed in the report. "A	city'	s business environment can be evaluated in many aspects,
10	Global ...	is another important factor that researchers use to evaluate a	city'	s business environment, Liu said, adding that it's
11	Global ...	of the year, indicating the resilience and vitality of the	city'	s economic operation. Chen said that the city will
12	Global ...	of the year, indicating the resilience and vitality of the	city'	s economic operation. Chen said that the city will
13	Global ...	regulations were announced by Yang Bingsheng, deputy director of the	city'	s Public Security Bureau. One confirmed case in Panyu
14	Global ...	Transportation Bureau on Monday said this can effectively streamline the	city'	s public transportation scheduling and save the route's

Figure 14 Part of Index Lines of "City"

Example 8: Guangzhou reported four new cases over the past 24 hours, all of which were found during screening of close contacts at quarantine hotels, the city's health authority announced on Monday (from *Global Times*, June 14, 2021).

And the news lays stress on the ideas and efforts of the authorities in epidemic prevention. Here is an example.

Example 9: The city's authorities imposed transportation restrictions on Sunday night to prevent the virus spreading (from *Global Times*, May 31, 2021).

The stress on authority information reflects the rigorousness of the news and widens the distance between the speaker and the listener.

The word "people" is located in the 18th position, which is related to the aspects of people's life and safety, and people's living needs. It reflects the city image of Guangzhou, which focuses on the people and serves the people.

Example 10: The city's counter-extreme weather authority on Tuesday started preparations for the transfer and resettlement of personnel to ensure the safety of people in dangerous areas (from *Global Times*, May 10, 2022).

5.2.2 Analysis of verbs

The second category of high-frequency words is verbs. "Said" has the highest frequency of use and is located in the 4th of all high-frequency real words. As a matter of fact, both indirect and direct speeches can also express modalities in English. In the news, "said" is used to quote other evaluators, indicating that this paper repeatedly conveys the views and emotions of relevant people, spectators or other reports on Guangzhou-related events or Guangzhou's city image, especially the opinions of government staff and experts, which effectively enhances the authenticity and persuasiveness of the news report.

Example 11: Experts said that the COVID-19 strain in the latest epidemic, which was initially detected in India, is more contagious and spreads faster, posing a huge challenge for medical workers to complete the citywide nucleic testing within two days (from *Global Times*, June 06, 2021)

It should be noted that the relevant evaluators elicited after "said" include: high-quality development, sufficient supplies, expect to be completed, positive cases, and so on (see Figure 15). The example 12 shows that Guangzhou, against the background of the epidemic's difficult situation, has not been afraid of difficulties and has actively sought development. It also highlights the people's optimism and confidence in Guangzhou's development.

Example 12: Chen said that the city will continue implement high-quality development in the financial sector during… so as to develop Guangzhou as the core engine of Greater Bay Area (from *Global Times*, November 22, 2020).

The news also used the verb "be" several times. An analysis of the indexing lines of "be" reveals that it is mostly used to express the passive voice, often paired with modal verbs such as "will" "should" "may" "could" "can" etc., and these words also followed by specific and active measures to elaborate on Guangzhou's future goals and plans for urban construction (see Figure 16). Example 13 reflects the fact that Guangzhou is a city of "action" that actively seeks better development for the city.

	File	Left Context	Hit	Right Context
1	Global ...	resilience and vitality of the city's economic operation. Chen	said	that the city will continue implement high-quality development
2	Global ...	resilience and vitality of the city's economic operation. Chen	said	that the city will continue implement high-quality development
3	Global ...	measures, the city ended the outbreak in late June. Officials	said	that the city has sufficient supplies of daily necessities
4	Global ...	cross infections, according to the health authority. Guangzhou health officials	said	that the city is facing its "most complicated and
5	Global ...	turday, including 80 confirmed cases and 14 asymptomatic infections. Experts	said	that the COVID-19 strain in the latest epidemic, which
6	Global ...	not a disease, and silent carriers are not patients. Zhong	said	that the COVID-19 epidemic is not over yet, but
7	Global ...	from India, which have been found in 26 COVID-19 patients. Experts	said	that the appearance of the strains, which are more
8	Global ...	on a few minutes later," a hotel receptionist said. She	said	that the black-out happened in the early morning
9	Global ...	half of this year. Huang Haoxuan, CEO of VDA Jewellery,	said	that the company has already bounced back to pre-
10	Global ...	or leaving the Guangdong Province on non-essential trips." Chen	said	that the government would strictly implement the information reporting
11	Global ...	imported cases amidst threats posed by the Delta variant. Zhong	said	that the international health station will serve as quarantine
12	Global ...	the city left lockdown status on Monday. "It can be	said	that the latest outbreak in the city has arrived
13	Global ...	well as the establishment of an innovative futures exchange. Lin	said	that the previous trials for carbon trading in eight
14	Global ...	with around 3,000 cups sold each day. The Guangzhou railway operator	said	that the pricing of the bubble tea took into

Figure 15 Part of Index Lines of "Said"

	File	Left Context	Hit	**Right Context**
1	Global ...	health station with a capacity of 5,000 people is expected to	be	put into operation in Guangzhou in early September, said
2	Global ...	a maximum speed of 350 km per hour is expected to	be	put into operation in 2023. (Photo: Xinhua) Workers are seen
3	Global ...	a maximum speed of 350 km per hour is expected to	be	put into operation in 2023. (Photo: Xinhua) Aerial photo shows
4	Global ...	a maximum speed of 350 km per hour is expected to	be	put into operation in 2023. (Photo: Xinhua) Workers are seen
5	Global ...	a maximum speed of 350 km per hour is expected to	be	put into operation in 2023. (Photo: Xinhua) <Guangzhou launches mass
6	Global ...	put into central quarantine. Their activities caused 197 close contacts to	be	put into quarantine and 1,680 people with the risk of
7	Global ...	on Friday, according to media reports. The subway train will	be	put into service at Guangzhou Metro's No. 18 and
8	Global ...	which he also mentioned that the focus moving forward should	be	put on preventing severe illness caused by the virus,
9	Global ...	positive reaches five, the airline's flight to China will	be	suspended for one week, and if the number reaches 10,
10	Global ...	from August 7, any flight with five detected COVID-19 cases will	be	suspended for one week when the confirmed cases account
11	Global ...	longer than the previously required suspension time. Airlines will still	be	suspended for four weeks if 10 or more passengers test
12	Global ...	passengers test positive for COVID-19, the route in question will	be	suspended for two weeks, one week longer than the
13	Global ...	for one week, and if the number reaches 10, operations will	be	suspended for 4 weeks. On June 14, the regulator suspended China
14	Global ...	Province also announced Monday that subway and bus services will	be	suspended from Monday until Friday as there were 384 new

Figure 16 Part of Index Lines of "Be"

Example 13: An international health station with a capacity of 5,000 people is expected to be put into operation in Guangzhou in early September, said a Guangzhou government official in June (from *Global Times*, September 05, 2021).

Besides, we also find more expressions of "will be suspended", indicating that the epidemic has slowed down many ongoing or upcoming urban construction activities, hindered Guangzhou's urban development, and had a more far-reaching impact on the city.

Example 14: Baiyun district in Guangzhou, South China's Guangdong Province also announced Monday that subway and bus services will be suspended from Monday until Friday (from *Global Times*, November 21, 2022).

Moreover, the reports also show "be" verbs are used in various tenses, including "is" "are" "were" "will be" "have been done" and so on. Among them, the word "is" is mostly paired with "expected", and further analysis of the phrase "is expected" reveals that it is mostly paired with positive words such as "cooperate" "accelerate" "improve" etc. (see Figure 17), which shows the positive attitude of expectation towards Guangzhou. The following is an example:

	File	Left Context	Hit	Right Context
1	Global ...	hotel. An international health station with a capacity of 5,000 people	is	expected to be put into operation in Guangzhou in
2	Global ...	makeshift hospital. One pavilion has been basically formed, and it	is	expected to be completed and put into use within
3	Global ...	Shanwei Railway with a maximum speed of 350 km per hour	is	expected to be put into operation in 2023. (Photo: Xinhua)
4	Global ...	Shanwei Railway with a maximum speed of 350 km per hour	is	expected to be put into operation in 2023. (Photo: Xinhua)
5	Global ...	Shanwei Railway with a maximum speed of 350 km per hour	is	expected to be put into operation in 2023. (Photo: Xinhua)
6	Global ...	Shanwei Railway with a maximum speed of 350 km per hour	is	expected to be put into operation in 2023. (Photo: Xinhua) <
7	Global ...	The Guangzhou Futures Exchange which mainly deals with commodity futures,	is	expected to cooperate with the spot transactions in Hong
8	Global ...	The Guangzhou Futures Exchange which mainly deals with commodity futures,	is	expected to cooperate with the spot transactions in Hong
9	Global ...	raw material market price fluctuations," Lin said. The futures exchange	is	expected to fill in the vacancy of commodity futures
10	Global ...	raw material market price fluctuations," Lin said. The futures exchange	is	expected to fill in the vacancy of commodity futures
11	Global ...	Futures Exchange has been approved by the State Council and	is	expected to go into operation within this year, said
12	Global ...	Futures Exchange has been approved by the State Council and	is	expected to go into operation within this year, said
13	Global ...	Guangdong Province, according to China Media Group (CMG). The move	is	expected to accelerate China's offshore wind power installation
14	Global ...	Port South Station, in South China's Guangdong Province. It	is	expected to arrive in Europe in 15 days, marking the

Figure 17 Part of Index Lines of "Is"

Example 15: The move is expected to accelerate China's offshore wind power installation capacity in deep-sea areas and promote affordable access to offshore wind power (from *Global Times*, September 29, 2022).

The words "are" and "were" are mostly used in the passive voice, elaborating on the impact of the Covid-19 pandemic on Guangzhou and Guangzhou's activities to deal with the Covid-19 pandemic.

Example 16: According to the announcement, residents are required not to leave home unless necessary (from *Global Times*, November 05, 2022).

The words "has" and "have" are mostly used in the present perfect tense and the present perfect progressive tense of verbs, and they are mostly used to describe the positive urban construction activities that have been completed in Guangzhou, such as the completion of the infrastructure construction and the improvement of the situation of the Covid-19 pandemic.

5.2.3 Analysis of topic words related to Covid-19 pandemic

The third category of high-frequency words is topic words related to Covid-19 pandemic. The words "cases" "epidemic" "nucleic" "acid" and "health" are located in the 10th, 11th, 12th, 14th, and 20th positions of high-frequency words, respectively. It is clear that "Cases of Covid-19 Pandemic" is the focus of *Global Times*' coverage of Guangzhou in 2020-2022, and thus the issue of people's health is one of the core issues in the news coverage. The main focus is on the status of the increase or decrease of cases of the epidemic and the arrangement of nucleic acid testing. Since "cases" "epidemic" "nucleic" and "acid" have been analyzed in the previous analysis of keyword section, so we do not repeat them here.

The word "health" is mostly used to express the "health committee", which leads to its opinion (see Figure 18). It reflects that the news focuses on the reporting of authoritative organizations and experts' opinions so as to reflect the characteristics and development of Guangzhou's urban construction in the period of Covid-19 pandemic.

	File	Left Context	Hit	Right Context
1	Global ...	and the risk of community transmission was high, the local	health	commission said at Thursday's press conference. Also, the
2	Global ...	Chen Bin, Deputy Director and spokesperson of the Guangzhou City	Health	Commission said at a press conference held by the
3	Global ...	On Friday's press conference, officials from the city's	health	commission said as of Thursday midnight, a total of 339
4	Global ...	had been administered across China as of Sunday, the National	Health	Commission said Monday. Photo: cnsphoto Two districts in Guangzhou
5	Global ...	work and production. At the press conference, the Guangzhou Municipal	Health	Commission said that it is further optimizing five prevention
6	Global ...	baby boy, the video exposed. A staffer from a local	health	commission said the commission will crack down on these
7	Global ...	international arrivals every day, according to Duan Yufei, director of	Health	Commission of Guangdong Province. In particular, Guangzhou, where one
8	Global ...	the shortage of nucleic acid testing staff in Guangzhou, the	Health	Commission of Guangdong Province began on Saturday to deploy
9	Global ...	has arrived, without a possibility of another major outbreak. The	Health	Commission of Guangdong Province said on Wednesday that no
10	Global ...	accounting for 5.8 percent, Zhang Yi, deputy director of the municipal	health	commission of Guangzhou said at a Monday press briefing.
11	Global ...	city for five consecutive days starting Monday. According to the	Health	Commission of Hebei Province, two new cases of COVID-19
12	Global ...	Province, with 14 flying from Bangladesh and three from India. Guangdong	health	commission on Sunday also reported four asymptomatic cases, three
13	Global ...	landing city, according to an official release from Guangzhou Municipal	Health	Commission on Tuesday. The official release did not reveal
14	Global ...	cases were reported on Tuesday, according to the Guangdong provincial	health	commission on Wednesday. "Although this is the first time

Figure 18 Part of Index Lines of "Health"

5.2.4 Analysis of adjectives

The last category is adjectives. In addition to the high-frequency adjective new, words "high" "local" and "international" are in the 15th, 16th, and 17th places respectively. "High" is mainly used in a variety of expressions. To begin with, it is used to express high - speed railway (see Figure 19), to elaborate the achievements and important impacts of the construction of high - speed railway, and to reflect that the epidemic has not hindered the development of China's high-speed railway. Moreover, as an outstanding achievement in China's transportation, high - speed railway has always been the focus of news reports.

	File	Left Context	Hit	Right Context
1	Global ...	hat helped understand the situation. <Congjiang section of Guiyang-Guangzhou	high-	speed railway in Guizhou> By Global Times Published: Mar 05, 2020 12:09
2	Global ...	train runs on the Congjiang section of the Guiyang-Guangzhou	high-	speed railway in Congjiang County, southwest China's Guizhou
3	Global ...	in a tunnel on Rongjiang-Congjiang section of Guiyang-Guangzhou	High-	speed Railway in southwest China's Guizhou Province, Sept. 3, 2020. (
4	Global ...	in a tunnel on Rongjiang-Congjiang section of Guiyang-Guangzhou	High-	speed Railway in southwest China's Guizhou Province, Sept. 3, 2020. (
5	Global ...	train is seen on Rongjiang-Congjiang section of Guiyang-Guangzhou	High-	speed Railway in south China's southwest China's
6	Global ...	in a tunnel on Rongjiang-Congjiang section of Guiyang-Guangzhou	High-	speed Railway in southwest China's Guizhou Province, Sept. 3, 2020. (
7	Global ...	and inspection work on Rongjiang-Congjiang section of Guiyang-Guangzhou	High-	speed Railway in southwest China's Guizhou Province, Sept. 2, 2020. (
8	Global ...	in a tunnel on Rongjiang-Congjiang section of Guiyang-Guangzhou	High-	speed Railway in southwest China's Guizhou Province, Sept. 3, 2020. (
9	Global ...	billion passenger trips have been made on the Beijing-Guangzhou	high-	speed railway since it went into operation ten years
10	Global ...	billion passenger trips have been made on the Beijing-Guangzhou	high-	speed railway since it went into operation ten years
11	Global ...	billion passenger trips have been made on the Beijing-Guangzhou	high-	speed railway since it went into operation ten years
12	Global ...	billion passenger trips have been made on the Beijing-Guangzhou	high-	speed railway since it went into operation 10 years ago,
13	Global ...	high-speed rail network in China, the 2,298-km Beijing-Guangzhou	high-	speed railway is closely connected with 12 other high-speed
14	Global ...	high-speed rail network in China, the 2,298-km Beijing-Guangzhou	high-	speed railway is closely connected with 12 other high-speed

Figure 19 Part of Index Lines of "High-Speed"

Example 17: The operation speed of high-speed railway connecting Beijing with Guangzhou, South China's Guangdong Province, will be gearing up to 350 kilometers an hour (km/h) in June, the China Railway announced on Friday (from *Global Times*, May 13, 2022).

Secondly, "high" is also often used with "risk" to indicate high-risk areas (see Figure 20), emphasizing the nucleic acid testing and epidemic prevention and control in high-risk areas of Guangzhou, reflecting the focused and targeted prevention and control of the epidemic in Guangzhou. Thirdly, "high" is often paired with "quality" to emphasize the requirements of high-quality economic development and high-quality life protection.

Example 18: Chen said that the city will continue implement high- quality development in the financial sector ... (from *Global Times*, November 22, 2020)

	File	Left Context	Hit	Right Context
55	Global ...	travel and contact history. As of Tuesday, Guangzhou has two	high-	risk areas and nine medium-risk area. <Guangzhou tests 16
56	Global ...	announcement. Guangzhou travel groups will not head to middle- and	high-	risk areas and will not accept applicants who had
57	Global ...	Of the examinees in the city, 819 students are located in	high-	risk areas or centralized medical management areas, or need
58	Global ...	are discovered in local communities and others are discovered in	high-	risk areas or among people who are under quarantine.
59	Global ...	remained unaffected. As of 10 am on Sunday, Guangzhou still presents 42	high-	risk areas and 64 medium-risk areas, according to media
60	Global ...	the only city in the Chinese mainland that currently has	high-	risk areas for COVID-19, Guangzhou has made full preparations
61	Global ...	statement also required those who have been to COVID-19 medium-	high	risk areas in China to go through 14-day quarantine
62	Global ...	at a press conference on Wednesday. The measures include delineating	high-	risk areas scientifically and accurately, carrying out epidemiological investigations
63	Global ...	work on a regular basis," Yang noted. Guangzhou has two	high-	risk areas, both in Liwan district, and 11 medium-risk
64	Global ...	Guangzhou were lifted from lockdown on Monday. Guangzhou has two	high-	risk areas, both in Liwan district, and 11 medium-risk
65	Global ...	The city has closed all agricultural markets in medium and	high-	risk areas, as well as closed and controlled management
66	Global ...	general duty and fever clinic, and ensure that people in	high-	risk areas, isolation sites, home quarantine and health monitoring
67	Global ...	masks after entering the venue, but students from medium- or	high-	risk areas, or those taking the exam in isolation
68	Global ...	undergo any quarantine upon arrival as they were not from	high-	risk regions and arrived before the tightened policy. The

Figure 20 Part of Index Lines of "High-Risk"

The word "local" is mainly used to express the local health authorities, government, and people (see Figure 21). For example, Guangzhou has tightened anti-epidemic measures in parts of the city to curb the recent COVID-19 resurgence, local authorities said Tuesday. It reflects that the news focuses on the interviews with local authorities and people and cares much about the ideas from local people, so as to get more comprehensive and reliable news content. Specifically analyzing the local people's evaluative discourse, it is found that the people of Guangzhou express their trust and support for the Guangzhou government's ability to manage and cope with the epidemic, and still feel a sense of well-being under the influence of the epidemic.

	File	Left Context	Hit	Right Context
1	Global ...	of 98 percent, according to flight information provider Flight Master. The	local	health authorities also announced that eight districts in Guangzhou
2	Global ...	WeChat account of Guangzhou Good World Plaza on Saturday, and	local	health authorities asked those who had visited the Starbucks
3	Global ...	all office workers in the building were asked by the	local	health authorities to take a free nucleic acid test
4	Global ...	code owner reports symptoms through the code system, communities and	local	health authorities will receive the information and carry out
5	Global ...	the virus to a three-year-old boy in Jieyang,	local	health authority previously said. So far, some 197 close contacts
6	Global ...	fresh COVID-19 infection in Guangzhou was both fast and strong,	local	health authority said. Guangzhou's fresh COVID-19 infections have
7	Global ...	a baby boy, the video exposed. A staffer from a	local	health commission said the commission will crack down on
8	Global ...	clear, and the risk of community transmission was high, the	local	health commission said at Thursday's press conference. Also,
9	Global ...	Wang, Guangzhou has finished 67,399 beds so far. According to the	local	health commission, Guangzhou reported 8,761 COVID-19 cases on Wednesday a
10	Global ...	rapid transfer of patients and close contacts. According to the	local	health commission, there are 6,006 cases in hospitals as of
11	Global ...	didn't make her the original source of infection, as	local	health officials had said she may have become infected
12	Global ...	Guangzhou were highly homologous, all from variants detected in India,	local	health officials had said earlier. Mutant strains of COVID-19
13	Global ...	tests in any fever clinics of medical institutes, according to	local	health authorities. Global Times <Turning point for Guangzhou with
14	Global ...	for a predicted epidemic peak in early January in 2023, a	local	health official said on Monday. Since December, the number

Figure 21 Part of Index Lines of "Local"

Example 19: Although the latest outbreak in Guangzhou slowed down the pace of the metropolis, most local residents still felt the city's strong management abilities and humane care (from *Global Times*, November 10, 2022).

This shows that the Guangzhou government cares for and loves its people, and it is good at management, and the people of Guangzhou live happily.

Words that go with "international" include: airport, health station, bus station, medical protective supplies fair, passenger, etc.

Example 20: The top epidemiologist revealed that the international health station that Guangzhou plans to build will cover an area of 250,000 square meters with 5,000 independent rooms in accordance with strict quarantine standards to prevent cross infection, Zhong said (from *Global Times*, June 26, 2021).

Guangzhou, as an important city in China's economic opening to the outside world, gathers foreign friends from all over the world and has a large population, thus making it more difficult to prevent and control the epidemic. However, Guangzhou has been able to build international medical stations and quarantine zones to strictly control the spread of

the epidemic, and at the same time provide adequate medical protection for foreigners to ensure that they can receive basic livelihood services in the city. Overall, the image of Guangzhou constructed by *Global Times* is that of a positive, people-centered metropolis.

5.3 Socio-Cultural Factors in Shaping City Image

To sum up, *Global Times* has shaped Guangzhou's city image into three main features: first, a positive and pragmatic, diligent and tenacious image, which is mainly reflected in the pursuit of high-quality development and the tenacious resistance to the epidemic; second, a people-centered image with a strong sense of serving people, which is mainly found in the strict protection of people's living needs; and, third, a city image of an international open and friendly metropolis, which is reflected in the fact that Guangzhou accommodated many foreigner and provided help to them in the epidemic. The construction of these three characteristics is mainly related to the idea of China's development, the purpose of *Global Times* and Guangzhou's urban culture.

