

Research on the Optimization of Translation and Dissemination Strategies for Central Plains Culture and Overseas Publicity Based on Audience Analysis

Weixia Li¹

¹Henan Kaifeng College of Science Technology and Communication, Kaifeng 475000, Henan, China

Corresponding author: Weixia Li (e-mail: Liviasisu@163.com)

ABSTRACT Central Plains culture faces a persistent cultural discount problem in overseas translation and dissemination. Traditional publicity translation is mainly text-centered and often lacks quantitative analysis of audience expectations, producing a mismatch between translated content and audience cognition. In digital and wireless media environments where cultural information is transmitted through multimodal channels, audience-oriented modeling is essential for improving communication efficiency. This study develops a closed-loop optimization model consisting of audience profiling, strategy adjustment, and effect feedback. Web crawling and LDA topic modeling were first used to classify overseas audiences into curiosity seekers, explorers, and audiences with cultural misconceptions according to topic probability thresholds and sentiment polarity. A layered progressive-disclosure text structure was then designed so that readers could choose either reconstructed cultural frames or deeper explanatory annotations. Finally, eye-tracking, reading comprehension tests, and focus group semantic analysis were used for multidimensional validation. The optimized translation reduced average gaze duration by 73.2 ms, decreased return gaze rate by 8.0%, increased message comprehension by 19.5 percentage points, and improved the proportion of positive emotional vocabulary by 18.4 percentage points. The findings demonstrate that data-driven translation design can reduce cognitive load and enhance cultural identification in international communication.

INDEX TERMS overseas publicity translation, audience analysis, topic modeling, cultural dissemination, multimodal communication

I. INTRODUCTION

AS an important cradle of Chinese civilization, Central Plains culture—represented by Shaolin Kung Fu, Henan Opera, and the advanced heritage of high-performance industrial craftsmanship—embodies rich historical and philosophical meanings. This integration of intangible cultural assets unique to the region constitutes a profound legacy of both spiritual wisdom and material engineering [1,2]. At present, under the background of the gradual implementation of “cultural out-reach”, the promotion and translation of Central Plains culture have become an important way to improve the country’s cultural soft power. However, in the process of overseas publicity translation, in order to promote Central Plains culture, the translator usually uses Henan Opera, Shaolin Kung Fu, Heluo culture as a prop. Due to the lack of cultural background knowledge, foreigners are only curious about

the dissemination of Central Plains culture, but cannot achieve true cultural dissemination. The reason is that traditional overseas publicity translation still exists in the “text centered” single encoding model, and the translator often judges “what to translate” and “how to translate” based on experience. They lack quantitative analysis of the audience’s cognitive habits, information acceptance characteristics and emotional needs, resulting in the gap between the translated content and the audience’s expectations. This “supply and demand mismatch” has also become the key limiting factor that affects the effectiveness of overseas dissemination of Central Plains culture [3,4].

Academia has explored audience factors in translation and dissemination from multiple perspectives. For example, LIU and QI explored the international dissemination path of the classics of Central Plains culture, proposing to promote the exchange and dissemination of Central Plains culture

with world culture by improving policy support, promoting Sino-foreign cooperative publication, and strengthening the localization interpretation of content[5]. Jing analyzed the problems existing in the Chinese-English translation of Zhibi culture from the perspective of communication studies, and proposed to follow the principles of “information priority” and “audience orientation” to improve the quality of translation and promote its international dissemination[6]. Sigley sorted out the development of the Tea Horse Road research and its impact on culture and tourism, and introduced the relevant results to the international academic community, while proposing suggestions to expand its transnational research perspective[7]. Yang et al. explored the relationship between agricultural development in the Songshan area and the origin and evolution of Central Plains civilization through the latest archaeological and botanical evidence[8]. However, existing research mostly stays at the theoretical level of strategy discussion, lacking data-driven description of audience needs; in terms of effect evaluation, it is mainly qualitative description, lacking quantifiable cognitive indicators to support it, and it is difficult to form a verifiable and iterative optimization mechanism. In other words, how to transform audience analysis from a theoretical concept into an operable and quantifiable translation strategy adjustment tool is still an urgent problem to be solved in current research.

