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#### **REVIEW**



# Study on calligraphy templates in ancient Chinese private schools

# Estudio sobre las plantillas de caligrafía en las antiguas escuelas privadas chinas

Yan Guo¹ <sup>□</sup> ⊠

Doctor of Fine Arts Program in Artistics, International College, Krirk University, Bangkok, 10220, Thailand

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Corresponding author: Yan Guo

### **ABSTRACT**

The historical and educational importance of calligraphy templates applied in ancient Chinese private schools, especially inside the context of cultural transmission and pedagogical practices. Calligraphy, a critical factor of Chinese education, performed a key role in shaping students' literacy, creative expression, and cultural identity. Study examines the evolution of calligraphy templates, which served as an essential tool in teaching proper writing techniques, stroke formation, and aesthetic concepts. By analyzing diverse historical periods, which encompass the Tang and Song Dynasties, that highlight how those templates, often based on the works of skilled calligraphers, guided students in studying exceptional scripts. historical documents and educational sources were examined to recognize how the templates facilitated learning and their evolution over time. This similarly explores how present-day training frameworks can integrate those conventional templates with innovative teaching strategies, making the continuing relevance and cultural maintenance of Chinese calligraphy inside the globalized instructional landscape. The method of traditional calligraphy templates in modern-day Chinese calligraphy training explores how those ancient tools had been incorporated into cutting-edge teaching practices and their persistent relevance in keeping cultural heritage and advancing artistic innovation. It concludes with practical advice for calligraphy teachers, advocating for the continuing use of traditional templates along with progressive techniques to bridge the gap between ancient calligraphy practices and contemporary educational requirements.

Keywords: Calligraphy Templates; Ancient; Chinese Private Schools; Educational Tools; Artistic Innovation.

### **RESUMEN**

La importancia histórica y educativa de las plantillas de caligrafía aplicadas en las antiguas escuelas privadas chinas, especialmente en el contexto de la transmisión cultural y las prácticas pedagógicas. La caligrafía, un factor crítico de la educación China, desempeñó un papel clave en la formación de la alfabetización de los estudiantes, la expresión creativa y la identidad cultural. El estudio examina la evolución de las plantillas de caligrafía, que sirvieron como una herramienta esencial en la enseñanza de técnicas de escritura adecuadas, formación de trazy conceptos estéticos. Mediante el análisis de diversos períodos históricos, que abarcan las dinasttang y Song, se pone de manifiesto cómo esas plantillas, a menudo basadas en las obras de calígrafos expertos, guiaron a los estudiantes en el estudio de las escrituras excepcionales. Se examinaron documentos históricos y fuentes educativas para reconocer cómo las plantillas facilitaban el aprendizaje y su evolución a lo largo del tiempo. Esto explora de manera similar cómo los marcos de capacitación actuales pueden integrar esas plantillas convencionales con estrategias de enseñanza innovadoras, haciendo que la continua relevancia y el mantenimiento cultural de la caligrafía China dentro del paisaje instruccional globalizado. El método de las plantillas de caligrafía tradicional en la formación de caligrafía China de hoy en día explora cómo esas antiguas herramientas habían sido incorporadas en las prácticas de enseñanza de vanguardia y su

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persistente relevancia en el mantenimiento de la herencia cultural y el avance de la innovación artística. Concluye con consejos prácticos para los profesores de caligrafía, abogando por el uso continuo de las plantillas tradicionales junto con técnicas progre para cerrar la brecha entre las antiguas prácticas de caligrafía y los requisitos educativos contemporáneos.

Palabras clave: Plantillas De Caligrafía; Escuelas Privadas Chinas Antiguas; Herramientas Educativas; Innovación Artística.

#### **INTRODUCTION**

Calligraphy has been a necessary part of Chinese education and tradition. Calligraphy is used in historical Chinese private schools to promote creative expression and cultural identity further to literacy improvement. (1) To educate students, the concepts of writing, inclusive of appropriate stroke techniques, script structures, and aesthetic standards, and calligraphy templates have been critical. (2) The templates, which function each teaching aids and creative standards, are regularly based on the creations of proficient calligraphers. (3) They play a crucial role in preserving cultural customs and passing down understanding to future generations.

