

Digital Empowerment: Pathways to Integrating Guangdong's Red Culture into Interpreter Training for Foreign Language Programs

Yang Zhou¹, Fan Zhang^{2,*}

¹*School of Foreign Languages, Lingnan Normal University, Zhanjiang, Guangdong, China*

²*Dalian University of Technology Press, Dalian, China*

** Corresponding Author*

Abstract: This paper aims to explore the effective integration of Guangdong's red culture into foreign language interpretation teaching under the background of digital empowerment, in order to address the dual challenges of insufficient integration of red culture and lagging application of digital technology in foreign language teaching in Guangdong's universities. The study constructs an innovative "resource-method-evaluation" three-dimensional integrated teaching model: In the resource development dimension, it transforms Guangdong's red cultural resources into a "four-in-one" resource ecosystem, including a core text library, audio-visual resource library, VR scene library, and interactive task library, through digital technology. In the method innovation dimension, it designs three types of situational teaching methods, including VR immersive training, red-themed project-based learning, and dual-line blended flipped classroom, to enhance the authenticity and participation of learning. In the evaluation system dimension, it establishes a quaternary dynamic evaluation model, integrating formative evaluation, cultural literacy evaluation, interpretation skill evaluation, and reflective evaluation, and relies on an intelligent evaluation central system to achieve cross-validation of multi-source data and instant feedback.

Keywords: Digital Empowerment; Guangdong Red Culture; Foreign Language Interpretation Teaching; Evaluation System; Innovation in Teaching Methods

1. Introduction

In today's era of rapid development of globalization and informatization, the country has comprehensively promoted the strategy of

"ideological and political education" and digitalization of education. Foreign language teaching shoulders the heavy responsibility of cultivating high-quality talents with international vision and feelings of home and country, and at the same time faces the dual challenges of cultural inheritance and technological innovation. As a big province with red cultural resources, Guangdong Province has more than 300 sites, ranking first in the country. These precious red cultural resources provide rich materials and profound cultural heritage for foreign language interpretation teaching.

However, at present, there are two practical dilemmas in foreign language interpretation teaching in Guangdong universities: on the one hand, 78% of interpretation courses are not systematically integrated into local red culture, which leads to students' weak cultural translation ability and makes it difficult to accurately and vividly spread China red culture in international exchanges; On the other hand, only 32% of colleges and universities use digital technologies such as VR/AR to assist interpretation teaching, so the traditional teaching mode can not meet the needs of actual training, and students' adaptability and cross-cultural communication ability in interpretation practice can not be effectively improved. In order to solve these problems, this paper explores the way to digitally empower Guangdong red culture into the teaching of interpretation for foreign language majors, and is committed to activating the red gene through technology and cultivating interpreters with international communication ability and cultural self-confidence.

2. The First Research

2.1 The Application of Digital Technology in Foreign Language Education

The application of digital technology in cultural education has been deeply studied, especially in

the field of foreign language teaching. Godwin-Jones, R. (2011). This paper discusses the application of emerging technologies (such as mobile applications and social media) in language learning, and emphasizes how technology can improve the interactivity and participation in language learning. Although the focus is not on specific culture, it provides theoretical support for the application of digital tools in language teaching [1]. Canning, T. (2013). This paper discusses how digital narrative technology can improve students' language skills and cultural understanding in language education. Putting forward digital stories can increase the interactivity and participation of cultural learning, which is of great reference value to the integration of culture into teaching [2]. Lv and Wang (2013) used the methods of classroom observation and questionnaire survey to quantitatively analyze the characteristics of teachers in college English classroom based on digital resource platform in terms of discourse volume, questioning strategies and feedback methods. Compared with the traditional classroom, the college English teacher's classroom based on digital resource platform can better reflect the learner-centered effective meaning negotiation, and pay more attention to the encouragement, guidance and inspiration of learners, thus promoting the development of learners' second language acquisition, which is of reference significance for the implementation of the flip classroom model [3]. Wang & Chen (2019). Discusses the application of virtual reality (VR) in foreign language teaching, especially its potential to improve cultural understanding and language skills. It provides a specific technical application case for digital empowerment culture teaching [4]. Jones, M. A., & Johnson, M. K. (2020). This paper summarizes the application progress of augmented reality (AR) in education, and emphasizes its advantages in improving learning experience and cultural communication. This is of reference value for the integration of red culture into the digital application of interpretation teaching [5]. Nguyen, T. H., & Park, S. (2024). Discusses the role of artificial intelligence (AI) in personalized language learning, especially its potential in improving learning effect and cultural understanding. The application of AI technology can provide a new solution for the digital empowerment of red culture teaching. The role of artificial

intelligence (AI) in personalized language learning, especially its potential in improving cultural understanding and learning effect, is discussed [6].