In recent years, some scholars have begun to introduce interdisciplinary methods to explore the quantitative evaluation of translation effects. For example, Zhang et al., based on the perspective of ecological translation studies, analyzed the adaptation and selection mechanisms of English translations of Chinese mainstream media’s overseas publicity texts in three dimensions: language, culture, and communication, and proposed an evaluation framework to improve the international communication effect of national discourse [9]. Huang and Yang took the cultural heritage along the Grand Canal in Suzhou as the research object, used geographic information systems to construct a cultural heritage dataset, analyzed its evolution mechanism, and provided a basis for the digital protection and utilization of cultural heritage [10]. However, these methods rely on the subjective reports of the subjects and are difficult to capture the immediate cognitive reactions during the reading process. In view of this, this paper proposes a research path of multimodal data fusion: first, using web crawlers and natural language processing technology to construct a refined demand profile of overseas audiences; second, designing a dynamic translation strategy with adjustable “cultural interpretation” based on the profile results; and finally, comprehensively using eye tracking, reading comprehension tests, and focus group semantic analysis to quantitatively evaluate the translation effect from three dimensions: cognitive load, comprehension accuracy, and emotional identification, and to realize the dynamic correction of translation strategies.

The main contributions of this paper are reflected in the following three aspects: First, it advances audience

analysis theory from conceptual discussion to an operational methodological level, constructing a closed-loop optimization model of “audience profiling - strategy adaptation - effect feedback,” providing data-driven decision-making basis for overseas publicity translation; Second, it breaks through the traditional single-dimensional effect evaluation framework, establishing a multi-dimensional quantitative indicator system that integrates cognitive load, comprehension accuracy, and emotional identification, achieving a refined description of translation effects; Third, through the comprehensive application of interdisciplinary methods such as eye tracking and semantic analysis—specifically applied to the visual perception of high-performance industrial—this research provides a new methodological reference for the translation and dissemination of regional cultures. By quantifying the cognitive engagement with technical structures alongside cultural symbols, the study establishes a rigorous framework for evaluating how material heritage and regional identity are perceived globally.

II. CONSTRUCTION OF OVERSEAS AUDIENCE PROFILES BASED ON BIG DATA

The key idea of audience analysis is that we should have a clear and quantitative understanding of cognitive characteristics and acceptance preference of target group. In order to avoid the limitations of experience-based guessing about audience needs in overseas publicity translation, this study uses big data mining method to collect and analyze user-generated content related to Central Plains culture on overseas social media in a systematic way first and then establish a profile of overseas audience needs.

In terms of data collection level, this study chose YouTube, Facebook and Reddit, three mainstream overseas social media as data sources. Based on the keywords like “Shaolin Kung Fu”, “Henan Opera”, “Luoyang”, a web crawler script was written in Python and then the official API interface of each platform were used to scrape the posts and user comments published from 2018 to 2023. In order to make the data more accurate and reliable, pure advertising content and non-English text were removed during the data collection process, and finally a total of 42,000 valid comment data were obtained.

In terms of data analysis level, this study uses natural language processing technology to mined comment text from multiple aspects. First of all, by using sentiment analysis (based on SentiWordNet dictionary), user attitudes were divided into positive, negative and neutral, and then the commenting text were clustered into several categories to get an initial understanding of the overall positive, negative or neutral attitude of overseas people on Central Plains culture. The modeling results show that the focus of attention of overseas audience on Shaolin Kung Fu is mainly confined to three dimensions of “Zen meditation”, “Kung Fu Philosophy”, “Body-mind Healing”, and the discussion on Henan Opera is mostly concentrated on “Exotic Customs”, “Clothing Beauty” and rarely mention the singing

style or even the origin. In addition, through the analysis of the keyword co-occurrence network, the study also found that there are several typical cognitive misconceptions, such as taking Shaolin Martial Arts as violent fighting, or mixing Heluo culture with ordinary Chinese folk customs.