Calligraphy templates provided students predetermined direction in historic Chinese schooling, helping them learn writing patterns and comprehending the cultured requirements of Chinese scripts. (4) Figure 1 shows the ancient Chinese calligraph images. In particular, the Tang and Song Dynasties were notable periods during which calligraphy flourished and templates were an essential training tool. These templates have been substantially prompted by the working of skilled calligraphers, which shaped the manner that writing and inventive expression were taught. (5) Calligraphy templates evolved because of adjustments in cultural customs and advances in the era. The templates had been modified to deal with the emergence of numerous scripts and styles, making certain their persevered applicability in educational settings. (6)







Figure 1. Ancient Calligraph of Chinese

Study discusses demanding situations with incorporating traditional calligraphy templates into contemporary education, together with the requirement for innovative teaching techniques, restricted access to conventional resources, and a lowering practice in calligraphy as an ordinary dependency. It also seems at how tough it is to strike stability among conventional education techniques and the necessities of current training.

The objective is to analyze how calligraphy templates evolve, their value as teaching tools, and their work in present-day education strategies to offer viable solutions for handling the demands of modern students at the same time as preserving cultural history.

# **DEVELOPMENT**

# Role of Calligraphy in Education

An important element of education for a long time has been calligraphy, specifically in ancient Chinese society. It became a way of developing ethical and intellectual features suitable to a beneficial skill. Calligraphy is an essential element of a scholar's education since its analysis in educational settings sought to expand both technical skill ability and expression. Students had been exposed to calligraphy at an early age as a means of enhancing their handwriting, growing their inventive expression, and internalizing cultural values.

#### Calligraphy as a Moral and Intellectual Tool

Calligraphy was regarded in ancient Chinese education as a sign of a person's moral character and intellectual ability. Students frequently practiced writing classical texts, such as Confucian teachings, historic works, or poetry, as a part of their calligraphy training. This not only helped them refine their writing techniques but

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also imbued them with ethical and philosophical lessons. Calligraphy became considered an art form that required patience, precision, and dedication qualities that had been valued in both educational and societal contexts. The act of writing was believed to have a transformative impact on the student, fostering qualities along with respect for tradition, interest in elements, and self-control. Thus, calligraphy training served as a method for well-rounded individuals, blending technical skills with the cultivation of virtues that were taken into consideration as vital for personal and social improvement.<sup>(7)</sup>

# Learning methods and skills for calligraphy among students in the early Tang Dynasty

During the early Tang Dynasty (618-907 CE), calligraphy learning strategies were deeply rooted in traditional academic practices and the cultural significance of calligraphy. One primary strategy was the use of templates created through master calligraphers, which include Ouyang Xun, Yu Shinan, and Chu Suiliang. Students would imitate these templates to examine proper stroke order, structure, and balance, progressively internalizing strategies through repetition. This method emphasized mastery of fundamental strokes, precision, and consistency, which had been vital for developing technical ability. Calligraphy training also involved copying classical texts from Confucian or Buddhist scriptures, integrating intellectual and ethical development with creative practice. Teachers supplied individualized mentorship, supplying remarks on areas along with stroke weight and individual spacing, ensuring that every student obtained tailored guidance.

As a result, students not only evolved technical ability but also the knowledge of aesthetic standards like balance, rhythm, and harmony. Moreover, calligraphy for the duration of the early Tang Dynasty recommended the expression of personal emotion and energy, transforming it into a deeply expressive art form. This combination of structured practices, intellectual enrichment, and personal expression contributed to the high degree of calligraphic achievement during the Tang period, influencing generations of students and artists and cementing calligraphy as an essential cultural and creative skill in Chinese society.<sup>(8)</sup>

# Evolution of calligraphy templates

Calligraphy templates in historic Chinese private schools were crucial tools for education, embodying both technological innovations and cultural values of their time. Over the centuries, these templates evolved in design, purpose, and usage, reflecting shifts in societal priorities and artistic expression. Initially, templates were created on durable substances consisting of bamboo, wood, or silk, with the appearance of paper in the Han Dynasty, substantially enhancing their accessibility. Each template served as a practical guide for teaching proper stroke order, character composition, and aesthetic stability, ensuring that students should emulate the exemplary works of renowned calligraphers. The layout of the template emerged definitively formed by the functions of the principal calligraphists of the time, among which we have Ouyang Xun, Yan Zhen Qing and Liu Gong Quan. As their creations are used in their incorporation into the templates, students can take closer looks at their methods and the philosophies of aesthetics. Since they often shielded passages from such works as the Works of Confucianism and Treatises of Poetry, these templates were slates and ways of educating and disseminating culture and knowledge.