It can be seen that under the background of big data, it is an inevitable development trend of foreign language education in the future to make full use of modern technology and establish an intelligent education and teaching system based on language intelligence research (Huang, 2022) [7]. Sun and Tang (2022) believe that the development of artificial intelligence (AI) technology has promoted the reform of educational practice and the emergence of "AI+ education" practice mode. As an important subject of educational practice, it is very important for teachers to conform to the educational development trend in the era of artificial intelligence and improve their own quality. It also explains the "four innovations" teacher development concept of "new technology, new concepts, new methods and new roles" as the guidance, and the "four-wheel" driven effective model of "creating intelligent education environment, improving teachers' intelligent literacy, innovating teachers' development model and optimizing teachers' data management" [8]. Wen and Liang (2024) found that the ability of human-computer interaction and negotiation is the key factor affecting the application effect of AI, which is very important for the cultivation of this ability. Offering a special course in foreign language education, one is to improve students' ability of human-computer interaction and consultation, and the other is to improve students' English learning efficiency, emphasizing that in the teaching process, three teaching principles should be paid attention to: practice-oriented, step by step and timely feedback [9].

2.2 Red Culture into Foreign Language Teaching Research

The comprehensive application of language processing technology can realize the matching of ideological and political resources and teaching content at multiple language levels, which can not only optimize the way of calling ideological and political resources, but also provide reliable basis for scientifically arranging ideological and political content and making targeted ideological and political teaching plans (Qin and Kong, 2023) [10]. Yang (2021), based on the practice of telling real life stories with

short videos, drew lessons from narrative theory, foreign language competence theory and cross-cultural competence theory, constructed a framework of Chinese college students' foreign language digital narrative competence, and explored new ideas of ideological and political education in foreign language courses in colleges and universities [11]. Mei et al. (2023) took the era of intellectual media as the research background, and discussed the blueprint for the future development of red culture, the continued enlightenment of intellectual media, risks and its governance. With the help of intelligent media, red culture presents a blueprint for future development from "three-dimensional reality" to "multiverse", from "linear space-time" to "nonlinear space-time" and from "single information flow" to "natural interaction". The continuous spread of red culture in the era of intelligent media has gained enlightenment from the experience of content living, subject extension and interactive gamification, but at the same time, it is also faced with the risks of distorting red history, desecrating red spirit and self-eating cultural ontology by intelligent media technology. In this regard, it is necessary to strengthen the construction of positive intellectual media values from the perspective of multiple subjects, and jointly open up a new realm of the future spread of red culture in the intellectual media era [12]. Mardan Mansour (2023) believes that the prevalence of intelligent AI such as ChatGPT makes it imperative to build a red discourse system in "algorithm". This is not only related to the security in the ideological field, but also closely related to the spread of the China story. In the era of intelligent internet, data, computing power and algorithms not only constitute the cornerstone of intelligent internet, but also are regarded as an important part of new infrastructure. This paper discusses the new challenges faced by red discourse in the dialogue with the times, and puts forward the corresponding optimization path, aiming at empowering the creative transformation and innovative development of red discourse in the new era, so as to make red discourse "fragrant" at home and abroad with the help of new infrastructure [13].

To sum up, the application of digital technology: The existing research mainly focuses on the application of digital technology (such as VR, AR, AI) in language learning, which has obvious advantages in improving teaching interactivity

and cultural understanding. However, there is relatively little research on the digital application of red culture in the existing literature, especially the specific path exploration in foreign language interpretation teaching.

Limitations of application scenarios: most of the research focuses on the application of general language learning technology, while case studies on specific cultures (such as Guangdong red culture) are relatively scarce. At present, there are two practical dilemmas in the teaching of foreign language interpretation in Guangdong universities: on the one hand, 78% of interpretation courses are not systematically integrated into the local red culture, which leads to students' weak cultural translation ability and makes it difficult to accurately and vividly spread China red culture in international exchanges; On the other hand, only 32% of colleges and universities use digital technologies such as VR/AR to assist interpretation teaching, so the traditional teaching mode can not meet the needs of actual training, and students' adaptability and cross-cultural communication ability in interpretation practice can not be effectively improved. In order to solve these problems, this project takes digital empowerment as a breakthrough, constructs a three-in-one teaching model of "resources-methods-evaluation", and is committed to activating the red gene through technology and cultivating interpreters with international communication ability and cultural self-confidence.

