Supplementary Material

Contents: Table S1 (full coding of the 62 included studies); Table S2 (the 559 records excluded during screening, with reasons and stage); Table S3 (methodological quality appraisal of the 62 included studies with the Mixed Methods Appraisal Tool).

Table S1

Full coding of included studies (n = 62)

Study	Theme	Calligraphic tradition	Education level / context	Research type	Core contribution
Li & Zhou (2015)	AI-based assessment of calligraphy quality	Chinese	Pre-service teachers	System development	ASP.NET-based intelligent assessment platform for teacher trainees' blackboard writing, integrating automated practice-test management, online and offline tutor feedback and peer review
Jiang et al. (2016)	AI-based assessment of calligraphy quality	Chinese	K-12	Empirical	Validity study of feature-marking-based intelligent assessment of hard-pen writing neatness, comparing automated scores with expert human judgement and supporting practical deployment
Xu et al. (2016)	AI-based assessment of calligraphy quality	Chinese	School learners (cross-age samples)	System development	Digital-capture (tablet-based) collection of handwriting samples from students of different ages, analysed with a self-developed teaching-and-evaluation system to assess effects of age on writing correctness and standardization
Zhang et al. (2017)	AI-based assessment of calligraphy quality	Chinese	Novice learners	System development	Deep learning + one-class SVM to detect style consistency in beginners' copying practice
Ma et al. (2018)	AI-based assessment of calligraphy quality	Chinese	Pre-service teachers	Design proposal	Design of a hard-pen calligraphy teaching programme for pre-service teachers integrating an intelligent character-writing assessment system with traditional instruction
Qiang et al. (2019)	AI-based assessment of calligraphy quality	Chinese	K-12	System development	Deep-learning classification of hard-pen calligraphy for K-12 writing evaluation
Cordova et al. (2020)	AI-based assessment of calligraphy quality	General	K-12 (children)	System development	Image-recognition evaluation of personal calligraphy quality linked to child writing development
S. Liu et al. (2020)	AI-based assessment of calligraphy quality	Chinese	General learners	System development	ResNet-based single-character scoring system supporting calligraphy practice
M.-W. Sun et al. (2023)	AI-based assessment of calligraphy quality	Chinese	General learners	System development	Siamese regression aesthetic fusion evaluation of calligraphy copying (SRAFE)
Wang (2023)	AI-based	Chinese	Higher education	System	Calligraphy teaching-quality

Study	Theme	Calligraphic tradition	Education level / context	Research type	Core contribution
	assessment of calligraphy quality			development	evaluation using BPNN with sparrow search algorithm
Chen et al. (2024)	AI-based assessment of calligraphy quality	Chinese	General learners	Review	Comprehensive survey of handwritten Chinese character quality evaluation methods
F. Yan et al. (2024)	AI-based assessment of calligraphy quality	Chinese	K-12	System development	Siamese transformer network for intelligent evaluation of hard-pen calligraphy
Z.-H. Yan et al. (2024)	AI-based assessment of calligraphy quality	Chinese	General learners	System development	Deep-learning evaluation system for handwritten character writing standardization
Chen et al. (2025)	AI-based assessment of calligraphy quality	Chinese	General learners	System development	SiamHCC: siamese network for quality evaluation of handwritten Chinese characters
L. Liu & Zhang (2025)	AI-based assessment of calligraphy quality	Chinese	General learners	System development	Deep-learning evaluation algorithm for hard-pen calligraphy combining a CNN and a vision transformer in a dual-branch fusion network for local detail and global structure
W. Sun et al. (2025)	AI-based assessment of calligraphy quality	Chinese	General learners	System development	Interpretable aesthetic evaluation model for calligraphy imitation
Li & Tang (2015)	Online and web-based learning	Chinese	Higher education (international students)	Design proposal	Proposal for an online platform integrating character-writing instruction with multimedia technology for international students, and its complementarity with classroom teaching
P.-J. Wang et al. (2016)	Online and web-based learning	Chinese	General learners	Design proposal	Analysis of the distinctive features of calligraphy education in networked environments, emphasising mobile-terminal interactivity and many-to-many nonlinear learning
Mi (2018)	Online and web-based learning	Chinese	K-12	Design proposal	Argument for developing online calligraphy courses as a new pathway for primary and secondary calligraphy teaching amid teacher shortage and uneven resource distribution
C. Wang (2021)	Online and web-based learning	Chinese	Higher education	Design proposal	Offline micro-class design for calligraphy teaching in the information age
Dai (2021)	Online and web-based learning	Chinese	Higher education	Design proposal	Application of computer multimedia technology in calligraphy education
Ouyang (2021)	Online and web-based learning	Chinese	K-12	Empirical	K-means analysis of test data informing online calligraphy course design for primary and secondary schools
Z. Yu (2021)	Online and web-based learning	Chinese	General learners	Design proposal	Interest-cultivation scheme for online calligraphy teaching in the internet era