III. CONSTRUCTION OF A DYNAMIC TRANSLATION STRATEGY LIBRARY WITH ADJUSTABLE CULTURAL INTERPRETATION

In accordance with the cognitive characteristics of the overseas audience shown by previous profiling big data, this study overcomes the monolithic criterion of “faithful equivalence” in traditional translation studies and builds a translation strategy library with changing cultural interpretation for dynamically changing audience type. The core logic of this strategy library is grounded in Gutt’s Relevance Theory and Venuti’s theory of domesticating vs. foreignizing translation. Different audience types possess varying cognitive environments, requiring a translator to calibrate the optimal relevance of cultural information. By applying ‘functional equivalence’ through socio-semiotic transformation, the strategy library moves beyond simple localization into a systematic cognitive-linguistic adaptation framework. The task of a translator is not to present a single correct translation, but to choose an appropriate depth of interpretation and expressive framework according to the cognitive landscape of the target audience.

According to the three types of audience found in the audience profiling results, this study designed three different translation strategy paths. First, as for the “curious” audience whose exposure to Central Plains culture is only skin deep, they are more likely to be attracted by heterogeneous visual symbols, but do not have the patience to read connotations. Faced with this situation, this study adopts a “frame reconstruction” strategy. The core concepts of Central Plains culture are semantically extended with the cognitive framework that the target audience is familiar with. The translation of Shaolin Kung Fu by the study adopts this strategy. In conventional discourse, the concept of ‘Chan Wu Yi’ is often rendered through literal equivalence as ‘the unity of Zen and martial arts’. This study replaces such static phrasing with ‘Martial Arts as Moving Meditation,’ a dynamic interpretation that resonates with Western cognitive frameworks. Furthermore, just as high-performance industrial structures require precise technical descriptors to be understood by global engineers, these cultural metaphors are treated as ‘symbolic weaves’ that require functional translation to bridge the gap between regional heritage and international perception. Through the connection between Eastern Zen meditation and the Western audience’s common experience of mindfulness meditation, the connotation is made easy to understand while the core is not lost.

Secondly, for the “exploratory” audience who has had some exposure experience and wants to further understand the philosophical connotation and historical origin of the text, this study adopts a “deep translation” strategy to add

a system of supplementary texts to compensate for the cultural deficiency part in addition to the main body of the translation. In order to make the target audience easily enter the deep reading stage, this study adds three types of supplementary texts to the translation of the experimental group. One is an introductory preface explaining the historical context and religious background of Shaolin Kung Fu. Another type of supplementary text are marginal notes that make simple explanations on some cultural terms like qi, ancestral home of Zen Buddhism and Bodhidharma. The last type of supplementary texts are appendix at the end of the translation providing a bibliography and index of key concepts for further reading.

The third characteristic of the “misunderstood” audience is that, because they lack information, they misinterpret Central Plains culture (for instance, they think that Shaolin martial arts is fighting that kills people or that Zen meditation is some kind of strange ritual). In order to overcome this characteristic, the corrective interpretation method is adopted, namely, corrective information is embedded in the translation. For the relationship between “martial arts” and “Zen” between “Shaolin Kung Fu combines martial arts and Zen” translated by the traditional group and “Shaolin Kung Fu is a kind of Zen practice expressed through Zen training” translated by the experimental group, through the reorganization of the sentence, Zen is positioned as the main part, martial arts is defined as the form of expression, and the misunderstanding of “martial arts first” in cognition of the Central Plains is eliminated.

IV. MULTIMODAL TRANSLATION EFFECTIVENESS VERIFICATION AND STRATEGY ITERATION

The establishment of the strategy library is just the beginning of the research; the effectiveness of the strategy library will be tested in the actual reading behavior of the audience. In order to systematically study the impact of different translation strategies on the cognitive process of audience and emotional attitude and further realize the dynamic optimization of strategies, this study constructed a small-scale multimodal translation effectiveness verification platform, using eye-tracking, behavioral testing and qualitative interview to compare and evaluate the traditional translation and optimized translation.

The recruited audience for verification experiment were 60 overseas audience whose native language was English, including 30 international students in China and 30 overseas native audience members recruited online. All recruited audience members didn’t have systematic Chinese language learning experience and only vague impression of Central Plains culture, which met the general feature of “overseas publicity audience”. We randomly selected participants into control group and experimental group, with 30 participants in each group. The control group read a traditional literal translation of the Shaolin Kung Fu introduction. In the experimental group, participants were first screened using a pre-test questionnaire to determine their profile (Seeker,

Explorer, or Misunderstander) based on the LDA-derived keywords from Section 2; they then received a version of the text specifically modulated with the corresponding strategy: framework reconstruction for Seekers, deep translation for Explorers, or corrective interpretation for Misunderstanders. This ensured the eye-tracking data reflected the cognitive load of a matched profile-strategy pair rather than a generic optimized text. The eye of participants were recorded when reading, using Tobii Pro Spectrum eye tracker, and the average fixation time and regression ratio were used as the quantitative standard of cognitive load. Immediately after reading, the participants finished the 10-question reading comprehension to test the degree of accuracy in understanding the core concept of Shaolin Kung Fu.