First of all, China's people-centered development thought greatly affects the shaping of Guangzhou's city image. President Xi Jinping emphasized that the broadest and deepest foundation of comprehensively advancing the rule of law is the people, and that it must be adhered to for the sake of the people and rely on the people. When in face of the difficulties of the epidemic, Guangzhou resisted the pressure, was calm and steady, and cooperated fully from the top to the bottom. We can see from the prevention and control of the epidemic that Guangzhou attaches great importance to the protection of people's livelihood, demonstrating its resilience and the glory of its good and gentle human nature; at the same time, the people of Guangzhou also demonstrated that they were united as one, trusted the government and fully supported and cooperated with the government's work. With the joint efforts of the government and the people, the epidemic in Guangzhou can be controlled in a more stable manner, and on this basis, the people's livelihood and economic construction can be strengthened, demonstrating the image of Guangzhou as a people-centered city.

Secondly, as the only newspaper that conveys comprehensive news to foreign countries in line with China's basic national conditions, *Global Times* adheres to the tradition of reporting which are objectiveness, sensitiveness, and without avoidance of sensitive issues, to show the world the rich, complex and changing China, as well as to report the world from the perspective of the Chinese people, and to convey the stance and views of the Chinese people on major international issues. Therefore, *Global Times* objectively describes the real situation of Guangzhou's urban development during the Covid-19 pandemic, including the situation of new cases, problems in economic development, etc., and does not shy about showing the obstacles that the epidemic has brought to the development of Guangzhou and the difficulties arising from the epidemic; at the same time, it also shows the efforts that Guangzhou has made for the development of Guangzhou under the epidemic, including: infrastructure construction, taking measures to accurately prevent and control the epidemic, etc. Therefore, the reports with the theme of the epidemic are not only the affairs reports on that background of the society, but also the recognition and support to the efforts made by Guangzhou as a city to resist the epidemic, and show the image of Guangzhou as a city that actively resists the epidemic and is pragmatic energetic and motivated.

Finally, Guangzhou itself is characterized by a spirit of tolerance, openness, flexibility and pragmatism. As a pioneer in China's reform and opening up, Guangzhou has been one of the most important ports for China's opening up to the outside world since ancient times, attracting business, culture and talents from all over the world. At the same time, Guangzhou upholds the belief of openness and friendliness to foreign travelers and businessmen, promoting cultural exchanges and economic development between China and abroad. In addition, the people in Guangzhou, who live in the water town, are both gentle and resilient in the face of difficulties. Therefore, in the face of the epidemic, the people in Guangzhou demonstrated a positive and optimistic mindset, at the same time cooperating strongly with the work of the government to combat the damage of the epidemic. In addition, Guangzhou is home to young people from all over the country, who work hard and spend their years in Guangzhou with passion and determination, making the city vibrant and full of vitality.

5.4 Strategies for Constructing Guangzhou's City Image

According to the above research, the following summarizes the strategies of Guangzhou's city image in news report: firstly, we should be good at using positive words to praise the progress and development of the city, and people's labor and sweat; secondly, we should narrate the news from multiple perspectives, and interview local people, such as experts, government staff, working people, etc., so as to ensure the comprehensiveness and truthfulness of the report, and to shape a more three-dimensional and rich Guangzhou; finally, we should not only focus on showing the city's image in diverse fields, such as transportation construction, cultural exchanges, and economic construction, but also seize the city's characteristics, highlight the city's advantages, and show the world the city's unique charms, such as the open and friendly characteristics of the coastal city of Guangzhou, which is shown in *Global Times*.

6 CONCLUSION

6.1 Characteristics of Guangzhou's City Image Construction

This paper adopts a corpus method to analyze *Global Times*' news reports about Guangzhou during the Covid-19 pandemic from the perspective of keywords and high-frequency words, summarizing the focuses and linguistic features

of the reports, and analyzing Guangzhou's city image on this basis. It is found that *Global Times*' news reports on Guangzhou are characterized by three main aspects. First, *Global Times*' news coverage of Guangzhou focused on three major themes: current events around Guangzhou, the Covid-19 pandemic and transportation; second, it focuses on conveying the views and attitudes of the people involved in the event, especially the authorities such as the government or experts; third, it chooses positive and affirmative vocabulary to describe the city of Guangzhou, reflecting the affirmation and praise for the city of Guangzhou. The portrayed image of Guangzhou as a city includes features such as positive and pragmatic, tenacious and hardworking, people-centered, open and friendly.

6.2 Limitations and Future Directions of the Research

It is necessary to point out that this paper only analyzes the characteristics of news discourse for keywords and high-frequency words. However, the analysis of news discourse can also be studied in terms of syntax, part of speech and semantics.

COMPETING INTERESTS

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TEACHING REFORM IN ENGINEERING MANAGEMENT PROGRAMS AT APPLIED LOCAL UNDERGRADUATE INSTITUTIONS

HaiChen Zhao[1], Liang He[1], DonYang Geng[1,2*], XiuFeng Liang[1], FanYu Shi[1], Gen Li[1], BeiNing Yang[1], ZiYa Yu[1], JianMing Guo[3]
[1]Hebei GEO University, Shijiazhuang 050000, Hebei, China.
[2]Hebei Province Underground Artificial Environment Smart Development and Management Technology Innovation Center, Hebei GEO University, Shijiazhuang 050000, Hebei, China.
[3]Hebei Jike Project Management Co., Ltd., Shijiazhuang 050000, Hebei, China.
Corresponding Author: DongYang Geng, Email: gengdongyang@hgu.edu.cn

Abstract: This study examines the engineering management program at applied local undergraduate institutions. Addressing current challenges such as outdated curricula, monotonous teaching methods, insufficient practical experience among faculty, and constrained practical teaching facilities, it proposes a teaching reform scheme centered on the Outcomes-Based Education (OBE) philosophy. The research systematically explores pathways for cultivating applied talents in engineering management through course objective design, teaching content optimization, deepening university-industry collaboration, implementing the "1+X" certificate system, and establishing a dual-mentor system. By strengthening the integration of theory and practice, constructing a diversified assessment system, and improving university-industry coordination mechanisms, the approach aims to enhance students' practical engineering abilities and innovative awareness, promote continuous improvement in teaching quality, and provide a feasible reference for cultivating high-caliber applied talents in engineering management programs at local undergraduate institutions.
Keywords: Applied undergraduate education; Engineering management; Teaching reform; Industry-education integration; Project-based teaching

1 INTRODUCTION

The cultivation of applied undergraduate talent responds to the demands of economic and social transformation and upgrading, while also representing an inevitable necessity for higher education institutions to define their institutional positioning and pursue rational development. Strengthening the organic integration of theory, practice, and innovation to enhance students' comprehensive qualities facilitates the achievement of cultivating multi-skilled professionals. Engineering management is an emerging interdisciplinary field integrating engineering technology with management science. It has evolved from disciplines including management engineering, international construction engineering and management, international engineering, real estate management, and related specializations. Currently, the program operates under the principle of "engineering as the vehicle, management as the direction, integrating engineering and management with industry-academia collaboration," providing robust support for China's engineering construction sector.

China's construction industry is rapidly expanding, leading to a more regulated building market that is on a healthy development trajectory. The "Two New and One Heavy" construction policy, alongside urban renewal, metropolitan area development, urban clusters, urban belts, and central city initiatives, heralds broader market prospects for the sector. Annual engineering investments amounting to trillions demand substantial engineering management talent, positioning the discipline for greater prominence. Engineering management is a discipline characterized by strong applied and practical dimensions, primarily aiming to cultivate students' ability to apply theoretical knowledge, execute practical operations, and demonstrate innovation. Achieving this educational objective necessitates a focus on practical teaching processes. However, current practical teaching in engineering management programs suffers from issues such as a lack of practical teaching bases, poor teaching effectiveness, and inadequate practical teaching skills among faculty. Within this educational environment, students' practical application and innovative capabilities remain underdeveloped, failing to meet corporate talent standards. This results in persistently low employment rates and hinders students' future career prospects. Consequently, effective teaching reforms are imperative for engineering management programs. These reforms should intensify practical teaching efforts and elevate their quality, thereby equipping students to meet corporate demands and boosting graduate employability. The following sections explore specific teaching reform measures for engineering management programs.

2 ANALYSIS OF CURRENT TEACHING PRACTICES

2.1 Outdated Talent Development Programs

As the core blueprint and overarching plan guiding talent cultivation within higher education institutions, the importance of the talent development program is self-evident. An exceptional program design functions like a precise navigation system, requiring foresight, adaptability, and innovation. Specifically, it must adeptly identify and address the urgent talent demands of national development strategies and regional economies. Simultaneously, it must align closely with industrial frontiers, incorporating advanced technologies, emerging knowledge systems, and future-oriented skills into teaching plans. This ensures students acquire not outdated knowledge, but tools for future competitiveness.

Yet within current educational practice, a significant **lagging phenomenon** plagues certain institutions. These universities tend to perpetuate and cling to traditional, even antiquated, training models and curricula. This path dependency creates a severe disconnect between their talent development programs and the rapid external changes. While the external world iterates at breakneck speed in technology, industry, and business models, these training programs appear frozen in time—characterized by sluggish content updates, rigid knowledge structures, and conservative competency targets.

The direct consequences of this lag are severe: universities are unable to adequately cultivate the innovative and entrepreneurial talent urgently required to align with national development priorities and meet the demands of market transformation and upgrading. In our era, the demand for talent has shifted from "knowledge-based" to "capability-based" and "interdisciplinary." The market craves high-caliber individuals possessing the capacity for resolving complex problems, critical thinking, interdisciplinary knowledge integration, and a strong entrepreneurial spirit. Yet clinging to traditional approaches often means teaching content remains stuck in the simple repetition of foundational theories, practical components lack authentic business scenarios, and coverage of emerging fields like artificial intelligence, big data, and green technology is inadequate—let alone effectively stimulating students' innovative potential and entrepreneurial drive.

2.2 Monotonous Teaching Methods

The teaching process for engineering project management courses is largely dependent on how the instructor delivers the material. It relies on a combination of classroom lectures and post-class exercises to impart knowledge, employing a monotonous teaching approach that relies entirely on the instructor's personal knowledge base and teaching experience. This approach lacks sufficient appeal and struggles to motivate students, with distractions and inattentiveness frequently occurring during lectures. Moreover, the inherently abstract nature of the theoretical knowledge makes comprehension particularly challenging for students without practical engineering exposure. This readily fosters aversion to the subject, undermining teaching effectiveness and objectives. Crucially, theoretical concepts such as safety management, quality management, quality control, cost control, and schedule control require in-depth application through real-world engineering case studies. Without this practical grounding, instruction remains theoretical and detached, severely hindering students' theoretical learning. Moreover, constrained by limited teaching hours, practical sessions are both scarce and unsystematic, primarily relying on project simulation exercises. This approach bears little resemblance to real-world engineering practice, resulting in students merely memorizing textual content without applying acquired knowledge to practical scenarios. Consequently, they fail to achieve genuine application of learning, with knowledge fading over time and hindering the development of practical skills.

2.3 Low Student Engagement

The reliance on purely theoretical instruction leaves students lacking spatial imagination and with a vague grasp of fundamental concepts. Conducting stress analysis on structural members, deriving formulas, and applying engineering principles proves exceptionally challenging. Consequently, student engagement remains low, and teaching outcomes are suboptimal. As a structural design course, our current teaching primarily relies on manual calculations, whereas industry predominantly uses software. Manual calculations involve complex, lengthy formulas, diverse symbols and coefficients, and variable code requirements for construction details. Students widely perceive this course as challenging, fostering a tendency to develop aversion to the subject.

2.4 Some teaching staff are unaware of the content they are teaching.

The teaching content for engineering management programs is broadly divided into two main areas: firstly, theoretical knowledge and practical skills centered on civil engineering technology; secondly, management and economic theories, methodologies, and legal knowledge relevant to civil engineering. The majority of teaching staff in the department have backgrounds in civil engineering technology, either through their academic specialization or professional experience. Only a minority graduated from engineering management-related programs or have extensive experience in the field. This is particularly true for younger lecturers, many of whom transitioned directly from graduation into teaching roles without substantial professional experience. Consequently, they often find themselves ill-equipped to guide students through practical teaching activities, inevitably leading to suboptimal teaching outcomes.

2.5 Practical teaching at construction sites presents certain difficulties.

Within engineering management programs, practical training at construction sites is crucial for developing students' engineering awareness and management capabilities. However, its implementation frequently encounters significant obstacles. Firstly, the complex environment of construction sites presents inherent safety risks. Universities, prioritizing safety and management considerations, impose stringent approval procedures and frequency restrictions on student site access, thereby limiting practical opportunities. Secondly, engineering projects exhibit cyclical and phased characteristics, with teaching content varying significantly across different construction stages. This makes it challenging for universities to cover the entire engineering management process within the limited time available. Furthermore, construction companies, under pressure from production tasks and deadlines, often struggle to allocate sufficient time and resources for teaching activities, highlighting the inadequacy of current university-industry collaboration mechanisms.

The challenges identified—outdated curricula, monotonous pedagogy, and a lack of practical exposure—demand a comprehensive overhaul of the engineering management educational ecosystem, centered on the foundational principles of Outcomes-Based Education (OBE). Successfully transitioning to an applied talent model necessitates moving beyond superficial modifications to core curriculum and truly embedding the desired graduate competencies into every phase of program design and delivery.

3 KEY COMPONENTS AND IMPLEMENTATION PATHWAYS OF TEACHING REFORM

3.1 Adopting the "1+X" System to Deepen Industry-Academia Collaboration

In today's era of digital and intelligent development, higher vocational colleges place particular emphasis on industry-academia collaboration, establishing corresponding regulations to safeguard such partnerships, yet the outcomes remain limited. Many enterprises, preoccupied with production tasks, reduce collaboration to superficial arrangements—merely taking students on internships to perform basic duties[1]. For construction project management students, deepened industry-academia partnerships offer precisely the opportunity to develop practical talent cultivation programs and provide professional practice platforms. The pilot implementation of the "1+X" certificate system represents a "cross-boundary" collaboration between schools and enterprises in dual-track, collaborative education. By establishing standardized industry-academia collaboration platforms and implementing robust cooperation and evaluation mechanisms, institutions ensure efficient, orderly partnerships that enhance the quality of talent development. Engaging experienced technical personnel from industry as teaching staff allows enterprise mentors to share real-world project challenges and solutions in the classroom—narratives that students often find particularly engaging. Furthermore, the "1+X" certificate system, through deepening industry-academia collaboration, creates broader development opportunities and platforms for students, offering diverse internship and employment prospects. Under this framework, students continuously hone their professional competence and technical skills within authentic workplace settings. This approach ensures a steady supply of high-caliber applied professionals to the construction sector, powerfully advancing the industry's sustainable development through skilled talent.

3.2 Optimizing Teaching Content

The curriculum for higher vocational construction engineering management programs predominantly relies on theoretical instruction, featuring relatively monotonous teaching methods and content. Consequently, adjusting and optimizing teaching approaches and content has become a critical research focus. The 1+X certificate system introduces professional skills certification assessments, aligning course content more closely with industry demands. Simultaneously, it enhances practical teaching components to improve students' operational capabilities and professional competence. In practical teaching, course content is systematically organized into modularized teaching units. Instruction is structured around each module, with video and textual materials for sub-modules collated and uploaded to Learning Pass. Relevant tasks are assigned to facilitate online learning, enabling analysis of student progress and outcomes for subsequent curriculum refinement. Leveraging Learning Pass's digital tools, a teaching case repository for 1+X certificate skill level assessments is established . This system requires students to obtain both academic qualifications and corresponding professional skill level certificates, ensuring they possess both a solid theoretical foundation and practical operational capabilities. Furthermore, the 1+X certificate system drives the updating and optimization of course content, aligning teaching materials more closely with industry demands. It also fosters innovation in teaching methodologies, such as introducing project-based learning and case-based teaching, to cultivate students' practical abilities and innovative thinking.

3.3 Establishing a Systematic and Scientific Assessment Approach

Surveys of undergraduate engineering management students reveal divergent developmental priorities: some emphasize theoretical knowledge, while others excel in practical application. Existing assessment methods, centered on end-of-term examinations, inevitably fail to reflect students' comprehensive competencies. Aligned with our college's applied talent cultivation model and the characteristics of engineering project management courses, we have adopted a blended assessment approach combining closed-book examinations, practical training assessments, and continuous performance evaluation. This approach appropriately increases the weighting of practical training while reducing the emphasis on

continuous assessment and closed-book examinations, thereby establishing a systematic and scientific assessment framework. The composition of each component's weighting is as follows:

3.4 Designing Course Learning Objectives and Assessment Methods Guided by "OBE"

Guided by the principles of Outcome-Based Education (OBE)[2], the design of course learning objectives and assessment methods should be closely aligned with the knowledge, competencies, and qualities students should possess upon graduation[3]. The OBE philosophy emphasizes a "student learning outcomes-centered" approach, meaning that the starting point and ultimate goal of the teaching process should be "what students can do and to what extent they can do it." Therefore, in the teaching reform of the Engineering Management program, course objectives should be designed in reverse from industry demands, ensuring that each course contributes to achieving the program's overall educational goals. Firstly, in setting course teaching objectives, specific achievement indicators for students in terms of knowledge, skills, and comprehensive qualities should be clearly defined. For instance, through core courses such as "Engineering Project Management," "Engineering Cost Control," and "Construction Organization Design," students should master the principles of full-process project management and acquire professional competencies in construction planning, schedule control, and quality and safety management[4]. Concurrently, emphasis should be placed on cultivating students' professional ethics, communication and collaboration skills, and information management capabilities to equip them for the demands of digital transformation in the construction industry. Secondly, teaching implementation should adopt an outcomes-driven approach through a "backward design" methodology. This entails determining teaching content and activities based on graduation requirements and course objectives, achieving "learning for application" through project-based, case-based, and contextualized teaching. Thirdly, assessment methods should embody the principles of "whole-process evaluation" and "multi-dimensional assessment." Traditional written examinations, or closed-book tests, often assess only rote knowledge, failing to comprehensively evaluate students' integrated application abilities[5]. In line with OBE principles, assessments should span the entire cycle of "learning process – practical performance – outcome delivery," incorporating diverse evaluation methods such as classroom participation, project assignments, interim reports, teamwork, and final project deliverables. Assessment criteria must correspond directly to course objectives to ensure consistency between teaching, learning, and assessment. Finally, to guarantee the achievement of teaching objectives, course resources and teaching conditions must be optimized and re-engineered[6]. Textbooks, practical components, and laboratory resources should be systematically integrated to advance the development of high-quality courses and teaching materials, establishing a multi-tiered practical teaching system. Concurrently, continuous teaching quality monitoring and feedback mechanisms should facilitate dynamic refinement of teaching content, methodologies, and assessment frameworks, forming a continuously optimized teaching feedback loop. Through these measures, the Engineering Management program can genuinely implement the OBE philosophy, constructing a course teaching and assessment system centered on learning outcomes and competency development, thereby providing robust support for cultivating applied professionals.

3.5 Developing Digitalized and Experiential Learning Resources

To combat monotonous teaching methods and low student engagement, institutions must invest heavily in developing sophisticated, digitalized teaching resources[7]. The theoretical concepts of engineering management—like complex scheduling or stress analysis—are best grasped through visual and interactive media. This includes the creation and utilization of Virtual Reality (VR) and Augmented Reality (AR) simulations that allow students to navigate a simulated construction site, identify safety hazards, or visualize the clash detection process in BIM models, all from the classroom. A centralized digital case library is paramount. This repository should be populated with real-world project documentation (contracts, schedules, risk registers) donated by industry partners, allowing students to analyze authentic, complex engineering problems. Furthermore, leveraging Learning Management Systems (LMS) for continuous, adaptive assessment and personalized feedback is vital. Digital tools enable self-paced learning for foundational knowledge, freeing up limited classroom time for critical-thinking exercises, complex problem-solving, and collaborative project work guided by the dual-mentor system. This blend of digital resource utilization and experiential learning directly addresses the practical skill deficit among faculty and students alike, ensuring the learning process is dynamic, relevant, and outcome-focused. The objective is to transform the classroom from a passive lecture hall into an active, high-fidelity engineering office environment.

3.6 Implementation of a Dual-Supervisor System

Engineering management is a multidisciplinary field, producing graduates equipped with both technical and managerial competencies—comprehensive professionals capable of spanning production, construction, service delivery, and management processes[8]. As educators play a pivotal role in developing these integrated skills, any deficiency in either theoretical knowledge or practical operational abilities hinders the achievement of this objective. In practice, teaching staff often possess strong theoretical expertise but lack practical operational skills[9]. Consequently, institutions must proactively address this imbalance. Recognizing that practitioners in the field possess strong practical abilities but often lack theoretical grounding, universities may adopt a dual-mentor system. Under this approach, academic faculty members responsible for theoretical instruction would be paired with industry technicians as co-mentors. Academic staff would deliver foundational theoretical knowledge, while industry practitioners would lead practical teaching

sessions[10]. This collaborative model enables both mentors to leverage their respective strengths, thereby achieving the educational objectives of the Engineering Management program.

Firstly, selection measures should be implemented. Theoretical instructors may continue to be drawn from within the academic faculty, while practical teaching staff should be recruited through engagement with supervision firms, construction enterprises, and similar entities. This involves appointing engineers or project managers possessing extensive frontline experience to deliver practical instruction. Secondly, scheduling arrangements must be made. On-campus theoretical instructors should cultivate students' mastery of professional theoretical knowledge upon enrollment, emphasizing the effective development of comprehension skills. They should also communicate the discipline's characteristics and developmental trajectory to students, fostering sound learning methodologies. Practicum instructors may be engaged during the second year of study, when students possess foundational theoretical knowledge and are ready to deepen their understanding of practical operations. Each student may undertake weekend or holiday placements at the practicum instructors' actual work sites, with this process continuing until graduation.

4 CONCLUSION

Through systematic research and practical exploration into teaching reforms for engineering management programs at applied local undergraduate institutions, the following conclusions and insights emerge. Presently, China's local undergraduate institutions face numerous challenges in cultivating applied engineering management talent, including outdated curricula, monotonous teaching methods, insufficient practical experience among faculty, and constrained practical teaching conditions. These issues directly impede the integration of theoretical knowledge with engineering practice, resulting in diminished competitiveness in the job market. This paper proposes systematic reform strategies and implementation pathways centered on curriculum restructuring, pedagogical innovation, deepened industry-academia collaboration, and the introduction of Outcome-Based Education (OBE) principles, offering viable solutions for innovating talent cultivation models in engineering management programs. Looking ahead, as educational digitalization converges with intelligent construction technologies, engineering management programs should further explore novel pedagogical approaches such as virtual simulation teaching and intelligent assessment systems. Concurrently, higher education institutions should proactively integrate into regional economic development strategies, strengthen collaborations with industry associations and corporate groups, and foster a collaborative education mechanism involving government, academia, industry, and research. This approach will drive continuous enhancement in the teaching quality of engineering management programs.