Study	Theme	Calligraphic tradition	Education level / context	Research type	Core contribution
Zhou (2021)	Online and web-based learning	Chinese	General learners	Design proposal	Digital-media pathways for calligraphy education communication and public engagement
Pujiati (2022)	Online and web-based learning	Arabic	General learners	Qualitative	Innovation of learning Arabic calligraphy through digital Quran media, examining cyberspace-based calligraphy learning in the digital era
Y. Li (2022)	Online and web-based learning	Chinese	K-12	Empirical	Big-data-supported primary-school calligraphy teaching model with questionnaire survey
Alashari et al. (2024)	Online and web-based learning	Arabic	General learners	Empirical	Case study of the Calligrapher e-platform for Arabic calligraphy and Islamic ornament instruction
C.-H. Wu et al. (2024)	Online and web-based learning	Chinese	General learners	Survey	Factors and mediation effects of intention to engage in online calligraphy learning
Wong et al. (2024)	Online and web-based learning	Chinese	General learners	System development	CNN-based web application for Chinese calligraphy learners
Xu (2024)	Online and web-based learning	Chinese	Higher education	System development	Virtual 3D camera system for intelligent remote calligraphy teaching with case-study evaluation
Yang et al. (2025)	Online and web-based learning	Korean	General learners	System development	Deep-learning web platform for Korean calligraphy learners
Mamoun et al. (2015)	Intelligent tutoring, generative AI and pedagogy	Arabic	General learners	Design proposal	Design proposal for educational software teaching basic Arabic calligraphy skills
Sadikoglu & Soroush (2016)	Intelligent tutoring, generative AI and pedagogy	Persian	General learners	System development	First intelligent tutoring system for Persian calligraphy learning
Brandão (2018)	Intelligent tutoring, generative AI and pedagogy	General	General learners	System development	App, system and tool for self-directed learning of flat-tip (Western) calligraphy
Xia et al. (2021)	Intelligent tutoring, generative AI and pedagogy	Chinese	Novice learners	System development	Visualization schemes of writing speed and pressure supporting calligraphy copying practice
J.-J. Li (2022)	Intelligent tutoring, generative AI and pedagogy	Chinese	K-12	Design proposal	Reconstruction of Chinese character-writing learning materials under digital transformation, exemplified by the 'Shuangyou Yunqiao · Shoushi Youzi' smart-writing course deployed in schools
Liu et al. (2022)	Intelligent tutoring, generative AI and pedagogy	Chinese	General learners	System development	Intelligent calligraphy teaching supported by digital media
Du (2024)	Intelligent tutoring, generative AI and pedagogy	Chinese	Higher education	Design proposal	Conceptual strategies for university calligraphy education in the AI era
Jamaluddin et al. (2024)	Intelligent tutoring, generative AI and	Arabic	General learners	Design proposal	I-HATIC framework for interactive tutoring applications in Islamic calligraphy

Study	Theme	Calligraphic tradition	Education level / context	Research type	Core contribution
	pedagogy				handwriting
Natheer (2024)	Intelligent tutoring, generative AI and pedagogy	Arabic	Higher education	Quasi-experimental	Two-group experiment (N=60) plus SEM on Dream-AI use and design proficiency for Arabic calligraphy ornamentation
Gong et al. (2025)	Intelligent tutoring, generative AI and pedagogy	Chinese	General learners	System development	CalliSense: interactive tool for process-based calligraphy learning (formative interviews N=8, CHI 2025)
Tang et al. (2025)	Intelligent tutoring, generative AI and pedagogy	Chinese	Vocational education	Quasi-experimental	Effects of STEAM-PBL on calligraphy vocational skills and artistic creativity (motivation as mediator)
Yu et al. (2025)	Intelligent tutoring, generative AI and pedagogy	Chinese	General learners	System development	Generative-AI construction of multimodal resources for Chinese character learning
Loup-Escande et al. (2017)	Immersive learning environments (VR/AR/MR)	Chinese	General learners	Experimental	Experiment on mixed-reality supplementary visual feedback in a calligraphy learning task
Ishihara & Makino (2020)	Immersive learning environments (VR/AR/MR)	Japanese	K-12	System development	AR self-learning system for Japanese calligraphy in the K-12 curriculum
Lee & Hsu (2021)	Immersive learning environments (VR/AR/MR)	Chinese	Older adults/lifelong	Quasi-experimental	Quasi-experiment of AR vs. e-book instruction in an older-adult calligraphy course during COVID-19
P.-F. Li et al. (2022)	Immersive learning environments (VR/AR/MR)	Chinese	Higher education	Empirical	VR-enhanced distance learning for practical skill-based calligraphy teaching
Luo et al. (2023)	Immersive learning environments (VR/AR/MR)	Chinese	General learners	Experimental	Learning Chinese calligraphy in VR with sponge-enabled haptic feedback
Ma & Yu (2024)	Immersive learning environments (VR/AR/MR)	Chinese	General learners	Review	Analytical examination of how VR applications convey tactile feedback for traditional calligraphy practice
Wang & Gao (2024)	Immersive learning environments (VR/AR/MR)	Chinese	General learners	System development	Mixed-reality calligraphy studying environment
Y. Li et al. (2024a)	Immersive learning environments (VR/AR/MR)	Chinese	Higher education	Empirical	Factors influencing students' intention to use metaverse-based calligraphy teaching (TPE)
Y. Li et al. (2024b)	Immersive learning environments (VR/AR/MR)	Chinese	Higher education	Empirical	College students' behavior in calligraphy courses within a virtual learning environment
Yu & Ma (2024)	Immersive learning environments (VR/AR/MR)	Chinese	Higher education	Empirical	Mixed-methods study of metaverse-based Chinese character and calligraphy education enhancing motivation and cultural engagement
Tsuda et al. (2018)	Robotics and haptic skill	Japanese	Novice learners	System development	Pressure-presentation device conveying brushwork force for