To capture changes in the audience's emotional attitudes, a focus group interview component was also introduced. After reading and the test, the two groups of participants were regrouped into six focus groups of 10 (five from the control group and five from the experimental group) for semi-structured interviews. The interviews focused on their overall impression of Shaolin Kung Fu, the most profound cultural aspects, and any comprehension difficulties. The entire interview was recorded. After transcription, the interview recordings were automatically encoded using LIWC software to calculate the percentage of positive emotional words in each participant's speech. Simultaneously, two coders independently conducted thematic analysis to identify three types of discourse: positive identification, neutral statements, and negative misunderstandings.

V. QUANTITATIVE EVALUATION SYSTEM FOR TRANSLATION RECEPTION EFFICACY

A. EXPERIMENTAL SETUP

The experiment recruited 60 overseas audience members whose native language is English (30 international students in China and 30 overseas native audience members), who were randomly assigned to a control group and an experimental group. The control group read a traditional literal translation of an English introduction to Shaolin Kung Fu (approximately 300 words), while the experimental group read a dynamic strategy translation based on audience profiles (the same content, including supplementary text and framework reconstruction).

B. EYE-TRACKING COGNITIVE LOAD EXPERIMENT

In the experiment, we recruited 60 overseas audience members whose native language is English and randomly assigned them into control group and experimental group. The control group read a conventional literal translation of an English introduction to Shaolin Kung Fu, while the experimental group read a dynamic strategy translation optimized according to audience profile. We recorded the reading process of audience using Tobii Pro Spectrum eye tracker. takes the average fixation duration and regression ratio as the quantitative indicators of cognitive load and

compared the cognitive effort of the two groups when reading the same cultural content.

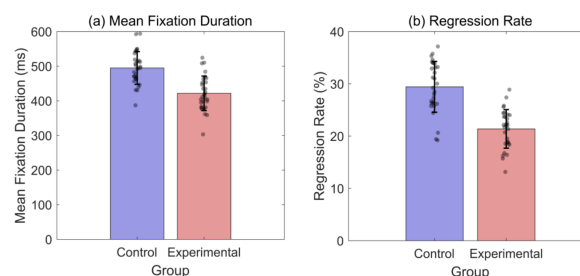


FIGURE 1. Comparison of Eye-Tracking Cognitive Load

In Figure 1, the dynamic translation strategy based on audience analysis significantly reduced the cognitive load of the target audience. In terms of average fixation duration, the experimental group (421.7 ± 49.8 ms) was significantly shorter than the control group (494.9 ± 47.3 ms), $t(58)=5.91$, $p<0.001$, indicating that the optimized translation reduced the cognitive processing depth of the readers. In terms of the re-apprehension rate, the experimental group ($21.4 \pm 3.7\%$) was also lower than the control group ($29.4 \pm 4.9\%$), $t(58)=7.36$, $p<0.001$, indicating that the optimized translation effectively reduced the need for readers to reread. The significant differences between the two groups demonstrate that the translation strategy incorporating audience profiles can effectively improve reading fluency and make the transmission of cultural information more efficient.

C. READING COMPREHENSION ACCURACY TEST

Sixty native English speakers from abroad were recruited for the study after random assignment into control and experimental groups. Then, both groups were administered the multiple-choice reading comprehension test immediately after completing the eye-tracking experiment. The reading comprehension test contained 10 questions on the basic ideas of Shaolin Kung Fu culture (e.g., “Zen and Martial Arts Unity,” and “Qi”). The control group answered the questions based on the conventional literal translation, and the experimental group answered the questions based on the optimized translation. The time limit was 5 minutes. The accuracy rates of both groups were recorded for the degree of accuracy in understanding cultural information.