COMPETING INTERESTS

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AI INTELLIGENT EVALUATION MODEL OF ART DESIGN EDUCATION: TEACHING DIAGNOSIS METHOD BASED ON MULTI-MODAL DATA

Cheng Huang
Shanghai Art & Design Academy, Shanghai 201899, China.
Corresponding Email: huangcheng1624@sada.edu.cn

Abstract: The evaluation of art design education has long faced the challenges of difficult quantification of teaching process, strong subjectivity of evaluation of creative achievements, and difficulty in taking into account the characteristics of disciplines. Based on this, this study constructs a set of AI intelligent evaluation model based on multimodal data: by integrating the three core modules of teaching process diagnosis, learning achievement evaluation and discipline characteristics adaptation, a complete evaluation system from data collection to diagnostic feedback has been established. Based on the formative evaluation theory and multiple intelligence theory, this model systematically collects the behavior data, work data and process data of teachers and students in the digital teaching environment, and then uses algorithms like decision tree analysis, LSTM time series analysis, CLIP semantic matching to realize the accurate diagnosis of the teaching process and the multi-dimensional evaluation of the learning results. In Shanghai Gongmei teaching, the model improves the accuracy of teaching process diagnosis by 30 %, the objectivity of achievement evaluation by 35 %, and the accuracy of student growth tracking by 92 %, which proves that it can effectively promote the transformation of art design education evaluation from empirical judgment to evidence-driven paradigm.
Keywords: Art design education; AI intelligent evaluation; Multimodal data; Teaching diagnosis; Education artificial intelligence

1 INTRODUCTION

The uniqueness of art and design education requires it to lay a complex evaluation system. Traditional evaluation methods rely primarily on subjective experience and expert intuition, and it is difficult to systematically evaluate the dynamics of the learning process and the internal development of students ' thinking[1]. This evaluation method has three major drawbacks : first, the ambiguity of the evaluation criteria hinders quantitative evaluation ; the second is that the evaluation process is static and cannot reflect the dynamics of teaching and learning ; third, there is a delay in the evaluation results, and it is difficult to quickly feedback to improve learning. Data-driven educational evaluation methods, coupled with the wide application of digital technology in art education, provide new opportunities to overcome this problem. Based on the research progress of artificial intelligence in the field of art and design education in Shanghai University of Arts and Crafts in the past three years, this study proposes an intelligent evaluation model of art and design education. The model not only focuses on learning outcomes, but also on the quality of the learning process and the development trajectory of students[2], which provides theoretical foundation and technical support for improving the quality of art and design education.

2 THEORETICAL FOUNDATION AND FRAMEWORK OF THE MODEL

The theoretical basis of the model is based on formative assessment theory, multiple intelligence theory and situational learning theory. The formative assessment theory focuses on the evaluation should serve the improvement of the learning process ; the sensory evaluation of multiple intelligence theory should be guided by the diversity of students ' development[3]. Situational learning theory feels that assessment should be closely integrated with the specific subject background. These principles together constitute the guiding principles of the model design to ensure the scientific effectiveness of the assessment and to meet the specific needs of art and design education.
From the perspective of architecture, the model adopts a hierarchical structure composed of three primary components : data collection layer, algorithm analysis layer and application service layer. It also applies various intelligent algorithms to implement pattern recognition. The application service layer transforms the analysis results into specific evaluation services to assist teachers in implementing teaching decisions and improving students ' academic performance. The three core modules (learning diagnosis module, performance evaluation module, and discipline improvement module) interact through integrated data interfaces, algorithms, and protocols to form a complete closed-loop education evaluation system[4].

3 THE COORDINATION MECHANISM AND CASE VERIFICATION OF THE MODEL

The intelligent system constructed according to the model implements the paradigm shift of art design teaching and evaluation through multi-modal data fusion and algorithm coordination. In order to verify the practical effect of the model, this study takes the college 's ' Chinese painting line drawing copying workshop based on artificial intelligence ' as a case, and systematically demonstrates the synergy mechanism of various engines. In this workshop, we apply a recognition card system based on artificial intelligence as a concrete manifestation of the model 's ability, and comprehensively demonstrate the synergy effect of each intelligent engine in the five-stage learning process.

In the cultural exploration stage of the workshop, Neo4 j knowledge graph engine and BERT semantic analysis engine jointly construct the visual pedigree of artistic style, and carry out in-depth analysis of students ' literature notes. In the stage of technique copying, the generative artificial intelligence tool generates a copy reference map consistent with the traditional handwriting style according to the semantic style vector of BERT analysis, and the handwriting analysis engine dynamically evaluates the students ' practice progress. In the creative self-assessment phase, the RoBERTa proofreading system verifies the cultural relevance of creative guidance to ensure the historical accuracy of artistic expression ; in the learning review stage, the LSTM time series analysis system implements pattern recognition and development prediction in the student learning process ; finally, in the stage of knowledge accumulation, the systems work together to transform excellent practical cases into new nodes in the system knowledge graph to ensure the continuous accumulation of teaching experience[5].

4 THE IMPLEMENTATION MECHANISM OF LEARNING DIAGNOSIS MODULE

The learning diagnosis module is composed of two subsystems : the teaching decision support system and the learning state diagnosis system, which ensures the accurate monitoring and optimization of the learning process. The teaching decision support system is constructed according to the decision tree algorithm. Its core innovation is to transform the teaching decision based on individual experience into a scientific decision based on evidence. The system records the behavior patterns of teachers in the digital learning environment, such as the mode of resource utilization, the timing of teaching intervention and the strategy of student guidance. Combined with the real-time learning status data of students, the model constructs the correlation model between teaching strategies and learning outcomes[6].

At the technical implementation level, this study uses scikit-learn as the primary tool for developing decision tree models. This tool provides a visual interface to support the training and improvement of decision trees. The following code example demonstrates a simple decision tree (implemented in Python to simulate classification tasks) :

python

```
from sklearn.tree import DecisionTreeClassifier
from sklearn.datasets import make_classification
X, y = make_classification(n_samples=100, random_state=42)
clf = DecisionTreeClassifier(max_depth=3)
clf.fit(X, y)
print(clf.tree_.max_depth)    # output: 3
```

The code generates simulated data and trains the decision tree, limiting its depth to three elements to prevent overfitting. In practical applications, when the system detects that more than 35 % of students stay in the creative conception stage, it will automatically advocate teachers to adopt the combination strategy of ' case inspiration + brainstorming '. The pilot data show that the strategy combination makes the students ' creative breakthrough rate reach 78 %, which significantly exceeds the effect of single teaching strategy. The empirical data show that the accuracy of teaching decision-making is significantly improved after the teachers participating in the pilot project apply the decision support system.

The learning state diagnosis system constructed according to the LSTM neural network can analyze the auspicious behavior characteristics of students in the digital education environment, so as to conduct in-depth diagnosis of the learning state. The system applies the TensorFlow deep learning framework to construct an LSTM network specially used to process student behavior data with timestamp, which can accurately identify typical learning states such as ' deep creativity ', ' exploratory learning ' and ' cognitive stagnation '. LSTM model code example :

python

```
import tensorflow as tf
from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import LSTM, Dense
model = Sequential()
model.add(LSTM(50, input_shape=(10, 1)))
model.add(Dense(1))
model.compile(optimizer='adam', loss='mse')
model.summary()    # Output model structure summary，The total parameters are about 10,451
```

This code creates a simple LSTM sequence model for predicting time series data. In an empirical study of a school, the system has achieved high accuracy in identifying student achievement levels, providing teachers with strong support for monitoring and early warning of student achievement status.

5 MULTIDIMENSIONAL EVALUATION SYSTEM OF PERFORMANCE EVALUATION MODULE

Aiming at the high subjectivity and ambiguity of the evaluation criteria of art design works, the performance evaluation module constructs a multi-dimensional evaluation system covering technical implementation, cultural expression and innovative value, and implements a comprehensive and objective evaluation of art works through a collaborative mechanism. In terms of technical consistency evaluation, the system applies OpenCV computer vision library and Blender Python API to automatically check the technical performance of the work, covering the basic parameters such as the improvement level of the model surface, the rationality of the material distribution, and the realism of the light and shadow rendering. The error rate of technical detection is less than 2 %. OpenCV version verification code is :

```
python
import cv2
print(cv2.__version__)  # output: 4.11.0（Example version）
```

This code is used for image processing, such as edge detection, to evaluate the technical level of the work. In terms of cultural connotation evaluation, the cross-modal CLIP model quantitatively evaluates the cultural consistency of the work by calculating the similarity between the image of the work and the description of the cultural theme text in the feature space. The empirical data show that the accuracy of the system in the identification of traditional cultural elements is more than 90 %. In the evaluation of Dunhuang style works, the score of cultural consistency is also more than 90 %.

In terms of innovation evaluation, the system creates quantitative innovation indicators based on Generative Adversarial Networks (GAN), and objectively evaluates the uniqueness and creativity of works by calculating the distance between new works and existing works in the feature space of professional databases. In the empirical research in the field of teaching, the evaluation system significantly improves the objectivity and reliability of the evaluation of works. According to the development tracking system of natural language processing, a comprehensive development evaluation system is constructed by analyzing the text data such as students ' learning reflection and project summary, and the development track of students ' core skills is clearly presented.

6 DYNAMIC ADJUSTMENT MECHANISM OF DISCIPLINE ADAPTATION MODULE

The subject adaptation module covers all disciplines of art and design disciplines, lays a dynamic weight adjustment mechanism, and ensures that the evaluation criteria are accurately matched with the subject characteristics. The module adopts the theory and data-driven design concept, and generates the benchmark weight matrix of each discipline according to the expert evaluation and the analytic hierarchy process (AHP). Combined with the correlation analysis of the actual teaching effect, the weight is dynamically improved.

After three years of practical teaching, the system found that Projects with higher scores in the ' sustainability ' dimension of industrial design have higher market recognition and industry appeal. According to this, the system automatically increases the weight of this dimension from the original 25 % to 30 %. This weight improvement mechanism based on empirical evidence ensures that the evaluation criteria reflect the development and change of the industry and social needs. The data show that the dynamic weight adjustment significantly improves the correlation between the evaluation score and the actual result.

Interdisciplinary practice shows that the system can well adapt to various disciplines. For the digital media art major, the system sets the weight of balanced technology integration, artistic expression and cultural exchange. For fashion design majors, the system dynamically adjusts the weight between technology application and creative expression according to the difference of design positioning[7]. The research shows that the system ensures a high degree of consistency in the evaluation of interdisciplinary assignments, which not only retains the uniqueness of each discipline, but also ensures the internal consistency of the evaluation criteria.

7 APPLICATION RESULTS AND EMPIRICAL ANALYSIS

Thanks to this progressive teaching practice, the model has shown significant effectiveness in the actual teaching environment; in terms of teaching process diagnosis, the effectiveness of the teaching process has been significantly improved, and teachers ' satisfaction with the system has also reached a high level ; in terms of performance evaluation, the objectivity of evaluation has been significantly improved, which helps to build a more comprehensive and scientific evaluation system. The comprehensive evaluation shows that the overall application of the model significantly improves the accuracy of evaluating teaching excellence and tracking students ' learning progress. In practice, the model promotes the construction of students ' self-assessment ' closed-loop ' mechanism and significantly improves the depth of evaluation results[8]. These data fully prove the validity and reliability of the model in practical applications. Students ' feedback shows that this multi-dimensional assessment method more accurately reflects the true level of students and provides a clear direction for further improvement.

8 CONCLUSIONS AND PROSPECTS

The intelligent evaluation model constructed in this study adopts the systematic theoretical framework and innovative technical means to effectively solve many challenges of education evaluation in the field of art design. This model is the result of the application of artificial intelligence in the field of art design teaching in Shanghai Institute of Arts and Crafts for three years. Its innovation lies in three aspects : the construction of a comprehensive evaluation system based on multi-modal data, the construction of multi-dimensional evaluation criteria and the development of weight dynamic

adaptation mechanism.

The practical value of this model has been fully verified by teaching practice, which not only improves the accuracy and objectivity of evaluation, but also constructs a continuously improved education evaluation ecosystem, which can be felt. With the accumulation of application data, the model will continue to improve and develop, and the evaluation criteria will be more accurate. In the end, the development will become an intelligent mechanism to continuously improve the quality of art design education.

In the future, we will carry out research in three aspects: first, further improve the multi-modal data fusion algorithm to improve the accuracy and real-time performance of the model ; the second is to expand the applicability of the model and enhance its adaptability in the context of interdisciplinary and intercultural education ; the third is to deepen the research on human-computer interaction mechanism and improve the integration of artificial intelligence and teachers ' professional knowledge. We believe that through these continuous efforts, the evaluation of art design education will move towards a deeper level of scientific and humanized unity, and provide solid support for the construction of a future-oriented art education system.

COMPETING INTERESTS

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CONSERVATION AND UTILIZATION OF THIRD-LINE INDUSTRIAL HERITAGE: A CASE STUDY OF THE CROW CAVE

XinMing Wang
College of History and Ethnic Culture, Guizhou University, Guiyang 550000, Guizhou, China.
Corresponding Email: 2769266314@qq.com

Abstract: The material and intangible remains of Third-line Construction industrial heritage collectively constitute its unique historical, social, scientific, economic, ideological, and emotional values. Within the current context, adopting "museumification" as an academic and practical pathway facilitates the systematic integration of standardized museum concepts and conservation experience, thereby exploring protection and utilization models suited to the characteristics of such heritage. Taking China's First Aero-engine Manufacturing Plant as an example, its musealization should integrate digital museum technologies and the conceptual framework of the industrial ecomuseum, while adhering to the dual logic of cultural heritage conservation that combines "holistic and scientific approaches" with "authenticity and living preservation." At the level of utilization, it is necessary to establish a systematic thinking that integrates scientific research, cultural-tourism synergy, and cultural-education fusion. Hence, from a methodological perspective, a "systematic-living" approach is the prerequisite for achieving effective conservation and value activation. Third-line industrial heritage in the new era should assimilate new concepts and practical experiences, fully manifest the heritage form shaped by the interplay of people, time, and space, and ultimately realize the return and fulfillment of its resource value in contemporary development.
Keywords: Third-line construction; Industrial heritage; Musealization; Crow cave; Aero-engine

1 INTRODUCTION

Musealization serves as both a crucial means to systematically present the historical formation, development, and transformation of Third-line Construction industrial heritage, and an effective method to adapt to the needs of preserving and utilizing its value in the new era. The heightened emphasis on value elements and the demands of contemporary progress have jointly created practical opportunities for the musealization of this heritage. Furthermore, museums can provide a cultural space for spiritual enrichment, further promoting the emotional value associated with the Third-line Construction. Therefore, selecting the musealization of Third-line Construction industrial heritage as a research topic holds significant academic value and practical importance.

Currently, the protection and utilization of Third-line Construction industrial heritage are in a phase of growth. Relevant research primarily includes: 1) Conceptual and review studies [1-7], which have established the interpretive and research scope of this heritage, with reviews synthesizing the evolving research landscape over time. 2) Regional conservation and utilization studies [8-11], predominantly focused on key geographical areas that historically supported the Third-line Construction. 3) Innovative research on activation and utilization strategies [12,13], mainly exploring how the Third-line Construction can be revitalized, protected, and utilized today.

However, research examining Third-line Construction industrial heritage specifically from a musealization perspective remains insufficient [14-17]. Furthermore, related research themes are relatively fragmented and have not yet yielded systematic and comprehensive results. Consequently, to further enable the creative reinvention of Third-line Construction industrial heritage resources and the reproduction of cultural resources, it is necessary to leverage the relevant characteristics and advantages of museums. This involves strengthening the rational protection and utilization of the historical, social, scientific, economic, ideological, and emotional values inherent in these heritage resources, fully activating their resource attributes, and thereby constructing new concepts and methods suited to the study of China's Third-line Construction industrial heritage. This effort will contribute Chinese wisdom to extending the systematic research and active utilization of cultural heritage.

2 FEASIBILITY ANALYSIS FOR THE MUSEALIZATION OF CHINA'S FIRST AERO-ENGINE MANUFACTURING PLANT

The site of China's First Aero-engine Manufacturing Plant, also known as the Dading Aero-engine Factory or Yunfa Machinery Manufacturing Company, is located north of Yangchang Village in Dafang County, Bijie City, Guizhou Province. The plant's main workshops were situated within a natural karst cave named "Crow Cave," approximately 900 meters in depth and 30 meters in height, featuring an internal plaza covering about 4,000 square meters. The primary factory building was a three-story timber-and-stone structure integrating warehouses, machining workshops, and an assembly workshop, with a total area exceeding 5,000 square meters. The unique cave environment provided distinct locational advantages for production, ensuring security and concealment [18]. The plant rigorously adhered to American blueprints and technical processes, successfully developing distinct locational advantages for

production, ensuring security and concealment [18]. The plant rigorously adhered to American blueprints and technical processes, successfully developing aero-engines that met all performance standards utilizing advanced technology. Furthermore, through eight technical training sessions conducted between 1943 and 1948, it systematically trained approximately 350 technicians, over 260 engineers, and 23 equipment managers, thereby establishing a solid talent foundation for the development of China's aviation industry and national defense.

A brief review of the plant's historical development reveals two primary phases: the period of the War of Resistance Against Japan and the subsequent period of socialist construction. Moreover, the formulation of strategic policies in response to the era's demands, coupled with the profound emotional and spiritual dedication of its personnel, constitutes critical heritage resource elements. The plant fully aligns with the typology and value system defining Third-line Construction industrial heritage. Its resource attributes are imbued with profound historical accumulation, rendering research into its musealization particularly significant from historical, typological, and operational perspectives.

The musealization of China's First Aero-engine Manufacturing Plant must adhere to three fundamental principles. The primary principle is conservation first, with rational development and utilization. The core principle emphasizes systematic-living protection and utilization. The innovative principle advocates keeping pace with the times through scientific and rational conservation practices. These pre-established principles, derived from the plant's specific heritage resources and musealization context, not only align with the typology and value framework of Third-line Construction industrial heritage but also comply with the core requirements of museological knowledge. Consequently, the musealization of the plant is both justified and grounded, making the integration of modern museum development advantages into the protection and utilization concept of Third-line industrial heritage both feasible and necessary.

Following the feasibility analysis and the clarification of these principles, it is essential to reconcile the conceptual correspondence and practical integration between industrial heritage and musealization. This ensures that the core purpose of heritage protection and utilization is not lost during the process. Firstly, as industrial heritage possesses historical resource elements, the musealization process must leverage the narrative function of museums to comprehensively describe its historical development trajectory. For the plant, this involves delineating its distinct historical stages according to its developmental characteristics. Secondly, given that the paramount value of industrial heritage lies in its associated scientific, technological, and human resources, the musealization must employ advanced digital technologies to simulate historical production and development scenarios. This provides the public with relevant knowledge dissemination and immersive learning experiences. Thirdly, industrial heritage, particularly that of the Third-line Construction, embodies distinct era-specific ideologies. Therefore, musealization needs to highlight the spirit and ethos of the period. The specific approach should remain people-centered: museums should utilize human activities and deeds to restore the spiritual and emotional values of the time, enabling the public to understand and empathize with past aspirations and realize the functional value of reflective education. For the plant, this could involve interviewing former workers, technicians, and local villagers to recall specific situations, or utilizing historical reenactments—a format widely adopted by museums—to perform past historical contexts, thereby enhancing contemporary relevance.

In essence, the musealization of China's First Aero-engine Manufacturing Plant necessitates a balanced consideration of both subjective and objective dimensions. It must respect the historical authenticity of the human subject ("the people") while adhering to the developmental realities of the physical site ("the object"). The conditions for feasibility, the adherence to core principles, and the fundamental objectives are all developed based on this subject-object duality. Therefore, by examining the forms and values inherent within the concept of industrial heritage, and supported by methodologies from cultural heritage and museology, a comprehensive and systematic construction of the musealization practice for the plant represents a scientific, theoretical, and systematic endeavor. This effort also provides a fresh museological perspective for developing China's heritage conservation system. Consequently, building upon the previously established theoretical framework, it is imperative to formulate more practical application plans for the conservation and utilization of the plant through musealization.

3 CONSERVATION THROUGH MUSEALIZATION OF CHINA'S FIRST AERO-ENGINE MANUFACTURING PLANT

The digital museum represents a rapidly evolving form of museum development in recent years, dedicated to the preservation, documentation, and digital exhibition of cultural relics. Digital museums primarily comprise four components: digital collections, storage platforms, processing platforms, and interactive display platforms. The application of technology is intrinsically linked to its conceptual framework, emerging from the derivation and selection of technical pathways within a systematic conceptual structure. Currently, exemplary models include the Palace Museum's "Digital Duobao Ge," which employs high-precision 3D modeling to recreate artifacts in meticulous detail, and the Dunhuang Mogao Caves' "Digital Dunhuang" platform, offering immersive online cave exploration and mural viewing experiences, supplemented by the "Cloud Tour Dunhuang" WeChat mini-program for enhanced accessibility. Additionally, the National Museum of China has established a digital exhibition hall, providing realistic viewing experiences that transform audience engagement. Other institutions, including the Shaanxi History Museum, Nanjing Museum, and Sanxingdui Museum, are also actively advancing digital museum initiatives.

The development of a digital museum for China's First Aero-engine Manufacturing Plant should be guided by two core principles and five key dimensions. The principles are: authenticity and integrity, ensuring the original, rich, and dynamic presentation of historical and cultural memories. The five dimensions include: comprehensive collection of

cultural relics and historical documentation; parallel pursuit of protective development and scientific research; balance between social benefits and economic considerations; integration of historical presentation with interactive exchange; and fusion of material representation with the transmission of ideological and spiritual values. In summary, the digital museum initiative must transcend mere digitization, actively incorporating experiences and technologies from exemplary domestic and international cases to effectively preserve and perpetuate the Third-line Construction industrial heritage that significantly contributed to China's industrialization.