Study	Theme	Calligraphic tradition	Education level / context	Research type	Core contribution
	training				apprentice calligraphy instruction
Wu et al. (2018)	Robotics and haptic skill training	Chinese	Cultural transmission	System development	Deep reinforcement learning calligraphy robot for cultural inheritance
Chao et al. (2019)	Robotics and haptic skill training	Chinese	Cultural transmission	System development	Robotic calligraphy with inverse reinforcement learning from human preferences
Raza et al. (2019)	Robotics and haptic skill training	Korean	General learners	Experimental	Haptic guidance system for transferring brush-stroke skills in Korean calligraphy
Wu et al. (2020a)	Robotics and haptic skill training	Chinese	Cultural transmission	System development	GAN-based calligraphy robot motivated by cultural inheritance and education
Wu et al. (2020b)	Robotics and haptic skill training	Chinese	Cultural transmission	System development	Actor-critic + GAN robotic calligraphy system framed around inheritance and education
Kobayashi & Katsura (2022)	Robotics and haptic skill training	Japanese	Cultural transmission	System development	Generative model of calligraphy from images and human motion for robotic inheritance
Fang et al. (2024)	Robotics and haptic skill training	Chinese	Novice learners	Experimental	Accessible three-axis plotter enhancing calligraphy learning through generated motion
Hu et al. (2025)	Robotics and haptic skill training	Chinese	General learners	System development	AI-powered robotic calligraphy creation system positioned as a teaching tool

Note. Studies are grouped by theme in the order presented in Table 3 of the main text and ordered by year within each theme. Where two or more included studies share a first-author surname and year, author initials or suffix letters distinguish them, following the in-text citations of the main text. CNKI study titles are rendered in English following the reference list of the main text.

Table S2

Records excluded during screening, with reasons and stage (n = 559)

No.	Database	Title	Year	Sourceoutlet	Excludedat	Reason
1	CNKI	在触摸屏上实现纸笔书写般的轻松感	2015	电子产品世界	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
2	CNKI	巧用多媒体提高小学识字课教学效率	2016	西部素质教育	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
3	Scopus	Arabic online handwriting recognition: A survey	2017	ACM International Conference Proceeding Series	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
4	WoS	Insight on Character Recognition for Calligraphy Digitization	2017	2017 Ieee Technological Innovations In Ict For Agriculture A	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
5	Scopus	Unlocking the Mechanism of Devanagari Letter Identification Using Eye Tracking	2017	Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
6	Scopus	An efficient convolutional neural network based classifier to predict Tamil writer	2018	Periodicals of Engineering and Natural Sciences	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
7	WoS	Boosting Handwriting Text Recognition in Small Databases with Transfer Learning	2018	Proceedings 2018 16Th International Conference On Frontiers	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
8	WoS	Towards the Machine Reading of Arabic Calligraphy: A Letters Dataset and Corresponding Corpus of Text	2018	2018 Ieee 2Nd International Workshop On Arabic And Derived S	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
9	CNKI	笔迹自动比对可行性探析	2018	辽宁警察学院学报	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
10	Scopus	A Semi-automatic Methodology for Recognition of Printed Kannada Character Primitives Useful in Character Construction	2019	Communications in Computer and Information Science	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
11	WoS	A novel CNN structure for fine-grained classification of Chinese calligraphy styles	2019	International Journal On Document Analysis And Recognition	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
12	Scopus	Applying Deep Convolutional Neural Network to Cursive Chinese Calligraphy Recognition	2019	Communications in Computer and Information Science	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
13	WoS	Arabic Handwritten Documents Segmentation into Text-lines and Words using Deep Learning	2019	2019 International Conference On Document Analysis And Recog	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
14	WoS	Generating Calligraphy	2019	2019 International	Title-and-abstract	Recognition, OCR, heritage

No.	Database	Title	Year	Sourceoutlet	Excludedat	Reason
		Works Based on DiscoGAN		Conference On Intelligent Manufacturing A	screening	digitization or automated evaluation without an educational context
15	WoS	Improving Urdu Recognition Using Character-Based Artistic Features of Nastalique Calligraphy	2019	Ieee Access	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
16	Scopus	Transfer learning of deep CNN de-noiser prior for Chinese ancient calligraphy tablet image denoising	2019	Proceedings of SPIE - The International Society for Optical Engineering	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
17	CNKI	点阵识别技术支持的纸笔书法智能教学系统	2019	人工智能	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
18	WoS	A fast solution for Chinese calligraphy relief modeling from 2D handwriting image	2020	Visual Computer	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
19	WoS	Chinese Calligraphy Character Image Recognition and Its Applications in Web and Wechat Applet Platform	2020	Proceedings Of The Acm/Ieee Joint Conference On Digital Libr	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
20	WoS	Deep learning autoencoder approach: Automatic recognition of artistic Arabic calligraphy types	2020	Kuwait Journal Of Science	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
21	WoS	Inscription Detection and Style Identification in Chinese Painting	2020	2020 Chinese Automation Congress (Cac 2020)	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
22	WoS	Key Technology of Virtual Roaming System in the Museum of Ancient High-Imitative Calligraphy and Paintings	2020	Ieee Access	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
23	Scopus	The Study of Chinese Calligraphy Font Style Based on Edge-Guided Filter and Convolutional Neural Network	2020	2020 IEEE 5th International Conference on Signal and Image Processing, ICSIP 2020	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
24	WoS	Toward Automatic Recognition of Cursive Chinese Calligraphy	2020	Proceedings Of The 2020 14Th International Conference On Ubi	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
25	Scopus	Toward Automatic Recognition of Cursive Chinese Calligraphy : An Open Dataset for Cursive Chinese Calligraphy Text	2020	Proceedings of the 2020 14th International Conference on Ubiquitous Information Management and Communication, IMCOM 2020	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
26	WoS	Unconstrained Handwritten Arabic Text-lines Segmentation based on AR2U-Net	2020	2020 17Th International Conference On Frontiers In Handwriti	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
27	CNKI	基于深度学习的在线字临摹分析系统设计	2020	信息技术与网络安全	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
28	CNKI	新型冠状病毒肺炎疫情期间网络授课存在的问题及	2020	中国现代教育装备	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated

No.	Database	Title	Year	Sourceoutlet	Excludedat	Reason
		解决措施				evaluation without an educational context
29	WoS	A New Computational Method for Arabic Calligraphy Style Representation and Classification	2021	Applied Sciences-Basel	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
30	Scopus	Chinese calligraphy recognition system based on convolutional neural network	2021	ICIC Express Letters	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
31	WoS	Exploiting Serialized Fine-Grained Action Recognition Using WiFi Sensing	2021	Mobile Information Systems	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
32	Scopus	Fake Calligraphy Recognition Based on Deep Learning	2021	Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
33	Scopus	Fast learning neural network based on texture for Arabic calligraphy identification	2021	Indonesian Journal of Electrical Engineering and Computer Science	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
34	Scopus	Learning Outcomes during Information Search in Digital Archives	2021	Proceedings of the Association for Information Science and Technology	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
35	WoS	MA-GAN: A Method Based on Generative Adversarial Network for Calligraphy Morphing	2021	Neural Information Processing, Iconip 2021, Pt I	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
36	WoS	Painting and calligraphy identification method based on hyperspectral imaging and convolution neural network	2021	Spectroscopy Letters	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
37	WoS	RETRACTED: Ancient Stone Inscription Image Denoising and Inpainting Methods Based on Deep Neural Networks (Retracted Article)	2021	Discrete Dynamics In Nature And Society	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
38	Scopus	Research and Application of Chinese Calligraphy Character Recognition Algorithm Based on Image Analysis	2021	2021 IEEE International Conference on Advances in Electrical Engineering and Computer Applications, AEECA 2021	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
39	WoS	Thai Calligraphy using Adversarial Generative Network	2021	2020 Ieee International Conference On Internet Of Things And	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
40	CNKI	“大数据+”中国书法的数字化保护与创新发展	2021	电脑知识与技术	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
41	CNKI	小学语文识字教学中信息技术的融合探讨	2021	2021 教育科学网络研讨年会论文集（上）	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
42	Scopus	Generating New Arabic	2022	Proceedings of 2022 5th	Title-and-abstract	Recognition, OCR, heritage

No.	Database	Title	Year	Sourceoutlet	Excludedat	Reason
		Letters-Rawashin Design using GAN		National Conference of Saudi Computers Colleges, NCCC 2022	screening	digitization or automated evaluation without an educational context
43	Scopus	Industry 4.0 Researchers Computer Numerical Control Machine Tool to Manufacture Calligraphy Board	2022	Lecture Notes in Electrical Engineering	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
44	WoS	RETRACTED: Recursive Neural Network-Based Market Demand Forecasting Algorithm for Calligraphy Practice Products (Retracted Article)	2022	Journal Of Mathematics	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
45	Scopus	Recognition of Handwritten Digit Using Neural Networks	2022	Proceedings - 2022 IEEE 2nd International Symposium on Sustainable Energy, Signal Processing and Cyber Security, iSSSC 2022	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
46	Scopus	The Recognition System of Chinese Calligraphy Style Based on Deep Learning	2022	Lecture Notes on Data Engineering and Communications Technologies	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
47	WoS	Triple discriminators-equipped GAN for Denoising of Chinese calligraphic tablet images	2022	Multimedia Tools And Applications	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
48	CNKI	基于 SVM 模型的电子签名笔迹动态特征检验的研究	2022	河北公安警察职业学院学报	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
49	Scopus	Calligraphy's Reflective Expression: Intelligent Chinese Calligraphy Affective and Style Recognition	2023	Proceedings - 2023 15th International Conference on Intelligent Human-Machine Systems and Cybernetics, IHMSC 2023	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
50	Scopus	Data Augmentation Techniques Based on Deep Learning for Chinese Paintings	2023	Proceedings of SPIE - The International Society for Optical Engineering	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
51	WoS	Deep learning based text detection using resnet for feature extraction	2023	Multimedia Tools And Applications	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
52	Scopus	HABFD: Houma Alliance Book Facsimiles Database	2023	2023 8th International Conference on Image, Vision and Computing, ICIVC 2023	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
53	WoS	HiGAN plus : Handwriting Imitation GAN with Disentangled Representations	2023	Acm Transactions On Graphics	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
54	WoS	How Many Handwritings Does Dostoevsky Have: Typology Tasks	2023	Neizvestnyi Dostoevskii-The Unknown Dostoevsky	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
55	Scopus	Mechatronics Computer Numerical Control Tool to Manufacture Calligraphy Board	2023	2023 IEEE International Conference on Integrated Circuits and Communication Systems,	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context