3. The Definition of Core Concepts: Three-Dimensional Integrated Logical Closed Loop

Digital empowerment refers to the use of modern information technologies such as VR/AR and intelligent learning platform to break through the time and space limitations of traditional teaching, reconstruct teaching scenes, and create more real, vivid and interactive learning experiences for students. For example, through the interpretation scene of the virtual red memorial hall, students can practice interpretation in the virtual environment, as if they were in the real red cultural site, and enhance their perceptual knowledge and emotional identification with the red culture. The three-dimensional integrated framework includes three dimensions: resource development, method innovation and evaluation system, which are interrelated and mutually

supportive, forming an organic whole and jointly promoting the reform and development of foreign language interpretation courses (figure 1). Resource development provides rich materials and tools for teaching, method innovation provides effective teaching strategies and means for teaching, and evaluation system provides scientific evaluation and feedback mechanism for teaching, ensuring the realization of teaching objectives and the improvement of teaching quality. Through digital empowerment, the red cultural resources are deeply integrated with foreign language interpretation teaching, and an innovative, practical and effective teaching model is constructed, which provides useful reference for the teaching reform of foreign language majors.

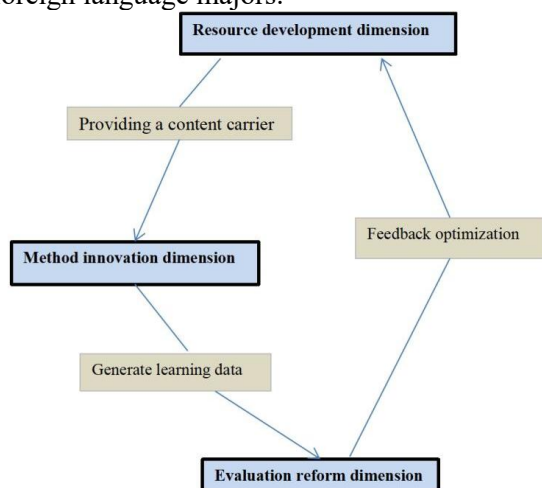


Figure 1. Three-Dimensional Interactive Model

4. The Construction of Teaching Mode: Three-dimensional Integrated System Design

4.1 The Dimension of Resource Development: Building a "Four-in-One" Digital Resource Ecology

4.1.1 The transformation mechanism of red cultural resources

Red cultural resources are precious wealth in Guangdong and important materials for foreign language interpretation teaching. In order to transform these rich red cultural resources into teaching resources, we have established a perfect transformation mechanism. First of all, organize professional teams to dig and sort out the red culture in Guangdong, collect the historical background, heroic deeds and documents of sites, and form a systematic red culture resource library. Then, according to the characteristics

and needs of foreign language interpretation teaching, these resources are screened, classified and adapted and transformed into teaching materials, cases, exercises and other forms suitable for interpretation teaching. For example, the speeches, declarations and other documents of ancestors are translated into foreign languages and designed as interpretation practice materials, so that students can understand and inherit the spirit of red culture while practicing interpretation. Through this transformation mechanism, red cultural resources can be better integrated into foreign language interpretation courses, providing rich material support for teaching.

Table 1. "Four Libraries in One" Digital Resource Ecology

Resource type	Development path
Core text library	Party History Documents → Foreign Language Terminology Database (e.g. standardization of Japanese translation of "Peasant Movement Workshop")
Audio-visual resource pool	Documentary Red Guangdong → Sub-topic Interpretation Training Video (with bilingual subtitles)
VR scene library	1:1 Restoration of the Virtual Scene of "Memorial Hall" (support for 360 visual angle switching)
Interactive task library	Decision-making interpretation tasks based on historical events (such as "Guangzhou Uprising Emergency Meeting" simulation)