Furthermore, the musealization of Third-line Construction industrial heritage requires innovative approaches integrating scientific concepts and practical inheritance. The ecomuseum concept, emphasizing holistic protection of the heritage site's original ecology and its sustainable development within the natural environment, offers relevant insights. This concept finds particular resonance in the digital museum development for the Plant, where the natural karst cave constitutes a distinct ecological setting, and the historical human-nature interaction represents a valuable socio-ecological dimension, both aligning with ecomuseum foundation requirements.

Therefore, it is necessary to first define the boundaries and scope of ecological protection for musealization based on the original purpose of ecomuseums. Secondly, drawing upon ecomuseum construction experience, identify suitable entry points and adaptable practices for ecological protection. Thirdly, establish a foundational plan for ecological conservation tailored specifically to industrial heritage typologies. Finally, formulate a comprehensive ecomuseum conservation and construction plan based on the Plant's unique resource endowment. This approach not only safeguards and presents the authenticity, integrity, and non-renewable nature of the natural and industrial cultural heritage, along with the dynamic relationships between people, place, and industrial legacy, but also provides innovative perspectives and methods for the musealization of Third-line industrial cultural heritage.

Authenticity has long been emphasized in cultural heritage conservation principles, while the concept of living conservation has gained significant attention in recent years. As part of Third-line Construction industrial heritage, the Plant should adhere to both authenticity and living conservation principles. However, historical changes have rendered its heritage resources unsuitable for "productive preservation." Nonetheless, the diverse forms, values, and other elements of the Plant's heritage resources provide a solid foundation for excavating authentic value and exploring living heritage connotations, supported by scientific, systematic theoretical frameworks and distinctive, targeted practical experiments.

The living conservation concept for the Plant's musealization necessitates a foundation in the heritage ontology combined with dynamic preservation. Focusing on the ontology entails the integrated protection of both tangible and intangible elements. Living conservation involves rationally planning protection strategies based on this ontology, utilizing museum conservation methods and concepts to achieve systematic preservation. However, beyond the physical remains, the Plant encompasses a sphere of human-centered activities that has often been neglected in living conservation efforts. Traditional conservation approaches predominantly focused on the tangible ontology, leading to a limited understanding that recognizes "the object but not the context," potentially overlooking the living history embodied by the heritage. Therefore, the living conservation concept for the Plant's musealization must be firmly rooted in the ontology while actively pursuing dynamic preservation, exploring new pathways and concepts for Third-line industrial heritage protection, and identifying sustainable and innovative developmental relationships for the Plant.

4 UTILIZATION THROUGH MUSEALIZATION OF CHINA'S FIRST AERO-ENGINE MANUFACTURING PLANT

The utilization of China's First Aero-engine Manufacturing Plant through musealization is predicated on its effective conservation. Rational utilization not only enhances the scientific and practical aspects of cultural heritage preservation but also infuses greater vitality into its transmission. The musealized utilization of the plant primarily focuses on three dimensions: in-depth sustainable scientific research, the appropriate application of cultural-tourism integrated development models, and inheriting innovation through cultural-educational integration in practical education. These aspects essentially represent the integrated utilization of scientific research with economic and social development. Such an approach ensures that cultural heritage research and protection are more grounded, secures broader support, and bridges the gap between conservation efforts and public memory. It enables the musealized utilization of the plant to proceed on a scientific trajectory while remaining connected to the realities of socio-economic development. Ultimately, successful implementation depends on the coordinated efforts and full development engagement among national and local authorities, alongside the inherent endowment conditions of the heritage resource itself.

Scientific research is integral to cultural heritage conservation, aiming to address practical challenges. The current research concerning China's First Aero-engine Manufacturing Plant faces three primary issues: 1) the "over-commercialization" of heritage utilization; 2) the "simplification" of utilization approaches; and 3) the "disorderliness" of utilization practices. These challenges, identified from the current state of scientific research related to the plant, also prompt reflection on the in-depth sustainable development of Third-line Construction cultural heritage.

"Over-commercialization" is the primary issue requiring prudent management. Conceptually, commercialization itself is not inherently problematic. However, when applied to cultural heritage themes, excessive commercial exploitation often sidelines the humanistic concerns of the heritage, amplifies the space for commercial profit, and to some extent neglects the intrinsic space of the cultural heritage itself and the experiential space of human subjectivity—effectively compressing both the core heritage space and its associated cultural sphere. Therefore, the plant must identify appropriate research directions and rational utilization parameters.

"Simplification" primarily refers to narrow approaches in both conservation and the objects of utilization. Singular conservation focus often subjectively prioritizes specific elements, overlooking the nested and integrated ecological integrity of resources beyond that singularity. For the plant, all related functional structures and the holistic elements of the human-land and human-heritage relationship should be targets for conservation and utilization, not merely the isolated factory building foundations.

Currently, the integration of culture and tourism has become a prevalent approach in cultural heritage development, with museums demonstrating considerable success in this regard. However, the cultural tourism potential of Third-line Construction heritage remains underexplored, presenting significant opportunities for growth. For the First Aero-engine Manufacturing Plant, three strategic dimensions for in-depth and rational development can be identified:

Firstly, the planning of highly interactive experiential scenarios that align with the heritage's core values. This involves creating immersive environments that allow visitors to directly engage with historical production and living conditions. Complementing this, the development of themed dining experiences reflecting the local lifestyle of the period can be established. This approach not only serves as a site for historical and cultural education but also provides a tangible, lived experience that contextualizes the technological level of that era.

Secondly, the integration of surrounding ecological resources with heritage utilization. This entails coordinated development of the natural environment and adjacent natural wonders such as Qingxu Cave (a natural karst cave), in line with the strategic requirements of rural revitalization. This achieves a win-win situation where heritage conservation and utilization synergize with regional socio-economic development. Such an approach not only helps address the current three challenges—over-commercialization, simplification, and disorderliness—in research and utilization but also fosters resonance between heritage conservation and tourism demands. It further facilitates the harmonization of systematic protection and rational utilization, thereby contributing to the refinement of evaluation indicator systems for the scientific conservation and appropriate use of Third-line Construction cultural heritage.

Thirdly, the design of distinctive branding elements representative of the plant's identity, specifically through cultural creative product development. Design inspiration can be drawn from historical archival materials or iconic factory machinery and instruments. Most crucially, these products must accentuate the ideological and spiritual values emblematic of the Third-line Construction period. This requires not only well-crafted promotional narratives but also powerful visual imagery that conveys the ethos of the era. Therefore, cultural creative products must deeply explore the connotations of these spiritual values, ensuring they authentically reflect the scientific rigor and long-term strategic vision upheld by the state during the Third-line Construction initiative [19].

"Disorderliness" manifests as chaotic utilization methods and development concepts. This situation often treats the cultural heritage as the sole object of exploitation without considering the wider cultural ecology beyond it. Exploiting the heritage in isolation can create numerous conflicts between development efforts and local communities. Consequently, the plant must establish a sound mechanism for protection and utilization, proactively addressing the challenge of disorderliness to identify a suitable musealization pathway. In confronting this issue, the principles of holistic and scientific conservation design, alongside concepts of authenticity and living conservation, can still provide valuable guidance for its musealized utilization.

Today, cultural-tourism integration is prevalent in cultural heritage development, and museums have performed notably well in this area. However, Third-line Construction cultural heritage remains underdeveloped in this regard, possessing significant potential for growth. Furthermore, the inheriting innovation achieved through cultural-educational integration and practical education reflects the connotative utilization of the plant's site, demonstrates its social utilization value, and underscores the integrated relationship between its protection and utilization. These interacting innovative approaches to inheritance align with our contemporary understanding of perceiving the human spirit through material objects—they are conceptually interconnected.

In summary, cultural-educational integration and practice prioritize educating people. Its essence lies not merely in emphasizing the uniqueness of the plant as cultural heritage, but in highlighting the interactive relationships and vivid scenarios between "people," their labor in creating history, and nature, geography, and space. The aim is to reveal how the "human" spirit resonated with the era and how individuals transcended self-interest for the collective good within this process. This approach not only highlights the historical context of "human" labor and practice but also illuminates the interaction between the "human" spirit and societal development.

5 CONCLUSION

The preservation and utilization of Third-line Construction industrial heritage demonstrate multifaceted dimensions of engagement. These efforts involve, to varying degrees, multiple values—historical, social, scientific, economic, ideological, and emotional—and encompass both tangible and intangible heritage elements. Although these two aspects represent distinct thematic foci, they are intrinsically interconnected in their underlying logic. The protection and utilization of Third-line Construction industrial heritage necessitate a systematic-living approach. Using the musealization of China's First Aero-engine Manufacturing Plant as an example, this not only requires leveraging established museum concepts and methods—achieving systematic protection through digital museum technologies, industrial ecomuseum practices, holistic and scientific conservation design, and principles of authenticity and living conservation—but also demands activating its significance through in-depth sustainable scientific research, the rational application of cultural-tourism integrated development models, and inheriting innovation via cultural-educational integration in practical education.

Furthermore, the preservation and utilization of Third-line industrial heritage require transcending the cultural heritage paradigm formed by the interweaving of people, time, and space. Its optimal development should be achieved through systematic, practical, and innovative methodological pathways. Currently, there is a pressing need to systematically construct a framework for this purpose. Primarily, this involves establishing a "Typology and Value Structure of Third-line Construction Industrial Heritage." Subsequently, building upon past theoretical paradigms in cultural heritage, it is essential to develop more practical application plans for its protection and utilization, thereby proposing a holistic thinking system for these efforts.

Therefore, this paper, using the musealization of China's First Aero-engine Manufacturing Plant as a case study, aims to strengthen the systematic-living protection and utilization of Third-line Construction industrial heritage. By supplementing the connotation and value of this heritage through a concrete case, it seeks to achieve comprehensive research, conservation, and utilization, ultimately providing a specific case study pathway for the protection and utilization of Third-line Construction industrial heritage.

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APPLICATIONS AND ETHICAL CHALLENGES OF ARTIFICIAL INTELLIGENCE IN ACADEMIC RESEARCH

LiWei Xue
School of Marxism, Zhuhai College of Science and Technology, Hong Kong region, China.
Corresponding Email: lvgoodluck@126.com

Abstract: Artificial intelligence (AI) technologies are now widely applied in academic research. On one hand, AI serves as a powerful auxiliary tool that significantly enhances the efficiency of scientific inquiry; on the other, it introduces ethical challenges that demand urgent attention and resolution within the scholarly community. This paper examines the applications of AI in academic research alongside its associated ethical dilemmas. It first outlines the role of generative AI in writing and education, as well as its applications in medical research; second, it analyzes the resulting issues of algorithmic bias, academic integrity, and privacy risks; third, it proposes corresponding ethical guidelines and adjustments to institutional review mechanisms. The conclusion offers governance strategies for a responsible AI-driven academic ecosystem to ensure the sustainability and fairness of scholarly pursuits.
Keywords: Artificial intelligence; Ethical challenges; Academic research; Responsible AI

1 INTRODUCTION

In recent years, artificial intelligence (AI) has profoundly transformed academic research through its robust data-processing and generative capabilities. From automated data analysis and AI-assisted paper drafting to complex modeling in fields such as medicine, AI has markedly improved research efficiency and spurred interdisciplinary innovation. However, its widespread adoption has also ushered in unprecedented ethical concerns, including distorted research outcomes due to algorithmic bias, threats to academic integrity, and risks of data privacy breaches. These issues not only affect the fairness of academic research but also challenge the credibility of science and its broader societal impact. This paper systematically explores the current applications of generative AI in writing, education, and medical research; dissects the resultant algorithmic bias, integrity crises, and privacy risks; and proposes targeted ethical guidelines and institutional review adjustments. The aim is to advocate for responsible AI use, thereby safeguarding the sustainability and equity of academic research.

2 OVERVIEW OF AI APPLICATIONS IN ACADEMIC RESEARCH

AI applications in academic research have evolved from basic algorithms to advanced generative models, substantially boosting efficiency and innovative potential. In practical workflows, AI is reshaping daily research practices. For literature reviews, researchers can first employ retrieval-augmented tools and automated screening algorithms to pinpoint highly relevant sources, then use topic modeling or knowledge graphs to map research trajectories, and finally leverage generative models to draft initial paragraph outlines—followed by expert review, evidence supplementation, and rewriting to ensure accuracy and originality. Similarly, in data-intensive studies, AI often handles preliminary pattern recognition and hypothesis generation, while human researchers focus on theoretical interpretation and experimental design, forming a “human-AI collaboration–iterative cycle” paradigm.

Generative AI has become routine in research, exemplified by tools like ChatGPT, Grok, and DeepSeek. ChatGPT, built on the Generative Pre-trained Transformer (GPT) architecture, predicts text sequences via large-scale neural networks to produce natural responses. It comprehends context, delivers diverse answers, and plays a pivotal role in academia: students use it to summarize articles, consolidate knowledge, and enhance learning outcomes; instructors apply it for syllabus design, discussion text generation, and assessment refinement. According to 2025 guidelines from Thesify, AI-powered structuring tools streamline thesis outlining and facilitate idea brainstorming, though over-reliance must be avoided to preserve originality [1]. A SSRN study confirms that AI tools are mainstream in literature reviews and draft writing but stresses the need for training to maximize benefits [2]. Research from ScienceDirect identifies six enhanced domains in academic writing—idea generation, content structuring, literature synthesis, data management, editing, and ethical compliance—enabling researchers to handle vast datasets and optimize outputs [2]. Moreover, AI fosters personalized learning in educational research, offering students diverse perspectives and proofreading while aiding scholars with email drafting, abstract summarization, and translation. The 2025 EDUCAUSE guidelines further note that AI promotes diversity, equity, and inclusion by bridging knowledge gaps without reinforcing biases [3]. Nonetheless, users must verify content accuracy and source reliability, guarding against training biases and over-dependence, particularly given generative AI’s limitations on post-2021 knowledge.

In medical research, AI applications are equally extensive. For instance, the big data smart healthcare system at China Medical University Hospital uses AI to analyze fundus images for detecting diabetic retinopathy, intracranial hemorrhage, and bone density, achieving 87.7% accuracy [4]. By integrating environmental data, life records, and

electronic health records via APIs, AI predicts acute exacerbations of chronic obstructive pulmonary disease (AECOPD), supporting precision medicine. A 2025 ResearchGate report highlights the shift in academic medical research from rule-based systems to deep learning, such as neural networks for genomic analysis to accelerate drug discovery [5].

AI has reshaped academic paradigms across data processing, knowledge generation, experimental design, result analysis, paper writing, and dissemination, undeniably elevating researcher productivity. Concurrently, its proliferation poses integrity challenges, necessitating rigorous scrutiny of AI outputs to prevent misleading results or improper citations. A 2025 Stanford Institute for Human-Centered Artificial Intelligence report underscores AI's boost to academic productivity but warns that deep integration demands balancing innovation with responsibility [6]. Thus, establishing clear ethical norms, refining institutional reviews, and enhancing AI literacy training are essential for upholding fairness and sustainability in research.

3 ETHICAL CHALLENGES OF AI IN ACADEMIC RESEARCH

Despite its benefits, AI's ethical challenges in academic research are increasingly prominent, manifesting in academic integrity, algorithmic bias, privacy infringement, accountability mechanisms, and behavioral manipulation. These stem not only from technical attributes but also clash with core academic values—honesty, fairness, and responsibility.

The most evident issue is the academic integrity crisis. Generative models produce fluent, well-structured text rapidly, easing paper writing and data integration but blurring originality and authorship boundaries. Integrity demands traceable, authentic outputs; undisclosed AI-generated content risks covert plagiarism or fabrication. The international publishing community has raised alarms: the Committee on Publication Ethics (COPE) forum highlights debates on accountability in AI-era publishing, including authorship attribution and plagiarism detection reliability [7]. Journals like Science and Nature stipulate that AI cannot be listed as an author and failure to disclose its use violates norms [8]. This reflects emphasis on transparency and accountability. In practice, however, AI detection tools have limited accuracy, and manual reviews are costly, hindering comprehensive violation identification. Deeper concerns arise as AI ubiquity may redefine scholarly labor: when machines generate plausible yet superficial knowledge, researchers' critical thinking, creativity, and originality risk marginalization.

Algorithmic bias ranks as another prevalent challenge. AI models train on vast datasets often embedding societal inequalities. Imbalances in gender, race, or geography yield covertly discriminatory outputs, amplified in research contexts. For example, overrepresentation of white male images in training data leads facial recognition algorithms to discriminate against minorities or women. This perpetuates injustice and exacerbates issues in academia, such as diagnostic biases in medical AI from skewed datasets affecting vulnerable groups. UNESCO's Recommendation on the Ethics of Artificial Intelligence warns of AI reproducing real-world biases and discrimination, advocating ethical safeguards like diverse datasets and bias audits [9]. Editorial analyses note ethical implications of AI-authored manuscripts, including bias propagation, and recommend source evaluation and fairness testing [10]. AI use may erode academic autonomy, threaten privacy, and widen global knowledge divides, particularly in developing regions [11].

Privacy and data protection have also emerged as focal concerns. AI systems require access to large-scale, granular data—including personal information, medical records, and learning behaviors. Absent clear consent and oversight, this invites misuse and breaches. In AI-driven cross-platform studies, data may auto-transfer or reuse beyond researcher control, creating ethical gray areas. While regulations like the EU's GDPR provide frameworks, AI's self-learning and regeneration challenge traditional informed consent. Researchers must legally comply and ethically uphold participant dignity and autonomy, prioritizing human-centered principles to ensure AI serves rather than supplants people.

Unaddressed, these challenges undermine research credibility. Studies indicate AI integration in higher education demands responsible handling of opacity and manipulation [12]. Scholars caution against uncritical AI acceptance, emphasizing foundational skills for effective use. Overall, these issues compel academia to shift from reactive to proactive governance, preserving knowledge production integrity.

4 GOVERNANCE STRATEGIES FOR A RESPONSIBLE AI ACADEMIC ECOSYSTEM

To counter AI's ethical challenges in academic research, a systematic, multi-layered governance framework is imperative to align technology with scholarly values. Updated ethical principles provide theoretical foundations. AI development should adhere to a "Hippocratic-like oath," stressing explainability, transparency, and researcher accountability. This requires verifying AI-generated content for accuracy and reliability, clarifying authorship, and preventing convenience from eroding originality and critical thinking. UN system-wide principles emphasize non-maleficence, fairness, non-discrimination, privacy, and human oversight, offering global consensus for practice [13]. EU guidelines prioritize human-centricity, mandating robustness, transparency, and accountability to bolster self-regulation in data and model use [14].

Institutionally, adapting Institutional Review Boards/Ethics Committees (IRB/REC) for human subjects is key. SACHRP recommends reviews assess data's contribution to knowledge, involvement of personal information, and bias potential [15]. Ensuring independence, diversity, proportional scrutiny, lifecycle monitoring, and algorithmic impact tools mitigates risks, curbing misuse, breaches, and enhancing accountability.

Education and training are central to ethical governance. AI proliferation may alter scholarly labor; without ethical literacy, researchers risk blindly accepting outputs, diminishing critical judgment. Wiley's Delphi consensus advocates integrating AI ethics into curricula and integrity frameworks to foster responsible use [16]. Stanford HAI urges unified

standards and education to bridge skill gaps, promoting equity amid adoption. This extends to graduates, faculty, and administrators, cultivating a participatory ethical culture.

Technical tools supplement governance. AI detectors aid integrity but require human oversight due to accuracy limits. Governance should prioritize bias detection/correction, ensuring outputs avoid amplifying inequities, with transparency and traceability in publishing and peer review. EDUCAUSE stresses justice, leveraging AI for diversity and inclusion without exacerbating disparities [3].

5 CONCLUSION

In summary, AI has deeply embedded itself in academic workflows—from literature reviews and data analysis to drafting and medical modeling—enhancing efficiency, sparking innovation, and fostering human-AI collaboration. Yet this revolution brings ethical hurdles: integrity crises, amplified biases, privacy leaks, and accountability ambiguities that test scholarly foundations. Left unchecked, they erode originality, fairness, scientific trust, and sustainable knowledge creation.

Looking ahead to 2025 and beyond, AI will continue evolving in academia, expanding generative boundaries and deepening interdisciplinary integration. Only by dynamically balancing innovation and responsibility can scholars harness AI tides for equitable, inclusive, credible knowledge creation. Ultimately, responsible AI is not merely technical regulation but a solemn academic pledge to truth—empowering human intellect through machines, not supplanting it.

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CONSTRUCTION AND PRACTICE OF AN INTEGRATED TALENT TRAINING MODEL IN VOCATIONAL EDUCATION UNDER THE RURAL REVITALIZATION STRATEGY

ShiXiong Guo
Tianjin Vocational Institute, Tianjin 300410, China.
Corresponding Email: 653846764@qq.com

Abstract: Vocational education plays a vital role in supporting China's Rural Revitalization Strategy by cultivating skilled professionals for rural industries and communities. However, current training systems often suffer from fragmented curricula and weak connections with industrial and local needs. This study proposes an Integrated Talent Training Model that combines theoretical education, practical training, industrial collaboration, and community participation within a unified framework.Based on System Theory, Industry–Education Integration Theory, Constructivist Learning Theory, and Rural Sociology Theory, the model emphasizes multi-dimensional integration—linking education with industry, theory with practice, and schools with local communities.Case studies from rural-oriented vocational colleges show that the model enhances students' professional competence, strengthens school–industry partnerships, and promotes talent retention in rural areas. The findings indicate that the integrated model not only bridges the gap between vocational education and rural development but also provides a replicable mechanism for aligning education reform with local revitalization.
Keywords: Vocational education; Rural revitalization; Integrated training model; Industry–education integration; Talent cultivation

1 INTRODUCTION

The implementation of China's Rural Revitalization Strategy has brought vocational education to the forefront of national development policy[1]. As a key vehicle for cultivating skilled professionals, vocational education is expected to provide a continuous supply of practical and innovative talents to support agricultural modernization, industrial transformation, and sustainable rural development. However, despite extensive reforms and policy support, a structural gap remains between vocational education outcomes and the actual needs of rural industries. Many vocational graduates lack the interdisciplinary skills, innovative capacity, and adaptability required to participate effectively in rural economic and social revitalization. This disconnection between education and practice has become a major obstacle to achieving the goals of rural revitalization.

In practice, vocational institutions still tend to emphasize theoretical instruction over applied learning. Curriculum content is often outdated, practical training opportunities are insufficient, and cooperation between schools, industries, and local communities remains limited[2]. As a result, vocational education frequently fails to cultivate talents who are both technically competent and socially responsive to the specific contexts of rural development. The core problem lies in the absence of an integrated mechanism that links educational institutions, industrial sectors, and rural communities into a coherent and mutually reinforcing system. Addressing this problem requires an innovative training model that bridges the divides between theory and practice, education and industry, and schools and local development.