No.	Database	Title	Year	Sourceoutlet	Excludedat	Reason
				ICICACS 2023		
56	WoS	Stroke Extraction of Chinese Character Based on Deep Structure Deformable Image Registration	2023	Thirty-Seventh Aaai Conference On Artificial Intelligence, V	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
57	Scopus	Style Recognition of Calligraphic Chinese Characters Based on Morphological Convolutional Neural Network	2023	Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
58	WoS	When artificial intelligence comes to the Chinese calligraphic landscape: The coming transformation	2023	Geography Compass	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
59	Scopus	Applications of Machine Learning in Recognizing Chinese Calligrapher's Handwriting Styles	2024	ACM International Conference Proceeding Series	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
60	Scopus	Automated Classification of Arabic Script Styles Using Enhanced CNN Frameworks	2024	2024 International Conference on Computer and Applications, ICCA 2024	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
61	WoS	CalliRewrite: Recovering Handwriting Behaviors from Calligraphy Images without Supervision	2024	2024 Ieee International Conference On Robotics And Automatio	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
62	Scopus	Calligraphy Alphabet Perception Using Artificial Intelligence	2024	Proceedings of 9th International Conference on Science, Technology, Engineering and Mathematics: The Role of Emerging Technologies in Digital Transformation, ICONSTEM 2024	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
63	WoS	Conv-ViT fusion for improved handwritten Arabic character classification	2024	Signal Image And Video Processing	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
64	WoS	Design and Implementation of a Virtual Exhibition System for Beilin Calligraphy Art Using VR Technology	2024	2024 4Th International Conference On Digital Society And Int	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
65	Scopus	Exploring the Multiple Aspects of Epigraphic Culture: Taking Miao Quansun's Calligraphy during the Late Qing Dynasty as Example	2024	Pakistan Journal of Life and Social Sciences	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
66	WoS	Generating and Evaluating Cursive Chinese Calligraphy by Semi-Classifying Style: A Case Study Using a Diffusion Model	2024	2024 International Symposium On Multimedia, Ism	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
67	Scopus	Image stitching based on scanned images of super large format artworks	2024	Proceedings of SPIE - The International Society for Optical Engineering	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
68	WoS	Increasing Offline Handwritten Chinese	2024	Electronics	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated

No.	Database	Title	Year	Sourceoutlet	Excludedat	Reason
		Character Recognition Using Separated Pre-Training Models: A Computer Vision Approach				evaluation without an educational context
69	WoS	MGCNet: A Multi-scale Grouped Convolution-Based Seal Detection Method for Painting and Calligraphy Works	2024	Web Information Systems And Applications, Wisa 2024	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
70	WoS	RETRACTED: Analysis of calligraphy Chinese character recognition technology based on deep learning and computer-aided technology (Retracted Article)	2024	Soft Computing	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
71	Scopus	Research on the Informatization Strategy and Practical Effect of Chinese Traditional Culture Education	2024	Applied Mathematics and Nonlinear Sciences	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
72	WoS	Strengthening Applications' Security with Handwritten Arabic Calligraphy Captcha	2024	2024 Ieee 8Th Forum On Research And Technologies For Society	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
73	Scopus	Stroke Extraction Method for Calligraphy Characters Based on Enhanced Pix2pix Network	2024	IEEE International Conference on Signal, Information and Data Processing, ICSIDP 2024	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
74	WoS	Stroke-Seg: A deep learning-based framework for chinese stroke segmentation	2024	Iet Image Processing	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
75	CNKI	基于 Swin Transformer 和 CNN 的汉字书法教学系统	2024	青岛大学学报(自然科学版)	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
76	Scopus	A CNN-Based Model for Classifying Arabic Calligraphy Extracted from Images	2025	Lecture Notes in Networks and Systems	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
77	Scopus	A Machine Learning-Based Calligraphy Font Recognition System Using HOG Features and Support Vector Machine	2025	Proceedings - 2025 11th International Conference on Computing and Artificial Intelligence, ICCAI 2025	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
78	Scopus	A Novel Character Recognition Algorithm of Chinese Brush Calligraphy Based on Fusion Attention Mechanism	2025	Advances in Transdisciplinary Engineering	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
79	WoS	AI-driven exploration system of emotional and stylistic expressions in calligraphy	2025	Journal Of Engineering Design	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
80	WoS	Advancing cultural heritage: a decadal review of digital transformation in Chinese museums	2025	Npj Heritage Science	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
81	WoS	AncientGlyphNet: an advanced deep learning framework for detecting ancient Chinese characters in	2025	Artificial Intelligence Review	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context