4.1.2 Technical implementation path

Under the background of digital empowerment, technology realization path is the key link of resource development. We have adopted a variety of advanced digital technologies to realize the digital development and application of red cultural resources. Among them, VR scene development is one of the important technical means. We use Unity engine to build 3D models and create virtual red cultural scenes, such as virtual red memorial halls and sites. These virtual scenes not only have a high degree of realism and immersion, but also can be flexibly customized and adjusted according to teaching needs. At the same time, we integrated the speech recognition system to evaluate the accuracy of students' translation in real time. When students practice interpreting in virtual scenes, the speech recognition system can

automatically identify the students' translations, score and give feedback according to preset standards, so as to help students find and correct mistakes in time and improve their interpretation level. In addition, we also established a resource management system based on the superstar platform. The system adopts hierarchical indexing and supports searching in three dimensions: historical period-event type-language difficulty. Teachers and students can quickly find the required red culture teaching resources through this system, and improve the utilization efficiency of teaching resources. Through these technical paths, we have built a digital resource ecology of "four databases in one", which provides strong resource support for foreign language interpretation teaching (table 1).

4.2 Method Innovation Dimension: Three Types of Situational Teaching Mode

4.2.1 VR immersion training

VR immersion training is a brand-new teaching mode, which uses virtual reality technology to create an immersive interpretation learning environment for students. In the operation process, students first enter the interpretation scene of the virtual red memorial hall through VR equipment, and various exhibits and explanations related to red culture are set in the scene. Students need to interpret the exhibits within the specified time and feedback the accuracy of the translation in real time through the speech recognition system. The system will give corresponding scores and feedback according to the quality of students' translations, point out the advantages and disadvantages of students, and provide suggestions for improvement. This immersive training method can make students feel as if they are in a real interpretation scene, and enhance their interpretation practice ability and adaptability. Compared with traditional teaching methods, VR immersion training has significant innovations. Traditional teaching methods are usually difficult to simulate the real "high-pressure real scene", and students often lack realism and tension in interpreting practice in class, so it is difficult to achieve the effect of actual combat training. VR immersion training, on the other hand, can make students exercise their interpretation ability in a realistic environment and improve their interpretation level and self-confidence through the high

realism and immersion of virtual scenes. In addition, the real-time feedback function of speech recognition system also provides students with timely and accurate guidance, which helps students to better master interpretation skills and improve the quality of interpretation.

4.2.2 Project-based learning with red theme (PBL)

Project-based learning with red theme is a student-centered teaching model, which takes red culture as the theme and allows students to complete related project tasks through teamwork. In the process of implementation, teachers design a series of project themes related to red culture according to the teaching objectives and the actual situation of students, such as "Research on the Communication Strategy of Guangdong Red Culture" and "Integration of Red Culture and Modern Science and Technology". Students are free to form project teams according to their own interests and specialties, and each team chooses a project theme for research and practice. In the process of project implementation, students need to study the project theme in depth by consulting materials, field research, team discussion, etc., form their own research results, and report in the form of reports, speeches, exhibitions, etc (table 2). This teaching mode can give full play to students' initiative and creativity, and cultivate students' teamwork ability, problem solving ability and comprehensive application ability. Through project-based learning with red theme, students can not only deeply understand and master the knowledge of red culture, but also apply the knowledge and skills they have learned to practical projects, so as to improve their practical ability and innovative spirit. At the same time, this teaching mode is also helpful to cultivate students' sense of social responsibility and mission, so that students can establish correct values and outlook on life in the learning process.

Table 2. Project-based Learning with Red Theme (PBL)

Project case	Interdisciplinary cooperation	Output results
"Red Tour Guide" Training	Historians review content +IT team technical support	Bilingual guide thesaurus (upload platform)
Translation and Introduction of "Ancestors' Letters"	Stylistic analysis of literature professors' guidance	Multilingual audio e-book

4.2.3 Two-line fusion flip classroom

Double-line fusion flip classroom is a teaching mode combining online and offline, which combines traditional classroom teaching with online learning and realizes the optimal allocation of teaching time and space. In the online part, students learn relevant red culture knowledge and interpretation skills by previewing MOOC courses. This course contains rich teaching resources, such as video lectures, text materials, online tests, etc. Students can study independently according to their own learning progress and time schedule. There is also an automatic terminology test in the course, through which students can test their understanding and mastery of red cultural keywords and find and make up for knowledge loopholes in time. In the offline part, teachers organize students to carry out "historical scene debate interpretation" activities in class, such as simulating the press conference of "the breakdown of cooperation between the Kuomintang and the Communist Party". In the activity, students need to use the knowledge of red culture and interpretation skills they have learned to interpret and debate on the spot. Teachers give guidance and comments in class to help students solve practical problems and improve their interpretation ability and adaptability. This two-line fusion flip classroom model gives full play to the autonomy and flexibility of online learning and the interactivity and practicality of offline teaching, realizes the complementary advantages of online and offline teaching, and improves the teaching effect and learning efficiency.