This study therefore proposes an Integrated Talent Training Model in vocational education under the framework of the Rural Revitalization Strategy. The model aims to construct a multidimensional and interactive system that combines theoretical learning, practical training, industrial participation, and community engagement. It emphasizes the formation of a talent ecosystem in which education serves as a central platform for collaboration among governments, schools, enterprises, and rural organizations. In doing so, the model seeks to transform vocational education from a closed instructional process into an open, adaptive, and innovation-oriented system that directly supports rural revitalization goals.

The purpose of this study is threefold. First, it seeks to establish a theoretical foundation for the integrated model by synthesizing insights from system theory, constructivist learning theory, industry–education integration theory, and rural sociology. These frameworks collectively provide a holistic understanding of how education and rural systems interact as interconnected subsystems. Second, it aims to design and implement a practical model that aligns curriculum development, teaching reform, industrial cooperation, and digital empowerment in an integrated way. Third, it endeavors to evaluate the outcomes of the model through empirical evidence from vocational colleges engaged in rural-oriented training programs, highlighting its contribution to rural human resource development and educational innovation.

Methodologically, this research adopts a qualitative approach combining theoretical analysis and case study investigation. A comprehensive review of domestic and international literature informs the theoretical basis, while systematic modeling defines the internal logic and structure of the integrated approach. Case studies from rural-oriented

vocational institutions are used to test the model's applicability, explore implementation mechanisms, and identify best practices for integration between education and local industries. This multi-level approach ensures that both theoretical rigor and practical relevance are maintained throughout the research process.

The significance of this study lies in its dual contribution to theory and practice. On the theoretical level, it expands the academic understanding of vocational education by framing it as a dynamic system that interacts with broader socio-economic structures, particularly rural revitalization. On the practical level, it provides a feasible pathway for constructing collaborative mechanisms among multiple stakeholders—governments, educational institutions, enterprises, and local communities—thereby enhancing the efficiency and sustainability of talent cultivation in rural areas. The integrated model proposed in this study also offers a replicable framework for other developing regions seeking to link vocational education reform with local development strategies.

2 LITERATURE REVIEW AND THEORETICAL FOUNDATIONS

Research on vocational education and rural development has gained increasing attention in recent years as governments and scholars seek effective ways to link human resource cultivation with local revitalization[3]. The relationship between education and rural development is both structural and functional: education provides the human capital necessary for rural modernization, while rural revitalization offers a contextual environment that shapes the relevance and effectiveness of education. In this regard, vocational education serves as a critical bridge that connects learning, employment, and regional development. However, despite substantial progress in educational reform, the disconnection between vocational training and rural needs remains a persistent issue.

Existing studies have explored vocational education reform from several perspectives. Early research, influenced by Tyler's curriculum theory and the competency-based education (CBE) approach, emphasized learning outcomes and job -related skills as central to curriculum design. In international contexts, the dual system of Germany and the TAFE model of Australia are often cited as benchmarks of effective industry–education integration. These systems feature a high degree of coordination between schools and enterprises, enabling students to alternate between classroom learning and workplace practice[4]. Such models ensure that vocational education directly responds to labor market needs and technological changes. However, their adaptation to China's rural context requires localization, as rural industries are more fragmented, small-scaled, and less formalized than urban or industrial sectors.

In China, since the release of the National Vocational Education Reform Implementation Plan, research has increasingly focused on the construction of high-quality vocational education systems that emphasize industry–education integration, school–enterprise cooperation, and curriculum innovation[5]. Scholars such as Zhang and Liu have highlighted that effective vocational curricula must align closely with occupational standards and industrial demands while incorporating modular design and digital resources. Nonetheless, most of these studies focus on manufacturing and urban service sectors, with limited attention to rural-oriented vocational education. The unique socio-economic characteristics of rural China—such as population aging, industrial diversification, and cultural preservation—necessitate distinct models of talent training that combine technical, entrepreneurial, and social skills.

A growing body of literature has begun to investigate the intersection of rural revitalization and education. These studies generally agree that education is the foundation for achieving the five key goals of rural revitalization: industrial prosperity, ecological livability, rural civilization, effective governance, and improved living standards. Yet, the majority of rural education research remains concentrated on basic education or agricultural extension, while vocational education is treated as a secondary or transitional pathway. The absence of a comprehensive integration mechanism between vocational colleges, local governments, and rural enterprises limits the contribution of vocational education to long-term rural transformation.The theoretical basis for this study integrates four complementary perspectives[6].

First, System Theory provides a holistic framework for understanding the interactive relationships among educational institutions, industrial systems, and rural communities. From a systems perspective, vocational education and rural revitalization are interconnected subsystems within a broader socio-economic network. Changes in one subsystem inevitably affect the others. This theoretical lens supports the design of a coordinated model that emphasizes feedback loops and dynamic equilibrium between education and development.

Second, Industry–Education Integration Theory offers a structural foundation for building partnerships between schools and enterprises. It emphasizes resource sharing, mutual participation, and co-construction of teaching content and training environments. Within the rural revitalization context, this theory underscores the need for vocational education to go beyond traditional “school-based” teaching and to form collaborative mechanisms with local industries such as agricultural technology, rural tourism, green manufacturing, and rural governance services. Through joint curriculum development and dual-teacher models, vocational education can achieve deeper alignment with real production and community contexts.

Third, Constructivist Learning Theory contributes a pedagogical dimension to the integrated model. It views learning as an active, experiential, and social process in which learners construct knowledge through authentic tasks and reflection. Applied to vocational education, constructivism suggests that teaching should occur in real or simulated professional environments, encouraging students to engage in project-based, problem-oriented, and collaborative learning. This perspective supports the integration of theory and practice in the proposed model and emphasizes the importance of contextualized, learner-centered pedagogy.

Finally, Rural Sociology Theory provides the socio-cultural foundation for understanding how education interacts with rural communities. Rural sociology highlights the significance of human capital, social networks, and cultural identity

in shaping local development. In the context of vocational education, it suggests that effective talent cultivation must respect rural culture, respond to community needs, and promote the retention and return of young talents. Education should thus be seen not only as an economic tool but also as a means of social reconstruction and cultural revitalization.
Integrating these theoretical perspectives leads to the conceptualization of the Integrated Talent Training Model as a dynamic system characterized by multi-level collaboration and feedback[7]. At the macro level, national and local policies provide institutional guarantees and strategic direction. At the meso level, schools and industries form cooperative structures that align curricula, training bases, and evaluation systems. At the micro level, students engage in experiential learning within community and industrial contexts, supported by digital and reflective tools. These three levels form an interactive loop that enables continuous improvement, adaptability, and sustainability.
The review of existing research also reveals several theoretical and practical gaps[8]. Although many studies recognize the importance of integration, few provide a systematic and operable framework that unites policy, education, and rural practice[9]. Furthermore, empirical evidence on how such integration enhances students' competence and rural development outcomes remains limited. The proposed model in this study addresses these gaps by combining theoretical insight with practice-based validation. It redefines vocational education as an ecosystem that not only produces skilled labor but also fosters innovation, entrepreneurship, and community engagement in rural settings[10].Figure 1 shown technical route of this research.

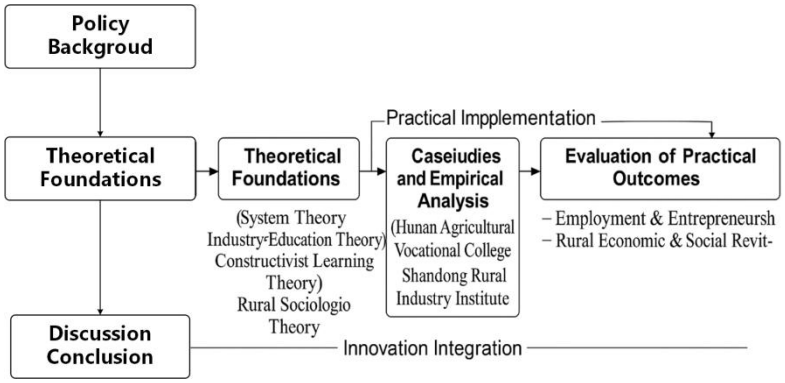

Figure 1 Technical Route of the Study

3 CONSTRUCTION OF THE INTEGRATED TALENT TRAINING MODEL

3.1 Concept and Objectives of Integration

The concept of the Integrated Talent Training Model in vocational education under the Rural Revitalization Strategy reflects a systematic approach to connecting theory, practice, industry, and community within a unified educational framework. Unlike traditional vocational training, which often separates classroom instruction from industrial practice and community engagement, the integrated model emphasizes fusion across multiple dimensions－pedagogical, institutional, and social. It is designed to transform vocational education into an open, dynamic system capable of cultivating professionals who possess both technical competence and rural adaptability.
At its core, integration refers to the coordinated interaction among diverse stakeholders－schools, enterprises, local governments, and rural communities—in the process of talent cultivation. This interaction aims to break the institutional and cognitive barriers that have historically existed between education and development. Through collaborative curriculum design, shared training resources, and cross-sectoral governance, the model creates a synergistic environment in which learning, working, and serving the community become interconnected activities. Integration thus becomes not only a structural adjustment but also a shift in educational philosophy－from fragmented, discipline-centered teaching to holistic, competency-oriented, and context-driven education.
The theoretical essence of the integrated model lies in the unity of knowledge and action, bridging the gap between what students learn and how they apply it in real contexts. The model advocates for a learning process that mirrors professional practice, encouraging students to construct knowledge through authentic experiences in rural industries and communities. It seeks to cultivate "learning in work" and "work through learning," aligning with the constructivist principle that knowledge acquisition is most effective when embedded in meaningful tasks and social interactions. As such, integration serves as both a pedagogical method and a strategic orientation for vocational education reform.
The objectives of the integrated talent training model are directly aligned with the broader goals of the Rural Revitalization Strategy, which emphasizes industrial prosperity, cultural flourishing, effective governance, and improved livelihoods. Therefore, the model's training objectives go beyond narrow technical specialization to embrace a comprehensive view of human development. It aims to cultivate compound talents who are not only skilled in production and management but also capable of innovation, cultural transmission, and social service in rural settings.
Specifically, the integrated training model pursues three interrelated objectives: (1) to develop professional competence through alignment with industry needs and occupational standards; (2) to enhance innovative and entrepreneurial

capacity through project-based and digital learning; and (3) to foster social responsibility and rural identity through community engagement and moral education.

These objectives are summarized in Table 1, which illustrates the logical framework and implementation focus of the Integrated Talent Training Model.

Table 1 Objectives of the Integrated Talent Training Model under the Rural Revitalization Strategy

Objective Dimension	Core Description	Implementation Focus	Expected Outcome
Professional Competence	Development of technical and operational skills aligned with key rural industries	School–enterprise cooperation, dual-teacher system, task-based training	Students acquire job-ready skills and professional adaptability
Innovation and Entrepreneurship	Cultivation of creativity and entrepreneurial awareness for rural development	Project-based learning, innovation labs, digital technology integration	Learners demonstrate problem-solving and innovation capacity
Social Responsibility and Rural Identity	Enhancement of civic consciousness, teamwork, and commitment to rural revitalization	Community service, cultural education, moral instruction	Graduates develop social responsibility and willingness to serve rural communities

3.2 Model Architecture

The Integrated Talent Training Model is built upon a hierarchical and interactive architecture that operates across three interrelated levels—macro, meso, and micro—each corresponding to a distinct dimension of policy, education, and practice. This multilevel structure ensures the coherence between national strategies and localized implementation, forming a dynamic mechanism that links policy guidance, educational reform, and practical engagement. By aligning these levels, the model promotes a systemic transformation in vocational education that directly supports rural revitalization.

At the macro level, the model is anchored in the national framework of the Rural Revitalization Strategy and the National Vocational Education Reform Implementation Plan, which emphasize talent cultivation as a strategic foundation for rural modernization. This level provides the policy and strategic support necessary to coordinate multiple stakeholders and to establish institutional guarantees for integration. Key components include government policy formulation, financial investment, legal regulation, and macro-level coordination among education, agriculture, and rural development departments. The macro level ensures that educational objectives are consistent with national goals, emphasizing high-quality development, sustainability, and innovation. It also establishes incentive mechanisms that encourage local governments and industries to participate in the co-construction of vocational programs, aligning public resources with regional needs.

The meso level represents the educational system integration—the structural and institutional layer where schools, industries, and local authorities collaborate to translate policy intentions into operational frameworks. This level focuses on curriculum design, teaching reform, practice organization, and evaluation mechanisms. Integration at this level is achieved through several strategies: (1) curriculum reconstruction, aligning professional courses with industrial and community needs; (2) dual-teacher systems, combining academic instructors with enterprise experts; (3) modular teaching design, emphasizing competency-based and project-driven learning; and (4) evaluation reform, introducing multi-dimensional assessment based on learning outcomes, workplace performance, and community contribution. Through these mechanisms, the meso level acts as the pivotal link connecting macro policy directives to micro-level teaching and learning activities.

At the micro level, integration is embodied in the practical carriers—the specific contexts in which students engage in experiential learning and skill application. This level focuses on implementation through industrial training bases, rural enterprises, community projects, and digital learning platforms. It operationalizes the "learning by doing" principle by situating students in authentic professional environments. Activities include field internships in agricultural enterprises, cooperative projects with rural cooperatives, and social innovation initiatives in village governance or rural tourism. The micro level also introduces digital empowerment through smart learning systems, data-driven management, and online-offline hybrid teaching. These technological tools not only expand learning opportunities but also strengthen feedback loops between schools, industries, and communities.

The interaction among the three levels forms a closed-loop system. Policies at the macro level set the direction and provide resources; the meso level interprets and implements these through institutional design and curriculum integration; and the micro level realizes them through practice, feedback, and continuous improvement. This cyclical process ensures adaptability and sustainability, allowing the model to evolve alongside the changing demands of rural industries and communities. Furthermore, feedback from micro-level practices informs meso-level reform and macro-level policy adjustment, thereby achieving dynamic balance within the entire vocational education system.

Another key feature of the model architecture is its interconnectivity and feedback mechanisms. Integration is not a linear process but a recursive one, in which experiences, evaluation results, and innovations at the micro level

continuously reshape higher-level decision-making. For example, successful practices in school−enterprise cooperation or digital learning can be scaled up through meso-level frameworks and institutionalized through macro-level policies. Conversely, new policy directives can stimulate experimentation and innovation at the grassroots level. This reciprocal interaction ensures that the model remains flexible, context-sensitive, and future-oriented.

In addition, the model incorporates cross-sectoral collaboration as a structural element at all three levels. Government agencies provide strategic planning and financial support; industries contribute expertise and employment platforms; schools supply human resources and educational innovation; and communities offer real-life contexts for practice and social engagement. This collaborative structure transforms vocational education from a closed academic system into an open ecosystem characterized by multi-stakeholder participation and mutual benefit. Within this ecosystem, knowledge flows bidirectionally between theory and practice, and learning outcomes are continuously validated through industrial and social application.

To summarize, the architecture of the Integrated Talent Training Model can be conceptualized as a three-tier system that combines top-down policy support with bottom-up innovation. Each level has distinct functions but operates interdependently, forming a unified framework for cultivating rural-adaptive professionals. Table 2 presents an overview of the three levels and their corresponding functions, components, and outcomes.

Table 2 Model Architecture of the Integrated Talent Training System

Level	Core Function	Main Components	Implementation Focus	Expected Outcomes
Macro Level	Policy and strategicsupport under the RuralRevitalization Strategy	National and local policies, funding mechanisms, interdepartmental coordination	Establishing policy synergy, resource allocation, and incentive mechanisms	Institutional foundation for integration and sustainable development
Meso Level	Educational system integration	Curriculum reform, dual-teacher system, modular teaching, multi-dimensional evaluation	Alignment of courses with industry needs; co-development of programs by schools and enterprises	Effective linkage between educational design and industrial practice
Micro Level	Practical carriers of learning and training	Industrial bases, rural enterprises, community projects, digital platforms	Experiential learning, on-site internships, online–offline hybrid instruction	Students' comprehensive development, innovation capacity, and rural adaptability

3.3 Key Pathways of Integration

The implementation of the Integrated Talent Training Model requires concrete pathways that translate its conceptual framework and structural architecture into effective educational practices. Integration, as conceived in this study, is not an abstract principle but a dynamic process of coordination among different domains—education, industry, community, and technology. The success of this process depends on how these dimensions interact to form a coherent and sustainable mechanism for talent cultivation. Based on empirical analysis and theoretical synthesis, four major pathways are identified as essential to realizing integration: industry−education integration, school−local cooperation, theory−practice integration, and digital empowerment.

The first and most fundamental pathway is industry−education integration, which establishes the structural connection between vocational education and the labor demands of rural industries. In this pathway, integration is achieved through close collaboration between schools and enterprises in curriculum development, training base construction, and internship management. Schools and industries jointly define skill standards, design teaching modules, and evaluate learning outcomes. This collaborative mechanism ensures that educational content remains relevant to current technologies and industrial practices. It also promotes the adoption of the dual-teacher system, where academic instructors provide theoretical guidance and enterprise mentors deliver applied training. In the context of rural revitalization, industry−education integration emphasizes aligning vocational majors with emerging rural sectors such as modern agriculture, green processing, e-commerce, and rural tourism. Through such alignment, vocational education becomes a direct driver of industrial upgrading and employment expansion in rural areas.

The second pathway, school−local cooperation, focuses on integrating vocational education into the broader ecosystem of rural governance and community development. This pathway extends beyond the traditional school－enterprise relationship to include local governments, cooperatives, and rural organizations as active participants in talent training. Local authorities provide policy and financial support, while communities offer real-life contexts for student learning and service. The integration of schools and localities facilitates embedded education, in which teaching, research, and practice are conducted within the local environment rather than confined to the classroom. For example, students may participate in community-based projects such as agricultural innovation, environmental protection, or cultural heritage preservation. This form of cooperation enhances the social responsiveness of vocational education and strengthens the interaction between knowledge production and rural problem-solving. Ultimately, school−local cooperation transforms vocational colleges into “community partners” that contribute directly to rural revitalization through education, innovation, and social service.

The third pathway, theory−practice integration, represents the pedagogical dimension of the model. It addresses the long-standing challenge in vocational education—how to bridge the gap between what students learn and what they can actually do. The integrated model adopts project-based, task-driven, and competency-oriented instructional methods that combine classroom learning with field application. Courses are organized around authentic professional scenarios, encouraging students to apply theoretical knowledge to solve real problems. Practical components such as simulations, workshops, and internships are incorporated into each module, ensuring that learning outcomes are measurable and performance-based. Teachers act as facilitators rather than lecturers, guiding students through inquiry, experimentation, and reflection. This process embodies the constructivist learning principle that knowledge is constructed through experience and social interaction. In the rural context, theory－practice integration helps students develop not only technical skills but also soft competencies such as teamwork, communication, and decision-making in complex, real-world environments.

The fourth pathway, digital empowerment, introduces an innovative and forward-looking dimension to the integrated model. As rural areas increasingly embrace digital transformation, vocational education must harness information technology to enhance teaching, management, and collaboration. Digital empowerment involves the creation of smart learning platforms, data-driven management systems, and hybrid teaching environments that blend online and offline learning. Through cloud-based resources, students can access up-to-date industrial data, simulation tools, and virtual training modules that supplement traditional instruction. Teachers and enterprise mentors can jointly supervise student projects via digital platforms, achieving real-time communication and feedback. Moreover, big data analytics enable educational institutions to monitor student progress, evaluate training effectiveness, and adjust curricula dynamically. In the context of rural revitalization, digital empowerment also facilitates the dissemination of knowledge to remote areas, narrowing the urban−rural education gap and supporting the development of smart agriculture, e-commerce, and digital governance in rural communities.

These four pathways are not independent components but interdependent mechanisms that collectively ensure the effectiveness of integration. Industry−education integration provides the structural foundation; school−local cooperation embeds education within community development; theory－practice integration ensures pedagogical coherence; and digital empowerment offers technological and data-driven support. Together, they create a comprehensive ecosystem that aligns vocational education with the economic, social, and technological dimensions of rural revitalization. The interactivity among these pathways forms a feedback system: industry collaboration informs curriculum reform; local cooperation enhances contextual learning; practice integration strengthens competence development; and digital tools support continuous evaluation and innovation.

The summary of these four key pathways is presented in Table 3, which outlines their core content, implementation strategies, and expected outcomes.

Table 3 Key Pathways of Integration in the Integrated Talent Training Model

Integration Dimension	Core Content	Implementation Path	Expected Outcomes
Industry–Education Integration	Alignment of vocational majors and curricula with industrial needs and employment standards	Joint training bases, dual-teacher system, co-developed teaching resources	Enhanced relevance of education to rural industries; improved employability of graduates
School–Local Cooperation	Collaboration between vocational institutions, local governments, and communities	Embedded rural project training, community-based learning, policy–school linkage	Stronger social service capacity; deeper participation of education in rural governance
Theory–Practice Integration	Combination of theoretical instruction and experiential learning	Project- and task-based teaching, competency-oriented assessment, simulation and field training	Cultivation of applied skills, problem-solving abilities, and reflective learning
Digital Empowerment	Integration of information technology into teaching, training, and management	Smart learning platforms, data-driven decision-making, online–offline hybrid instruction	Improved learning efficiency, digital literacy, and sustainability of rural education

4 PRACTICAL PATHWAYS AND CASE ANALYSIS

4.1 Implementation Mechanisms

The effective operation of the Integrated Talent Training Model relies on a systematic mechanism that coordinates multiple stakeholders, ensures collaboration, and enables continuous improvement. In practice, three interrelated mechanisms support implementation: the four-party collaborative system, the “three integrations and three linkages” synergy model, and the feedback and continuous improvement mechanism. Together, they establish an open, adaptive ecosystem for vocational education aligned with rural revitalization.

The four-party collaboration mechanism forms the institutional foundation of the model. It unites government, schools, enterprises, and local communities under shared responsibilities and goals. The government provides strategic direction, policy support, and financial incentives to link education with the Rural Revitalization Strategy. Vocational colleges act

as organizers and executors, focusing on curriculum reform and talent development. Enterprises supply industrial expertise, technical resources, and practical training environments, while local communities offer real rural contexts for experiential learning and social service. This partnership transforms vocational education into a shared social mission rather than an isolated institutional task.