No.	Database	Title	Year	Sourceoutlet	Excludedat	Reason
		complex scene				
82	Scopus	Artificial Intelligence Contributes to the Creative Transformation And Innovative Development of Traditional Chinese Culture	2025	International Journal of Computational and Experimental Science and Engineering	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
83	Scopus	Artificial Intelligence for Calligraphic Writer Identification: The Case of Lope de Vega's Autographs; [Inteligencia Artificial para la identificación caligráfica: El caso de los autógrafos de Lope de Vega]	2025	Hipogrifo	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
84	Scopus	CCR-LWECNN: A Lightweight CNN Framework for Chinese Calligraphy Recognition and Evaluation	2025	Acta Physica Polonica B	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
85	WoS	DRA-Net: Dynamic Feature Fusion Upsampling and Text-Region Focus for Ancient Chinese Scene Text Detection	2025	Electronics	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
86	Scopus	Multimodal Framework for Cursive Calligraphy Recognition with Unet, ResNet, and LLMs	2025	2025 7th International Conference on Artificial Intelligence Technologies and Applications, ICAITA 2025	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
87	WoS	Predict the writer's trait emotional intelligence from reproduced calligraphy	2025	Scientific Reports	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
88	WoS	Research on Efficient Calligraphy Image Classification Based on Attention Enhancement	2025	Mathematics	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
89	Scopus	Research on the Recognition Algorithm of Traditional Cultural Elements in New Media Advertising Design Based on Deep Learning	2025	2025 IEEE 3rd International Conference on Control, Electronics and Computer Technology, ICCECT 2025	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
90	Scopus	ShufaNet: Classification Method for Calligraphers Who Have Reached the Professional Level	2025	Proceedings of SPIE - The International Society for Optical Engineering	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
91	WoS	Text Extraction and Script Completion in Images of Arabic Script-Based Calligraphy: A Thesis Proposal	2025	Proceedings Of The 2025 Conference Of The Nations Of The Ame	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
92	WoS	Text Line Segmentation of Ottoman Manuscripts	2025	2025 33Rd Signal Processing And Communications Applications	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
93	CNKI	人工智能何以赋能中小学书法教育	2025	书法教育	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
94	CNKI	墨韵与智能：书法在人工智能时代的展望	2025	大众文艺	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated

No.	Database	Title	Year	Sourceoutlet	Excludedat	Reason
						evaluation without an educational context
95	CNKI	头颈 CT 血管成像人工智能辅助阅片在住院医师规范化培训中的应用	2025	江苏卫生事业管理	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
96	CNKI	重构与创新：AI 驱动下的小学识字评价新范式研究	2025	交叉科学驱动下的教育变革与未来展望论文集（二）	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
97	WoS	Calli-VA: A Visual Analytics System for Analyzing and Comparing Chinese Calligraphic Styles	2026	Ieee Transactions On Visualization And Computer Graphics	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
98	WoS	Constructing a Knowledge Graph for the Aesthetic System of Chinese Calligraphy and Painting	2026	International Journal Of Knowledge Management	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
99	WoS	Evaluating Aesthetics of Arabic Handwriting: Hand Motion-Based Approach	2026	Artsit, Interactivity And Game Creation, Artsit 2024, Pt I	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
100	WoS	Handwritten Arabic Text Recognition: A Review of Recent Trends and Future Direction	2026	International Journal Of Computer Vision	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
101	WoS	Inpainting of Ancient Chinese Character Rubbings via Generative Adversarial Network	2026	Image Analysis And Processing - Iciap 2025, Pt 2	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
102	WoS	Multi-Scale Structural Response in Calligraphic Layout Deviation Detection	2026	Applied Sciences-Basel	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
103	WoS	Scribe identification for Tang Dynasty Changsha Kiln poetic ceramics via dual-path multi-scale global attention model	2026	Npj Heritage Science	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
104	WoS	Writing instruments in a calligraphy experience system conveying the relationship between kanji and nature	2026	Entertainment Computing	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
105	CNKI	以研促学、以创促能、科教融合的高分子材料综合实验教学探索与实践——以机器学习辅助的智能书写识别系统为例	2026	大学化学	Title-and-abstract screening	Recognition, OCR, heritage digitization or automated evaluation without an educational context
106	WoS	Training system for endoscopic surgery with haptic guide function and augmented reality	2015	International Journal Of Space-Based And Situated Computing	Title-and-abstract screening	Calligraphy peripheral or the application non-educational
107	CNKI	初中语文教学中板书运用策略	2015	福建质量管理	Title-and-abstract screening	Calligraphy peripheral or the application non-educational
108	CNKI	基于 Flash CS 软件的课堂板书设计与实现	2015	电脑编程技巧与维护	Title-and-abstract screening	Calligraphy peripheral or the application non-educational
109	CNKI	对美术教学与现代多媒体技术接轨方式的探讨	2015	美与时代(上)	Title-and-abstract screening	Calligraphy peripheral or the application non-educational