4.3 Evaluation System Dimensions: Building an All-round Evaluation System

4.3.1 Model design principles

In order to ensure the effective implementation of teaching mode and the improvement of teaching quality, we have constructed an all-round evaluation system. The evaluation system follows the following three design principles:

Dynamic: evaluation runs through the whole cycle before class (diagnosis), during class (process) and after class (reflection). Before class, students' learning foundation and learning needs are understood through diagnostic evaluation, which provides basis for teaching design; In class, students' learning progress and learning effect can be known in time through

process evaluation, and the teaching process can be adjusted and optimized; After class, students are guided to sum up their learning experience through reflective evaluation, reflect on the problems and deficiencies in the learning process, and provide improvement directions for subsequent learning. This dynamic evaluation method can feed back teaching information in time and promote the continuous improvement and development of teaching.

Four-dimensional mutual verification: multi-source data are used to cross-verify the evaluation results to ensure the comprehensiveness and objectivity of the evaluation. The evaluation dimension includes four aspects: platform learning behavior data, skills measured data, cultural literacy evaluation and subject reflection. Platform learning behavior data is collected through the learning management system, including students' learning time, learning progress, test scores, homework completion, etc. The measured data of skills are obtained through interpretation skills tests, such as interpretation simulation test and on-site interpretation assessment. The evaluation of cultural literacy is conducted through questionnaires and interviews to understand students' understanding, attitudes and values of red culture; Subjective reflection is collected through students' self-evaluation and reflection reports. Through the mutual verification of these four dimensions of data, students' learning achievements and teaching effects can be comprehensively and accurately evaluated.

Immediate feedback: the intelligent system generates improvement suggestions in real time to help students adjust their learning strategies in time. In the process of students' learning, the intelligent evaluation system will analyze students' learning situation in real time according to their learning behavior and test results, find problems and deficiencies in learning, and generate personalized improvement suggestions in time. For example, if students do not achieve satisfactory results in the test of a certain red cultural knowledge point, the system will automatically push relevant learning resources and exercises to help students consolidate their knowledge points; If students make frequent mistakes in interpretation practice, the system will analyze the causes of the mistakes and provide targeted training suggestions. This instant feedback mechanism can improve students' learning efficiency and motivation, and

promote students' personalized development.

4.3.2 Evaluation dimension and implementation path

Evaluation dimension and implementation path are important components of evaluation system. In the evaluation dimension, we set up a number of indicators to comprehensively evaluate students' learning achievements and teaching effects. Specifically including (table 3):

Platform learning behavior: collect students' learning behavior data through the learning management system, such as learning time, learning progress, test scores, homework completion, terminology query frequency, task retry rate, etc. These data can reflect students' learning attitude, learning habits and learning effects, and provide teachers with the basis for teaching adjustment.

Skills measurement: Evaluate students' interpreting ability through interpreting skills test. The test includes simulated interpretation test, on-site interpretation examination and other forms to evaluate students' language accuracy, fluency, adaptability and cultural understanding in the process of interpretation. The test results can directly reflect the students' interpretation level and progress.

Cultural literacy: Evaluate students' understanding, attitude and values of red culture through questionnaires, interviews and classroom performance. For example, set up questions about red culture cognition, emotional identification and behavior tendency to understand students' identification degree and

willingness to inherit red culture.

Subjective reflection: guide students to conduct self-evaluation and reflection, and write a study reflection report. Students can reflect on learning contents, learning methods, learning gains and existing problems, sum up their learning experience and put forward improvement measures. According to the students' reflection report, teachers can understand the students' learning experience and learning needs and further optimize the teaching design.

In the implementation path, we adopt the intelligent evaluation central system to support the whole process of evaluation (figure 2). The system includes platform learning behavior analyzer, VR scene reaction time/accuracy double-index scoring system, mutual evaluation radar chart and other intelligent evaluation tools. The platform learning behavior analyzer can track students' learning behavior in real time and analyze students' learning mode and learning effect. The VR scene reaction time/accuracy double-index scoring system can score students' interpretation performance in virtual scenes in real time and evaluate students' reaction speed and translation accuracy. The radar chart of mutual evaluation presents the evaluation results of students in six dimensions, such as cultural understanding, language fluency, adaptability and teamwork ability, in a visual way, which helps students to intuitively understand their own strengths and weaknesses and promote their all-round development.