The models are extremely sensitive to broader cultural variations and have been modified as different dynasties came into power. For instance, templates offered a strong emphasis on exact and neaten- ness for the length of the Tang empire, a period of ethnic sophistication, and the period corresponded to the Tang empire's value of artistry of duration. With individualistic patterns wining prestige, and cursive and running scripts being recognized, templates became more numerous during the Song Dynasty. Despite those changes, the core reason for calligraphy templates to guide learners in learning the art while preserving cultural history remained constant. This evolution highlights the recognizable importance of calligraphy templates in Chinese education. They not only facilitated the improvement of technical talents but additionally served as a medium for instilling discipline, fostering creativity, and connecting students with their cultural roots. The legacy of those templates continues to encourage modern calligraphy education, bridging the gap between culture and innovation. (9)

# The Best Practices of Calligraphy Education in the Early Tang and Song Dynasties

During the early Tang and Song Dynasties, calligraphy education become deeply intertwined with each technical mastery and moral cultivation. These practices were not limited to perfect writing competencies but also emphasized the improvement of personal character and intellectual intensity. The education system focused on developing well-rounded scholars who could excel both in art and ethics.

### **Emphasis on Mastery of Script Styles**

In both the Tang and Song Dynasties, students started their calligraphy education by mastering simple strokes and regularly advanced to more complex scripts, inclusive of regular script (kaishu), semi-cursive script (xingshu), and running script (caoshu). The primary purpose was to make certain students had a solid understanding of the structure, balance, and order of strokes. Calligraphy became considered a skill that

required precision and fluidity, and students were recommended to practice each script until they could write with consistency and style.

# Copying Masterworks of Renowned Calligraphers

A key practice in calligraphy education during this time was the imitation of masterworks through renowned calligraphers, Students frequently copied the calligraphic works of these masters, who were regarded as models of excellence, to learn proper stroke order, shape, and aesthetic harmony. Students who copied those sections learned not only technical skills but also the artistic and philosophical ideas that were incorporated into the calligraphy, which were frequently taken from Daoist or Confucian teachings.

## Moral and Intellectual Development through Calligraphy

During the early Tang and Song Dynasties, calligraphy education served as a method of promoting ethical and intellectual increase in addition to presenting technical practice. Texts from Buddhist texts, historical accounts, and Confucian classics have been regularly copied through students, reinforcing ethical concepts and intellectual development. Students had been capable of internalizing ethical lessons, which include recognizing tradition, self-discipline, and integrity by writing these texts. As a result, calligraphy was considered a way for people to expand themselves with the quality of their writing, reflecting their internal selves.

### Personalized Instruction and Teacher Feedback

Teachers' provision of adapted practice and comments changed into vital in forming students' calligraphy education. To guide stroke method, character stability, and general composition, instructors may also carefully examine every student's progress. Students were capable of enhancing their competencies and acquiring a higher grasp of their very own distinctive writing style through individualized mentoring. Teachers emphasized the importance of patience, perseverance, and mindfulness during the learning process, instilling features of discipline and self-reflection.

### Integration of Calligraphy with Cultural and Artistic Values

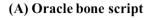
Calligraphy in the Tang and Song Dynasties was considered not simply as an academic subject but additionally as a form of cultural expression. As such, it was deeply connected to broader artistic and cultural values. Calligraphy education was meant to cultivate not only technical understanding but also an appreciation for the beauty and symbolism in writing. Students were recommended to increase their creative expression, merging technical skill ability with personal creativity and cultural understanding. This blend of lifestyle and individual style has become one of the hallmarks of the Tang and Song calligraphic styles. (10)

# Major Scripts in Chinese Calligraphy

The six major scripts of Chinese writing have evolved over more than three thousand years, each representing a unique level within the history of Chinese calligraphy. These scripts, such as oracle bone, seal, clerical, cursive, running, and standard, are integral to the artwork of calligraphy and continue to be extensively used for artistic expression.