No.	Database	Title	Year	Sourceoutlet	Excludedat	Reason
110	CNKI	浅论多媒体进课堂后教学板书的功能	2015	大众科技	Title-and-abstract screening	Calligraphy peripheral or the application non-educational
111	WoS	KPTI: Katib's Pashto Text Imagebase and Deep Learning Benchmark	2016	Proceedings Of 2016 15Th International Conference On Frontie	Title-and-abstract screening	Calligraphy peripheral or the application non-educational
112	CNKI	交互式电子白板在课堂教学中的应用	2016	海南师范大学学报(自然科学版)	Title-and-abstract screening	Calligraphy peripheral or the application non-educational
113	CNKI	多媒体课件在小学语文识字教学中的应用	2016	中国教育技术装备	Title-and-abstract screening	Calligraphy peripheral or the application non-educational
114	CNKI	小学低年级识字教学中多媒体的应用探析	2016	西部素质教育	Title-and-abstract screening	Calligraphy peripheral or the application non-educational
115	CNKI	教育信息化中蒙古文数字化出版遇到的困境	2016	内蒙古教育(职教版)	Title-and-abstract screening	Calligraphy peripheral or the application non-educational
116	CNKI	高师学习质量多元化评价体系设计与实践	2016	沈阳师范大学学报(社会科学版)	Title-and-abstract screening	Calligraphy peripheral or the application non-educational
117	CNKI	多媒体广泛应用背景下中学历史教学板书有效性研究	2017	文山学院学报	Title-and-abstract screening	Calligraphy peripheral or the application non-educational
118	CNKI	应用多媒体技术,提升语文课堂教学趣味性的研究	2017	新课改背景下课堂教学方法与手段的有效性研究科研成果集（第三卷）	Title-and-abstract screening	Calligraphy peripheral or the application non-educational
119	CNKI	网络背景下高中数学规范解答模式的对比与研究	2017	中学教育科研 2017 年 11-12 期（总第 222-223 期）	Title-and-abstract screening	Calligraphy peripheral or the application non-educational
120	WoS	Calligraphy: a Mobile Device Based Annotation Tool Supporting Learner Crowdsourcing	2018	2018 Ieee Smartworld, Ubiquitous Intelligence & Computing, A	Title-and-abstract screening	Calligraphy peripheral or the application non-educational
121	WoS	Generating Handwritten Chinese Characters using CycleGAN	2018	2018 Ieee Winter Conference On Applications Of Computer Visi	Title-and-abstract screening	Calligraphy peripheral or the application non-educational
122	WoS	Path-Following Guidance Using Phantom Sensation Based Vibrotactile Cues Around the Wrist	2018	Ieee Robotics And Automation Letters	Title-and-abstract screening	Calligraphy peripheral or the application non-educational
123	CNKI	智慧教室与智慧教学的原理与应用	2018	中国培训	Title-and-abstract screening	Calligraphy peripheral or the application non-educational
124	Scopus	Chinese calligraphy: Character style recognition based on full-page document	2019	ACM International Conference Proceeding Series	Title-and-abstract screening	Calligraphy peripheral or the application non-educational
125	Scopus	Use of technological tools to evaluate handwriting production of the alphabet and pseudocharacters by Brazilian students	2019	Clinics	Title-and-abstract screening	Calligraphy peripheral or the application non-educational
126	WoS	Chinese Typography Transfer Model Based on Generative Adversarial Network	2020	2020 Chinese Automation Congress (Cac 2020)	Title-and-abstract screening	Calligraphy peripheral or the application non-educational
127	Scopus	Information Literacy and Transcultural Learning: How Chinese Calligraphy and Historical Korean Poetry Were Turned into a Library Co-Curricular Initiative	2020	International Information and Library Review	Title-and-abstract screening	Calligraphy peripheral or the application non-educational
128	Scopus	Structural Analysis and Optimization of Convolutional Neural	2020	Scientific Reports	Title-and-abstract screening	Calligraphy peripheral or the application non-educational

No.	Database	Title	Year	Sourceoutlet	Excludedat	Reason
		Networks with a Small Sample Size				
129	Scopus	Calligraphic Drawing for Collaborative Virtual Whiteboard Systems	2021	Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)	Title-and-abstract screening	Calligraphy peripheral or the application non-educational
130	Scopus	English to Thai Calligraphy Style Transfer Using Deep Learning	2021	2021 IEEE Asia Conference on Information Engineering, ACIE 2021	Title-and-abstract screening	Calligraphy peripheral or the application non-educational
131	Scopus	On the construction and management of college students' art troupe under the new situation exploration and thinking-taking nantong institute of technology as an example	2021	ACM International Conference Proceeding Series	Title-and-abstract screening	Calligraphy peripheral or the application non-educational
132	CNKI	中国教育智能硬件趋势洞察 2021 年	2021	艾瑞咨询系列研究报告（2021 年第 4 期）	Title-and-abstract screening	Calligraphy peripheral or the application non-educational
133	Scopus	Analysis of Chinese Calligraphy Fonts Using Content-based Image Retrieval	2022	Proceedings of the 2nd IEEE International Conference on Social Sciences and Intelligence Management, SSIM 2022	Title-and-abstract screening	Calligraphy peripheral or the application non-educational
134	WoS	Analysis of handmade paper by Raman spectroscopy combined with machine learning	2022	Journal Of Raman Spectroscopy	Title-and-abstract screening	Calligraphy peripheral or the application non-educational
135	WoS	Application of Deep Neural Networks and Human-Computer Interaction Technology in Art and Design Area	2022	Wireless Communications & Mobile Computing	Title-and-abstract screening	Calligraphy peripheral or the application non-educational
136	WoS	Pashtu Language Digits Dataset	2022	Data In Brief	Title-and-abstract screening	Calligraphy peripheral or the application non-educational
137	WoS	RETRACTED: Analysis of Painting Elements of Tea Culture and Art Works Based on Image Perception (Retracted Article)	2022	Security And Communication Networks	Title-and-abstract screening	Calligraphy peripheral or the application non-educational
138	WoS	RETRACTED: Contemporary Advertising Text Art Design and Effect Evaluation by IoT Deep Learning under the Smart City (Retracted Article)	2022	Security And Communication Networks	Title-and-abstract screening	Calligraphy peripheral or the application non-educational
139	Scopus	Research on Machine Generation and Design of 'Orchid Calligraphy'	2022	2022 10th International Conference on Orange Technology, ICOT 2022	Title-and-abstract screening	Calligraphy peripheral or the application non-educational
140	Scopus	Research on authenticity identification of Chinese painting based on computer technology	2022	Proceedings of SPIE - The International Society for Optical Engineering	Title-and-abstract screening	Calligraphy peripheral or the application non-educational
141	Scopus	Arabic Calligraphy Generation Through Image-to-Image Translation Using Generative Adversarial Networks (GANs)	2023	2nd International Engineering Conference on Electrical, Energy, and Artificial Intelligence, EICEEAI 2023	Title-and-abstract screening	Calligraphy peripheral or the application non-educational
142	WoS	Dongpo dream machine: notes towards an exhibition	2023	Journal Of Visual Art Practice	Title-and-abstract screening	Calligraphy peripheral or the application non-educational