Table 3. Evaluation Dimensions and Implementation Paths

Evaluation dimension	Evaluation tools/methods	Data source and closed-loop application
1. Process evaluation (30%)	-Analysis of learning trajectory of superstar platform (login frequency, resource browsing time, term query heat map) -AI speech recognition system (completion rate/accuracy of self-exercise before class)	→ Automatically generate a learning behavior report → Push personalized remedial exercises (e.g. terminology weakness enhancement package)
2. Cultural literacy evaluation (30%)	-Cultural Translation Accuracy Scale (0-5) -VR scene restoration score (e.g. "Peasant Movement Workshop" scene detail reproducibility) -In-depth evaluation of cultural interpretation of red theme projects	→ Output the radar map of cultural literacy. → trigger cultural experts to intervene in the counseling mechanism.
3. Interpretation skill evaluation (25%)	-CATTI Level 3 Interpretation Scoring Standard (information integrity/language quality/adaptability) -VR actual combat stress test score (reaction time, mistranslation rate)	→ Generate a skill short board diagnosis. → Matching scenario simulation intensive training
4. Reflective evaluation	-Standardized reflection logs (including structured issues such as "acquisition of red terms" and	→ Integration into growth files → Drive the dynamic adjustment

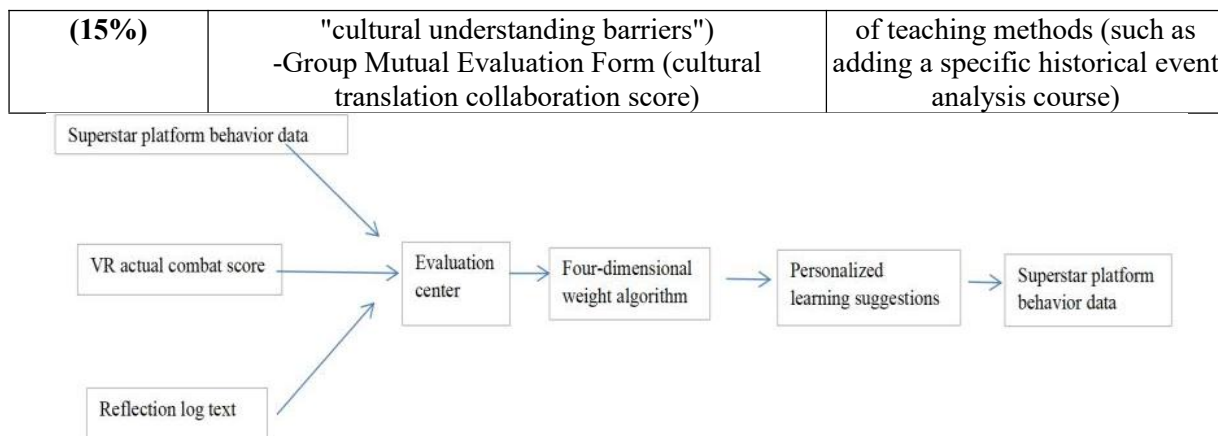


Figure 2. Intelligent Evaluation Central System

5. Conclusion

This thesis focuses on Guangdong red culture, a unique cultural resource, and explores its application path in interpretation teaching for foreign language majors. Guangdong red culture has unique historical and cultural value, but its application in digitalization and foreign language teaching is not sufficient. This paper comprehensively and systematically studies the digital empowerment and teaching application of Guangdong red culture through field investigation, digital resource development, teaching experiments and other methods, which is less involved in the existing research.

Through the teaching of interpretation, Guangdong's rich red culture will be spread to the international stage, and the international community's understanding of China's history and culture will be enhanced. Under the background of globalization, this kind of cultural communication not only helps to enhance the international image of China, but also promotes the understanding and communication between different cultures. The "three-in-one" teaching model deeply integrates Guangdong red cultural resources with foreign language interpretation teaching through digital empowerment, and constructs a "resource-method-evaluation" trinity teaching system, which effectively solves the problems of cultural education absence and technical application lag in foreign language interpretation teaching. Practice shows that this model can significantly improve students' interpretation ability, cultural understanding and learning interest, and cultivate interpreters with international communication ability and cultural self-confidence. In the future, we will further optimize teaching resources, expand application scenarios, promote the application of this model

in more universities and courses, and provide useful reference for the teaching reform of foreign language majors and the inheritance of red culture.

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