Building on this foundation, the "three integrations and three linkages" model provides an operational framework for collaboration between education, industry, and society. The three integrations—industry-education, science-education, and culture-education—connect technical training with production, research, and cultural revitalization. Industry-education integration aligns courses with local industrial needs; science-education integration introduces technological innovation into teaching; and culture-education integration incorporates rural traditions and creative industries into curricula.

Correspondingly, the three linkages—learning-practice, school-enterprise, and education-community—translate these integrations into daily operations. Classroom teaching is closely linked with fieldwork; joint instruction teams bridge schools and enterprises; and community engagement embeds education in rural governance and development. This multidimensional framework ensures that learning, working, and serving occur in synergy.

To sustain these integrations, a feedback and continuous improvement mechanism ensures dynamic adjustment and innovation. It operates through a recurring process of planning→implementation→evaluation→optimization, supported by digital platforms for real-time monitoring. Feedback from students, teachers, enterprises, and communities is collected and analyzed to refine curricula, improve teaching quality, and adjust partnership strategies. This cyclical feedback loop allows the model to evolve continuously with industrial and regional changes, maintaining its effectiveness and sustainability.

The summary of these mechanisms is presented in Table 4, which outlines their core functions, main participants, implementation focuses, and expected outcomes within the Integrated Talent Training Model.

Table 4 Implementation Mechanisms of the Integrated Talent Training Model

Mechanism	Core Function	Main Participants	Implementation Focus	Expected Outcomes
Four-Party Collaboration	Builds multi-stakeholder governance and coordination	Government, schools, enterprises, local communities	Policy guidance, funding support, curriculum co-design, practical training	Institutional foundation for sustainable cooperation
"Three Integrations and Three Linkages Model	Promotes synergy among education, industry, science, and culture	Schools, enterprises, research institutes, communities	Industry–education, science–education, and culture–education integration; linking learning, work, and service	Collaborative innovation in teaching and rural development
Feedback and Continuous	Ensures dynamic adaptation and innovation	Students, teachers, enterprises, policymakers	Multi-source evaluation, digital monitoring, iterative curriculum updates	Continuous quality improvement and long-term adaptability

4.2 Standards and Characteristics of 'Gold Textbooks'

The implementation of the Integrated Talent Training Model has been piloted in several rural-oriented vocational colleges, demonstrating its adaptability and effectiveness in linking education with local development. This section presents representative cases from Hunan Agricultural Vocational College and Shandong Rural Industry Institute, which have successfully applied the model through curriculum reform, base construction, and project-driven teaching. These cases illustrate how the integration of education, industry, and community contributes to improving employability, enhancing enterprise participation, and promoting rural industrial transformation.

At Hunan Agricultural Vocational College, the integrated model was introduced within the Modern Agricultural Management and Rural E-commerce programs. The college first restructured its curricula based on regional industrial characteristics, emphasizing alignment with the "One Village, One Product" strategy. Each course module was redesigned to combine theoretical instruction with application-oriented projects, such as agricultural branding, digital marketing, and logistics optimization for local agricultural products. Partnerships were established with agricultural enterprises and e-commerce platforms to co-develop teaching content, provide field training opportunities, and implement a dual-mentor system involving both academic instructors and enterprise experts.

A notable innovation at Hunan Agricultural Vocational College was the creation of Rural Entrepreneurship Practice Bases, where students collaborated with farmers and cooperatives to develop new business models and agricultural service solutions. These bases functioned as both training grounds and innovation incubators, allowing students to apply classroom knowledge to real economic activities. As a result, the college reported a 22% increase in graduate employment within rural industries and a significant rise in student-led entrepreneurial projects. The initiative also strengthened cooperation between the college and local governments, which began to use the training bases as talent hubs for regional agricultural modernization.

In contrast, Shandong Rural Industry Institute focused on integrating cultural and ecological elements into its Rural Tourism and Ecological Economy program. The institution collaborated with local tourism enterprises and rural committees to build dual-function training bases that serve as learning environments and tourist service centers. Students participated in the planning and operation of tourism routes, ecological conservation projects, and local festivals, thereby gaining experience in sustainable development and community engagement. The college also implemented the "Classroom + Field + Project" teaching model, combining interdisciplinary instruction with experiential learning. This model effectively linked theory with practice and promoted a strong sense of social responsibility among students.

Moreover, Shandong Rural Industry Institute employed digital empowerment to expand access to resources and strengthen cooperation between urban and rural institutions. Through its digital platform RuralLink, the institute created an online resource-sharing network that connects students, teachers, and enterprises. The platform provides virtual simulations, interactive case libraries, and project supervision tools that allow continuous interaction beyond the physical classroom. This innovation enabled both on-campus and off-site learners to participate in integrated training programs and enhanced the inclusivity and scalability of the model.

The outcomes from these two institutions reveal consistent patterns. Both colleges reported substantial improvements in employment quality and relevance, with graduates more likely to work in rural industries or start local businesses. The integration of teaching and practice also increased enterprise participation, as local companies became active partners in curriculum design, student evaluation, and joint innovation projects. Additionally, the colleges contributed directly to rural industrial revitalization by fostering new business models, enhancing technological application, and promoting community-based entrepreneurship.

The comparative summary of the two cases is presented in Table 5, which highlights the main practices, innovations, and outcomes of the integrated model in different institutional and regional contexts.

Table 5 Case Study of the Integrated Talent Training Model in Rural-Oriented Vocational Institutions

Institution	Key Implementation Practices	Innovative Features	Major Outcomes
Hunan Agricultural Vocational College	Curriculum reform aligning agricultural majors with local industries; establishment of Rural Entrepreneurship Practice Bases	Dual-mentor teaching system; integration of entrepreneurship training with agricultural e-commerce projects	22% increase in graduate employment in rural sectors; growth of student-led startups; stronger college–government cooperation
Shandong Rural Industry Institute	Integration of tourism, ecology, and community engagement into practical training; construction of dual-function training bases	"Classroom + Field + Project" model; use of digital platform RuralLink for hybrid teaching and collaboration	Enhanced student innovation and social responsibility; broader enterprise participation; positive regional tourism and ecological impact

4.3 Evaluation of Practical Outcomes

The implementation of the Integrated Talent Training Model has generated significant educational, economic, and social outcomes, demonstrating its effectiveness in aligning vocational education with the objectives of the Rural Revitalization Strategy. Evaluation of practical results focuses on three major dimensions: (1) enhancement of employment quality and structure, (2) promotion of entrepreneurship and innovation, and (3) contribution to rural economic and social revitalization. These dimensions reflect the overall goal of vocational education reform—to cultivate technically competent, innovative, and socially responsible professionals who actively participate in rural development.

The first dimension concerns employment and career development. Data from participating institutions indicate that graduates trained under the integrated model achieve higher employment rates and stronger job–major alignment compared to those from traditional programs. For instance, at Hunan Agricultural Vocational College, the employment rate for students from the Rural E-commerce program reached 96.4%, with most graduates entering agricultural service enterprises, logistics companies, or village-level e-commerce operations. Similarly, at Shandong Rural Industry Institute, more than 80% of graduates found employment in rural tourism, ecological management, and cultural service sectors within six months of graduation. This improvement is largely attributable to the industry–education integration mechanism, which exposes students to authentic industrial contexts during their studies, thereby increasing both their technical competence and employability. Employers also report that integrated-model graduates possess better teamwork, communication, and problem-solving abilities, suggesting that the model enhances not only vocational skills but also professional soft skills critical for rural employment environments.

The second dimension is entrepreneurship and innovation capacity. The integrated model encourages students to transform learning into entrepreneurial practice by linking education with real-world challenges. Institutions have established entrepreneurship incubation bases and innovation workshops where students collaborate with enterprises and communities to develop business solutions tailored to local needs. At Hunan Agricultural Vocational College, the Rural Entrepreneurship Practice Base produced more than 60 student-led start-up projects between 2021 and 2024, covering areas such as agricultural branding, local specialty processing, and digital marketing. Many of these projects received local government micro-funding and were later registered as rural enterprises or cooperatives. Similarly, at

Shandong Rural Industry Institute, students initiated community-based projects in ecological tourism, handicraft design, and cultural festival organization, contributing directly to local industry diversification.

This entrepreneurial vitality reflects the learning–practice linkage within the integrated framework, which encourages experimentation, risk-taking, and reflection. The introduction of innovation competitions and project-based assessments further reinforces this orientation by making creativity a measurable learning outcome. As a result, vocational education shifts from merely preparing students for employment to equipping them with the capability to create employment, embodying the principle of "learning for application, and learning through innovation."

The third dimension evaluates the model's broader contribution to rural economic and social revitalization. Beyond individual employment or entrepreneurship outcomes, the integrated model serves as a catalyst for regional development by enhancing the connectivity between educational institutions and rural economies. Participating colleges have become local innovation hubs, supporting rural enterprises with technical consulting, digital transformation, and workforce training. For instance, joint research and training programs between vocational colleges and agricultural cooperatives have improved production efficiency and product branding in several pilot villages.

Additionally, the integration of cultural education and community engagement has strengthened rural identity and social cohesion. Students' involvement in rural governance, cultural preservation, and public service projects enhances their understanding of rural realities while revitalizing community participation. Teachers and enterprise mentors report that this approach fosters a new generation of "rural-minded" professionals—graduates who not only possess technical skills but also demonstrate civic responsibility and a willingness to serve their home regions. Thus, the model fulfills both economic and humanistic goals of the Rural Revitalization Strategy by promoting inclusive growth and sustainable community development.

Quantitative and qualitative evaluation further confirms the model's long-term impact. Employment surveys, enterprise feedback, and community assessments show consistent improvement in satisfaction and performance indicators. The employment relevance index (ratio of major-related jobs) increased by 18–25%, the entrepreneurship rate rose by 15%, and community satisfaction with student projects exceeded 90% in the surveyed regions. These results suggest that the integrated model effectively links education outcomes with industrial and social transformation. The summary of these evaluation outcomes is presented in Table 6, which consolidates the three major dimensions, key indicators, and representative results.

Table 6 Evaluation Summary of Practical Outcomes

Evaluation Dimension	Key Indicators	Representative Results	Overall Impact
Employment Enhancement	Employment rate, job–major alignment, employer satisfaction	96.4% employment rate in Hunan Agricultural Vocational College; 80% of Shandong graduates employed in rural industries	Improved job relevance, technical competence, and career stability
Entrepreneurship and Innovation	Start-up projects, entrepreneurship participation rate, innovation outcomes	Over 60 student-led start-ups; growth of rura	Enhanced innovation capability; stronger entrepreneurial ecosystem in rural areas
Rural Economic and Social Revitalization	Industry collaboration, community engagement, social impact assessments	Increased productivity and branding in pilot villages; over 90% community satisfaction with student projects	Strengthened local economies, cultural revitalization, and talent retention in rural communities

5 DISCUSSION AND CONCLUSION

The construction and implementation of the Integrated Talent Training Model under the Rural Revitalization Strategy provide both theoretical innovation and practical transformation for vocational education in China. The findings from previous sections reveal that the model successfully bridges the gap between education and industry, integrates theory with practice, and promotes collaboration between schools and communities. This chapter discusses the implications of these findings, identifies remaining challenges, and concludes with recommendations for sustaining and expanding the model's impact.

5.1 Discussion

The results of this study demonstrate that integration is the key driver of vocational education reform in the context of rural revitalization. Traditional models of vocational training often emphasize technical instruction but neglect the socio-economic environment in which learning occurs. The integrated model redefines vocational education as a dynamic system involving multiple actors and feedback loops. By linking education with production, research, and community development, it transforms schools into agents of regional innovation rather than isolated teaching institutions.

From a theoretical perspective, the study verifies that system theory and constructivist learning theory together provide a robust analytical foundation for understanding vocational education as an open and interactive system. System theory explains how macro-level policies, meso-level institutions, and micro-level learning activities can form a coherent structure when aligned under shared objectives. Constructivist principles, on the other hand, highlight the learner's active role in constructing knowledge through authentic, situated experiences. The success of the integrated model

confirms that combining these perspectives yields a more comprehensive framework for understanding how vocational education can adapt to complex and evolving social realities.

Practically, the industry−education integration and school−community cooperation mechanisms have shown substantial results. The case studies demonstrate that when enterprises and local governments are deeply involved in curriculum design, training base construction, and student evaluation, the educational process becomes more relevant and outcome-oriented. Students are not only able to acquire specific technical skills but also develop broader competencies such as teamwork, problem-solving, and innovation. Furthermore, the embedding of education into rural governance and community service ensures that talent cultivation contributes directly to local development. This dual function－educational and societal—distinguishes the integrated model from traditional vocational programs.

Another important finding is the role of digital empowerment in expanding the model's effectiveness and reach. Digital platforms enhance communication, data sharing, and collaborative learning, enabling rural institutions to overcome geographic and resource constraints. They also facilitate evidence-based management by providing real-time feedback on teaching outcomes, internship performance, and industry engagement. As a result, digitalization acts as a catalyst that strengthens all other forms of integration－connecting people, knowledge, and practices across institutional and regional boundaries.

Despite these achievements, several challenges and limitations remain. First, the degree of integration still varies across regions and institutions. In some areas, cooperation between schools and enterprises remains superficial, limited to short-term internships or formal agreements without deep curricular collaboration. Second, the sustainability of the model depends heavily on policy and financial support from local governments. Without stable funding and long-term incentives, schools may struggle to maintain enterprise partnerships or update training infrastructure. Third, while digital tools have improved connectivity, disparities in technological capacity between urban and rural colleges persist, potentially widening inequalities in implementation quality. Addressing these issues requires continuous institutional innovation, policy consistency, and resource redistribution.

Moreover, the integrated model calls for a shift in educational culture and evaluation criteria. Many vocational institutions still rely on examination-based assessments rather than competency-based evaluations. The new model demands performance-oriented systems that recognize applied skills, creativity, and community contribution. Teachers also need professional development to adopt project-based and interdisciplinary teaching methods. This transformation requires a comprehensive rethinking of what constitutes “quality” in vocational education－not merely knowledge acquisition but the ability to act effectively and ethically in real-world rural contexts.

5.2 Conclusion

This research contributes to the theoretical and practical advancement of vocational education reform under the framework of the Rural Revitalization Strategy. It establishes a conceptual and operational model that integrates education, industry, science, and culture into a unified system of talent cultivation. The study confirms that the Integrated Talent Training Model enhances employment outcomes, entrepreneurial competence, and rural engagement by promoting multi-level collaboration and continuous feedback.

Theoretically, the study enriches vocational education research by proposing an integration-based paradigm that combines system coordination with learner-centered pedagogy. It extends the discourse from simple school−enterprise cooperation to holistic ecosystem construction, emphasizing shared governance and dynamic adaptation. Practically, the findings provide concrete guidance for policymakers, educators, and industries on how to operationalize integration through structural collaboration, curriculum co-design, and digital transformation. The demonstrated success in rural-oriented colleges proves that vocational education can serve as a strategic instrument for rural revitalization, promoting both economic growth and social sustainability.

However, realizing the full potential of the integrated model requires long-term commitment and structural support. Future efforts should focus on three directions.

First, institutionalization and policy continuity—the integrated approach must be embedded into regional development plans and national vocational education standards to ensure stability and scalability.

Second, capacity building for educators and partners—teacher training, enterprise involvement, and local participation should be deepened to enhance the quality and authenticity of integration.

Third, digital inclusivity and innovation－developing smart learning ecosystems and open resource platforms will further equalize access to quality vocational education across regions.

In conclusion, the Integrated Talent Training Model represents a transformative pathway for aligning vocational education with China's long-term rural revitalization goals. By linking learning with practice, schools with communities, and innovation with social service, it establishes a sustainable cycle of education and development. The model's success demonstrates that vocational education, when properly integrated with local realities and driven by collaboration and innovation, can become a powerful force for building a more prosperous, equitable, and revitalized rural China.

COMPETING INTERESTS

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

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THE INNOVATION OF COLLEGE ENGLISH MULTIMODAL TEACHING FROM THE PERSPECTIVE OF ARTIFICIAL INTELLIGENCE LITERACY--AN EMPIRICAL ANALYSIS BASED ON 127 QUESTIONNAIRES

ZhiYing Li[1], JianLong Xu[2], MingRui Ai[3], Lv Lin[1*]
[1]*School of Foreign Studies, South China Agricultural University, Guangzhou 510642, Guangdong, China.*
[2]*School of Foreign Studies, South China Normal University, Guangzhou 510631, Guangdong, China.*
[3]*College of Mathematics and Informatics, South China Agricultural University, Guangzhou 510642, Guangdong, China.*
Corresponding Author: Lv Lin, Email: linlv@scau.edu.cn

Abstract: The rapid development of Generative Artificial Intelligence (GenAI) is reshaping the college English teaching ecosystem. The challenge of how to maintain the core value of language teaching in the face of the widespread integration of AI has become a new, urgent imperative for college English education. Based on survey data from 127 college students, this paper analyzes the current status and deficiencies of students' Artificial Intelligence Literacy (AIL) across four dimensions: AI knowledge, AI skills, AI attitude and values, and AI ethics. The results indicate significant shortcomings among students in prompt engineering and the critical evaluation of AI-generated content. Addressing these issues, this paper proposes an innovative model for college English teaching based on GenAI applications, promoting the synergistic development of students' language proficiency and AI literacy. AI literacy education (AILE) should be embedded in the language learning process, activating learners' meaning construction and creativity through multimodal tasks to achieve technology-enabled innovation in college English multimodal teaching.
Keywords: Generative artificial intelligence; Artificial intelligence literacy; College English teaching; Multimodal teaching

1 INTRODUCTION

The powerful generative capability of GenAI has brought a tremendous impact on the core value and practice of language teaching. While offering learners instant feedback, content generation, and personalized support, it also introduces potential problems such as language skill degradation, homogenization of thinking, and academic misconduct. As GenAI technologies rapidly evolve and become increasingly prevalent in foreign language education, the integration of AILE into college English curricula has become imperative for enhancing learners' AIL and enabling them to adapt to the ongoing transformation of education. Therefore, this study aims to explore the current status and overall profile of students' AIL and to analyze the implementation of general AILE in college English teaching. Building on these findings, it seeks to design an innovative AI-integrated teaching paradigm that fosters the synergistic development of learners' language proficiency and AI literacy.

2 RELATED RESEARCH

Conceptually, AIL closely overlaps with information literacy and digital literacy, and it is rapidly emerging as a focus of global educational attention. Long and Magerko define AI literacy as "a set of competencies that enable individuals to critically evaluate AI technologies; communicate and collaborate effectively with AI and use AI as a tool online, at home and in the workplace"[1]. A number of authoritative international organizations, such as UNESCO, the European Union (EU) , and the Organisation for Economic Co-operation and Development (OECD), have developed influential conceptual frameworks to define and promote digital literacy worldwide. In its 2021 report, the Cyberspace Administration of China outlined four core dimensions: digital awareness, computational thinking, digital learning and innovation capabilities, and digital social responsibility, underscoring a people-centered and responsible approach to the application of AI technologies in the age of intelligence. These mainstream frameworks reveal a shared understanding that AIL extends beyond technical proficiency to encompass a broader competency for responsible reasoning and ethical action within AI-mediated contexts.

Scholars have conducted relevant research on the connotation, framework, and evaluation system of AIL. Huang et al. argue that AI literacy (AIL) represents a fundamental competency for all citizens in the AI era[2]. They proposed an AIL educational framework encompassing four core dimensions: AI knowledge, AI skills, AI application, and AI ethics, and stressed that educators should adapt instructional content and methods to the characteristics and needs of diverse learner groups. Similarly, Zhou et al. developed a conceptual framework for AIL based on the KSAVE assessment model, comprising four dimensions: AI knowledge, AI skills, AI attitudes and values, and AI ethics[3]. They highlighted that AI literacy constitutes a comprehensive competency system integrating technical proficiency, cognitive

understanding, and ethical reflection. This study developed and validated an AIL scale designed for college students, aiming to examine the multidimensional structure of their AIL through the construction and application of this measurement instrument.

Regarding AILE, Zhang et al. conceptualize it as a set of initiatives designed to help the public, particularly non-professionals, understand, evaluate, and effectively apply AI technologies, while cultivating critical awareness of their ethical, social, and risk-related implications[4]. They further underscore the need to promote AILE strategically in higher education. In higher education, three types of institutional bodies play a central role in promoting AIL among faculty and students. First, cross-departmental collaborations and expert teams offer general AI courses. Second, teaching and learning development centers, including writing centers, establish guidelines and standards for AI practice and application. Third, university libraries provide lectures, training programs, consultation services, and elective courses. Zhang advocates that universities, in addition to providing specialized AI literacy courses, should further define educational objectives and content within a pervasive AI education framework[5]. Thematic instruction should be offered to address the needs of different application scenarios and academic disciplines.

Existing research on AILE has mainly concentrated on the development of AIL concepts and frameworks, thus offering theoretical foundations and guiding principles for AIL education. However, research on discipline-specific AIL and the integration of AILE into subject courses remains limited and warrants further investigation.Therefore, this paper aims to adapt an existing AIL scale for application in English course teaching. Using a questionnaire survey, it seeks to assess the current status of college students' AIL, identify areas for improvement, and explore approaches for the deeper integration of language learning and intelligent technologies. The study addresses the following research questions:

(1) What is the overall level and profile of college students' AI literacy?

(2) What are the key factors influencing the development of college students' AI literacy?

(3) How can AI literacy development be effectively integrated into college English teaching to promote the synergistic advancement of language learning and AI literacy?

3 RESEARCH METHODS

The study employed a questionnaire adapted from the AIL scale developed by Zhou et al. for college students[3], which underwent expert evaluation by four specialists and was refined through two rounds of pilot testing. Reliability and validity were subsequently verified through statistical analyses, confirming the instrument's scientific rigor and construct specificity. This study preserved the core structure of the original AIL scale while adapting it to specific English learning contexts. Prior to formal administration, a small-scale pilot test was conducted with 55 participants. The reliability of the scale was assessed via the Cronbach's α coefficient, which exceeded 0.7, demonstrating high internal consistency and stability.