TABLE 1. Comparison of Reading Comprehension Accuracy

Group	Sample size	Mean accuracy (%)	Standard deviation (%)	t-value	p-value
Control group	30	54.7	9.8	8.42	< 0.001
Experimental group	30	74.2	8.3		

In Table 1, the mean accuracy rate of the experimental group ($74.2 \pm 8.3\%$) was significantly higher than that of the control group ($54.7 \pm 9.8\%$), $t(58)=8.42$, $p<0.001$. This difference indicates that dynamic translation strategies

based on audience profiling optimization can significantly improve the target audience's accurate understanding of core concepts of Central Plains culture. The control group, lacking cultural background compensation and contextual adaptation, suffered from nearly half of the misunderstood or omitted key information; while the experimental group, through in-depth annotation and frame reconstruction, effectively bridged the cultural gap, enabling the audience to more accurately grasp the philosophical connotations and historical background of Shaolin Kung Fu. This result further validates the crucial role of audience analysis in improving the effectiveness of translation and dissemination.

D. FOCUS GROUP AND SEMANTIC ANALYSIS EXPERIMENT ON EMOTIONAL IDENTIFICATION

This study adopted focus group and semantic analysis methods to explore the influence of translation strategies on the identification of audiences' emotions. A total of 60 overseas participants whose mother tongue was English were recruited and randomly assigned to the control group and the experimental group. The control group read the traditional translation and the experimental group read the translation implemented the dynamic strategies optimized by audience profiling. Then, the two groups were randomly mixed into 6 focus groups to participate in semi-structured interviews about their feelings and emotional attitudes towards Central Plains culture. The interview recordings were transcribed and then the proportion of positive emotional words was analyzed quantitatively by LIWC software to explore the difference of identification of emotion between the two groups.

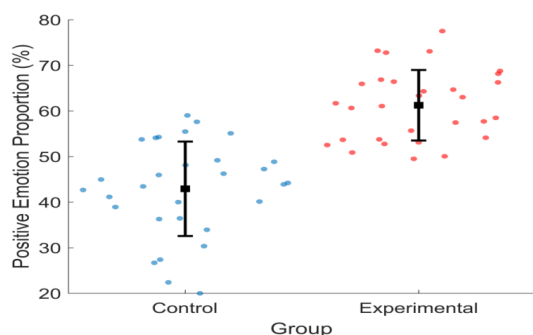


FIGURE 2. Focus Group and Semantic Analysis of Emotional Identification

In Figure 2, the proportion of positive emotional vocabulary in the experimental group ($61.3 \pm 7.7\%$) was significantly higher than that in the control group ($42.9 \pm 10.4\%$), $t(58) = -7.76$, $p < 0.001$. Focus group interviews showed that the experimental group audiences resonated more strongly with the cultural connotations of Shaolin Kung Fu, frequently using words such as “inspiring” and “meaningful” to describe it, while the control group generally experienced comprehension difficulties and emotional alienation. This result confirms that the translation strategy based on

audience profile optimization can effectively enhance the emotional identification of the target audience and narrow the cultural gap.

VI. CONCLUSION

This paper deals with the fundamental problem of the mismatch between supply and demand in the translation and dissemination of Central Plains culture—specifically regarding the technical terminology of high-performance industrial manufacturing—and creates a closed-loop optimization model through audience analysis. By synchronizing cultural narratives with the precise specifications of industrial structures, the model ensures that the region's material heritage is communicated accurately to global technical and cultural stakeholders. By means of the experimental assessment conducted with the help of three-dimensional reading, focus group analysis of the semantics, and eye-tracking, it is identified that the dynamical translation strategy on the basis of audience profile can considerably decrease the cognitive load of the target audience, enhance the accuracy of the cultural information comprehending, and be effective in reference to the emotional identification. It was found that the way to transform the emphasis of foreign communication translation through digitization of audience requirements, dynamically generation of strategies and multidimensionalization of effect evaluation are successful directions towards changing the orientation of the former text-centric foreign communication translation to the more audience-centric perspective. While the audience profiling was derived from a large-scale dataset of 42,000 global social media comments to ensure the theoretical validity of the strategy library, the current verification phase serves as a targeted pilot study. This study recruited 60 participants as a representative microcosm, incorporating both international students in China and overseas residents to balance internal and external validity. Future research will employ remote eye-tracking and web-based behavioral testing to scale the verification to a larger, globally distributed sample that fully matches the scale of the initial big data mining. Moreover, the test materials merely picked the single cultural symbol of Shaolin Kung Fu, therefore, the generalizability of the conclusions is to be verified. Further studies can also broaden the sample area to cover additional cultural types of the Central Plains and examine the automated pathways that AI-assisted audience profiling and strategy creation can take to make the model more practical and promotional.