The oracle bone script, courting again to the Shang Dynasty (1600-1046 BCE), is the earliest form of Chinese writing. It consists of pictographic and linear characters etched onto bones and shells used for divination. Figure 2 (A) shows the oracle bone script. While not in realistic use, this script serves as a crucial historical foundation and inspires modern calligraphers who discover historic aesthetics. (11) The seal script, which evolved during the Zhou Dynasty and turned standardized during the Qin Dynasty (221-206 BCE), is characterized by way of its rounded, symmetrical strains. Often used for inscriptions and seals, it remains significant in ceremonial and inventive contexts. (12) Figure 2 (B) shows the seal script.







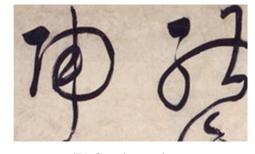
(B) Seal script

Figure 2. Images of (A) Oracle and (B) seal scripts

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Clerical script emerged during the Han Dynasty (206 BCE-220 CE) as a sensible and simplified form of writing for administrative functions. Figure 3 (A) shows the Clerical script. Its squared, structured appearance with flat strokes and exclusive endings made it purposeful but elegant. This script continues to be preferred in calligraphy for its balance of clarity and beauty. (13) In contrast, cursive script, additionally developed during the Han Dynasty, is highly stylized and fluid, designed for speed and informality. Its dynamic, emotive features make it a favorite among calligraphers searching for expressive freedom. (14) Figure 3 (B) shows the cursive script.





(A) Clerical script

(B) Cursive script

Figure 3. Scripts of (A) Clerical and (B) Cursive

Running script, which was regarded for the duration of the Eastern Han Dynasty (25-220 CE), bridges the gap between cursive and standard scripts. It is semi-connected, blending legibility with fluidity, and is widely utilized in both informal and formal contexts. Figure 4 (A) shows the image of the Running script. The standard script, perfected in the duration of the Tang Dynasty (618-907 CE), is the most specific and based on the scripts. Its clarity and well-defined strokes make it foundational for learning Chinese writing and significant in modern calligraphy. Figure 4 (B) shows the image of the standard script.





(A) Running script

(B) Standard script

Figure 4. Images of (A) running script and (B) standard script

Those scripts represent the inventive and cultural richness of Chinese calligraphy, offering a wide variety of patterns that keep influencing cutting-edge practice.

# Practical Recommendations for Calligraphy Instructors

To ensure the maintenance of traditional calligraphy practices whilst addressing modern instructional demands, teachers can adopt a balanced method that combines using historic templates with modern teaching methods. This technique not only fosters cultural appreciation but also enhances students' creative abilities in a contemporary context.

## Integrating Traditional Templates into Modern Teaching

Traditional calligraphy templates, which can be based on the works of renowned master calligraphers, provide helpful insights into stroke techniques, character formation, and aesthetic principles. Instructors should incorporate these templates into their lessons to give students a strong foundation in classic calligraphy styles. By practicing with those models, students can examine the structural precision and artistic stability that define traditional Chinese calligraphy. Using replicas of historical templates or digital variations allows for wider access while preserving the essence of ancient practices.<sup>(17)</sup>

# **Utilizing Technology for Interactive Learning**

Innovative tools along with digital calligraphy apps, interactive whiteboards, and online platforms can

complicate conventional techniques. These technologies permit instructors to demonstrate brush techniques in real time, offer instant feedback, and allow students to practice virtually. For instance, digital systems can simulate the pressure sensitivity of brushes, permitting students to test with strokes even as refining their method. Combining traditional templates with these technologies makes the learning technique more attractive and accessible for modern students.

# **Encouraging Creative Expression**

While conventional templates focus on studying enhanced patterns, teachers should also inspire students to discover their creativity. Students can develop accurate styles that respect historical calligraphy while adjusting to autistic trends by fusing traditional methods with their own unique expression. Innovation may be sparked with the aid of tasks like developing current compositions inspired by classical works or incorporating calligraphy into a multimedia artwork.