The adapted questionnaire comprises 22 items, including fill-in-the-blank, multiple-choice, and 7-point Likert scale questions (1 = Strongly Disagree; 7 = Strongly Agree). It is organized into three sections. The first section collects demographic information, including age, gender, and region. The second section assesses participants' educational experience, attitudes toward AI, frequency of AI use, and purpose of AI engagement. The third section constitutes the AIL measurement scale, covering four dimensions: AI knowledge (Q7-Q10), AI skills (Q11-Q14), AI attitude and values (Q15-Q19), and AI ethics (Q20-Q22). The survey participants were freshmen at the first author's university.

4 RESULTS ANALYSIS

A total of 127 valid questionnaires were obtained for this study. The results were analyzed in three stages: first, descriptive statistical analysis; second, evaluation of AIL dimensions and identification of areas for improvement; and third, multiple regression analysis to examine the impact of variables on the overall AIL score.

4.1 Descriptive Statistical Analysis

As shown in Table 1, the sample's demographic characteristics and AI usage behavior are as follows. The gender distribution is approximately equal, with 48.03% male and 51.97% female participants. The majority of respondents (69.29%) have a professional background in STEM fields. In terms of AI usage, students exhibit a high overall frequency of use: 66.15% engage with AI several times a week or more, and 19.69% use it almost daily. Additionally, 51.97% of students have participated in AI-related courses or training, slightly exceeding the proportion of students without such exposure.

Table 1 Sample Demographic Characteristics and AI Usage Behavior (N=127)

Variable	Category	Frequency	Percentage (%)
Gender	Male	61	48.03
	Female	66	51.97
Professional Background	STEM (Sci/Eng/Med/Agr)	88	69.29
	Humanities/Social Sciences	18	14.17
	Economics/Management/Arts	16	12.60
	Other	5	3.94
AI Usage Frequency	Almost Daily/Several Times a Week (High Frequency)	84	66.15

	Several Times a Month/Rarely Used (Low Frequency)	43	33.85
AI Education Experience	No Training	61	48.03
	Any Form of Training	66	51.97

4.2 Analysis of AIL Dimensions and Areas for Improvement

Table 2 presents the descriptive statistics for the four dimensions of AI literacy and the overall score. The total AI literacy score ranged from 50.00 to 112.00 (M = 89.76, SD = 13.11), reflecting an overall high level of AI literacy among the participants, with a moderate degree of individual variation.

Table 2 Mean Scores and Standard Deviations for AIL Dimensions (N=127)

Dimension	Minimum	Maximum	Mean (M)	Standard Deviation (SD)
AI Knowledge (Q7-Q10)	1.25	7.00	5.64	1.21
AI Skills (Q11-Q14)	2.00	7.00	5.28	1.06
AI Attitude and Values (Q15-Q19)	3.40	7.00	5.56	0.98
AI Ethics (Q20-Q22)	4.00	7.00	6.09	0.92
Total AIL Score	50.00	112.00	89.76	13.11

Among the dimensions, AI ethics demonstrated the highest mean score (M = 6.09, SD = 0.92). Specific items, including "Ethical Consideration" (6.20) and "Privacy Protection" (6.07), ranked among the highest across all items, indicating a generally high level of ethical awareness among students. AI knowledge (M = 5.64, SD = 1.21) and AI attitude and values (M = 5.56, SD = 0.98) also showed high levels, suggesting that students generally possess a solid understanding of AI concepts and maintain a positive orientation toward AI use. In contrast, AI skills exhibited the lowest mean (M = 5.28, SD = 1.06), implying that practical abilities in operating AI tools and employing effective strategies (e.g., prompt design, tool selection) may be comparatively less developed. Further analysis of individual items identified two major shortcomings in students' AIL:

(1) Limited critical evaluation capability. Among all items, the "Ability to evaluate the reliability of AI-generated content" obtained the lowest mean score (M=4.86), indicating that students generally demonstrate insufficient critical evaluation skills. Consequently, they may struggle to use AI cautiously, verify information, and integrate content critically within AI-supported learning environments.

(2) Insufficient prompt engineering skills. The "Prompt capability" item received the lowest self-assessment among operational skills (M=5.10), with only 22.8% of students reporting proficiency in producing high-quality prompts. Considering that prompts are pivotal for effective human-AI interaction, this deficiency considerably constrains students' ability to engage productively and accurately with generative AI systems.

4.3 Correlation and Regression Analysis of AIL Dimensions

In order to examine the independent contributions of different factors to the overall AIL score, a multiple regression analysis was conducted. Table 3 presents the correlation coefficients (r) and standardized regression coefficients (β) obtained from this analysis for the key predictor variables.

Table 3 Pearson Correlations and Standardized Regression Coefficients for AIL Dimensions (N=127)

Dimension	Pearson r	p(r)	Standardized β	p(β)	Relative Influence Strength
AI Attitude and Values	0.823	<0.001	0.373	<0.001	Strong
AI Knowledge	0.731	<0.001	0.368	<0.001	Strong
AI Skills	0.831	<0.001	0.323	<0.001	Strong
AI Ethics	0.738	<0.001	0.211	<0.001	Moderately Strong

All dimensions show strong and significant positive correlations with total AIL scores (r = .731–.831, p < .001). Among them, AI skills (r = .831) and AI attitude and values (r = .823) exhibit the strongest bivariate associations, followed by AI ethics (r = .738) and AI knowledge (r = .731).

After controlling for intercorrelations among the four AIL dimensions, AI attitude and values (β = .373, p < .001) demonstrated the strongest independent predictive effect on overall AIL, followed closely by AI knowledge (β = .368, p < .001) and AI skills (β = .323, p < .001). These findings indicate that learners' perspectives toward AI, cognitive understanding of AI concepts, and practical ability to use AI tools each make substantial and unique contributions to AIL. In comparison, AI ethics (β = .211, p < .001), while still significant, showed a moderately strong effect. This suggests that ethical awareness's predictive power is relatively smaller once attitudes, knowledge, and skills are taken into account.

5 DISCUSSION

5.1 Current Status and Primary Shortcomings of College Students' AI Literacy

A questionnaire survey of 127 college students revealed that the overall level of AIL was relatively high, but with notable imbalances across dimensions. Participants displayed high ethical awareness and positive learning attitudes, including a willingness to engage with new AI tools. Moreover, students demonstrated a solid understanding of AI's fundamental characteristics, such as inaccuracy and inherent limitations. Collectively, these results indicate that college students possess awareness of AI's social implications and basic risks, and are inclined to accept and learn this emerging technology.

However, two primary deficiencies in college students' AIL were identified: prompt engineering capability and critical evaluation capability. Multiple regression analysis confirmed that prompt capability constitutes the largest independent predictor of overall AI literacy among AI skill dimension (M=5.10). A deficiency in this skill substantially constrains students' capacity to interact with generative AI effectively and accurately, thereby diminishing the potential of AI as a learning tool. The ability to evaluate the reliability of AI-generated content received the lowest mean score (M=4.86), indicating that students generally lack the competencies to critically scrutinize, verify, and assimilate AI outputs. Such shortcomings may introduce risks in academic research and language learning, including exposure to inaccurate information and the fostering of cognitive complacency.

Moreover, students exhibited relatively low awareness of AI-related social biases, including gender and racial bias (M=4.93). Multiple regression analysis demonstrated that knowledge-based cognition and ethical understanding do not make significant independent contributions to overall AIL; their impact is realized only when transformed into concrete skills and practical behaviors, such as tool operation, prompt engineering, and critical evaluation. These results imply that AIL development in college English teaching should not be limited to AI knowledge education, but should emphasize core skills training and the practical application of AI technologies.

5.2 Path for Integrating AIL into College English Teaching

The application of GenAI in language education introduces potential issues, such as the degradation of language skills, homogenization of thinking, and challenges to the authenticity and effectiveness of teaching evaluation. Consequently, literacy development objectives in the GenAI era must be restructured to include AIL as a core component. Given that AIL encompasses practical and multimodal competencies, the New London Group's Multiliteracies theory developed by Cope & Kalantzis offers a suitable pedagogical framework to address the limitations of traditional monolingual literacy instruction in the context of globalization, multiculturalism, and digital media[6]. Empirical evidence indicates that multimodal teaching grounded in the Multiliteracies framework effectively promotes the development of literacy-related competencies, such as critical thinking[7], suggesting that it can serve as an effective approach to fostering AIL in GenAI-enabled language learning. Nevertheless, prior multimodal instruction was largely constrained to receptive multimodal input, and productive multimodal tasks were rarely implemented due to technical limitations. The advent and rapid advancement of GenAI, with its robust multimodal generation capabilities, provides the necessary technical support to implement productive multimodal tasks. Recent studies, including explorations of AI text-to-image models in foreign language instruction, present promising pathways for enhancing the efficacy of multimodal teaching[8].

The questionnaire survey results indicate that in terms of AI skills prompt engineering capability ($r=0.682$, $\beta=0.168$) constitutes the most significant predictors of overall AIL, followed by. The "skill triangle" comprising tool use, prompt engineering, and critical evaluation—exerts a central influence on students' AIL development. Given these findings, effective AILE requires students to complete task-based activities involving extensive engagement with GenAI, thereby promoting the development of prompt engineering and critical evaluation competencies through hands-on practice. In light of this, the present study proposes a targeted, innovative pathway for college English multimodal instruction.

First, it is necessary to reformulate teaching objectives. Based on existing language and intercultural goals, relevant AIL components should be integrated, with a focus on cultivating critical thinking and digital innovation competencies. Survey findings indicate that while students frequently use AI and demonstrate a willingness to engage with it, such usage has not yet been fully translated into advanced skills that support deep language learning and critical thinking. Given these findings, the primary focus of teaching innovation should be the restructuring of objectives to develop competencies for effective human-AI collaboration through prompt engineering and critical evaluation. Consequently, critical thinking and innovation competencies should be established as core teaching objectives alongside language proficiency and intercultural competence. This objective-level restructuring ensures that instructional practices target students' weaknesses in prompt writing and critical evaluation, shifting learners' focus from passive information retrieval to active knowledge construction in collaboration with AI.

Second, reshape the teaching process through the design of multimodal tasks grounded in the skill triangle framework. Following Zhang, who emphasizes that practical engagement is a crucial component of AI literacy education and that instructional methods should balance theory with hands-on operation across all course levels[5], multimodal tasks should be integrated throughout the curriculum. Such tasks aim to foster the integration of tool use, prompt engineering, and critical evaluation competencies within authentic language use contexts. Illustrative examples include analyzing AI-generated images and textual content, producing AI-assisted podcasts, and translating video subtitles. By engaging in these activities, students can comprehensively apply the three core competencies in practice, thus facilitating the simultaneous advancement of both language proficiency and AIL.

Finally, it is essential to integrate a critical evaluation component into all GenAI-based tasks. Given students' relatively weak critical evaluation competency alongside their awareness of AI inaccuracy, each task should require students to

evaluate AI-generated content using a structured rubric, providing reasoned justification for accepting or rejecting AI suggestions. This approach transforms students' engagement from passive information reception to active knowledge construction and meaning negotiation, thereby fostering the development of critical evaluation competency. Moreover, assessment should not be limited to the final language output; it should also consider the quality of prompts, the interaction logs with AI, and a critical reflection report on AI-generated content, thus enabling a comprehensive characterization of students' overall AI literacy.

6 CONCULSION

The empirical survey conducted in this study indicates that college students exhibit generally high levels of AI literacy, yet significant competency gaps remain, particularly in the areas of prompt engineering and critical evaluation. In response, college English teaching should proactively integrate GenAI technology, embedding AIL development across the entire instructional process. Through a systematic re-constructing of teaching objectives, instructional procedures, and assessment strategies, a novel paradigm for multimodal English instruction is proposed. This paradigm not only addresses students' competency gaps but also promotes intrinsic motivation through structured engagement with multimodal tasks. It facilitates the development of competencies for effective communication and collaboration with AI while maintaining critical thinking in authentic language application contexts. Such an approach is both essential for adapting to technological transformations and pivotal for cultivating students with integrative competencies encompassing language proficiency, intercultural understanding, critical thinking, and digital innovation.

Future research may examine the differential effects of various multimodal tasks on specific AIL sub-dimensions, optimize the deployment of GenAI in formative assessment, and explore strategies to mitigate technology dependence while ensuring the sustainable development of students' language proficiency.

COMPETING INTERESTS

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THE INFLUENCE OF AI-ENABLED SMART COURSES ON THE TEACHING PEDAGOGY IN HIGHER EDUCATION

LiShan Lv
School of Foreign Study, South China Agricultural University, Guangzhou 510642, Guangdong, China.
Corresponding Email: lv_sally@scau.edu.cn

Abstract: With the rapid advancement of artificial intelligence (AI) and educational technology, smart courses have emerged as a transformative force in reshaping English language teaching (ELT) pedagogy in higher education globally. This paper explores the impact of smart courses on ELT pedagogy by first reviewing the development of smart courses and distinguishing them from traditional online learning platforms such as MOOCs and Coursera. It then analyzes the revolutionary changes brought by AI empowerment, focusing on three dimensions: reform in AI-enabled education, the specific impacts on teaching pedagogy (encompassing teachers, students, and management and evaluation), and the overall influence on higher education. Finally, the study also raises some concerns about future research of smart courses.
Keywords: AI-enabled smart course; English language teaching; Higher education; Pedagogy; AI empowerment

1 INTRODUCTION

In the digital era, the integration of educational technology and language teaching has become a core trend in higher education reform. English, as the most widely used international language, plays a pivotal role in global academic exchange, career development, and cultural communication. Traditional English teaching in higher education, however, often faces challenges such as standardized curricula that fail to cater to individual learning needs, limited interaction between teachers and students, and inefficient assessment methods[1] . The emergence of online learning platforms like MOOCs (Massive Open Online Courses) and Coursera in the early 2010s initially addressed some of these issues by expanding access to educational resources, but they still lacked adaptability and personalized guidance [2].

In recent years, smart courses, empowered by AI technologies such as natural language processing (NLP), machine learning (ML), and big data analytics, have transcended the limitations of traditional online education. Unlike MOOCs which primarily focus on content delivery, smart courses emphasize dynamic interaction, adaptive learning paths, and data-informed decision-making. This paper aims to investigate how smart courses are transforming ELT pedagogy in higher education both at home (China) and abroad. By examining the development of smart courses, comparing them with traditional online platforms, and analyzing the AI-driven changes in teaching practices, this study seeks to provide insights into the future direction of ELT and its contribution to higher education quality and national language soft power.

2 LITERATURE REVIEW

2.1 The Development of AI-enabled Smart Courses

The concept of “smart courses” originated from the intersection of smart education and adaptive learning. According to UNESCO [3], smart education refers to “the application of emerging technologies to transform teaching and learning environments, making education more personalized, efficient, and inclusive.” Smart courses, as a core component of smart education, integrate AI, big data, and interactive technologies to create learning environments that can adjust to individual learners’ abilities, interests, and progress. Abroad, institutions like Stanford University and MIT have pioneered smart course platforms, such as Stanford’s AI-powered language learning system that uses NLP to provide real-time feedback on students’ writing and speaking .In China, the development of smart courses has been accelerated by national policies such as the “Education Informatization 2.0 Action Plan”[4], which emphasizes the integration of AI into educational practices.

The global promotion in AI-enabled education has grown exponentially in recent years, with a particular focus on smart courses for language learning. In China, major universities such as Peking University and Tsinghua University have established AI-education laboratories to develop smart English courses, which integrate virtual reality (VR) for immersive language learning and big data analytics for student performance tracking. Tsinghua University’s “Smart English” platform has been adopted by over 100 domestic universities, serving more than 500,000 students. Some other provinces also promote the construction of platforms for smart education at faster speed, focusing more on large-scale platform construction and policy-driven promotion.

2.2 Differences Between AI-enabled Smart Courses and Traditional Online Platforms

Traditional Online Platforms such as MOOCs and Coursera have made significant contributions to expanding educational access, they differ fundamentally from AI-enabled smart courses in several key aspects. First, in terms of personalization, MOOCs typically offer a one-size-fits-all curriculum, whereas smart courses use ML algorithms to analyze students' learning data (e.g., quiz scores, time spent on tasks, error patterns) and generate customized learning paths. For example, a smart English course can identify a student's weakness in grammar and recommend targeted exercises, while a MOOC would present the same grammar module to all students [5]. Second, interaction in MOOCs is often limited to discussion forums and pre-recorded videos, while AI-enabled smart courses enable real-time interaction through AI chatbots, virtual tutors, and interactive simulations. Third, assessment in MOOCs relies heavily on automated multiple-choice tests, whereas smart courses use NLP and ML for formative assessment, such as evaluating essay content, detecting plagiarism, and providing detailed feedback on pronunciation [6].

The potential of digital technologies in language teaching has been explored in early studies [7] but did not fully integrate AI. More recent studies have examined the effectiveness of AI-powered tools in smart courses. AI is streamlining operations and improving efficiency. Universities are leveraging AI to automate tasks like admissions processing, grading assignments, it did improve the effectiveness. Researches also studied the modes of function of information presentation and assess their impacts on college students' cognitive, skill-based, and affective learning outcomes[8-10].However, these previous studies have focused on individual technological tools rather than the holistic impact of smart courses on teaching pedagogy.

3 REQUIREMENTS IN AI-ENABLED SMART COURSES

AI-Enabled Smart Courses should cater to the following qualities: 1. adaptive learning with tailored content based on individual strengths and weaknesses, thus better satisfying students' need; 2. immersive learning environment with real-world scenarios to simulate work or academic contexts and bridge the gap between theory and practice; 3. real-time feedback system with instant corrections on learning. With "digital intelligence-driven and multi-dimensional integration" as its core strategy, the course systematically integrates knowledge graph, competence graph, question graph and literacy graph (ideological and political quality) together with all teaching contents to form a whole system, reconstructs the learning and teaching ecology, effectively enhancing students' language application ability and cross-cultural literacy.

Various resources such as textbooks and other learning materials present the logical connections of knowledge nodes through knowledge graphs, helping students build a systematic language knowledge network. Knowledge graph usually helps to visualize hierarchical relationships between dimensions, nodes, and resources. The graph continuously is updated based on teaching feedback and curriculum reforms.

Smart courses also highlight the competence dimensions of students: Based on teaching objectives and language proficiency frameworks (e.g., CEFR), it presents the competence into four core dimensions: language proficiency (listening, speaking, reading, writing, translation), cultural literacy (cross-cultural communication, global cultural awareness), academic skills (academic writing, critical reading, research presentation), and learning autonomy (self-assessment, resource utilization).Through the competence map, teachers get to identify students' strengths and weaknesses by analyzing their performance against node indicators .

Together with these two graphs, the question graph that centers on "learner questions" is also a required part of the whole course design. It systematically organizes, classifies, and associates questions generated in teaching (e.g., students' doubts, key inquiry topics, and assessment questions) with knowledge nodes, learning resources, and competence goals.

As a new requirement in the design of the smart course, systematic construction of literacy (ideological and political literacy or quality) corresponds to a clear value view, such as dedication, patriotism, innovation, and progress. It also supports the visualization of critical thinking cultivation in the course.

For each dimension, map knowledge and skill nodes refine sub-competencies and link to specific knowledge nodes (e.g., "academic writing" includes sub-nodes like essay structure, citation norms, and academic vocabulary) and skill indicators (e.g., "speaking" covers fluency, pronunciation, and topic relevance).

The 4-dimension system enhance the teaching alignment, it helps to guide teachers to design lessons aligned with core dimensions, ensuring resources and activities directly contribute to competence improvement.

4 THE IMPACT OF SMART COURSES ON TEACING PEDAGOGY

According to the China Smart Education Development Report, 2025 was defined as the "first year of smart education"[11]), since then smart courses have brought profound changes to ELT pedagogy, affecting teachers, students, teaching methods, and management & evaluation.

4.1 For Teachers

Student-centered pedagogies prioritize learners' autonomy, individual needs, and active participation. Smart courses have transformed teachers' roles from "knowledge transmitters" to "learning designers and mentors". AI, big data, and interactive technologies amplify this focus by enabling personalization, adaptive learning, and collaborative engagement. AI tools handle routine tasks such as grading homework, providing basic feedback, and tracking student progress, allowing teachers to focus on designing personalized teaching strategies and facilitating interactive activities.

Smart courses serve to reduce teachers' workload. More intelligent agents or tools like VR that can simulate real-world scenarios (e.g., international conferences, job interviews) allowing students to practice English in immersive environment.

However, many macro-systems lack sufficient training and support for teachers, leading to resistance or ineffective implementation because teachers may be inadequately trained to use AI-powered smart course tools, and struggle to balance technology with traditional teaching methods. This may lead to "tech-for-tech's-sake" implementations—smart courses are adopted in macro-designs but not integrated meaningfully into lessons, wasting resources and failing to improve learning outcomes. In the context of AI era, access to information is easy, another problem may come out--teachers need to figure out innovative ideas that can attract the interest of students to learning while struggling to learn new technologies like AI and generative tools at a faster pace than students do, which will be more challenging for language teachers. ELT teachers should aim high in designing smart courses that can enhance students' ability to participate in global academic and cultural exchanges, fostering cross-cultural understanding and strengthening global language soft power networks.

4.2 For Students

With adaptive learning paths, students can learn at their own pace and focus on areas where they need improvement. The interactive features of smart courses, such as AI chatbots and VR simulations, also increase student engagement. Smart courses also offer integrated graph resources such as knowledge graph, competence graph, question graph as well as literacy graphs (or quality that help to shape the critical thinking) for students to follow and search the content they want to learn at a faster pace. For example, a smart course on "Airport English" includes a self-directed learning hub. Students can select subtopics based on personal needs (e.g., a student preparing for an international trip might prioritize "check-in dialogue practice,". Students can use a built-in self-assessment tool after practicing "boarding pass vocabulary," and they can take a 10-question quiz and receive an instant report (e.g., "You mastered 7/10 words－review 'gate number' and 'departure time''). And they can join peer forums to ask questions (e.g., "Does anyone have tips for pronouncing 'baggage claim' clearly?") and share resources (e.g., linking to a YouTube video on "airport announcement listening practice"). This empowers students to take ownership of their learning journey. Students can have independent learning at their own pace, but have a clear picture of how they learn and what position they are in compared with their peers with the data produced in the learning platform.

Smart courses include tools for students to evaluate their own progress-encouraging them to reflect on strengths and weaknesses. This aligns with student-centered pedagogy by giving students ownership of their learning, for example a smart course on "airport English" includes a self-assessment tool for the "navigation" module. Students complete a practice quiz on signage vocabulary and directional dialogue. They can evaluate their learning outcome by using a checklist to rate their own skills (e.g., "I can understand 'baggage claim' signs: 1=Not at all, 5=Very well"). This helps students identify gaps independently and take steps to improve.