AUTHOR CONTRIBUTIONS

Weixia Li designed, collected and analyzed the data, and drafted the manuscript. Weixia Li conducted the study, critically revised the manuscript for important intellectual content, and gave final approval of the version to be published. Weixia Li participated fully in the work, take public responsibility for appropriate portions of the content, and agreed to be accountable for all aspects of the work in

ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

CONFLICTS OF INTEREST

The author declares no conflict of interest.

FUNDING

This paper is a research achievement of the Henan Provincial Philosophy and Social Sciences Research Project on Building a Strong Education Province. Project No.: 2026JYQS806.

ACKNOWLEDGEMENTS

None.

REFERENCES

- [1] L. Yan, R. Yang, P. Lu, et al., "The spatiotemporal evolution of ancient cities from the late Yangshao to Xia and Shang Dynasties in the Central Plains, China," *Heritage Science*, vol. 9, no. 1, pp. 1-16, 2021, doi: 10.1186/s40494-021-00580-7.
- [2] H. Ma, Y. Zhou, R. Wang, et al., "Ancient genomes shed light on the long-term genetic stability in the Central Plain of China," *Sci Bull*, vol. 70, no. 3, pp. 333-337, 2025, doi: 10.1016/j.scib.2024.07.024.
- [3] Y. J. Fan, "A Study on the Current Situation and Countermeasures of Translation of Xu Shens Culture for External Communication," *Journal of Luohe Vocational and Technical College*, vol. 21, no. 5, pp. 7-10, 2022, doi: 10.3969/j.issn.1671-7864.2022.05.002.
- [4] M.-N. Yun, "Translation Strategies of Red Tourism Terms in the Central Plains-Taking Red Central Plains as an Example," *Journal of Literature and Art Studies*, vol. 14, no. 2, pp. 133-137, 2024, doi: 10.17265/2159-5836/2024.02.005.
- [5] Y. LIU and Y. QI, "What Makes Beauty Universal: Approaches for Overseas Publishing of Central Plains Culture Classics," *Science-Technology & Publication*, vol. 44, no. 10, pp. 142-150, 2025, doi: 10.16510/j.cnki.kjycb.20250930.008.
- [6] Y. Jing, "On CE Translation Strategies and Methods of Zhibi Culture for Global Communication," *Journal of Literature and Art Studies*, vol. 11, no. 12, pp. 971-980, 2021, doi: 10.17265/2159-5836/2021.12.007.
- [7] G. Sigley, "Reimagining the Central Plains(Zhongyuan) and Borderlands(Bianjiang): The cultural heritage scholarship of the Ancient Tea Horse Road (Chamagudao) of Southwest China," *International Journal of Heritage Studies*, vol. 27, no. 9, pp. 904-919, 2021, doi: 10.1080/13527258.2021.1883713.
- [8] M. Yang, Y. Yang, W. Gu, et al., "The agricultural basis for the continuous development of the Central Plains civilization: A systematic radiocarbon dating and archaeobotanical study at the Qingtai site, central China," *The Holocene*, vol. 35, no. 3, pp. 289-299, 2025, doi: 10.1177/09596836241297666.
- [9] X. Zhang, F. Wang, and Q. Tang, "An Ecological Analysis of the Translation of International Communication Texts by Chinese Mainstream Media from the Perspective of Eco-translatology," *International Journal of English Language Education*, vol. 13, no. 2, pp. 1-17, 2025, doi: 10.5296/ijele.v13i2.22896.
- [10] Y. Huang and S. Yang, "Spatio-temporal evolution and distribution of cultural heritage sites along the Suzhou canal of China," *Heritage Science*, vol. 11, no. 1, pp. 1-21, 2023, doi: 10.1186/s40494-023-01034-y.