### **Building Cultural and Historical Context**

The cultural importance of calligraphy and its historic development has to be emphasized by instructors. Students' appreciation of Chinese calligraphy is higher using lessons that cover subjects that include the ancient historical background of templates, the people who created them, and the philosophical concepts that underlie this artwork's shape. This comprehension can also be established through field trips to museums or workshops with professional calligraphers. (18)

Teachers can create a complete learning experience that bridges the gap between historic practices and present-day requirements by combining the usage of conventional templates with progressive education techniques. This technique ensures Chinese calligraphy's persistent relevance in the modern globalized instructional environment while also maintaining its cultural heritage.

#### **CONCLUSIONS**

In ancient Chinese culture, calligraphy templates were considered one of the most important items in traditional academic apparatus. Educationists were created to teach learners how to write with style and accuracy. Specifically in this work, their educational, cultural and ancient values are revealed as well as explored with specific reference to historic Chinese private schools. These templates are useful in guiding students to augment their ethical and intellectual skills in addition to teaching jury appropriate stroke strategies, character composition, and aesthetics. These operate off types originating from classical literature and scripts of master calligraphists and encouraged subjectivity, creativity, and novelty concurrently with the continuing pass of cultural heritage. Discussing their importance for the traditional education systems and the influence that was made by revealing their development throughout several historical periods on the further development of revolutionary calligraphy techniques. Therefore, China calligraphy will remain relevant and be used in the world that has become a global village because of these old tools have been incorporated into today's teaching curriculums which brings the world in between the traditional and modern world.

## Limitation

Nevertheless, calligraphy templates as important and enduring as they are, continue to encounter challenges in modern classrooms. This is due to a number of factors; the first of which is the general ignorance of these objects in the younger generations and the second factor being the reduced availability of original pieces to the outside world. Also, compared to the modern generation, fast learning of tactics and the conventional instructional method may seem rather slow. Another challenge is the technical complexity of accurately digitizing and reproducing the templates while retaining their originality. A close cooperation between educators, historians and technologists is required to deal with those challenging situations and keep the history of calligraphy alive as well as modifying it to meet the present academic needs.

#### Future scope

The prospects of calligraphy templates depend on how they incorporate themselves into sophisticated instructional models and advanced technologies. Much potential is offered through digitization which guarantees that such templates will be disseminated almost universally through online formats and archives for future reference. Enhancing calligraphy guidance with the help of contemporary means, VR, and AR can renovate calligraphy learning spaces with completely new nearly real environments for children to practice calligraphy and learn. It is possible to conclude that calligraphy might stimulate creativity and expand the amount of cultural knowledge within cross-thematic teaching practices linking language, art, and history. In the same token, those templates, which are blending conventional embellishments with modern advances, may offer hints to present graphic design, multimedia, or artwork jobs. There is the potential of preserving calligraphy templates as an essential component of art, education and preservation of cultures by embracing traditional

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methods and incorporating current technology.