However, since knowledge are easily accessed to, they may face the decrease of efforts and willingness of getting involved in the required study time, thus the guiding of learning for teachers and the sense of fulfillment may become the more important focus in education.

4.3 For Management and Evaluation

Smart courses enable data-driven management and formative evaluation. Big data analytics can track students' learning behaviors in real time, providing teachers and administrators with insights into student progress and course effectiveness. Students-centered smart courses organize resources (e.g., micro-lectures, practice exercises, peer forums) in a modular, searchable way. AI analyzes student behavior (e.g., which resources are accessed most, how long students spend on them) to update resource libraries—adding high-demand materials and removing outdated ones. For example, smart courses use real-time data to track each student's progress toward learning goals (e.g., mastering "airport check-in dialogue," improving writing fluency). Teachers can access dashboards to identify students who need extra support or acceleration—enabling proactive intervention.

Traditional evaluation often focuses on summative assessments (e.g., midterm/final exams) that measure "what students know" at a single point. Student-centered smart courses shift to formative, multi-dimensional evaluation—using AI to assess skills (e.g., speaking fluency, collaboration), provide real-time feedback, and involve students in self-assessment. This makes evaluation fairer, detailed, and focused on improvement on not just factual knowledge (e.g., vocabulary, grammar rules) but also practical skills (e.g., communication, critical thinking) and soft skills (e.g., collaboration, self-direction)—key to student-centered learning. AI tools analyze multiple data points (e.g., dialogue recordings, group project contributions) to generate holistic evaluations.

AI-powered assessment tools can evaluate not only knowledge acquisition but also skills such as critical thinking and communication. Feedback of students learning can further help the redesign of the teaching process and the adjustment of the teaching content flexibly. Smart courses break geographic and resource barriers by centralizing high-quality educational content (e.g., lectures by top professors, interactive simulations, digital libraries) on cloud-based platforms, making them accessible to schools nationwide or even globally. The democratization of resources aligns with macro-design goals of reducing regional education disparities, ensuring more equitable access to quality learning opportunities.

Though with the massive volumes of student data (e.g., learning habits, performance metrics, personal information etc.) generated by smart courses, educators can use them in the promotion of better education to realize the macro schema of education. But it may also raise critical ethical concerns in macro-educational design, such as data privacy breaches, algorithmic bias, and the potential misuse of sensitive information. Without robust regulatory frameworks, macro-designs may prioritize data utility over student privacy.

5 CONCLUSION

This paper has explored what smart courses center on and how smart courses are transforming ELT pedagogy in higher education in the new era. Smart courses highlight the importance of the design of the course's four graphs (knowledge graph, competence graph, question graph and literacy graph) that work for the development of students in the new era. It advocates shifting from traditional knowledge-based education to a more comprehensive model that integrates personal development with societal needs. We believe that it will enhance the quality and accessibility of higher education and reshape teaching pedagogy by redefining the roles of teachers and students, promoting learner-centered teaching methods, and enabling data-driven management and evaluation.

Despite the progress, we would like to remind that challenges remain, such as ensuring the equity of access to smart courses, addressing data privacy concerns, and integrating AI tools with human teaching effectively. When an AI tutors a student on the language by adapting explanations based on real-time performance, it redefines the "source" of knowledge—not just a teacher or textbook, but an algorithm that synthesizes vast datasets. This raises questions: Does knowledge generated by AI carry the same "validity" as human-curated knowledge? Can learners truly "know" a concept if their understanding is shaped by an algorithm's priorities (e.g., prioritizing testable facts over conceptual depth)? What is the influence of teachers in the shaping of students' thoughts since we believe in the saying of "The essence of education lies in the fact that one tree shakes another tree, one cloud pushes another cloud, and one soul awakens another soul."

Future research should focus on these challenges and explore the long-term impact of smart courses on ELT pedagogy. Overall, smart courses represent a promising direction for the future of English teaching in higher education, offering new opportunities to improve learning outcomes and promote the development of education.

COMPETING INTERESTS

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THE APPLICABILITY OF "INVISIBLE DEATH" TO POSTWAR HONG KONG REGION

ChengDian Song
Faculty of Arts, The University of Hong Kong, Hong Kong Region 999077, China.
Corresponding Email: songcd202223@163.com

Abstract: The French historian Philippe Ariès posited that the twentieth century ushered in an era of "invisible death," where death became increasingly marginalized and secluded in the process of modernization, turning into a secretive taboo. While this theory offers a pivotal framework for understanding the transformation of death in Western society, its applicability to non-Western contexts remains untested. Post-war Hong Kong region provides a valuable case study for this examination.Therefore, the death in post-war Hong Kong region did not fade out of social vision, but was re-anchored through a series of institutional and ritual practices, becoming a continuously visible component of social structure. By analyzing this unique case, this study not only reveals the cross-cultural application limitations of the "invisible death" theory, but also attempts to clarify the cultural institutional arrangements that maintain and reconstruct the visibility of death in modern society.
Keywords: Invisible death; Post-war Hong Kong region; Visibility of death; Cultural system

1 INTRODUCTION

Philippe Ariès, the pioneering French historian, fundamentally reshaped our understanding of Western attitudes towards mortality through his seminal thesis of "inverted death." In his magnum opus, *The Hour of Our Death*, Ariès posits a profound historical shift wherein death, once a public and familiar event integrated into the fabric of community life, was progressively marginalized in the modern era. It retreated into the sterile, technical confines of the hospital, becoming a sequestered and sanitized taboo—a phenomenon he famously termed "invisible death." This powerful narrative of modernization-as-concealment has provided an indispensable framework for analyzing the socio-cultural trajectories of death in Western societies. However, its explanatory power becomes more complex and contested when applied to non-Western contexts undergoing their own distinct modernities.

It is at this critical juncture of theoretical dialogue that the case of post-war Hong Kong region presents a compelling site for examination. The socio-cultural landscape of Hong Kong region during the latter half of the twentieth century—a period marked by rapid urbanization, refugee influx, and colonial governance—would seem, at first glance, to exhibit conditions ripe for the emergence of Ariès's "invisible death." The simplification of domestic mourning rituals under the pressures of urban life, the traumatic yet ephemeral shock of the 1968-69 Hong Kong region flu pandemic, and the phenomenon of isolated deaths among a vulnerable elderly population all appear as potential vectors for death's social disappearance. Yet, to conclude that death became invisible in post-war Hong Kong region would be to overlook the robust and resilient structures that ensured its continued visibility. A meticulous death registration system, the enduring materiality of recorded identities in columbaria, the performance of indispensable public funeral rites, and the annual reaffirmation of communal memory through tomb-sweeping festivals collectively forged a distinctive reality. This paper, therefore, seeks to interrogate the applicability of Ariès's thesis by arguing that in post-war Hong Kong region, death was not so much rendered invisible as it was re-articulated through a complex interplay of bureaucratic, spatial, and ritualistic channels that maintained, and in certain ways even amplified, its presence within the public sphere.

In order to draw the above conclusions, this paper will start from the clarification of the concept of "invisible death," and on the basis of the literature review, we will examine in-depth the special historical arena of Hong Kong region in the post-war period, with a view to revealing how death has been redefined, recounted and remembered in the midst of social changes, so as to deepen our understanding of Hong Kong region's socio-cultural contexts.

2 LITERATURE REVIEW

In the field of Chinese social studies, funeral practices, as an important window for understanding cultural structures and social mentality, have traditionally received extensive attention from anthropologists and historians. Established studies have systematically explored Chinese funeral traditions from the perspectives of ritual practices, belief systems and social organisation. For instance, Ahern reveals the social connection and reciprocity behind ritual behaviour through a careful observation of ancestor worship in villages[1]. Henriot, on the other hand, traces the trajectory of the evolution of death concepts and practices from the late Qing to the Republican period through the lens of historical change[2]. Meng Xuehua, taking the Maonan as the object of study, points out that the funeral rites of the Maonan people center on the principle of "filial piety," guiding both the remembrance of the deceased and the sending-off of the

soul, with their elaborate practices constituting a multicultural amalgam that integrates Bai-Yue, indigenous Guizhou, and Han Chinese customs[3].

In this line of scholarship, Hong Kong region's funerary history is characterised by a distinctive regional and staged approach, with Wilson noting that Hong Kong region functioned as a transit hub for human remains during the pre-war and early post-war periods, with organisations such as the Tung Wah Hospital playing a key role in the process[4]. With the development of the times, the social functions of funeral practices have also been given new interpretations: Zhuo Yue argues that Chinese funerals strengthen the individual's sense of belonging to the family and community through ritual activities[5]; Beaunoyer and Guitton further suggest that digital technologies are reshaping the ways in which the living and the dead interact, using the concept of "Cyberthanathology" to suggest that death does not really "pass away invisibly"[6]. Rather, it has moved into the digital realm and taken on new visible forms.

While these studies have laid an important foundation for understanding the continuity and transformation of Chinese funeral culture, there is a lack of systematic and in-depth discussion on the question of whether "invisible death" has survived the drastic social changes and modernisation process in the specific historical context of post-war Hong Kong region. In particular, it is worth asking how the social visibility of death was reconfigured when traditional funeral rituals encountered the multiple pressures of urban development, spatial compression and colonial modernity. Taking "invisible death" as a clue, this article attempts to re-examine the complex relationship between the governance of death, spatial order and cultural memory in post-war Hong Kong region, and thus responds to the explanatory power and limitations of Ariès's thesis of "death's recession" in non-Western contexts.

3 THE DEFINITION OF "INVISIBLE DEATH"

At the beginning of the 20th century, before the World War I, throughout the Western world of Latin culture, in both space and time, a person's passing still profoundly altered a social group or even an entire community[7]. When a person died, this family would put a funeral notice on the door and leave the front door open to allow entry for the person who was being mourned[7]. A service at the church then brought the entire community together, and after the congregation had expressed their condolences to the family, the casket was taken to the cemetery[7]. Social groups were struck by the death and reacted collectively, from immediate family members to wider circles of relatives and acquaintances[7]. In those days, every death could be called a public event.

With industrialization and urbanization, there was a quiet shift in attitudes towards death: the deaths of people other than politicians were not publicized; the old black and silver hearse became a plain grey sedan; and the disappearance of individuals no longer affected the continuity of society. The psychological mechanism that divorced death from society and removed its public ritualistic nature was accomplished. This made the death and mourning process more private and less visible in society, leading to the privatization of death. Another key point is the rejection and elimination of mourning, whereby the family of the deceased could not show distress in public. Around the middle of the 20th century, among the most individualistic middle classes in the West, there was a conviction that public expressions of mourning were inherently pathological[7]. This is society's way of denying participation in the emotions of the bereaved, a way of denying death in practice.In addition, death was fully medicalized after the World War II, and death was transferred from the home to the hospital.The isolation of the deceased from their families and communities by hospitals and the efforts of funeral directors to conceal their physical characteristics had also contributed to "invisible death[8]." Death had become a disguised admission of human failure as people find themselves unable to work against nature.

The above is Philip Ariès' theory of "invisible death." In short, this theory describes the phenomenon that death in modern society has gradually become hidden and difficult to be directly perceived and experienced by the public. In traditional societies, death is usually a public, collective event, accompanied by public activities such as ceremonies and funerals, reflecting the social nature of death. However, in the twentieth century, with the advancement of medical technology, the specialisation of hospitals and institutions, and the social avoidance and denial of death, death has become more private and invisible. Modern societies have progressively excluded death from public life, and the loss of the deceased no longer attracts collective attention or rituals, making death invisible or difficult to detect. This trend has led to an increased sense of strangeness and fear of death in society, and also reflects our denial of "evil" or the end of life, thus making death an "invisible existence" that is difficult for the public to understand or accept.

4 "INVISIBLE DEATH" AND POSTWAR HONG KONG REGION

It must be acknowledged that in the social landscape of post-war Hong Kong region, death does show some signs that are in line with Philippe Ariès' theory of "invisible death," especially in the modernisation of the hospital system and the phenomenon of the lonely death of the individual in the process of urbanisation.

In Hong Kong region in the second half of the twentieth century, hospitals, as the core of the modern healthcare system, continued to fulfil the social function of separating the living from the dead. Behind this phenomenon are multiple dynamics of cultural attitudes, urbanisation and the development of medical technology.

According to relevant studies, it was a common belief among Hong Kong region Chinese at the time that placing the body in the living space would bring about psychological discomfort and cultural ominous significance[9]. This belief was not simply a superstition, but a product of the interaction between the traditional funeral culture and the high-density urban living environment. Placing a body in a residential building, even if there are no real hygiene issues, is seen as incompatible with the norms of modern urban life[9]. This perception makes hospitals the ideal place to deal

with deaths. At the same time, traditional family ritual spaces are also facing challenges in the urban environment. A significant proportion of residents believe that the installation of family altars in high-rise dwellings may affect neighbourly relations, and in particular may be perceived by neighbours as damaging the Feng Shui of the living space. This community pressure reinforces each other with government regulation, prompting many families to relocate their ancestral tablets to specialised religious sites[10]. On the other hand, significant advances in medical technology have also reinforced the position of hospitals as the primary site for end-of-life care. Hong Kong region residents increasingly believe that hospitals are able to provide more effective treatment and life-sustaining care, and this perception has led to the common choice of sending sick family members to hospitals. Together, these factors have contributed to the central role of hospitals in the management of the dying process. By centralising end-of-life care and the disposal of human remains in specialised institutions, hospitals achieve a physical separation of the domains of life and death, thus constituting the distinctive spatial dimension of the "invisible death."

However, "invisible death" is not limited to the hospital setting, but also extends to the severance of social relationships and the disappearance of mourning rituals during outbreaks of infectious diseases: the influenza epidemic in Hong Kong region in July 1968, spread by droplet transmission, resulted in an estimated 400,000 to 600,000 people being infected[11]. To prevent the spread of the epidemic, patients were often asked to isolate themselves from their families, and most of the relatives and friends of the deceased were unable to attend the funerals due to the fear of mass infection. In this process, death is not only isolated within the high walls of hospitals, but also stripped of its original social ritual attributes due to the contagious nature of the disease, becoming a repressed and hidden event. Nonetheless, the living have not given up their emotional connection and expression of grief, turning to letters or the early Internet to convey their thoughts. Thus, even under the "invisible death" constructed by government control, disease threat and interpersonal isolation, human beings are still tenaciously seeking ways to express their remembrance and grief for the deceased.

With the emergence of the phenomenon of "invisible death" in the hospital space and in the control of diseases, another profound manifestation of this phenomenon at the social level is the increasingly frequent phenomenon of "death by loneliness." In order to analyse this phenomenon in depth, this article will take two cases of elderly people in the South China Morning Post (SCMP) in 1994 as examples: one of them is Mr. Wong, who was paralysed in his bed and had not been able to contact his son for many years; and the other one is Ms. Chan, who was ashamed to go back to her home because of her poverty and had no choice but to live in the Tung Wah Hospital[12]. These two elderly people had to face the end of their lives alone in the hospital without the care of their relatives. What they experienced was not only a lack of material support, but also a complete breakdown of social and emotional ties, and even neglect and forgetfulness in their last stage of life.

Such "invisible death" not only point to the physical aspect of passing away alone, but also profoundly reveal the changes in morality, ethics and family concepts in the process of urbanisation, and can be said to be an inevitable product of the trend towards Dink families and the era of indifference to the human condition.

In conclusion, in the modernisation process of post-war Hong Kong region, death has indeed shown many of the signs of what Ariès called "invisible death." The professionalisation of the hospital system has removed death from the domestic sphere, and the stigma of urban life and illness has prompted people to leave death and funeral matters to professional institutions, all of which have, to a certain extent, shifted death away from the public view of everyday life, making it appear invisible and isolated. However, under the surface of modernisation, death is still seen, discussed and even publicly emphasised in various ways. This is precisely the picture that the perspective of "visible death" is about to reveal to us.

5 "VISIBLE DEATH" AND POSTWAR HONG KONG REGION

Although the phenomenon of death in post-war Hong Kong region displays some of the characteristics of the "invisible death" of Ariès, if we look beyond this appearance, we will find that this "invisible" narrative is far from being the whole story. Hospitals and policies have moved death from the family to the public administration system; epidemics have made it an ongoing public crisis; and cases of "death by loneliness" have been exposed in the media and have become visible symbols of critique of social problems, forcing the public to face up to the costs of modernity. Death has not disappeared in post-war Hong Kong region, but has been systematically managed, embodied and continuously performed in the social community through a set of sophisticated institutional registries, highly centralised spatial settlements and cyclical cultural practices.

First of all, death registration has made deaths more visible. The earliest census of Hong Kong region was published in the Hong Kong region Government Gazette on May 15, 1841, and the official publication of the Hong Kong region government during the colonial period has been published ever since[13]. In 1872, the colonial government enacted "An ordinance for registering Births and Deaths in Hong Kong region," under which General Register Office was established to register all births and deaths in Hong Kong region[13]. The system has some limitations, such as the tendency not to report infant deaths, the sometimes arbitrary estimation of the number of deaths and the omission of deaths in order to avoid autopsies. But it was a marked improvement over previous death registration. Until 1961, government officials did not compile population projections and estimated life tables because they considered the data to be inaccurate and because the population of Hong Kong region was highly mobile before the outbreak of the Pacific War[13]. After a 30-year hiatus due to war and destabilizing events, Hong Kong region's first modern population census was conducted in February-March 1961, and since then censuses have been conducted every 10 years, so that

since 1961, Hong Kong region's registration of births and deaths has been considered to be very accurate[13]. By the 1970s, the number of deaths in Hong Kong region was affected by the influx of immigrants into the territory as a result of the unstable political situation in Mainland China. All deaths occurring in Hong Kong region are registered, including those of immigrants, irrespective of their country of residence or length of stay in Hong Kong region, resulting in a wide and complete coverage of deaths data[13]. Although there are some drawbacks, such as the fact that a death may be registered later than the year in which it occurred. But we still can see that death records from the late 20th century onwards are very clear, and even if you search for them now, you can find data on deaths at that time. The rigorous death registration system set up by the colonial government has transformed every death into a traceable file, enabling precise control of the deceased population.

Next, death also seems to be moving more towards visibility when it comes to how the remains are disposed of. Starting in the 1940s, cremation became progressively more popular in Hong Kong region, and by 1993, 68% of the deceased in Hong Kong region had been cremated, a significant increase from 35% in 1976[14]. As for the popularity of cremation, it is related to factors such as world trends, government policies and space constraints. In the late 19th century, cremation was introduced in Europe and the United States one after another, and the British Hong Kong region Government also encouraged the use of cremation[14]. In the late 1950s, the British Hong Kong region colonial government began efforts to modernize existing crematoria, build new crematoria and design attractive columbaria for storage of cremains, and the policy shifted towards the promotion of cremation as the preferred means of disposal of the deceased.Another key factor is the pressure on urban space, which is unique to Hong Kong region. Hong Kong region's limited land and high population density made traditional coffin burials less practical, and cremation was a more space-efficient way of disposing of the deceased[14]. The bodies "vanished" through cremation, which appears to be an "invisible death." But in its place were columbarium niches, affixed with the names and photographs of the deceased, and relatives who go to offer condolences can see their loved ones along with messages from other deceased persons, avoiding a complete separation of the living from the dead. Instead of making death invisible, the practice of cremation in post-war Hong Kong region constitutes a unique "visible death" through the concentration of space and the publicisation of rituals. Cremation concentrates the remains in the columbarium, a specialised territory for death, and when people go to pay their respects, they are entering a public space that is officially recognised and specialised by society. During traditional festivals such as Ching Ming, the crowds of people travelling to the columbarium form a periodic public spectacle, making mourning a highly visible social act. What is more, social controversies such as the shortage of columbarium niches completely problematise death, making it a visible social issue to be addressed by public policy, and making death continuously visible in the public sphere.

Then there are the funeral rites and grave-sweeping ceremonies that promoted "visible deaths." Needless to say the politicians because whenever a famous national leader passes away, the media in various countries will scramble to report on it and promote it to the public. In Hong Kong region, after the death of an ordinary person, the relatives of the deceased will also organize funeral ceremonies and invite others to come and offer condolences. What's more, during major festivals every year, people will make offerings of food and paper objects, including replicas of the deceased, to the deceased, because these gestures signify the spatial closeness of the departed souls and the continuity of the lineage in time[15]. Furthermore, the annual tomb-sweeping festivals of Ching Ming and Chung Yeung have been recognized by the State since 1961 and 1977 respectively, formalizing most of the informal practices of traditional tomb-sweeping[15]. These ceremonies not only served to lay the deceased to rest and gave psychological comfort to the family, but were also a way of capturing the attention of others and publicizing the deceased. The collective behaviour of the public in concentrating on sweeping graves during the Qingming and Chungyang seasons has created a cyclical public ritual. This phenomenon brings death into public view year after year in such a huge volume that it cannot be ignored. Thus, instead of making death disappear, the ritual transforms it into a public social fact that continuously confirms the visible presence of death in society.

To summarise, what post-war Hong Kong region presents is not the disappearance of death, but the modern transformation of its "visible" form. From a traditional cultural ritual, death has been transformed into a closely registered administrative fact, a centrally managed spatial event, and a social issue that is repeated through public rituals and media narratives. This multi-dimensional "visible death" reveals the profound changes in the social structure, family ethics and individual destiny of the colonial city in the process of modernisation.

6 CONCLUSION

To sum up, this study examines the historical evolution of death conceptions in late twentieth-century Hong Kong region, revealing a dialectical interplay between "invisible death" and "visible death." Moving beyond the dominant Western-derived narrative of death as "retreat," it demonstrates that postwar Hong Kong region's death paradigm exhibits a unique dual dynamic: while death has undergone a degree of concealment through modernization, it has simultaneously been systematically and publicly managed via state institutions, ritual practices, and spatial configurations, thereby acquiring a new form of visibility. This localized theoretical framework offers a significant conceptual tool for understanding modernity in non-Western societies.

That said, this study focuses primarily on macro-structural and cultural mechanisms, leaving room for further exploration of individual emotions and everyday practices at the micro level. Future research that delves into the fabric of daily life, capturing how people encounter death through concrete practices and emotional experiences, could engage in productive dialogue with this study and contribute to a richer, more comprehensive social history of death.

COMPETING INTERESTS

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

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