### **REFERENCES**

- 1. Wang X, Yang Y, Wang W, Zhou Y, Yin Y, Gong Z. Generative adversarial networks based motion learning towards robotic calligraphy synthesis. CAAI transactions on intelligence technology. 2024 Apr;9(2):452-66. https://doi.org/10.1049/cit2.12198
- 2. Wan J, Zhang H, Zou J, Zou A, Chen Y, Zeng Q, Li X, Wang Q. WuMKG: a Chinese painting and calligraphy multimodal knowledge graph. Heritage Science. 2024 May 21;12(1):159.
- 3. Luo Y, Wu Z, Lian Z. CalliRewrite: Recovering Handwriting Behaviors from Calligraphy Images without Supervision. In2024 IEEE International Conference on Robotics and Automation (ICRA) 2024 May 13 (pp. 8671-8678). IEEE. 10.1109/ICRA57147.2024.10610332
- 4. Fang CM, Huang L, Kuang Q, Lieberman Z, Maes P, Ishii H. An Accessible, Three-Axis Plotter for Enhancing Calligraphy Learning through Generated Motion. InProceedings of the 2024 CHI Conference on Human Factors in Computing Systems 2024 May 11 (pp. 1-11). https://doi.org/10.1145/3613904.3642792
- 5. Yan F, Lan X, Zhang H, Li L. Intelligent Evaluation of Chinese Hard-Pen Calligraphy Using a Siamese Transformer Network. Applied Sciences. 2024 Feb 29;14(5):2051. https://doi.org/10.3390/app14052051
- 6. Ying L, Sisi R, Lin L. The Role and Challenges of Three-Stroke Script in Modern Calligraphy Education. Asian Journal of Research in Education and Social Sciences. 2024 Sep 30;6(3):529-38.
- 7. Long R. Research Value of Calligraphy Education in Higher Education Institutions in the New Era. International Journal of New Developments in Education. 2024 Feb 25;6(2). doi: 10.25236/IJNDE.2024.060206
- 8. Liu W, Mangaliag AD. Influence of Early Tang Dynasty Calligraphy Education on Current Pedagogy. International Journal of Education and Humanities. 2024 Mar;12(3):72-77 DOI:10.54097/q1fatf68
- 9. Zhang S. The Origin and Evolution of Official Script in Chinese Calligraphic Font. In8th International Conference on Arts, Design and Contemporary Education (ICADCE 2022) 2022 Nov 21 (pp. 31-39). Athena Publishing. https://doi.org/10.55060/s.atssh.221107.007
- 10. Chen X. Politics and Calligraphy at the Courts of the Early and Middle Tang Dynasty: The Tang Imperial Collection of Calligraphy. Monumenta Serica. 2022 Jan 2;70(1):99-130. https://doi.org/10.1080/02549948.202 2.2061163
- 11. Jiang H, Pan Y, Chen J, Liu Z, Zhou Y, Shu P, Li Y, Zhao H, Mihm S, Howe LC, Liu T. Oraclesage: Towards unified visual-linguistic understanding of oracle bone scripts through cross-modal knowledge fusion. arXiv preprint arXiv:2411.17837. 2024 Nov 26. https://doi.org/10.48550/arXiv.2411.17837
- 12. Ou Y, Zhou ZJ, Kang DW, Zhou P, Liu XW. Qin seal script character recognition with fuzzy and incomplete information. Baghdad Science Journal. 2024 Feb 25;21(2 (SI)):0696-. https://orcid.org/0000-0002-4052-1105
- 13. GUOZHONG T. The Historical Significance of Chinese Character Simplification. Assistant Editors. 2024 Dec 27:98. DOI: 10.5281/zenodo.14558178
- 14. Shan X, Zhang K, Shen L, Wang B. The WuShu Database for Cursive Script Character and Style Recognition. In2024 IEEE International Conference on Multimedia and Expo Workshops (ICMEW) 2024 Jul 15 (pp. 1-6). IEEE. 10.1109/ICMEW63481.2024.10645415
- 15. Cao H, Champadaeng S. The Art of Chinese Calligraphy: Educational Protection and Literacy Study of Cultural Heritage. International Journal of Education and Literacy Studies. 2024 Jul 30;12(3):160-71. https://doi.org/10.7575/aiac.ijels.v.12n.3p.160
- 16. Wang Y. Standards and Norms for Calligraphy and Painting: Fenggu in Calligraphy. InAesthetics from Ancient China: Aspects of Fenggu 2024 Jul 6 (pp. 17-54). Singapore: Springer Nature Singapore. https://doi.org/10.1007/978-981-97-2401-7\_2

- 17. Guo H, Zhang L. Exploring Chinese and Canadian Educational Practitioners' Perceptions of Chinese Calligraphy: A Cross-Cultural Study. InReciprocal Learning between Canada and China in Language and Culture Education 2024 Nov 8 (pp. 89-110). Cham: Springer Nature Switzerland. https://doi.org/10.1007/978-3-031-69280-2\_5
- 18. Huang X, Qiao C. The Effects and Learners' Perceptions of Cluster Analysis-Based Peer Assessment for Chinese Calligraphy Classes. SAGE Open. 2024 May;14(2):21582440241255846. https://doi. org/10.1177/21582440241255846

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Conceptualization: Yan Guo. Formal Analysis: Yan Guo. Methodology: Yan Guo.

Project Administration: Yan Guo. Writing - Original Draft: Yan Guo.

Writing - Processing and Editing: Yan Guo.