No.	Database	Title	Year	Sourceoutlet	Excludedat	Reason
143	WoS	PESTD: a large-scale Persian-English scene text dataset	2023	Multimedia Tools And Applications	Title-and-abstract screening	Calligraphy peripheral or the application non-educational
144	WoS	Paper-Fiber-Activated Triplet Excitons of Carbon Nanodots for Time-Resolved Anti-counterfeiting Signature with Artificial Intelligence Authentication	2023	Acs Applied Materials & Interfaces	Title-and-abstract screening	Calligraphy peripheral or the application non-educational
145	Scopus	Research on Applying Dense Convolutional Neural Network in Chinese Character Font Recognition	2023	2023 IEEE 3rd International Conference on Electronic Technology, Communication and Information, ICETCI 2023	Title-and-abstract screening	Calligraphy peripheral or the application non-educational
146	Scopus	Research on Calligraphy Style Recognition Based on Adaptive Image Enhancement and Improved DenseNet Algorithm	2023	ITOEC 2023 - IEEE 7th Information Technology and Mechatronics Engineering Conference	Title-and-abstract screening	Calligraphy peripheral or the application non-educational
147	Scopus	A Case Study of Enhancing Ai-Integrated Physical and Arts Education Donation Programs Using the Sum Model	2024	Nanotechnology Perceptions	Title-and-abstract screening	Calligraphy peripheral or the application non-educational
148	Scopus	A study of feature extraction for Arabic calligraphy characters recognition	2024	International Journal of Electrical and Computer Engineering	Title-and-abstract screening	Calligraphy peripheral or the application non-educational
149	WoS	Aesthetic and functional analysis of mosque entrance areas in Ottoman and Safavid Empires: a comparative study	2024	Cogent Arts & Humanities	Title-and-abstract screening	Calligraphy peripheral or the application non-educational
150	Scopus	Chinese Calligraphy Style Transfer with Generative Adversarial Network	2024	ACM International Conference Proceeding Series	Title-and-abstract screening	Calligraphy peripheral or the application non-educational
151	Scopus	DeepCalliFont: Few-Shot Chinese Calligraphy Font Synthesis by Integrating Dual-Modality Generative Models	2024	Proceedings of the AAAI Conference on Artificial Intelligence	Title-and-abstract screening	Calligraphy peripheral or the application non-educational
152	WoS	Exploring the representation of Chinese cultural symbols dissemination in the era of large language models	2024	International Communication Of Chinese Culture	Title-and-abstract screening	Calligraphy peripheral or the application non-educational
153	Scopus	Intelligent Recognition Algorithm for Calligraphy Fonts Based on Texture Mapping	2024	Computer-Aided Design and Applications	Title-and-abstract screening	Calligraphy peripheral or the application non-educational
154	WoS	May the Force Be with You: Dexterous Finger Force-Aware VR Interface	2024	2024 Ieee International Symposium On Mixed And Augmented Rea	Title-and-abstract screening	Calligraphy peripheral or the application non-educational
155	WoS	Multi-sensory learning framework for visually impaired learners: Use of 3D, haptic, audio, olfactory media	2024	Multimedia Tools And Applications	Title-and-abstract screening	Calligraphy peripheral or the application non-educational
156	WoS	Saraiki language characters dataset (SLCD)	2024	Data In Brief	Title-and-abstract screening	Calligraphy peripheral or the application non-educational
157	Scopus	A Systematic Literature Review of Deep Learning Methods for Handwritten Text Recognition in Historical Arabic	2025	Engineering, Technology and Applied Science Research	Title-and-abstract screening	Calligraphy peripheral or the application non-educational

No.	Database	Title	Year	Sourceoutlet	Excludedat	Reason
		Manuscripts				
158	WoS	Developing a New Model of Using Artificial Intelligence and Postmodern Arts in Visual Arts and Design Courses (VADC) Among University Students	2025	Ieee Access	Title-and-abstract screening	Calligraphy peripheral or the application non-educational
159	WoS	Digital Maktaba project: Toward a metadata-driven, LLM-assisted framework for arabic digital libraries	2025	International Journal On Digital Libraries	Title-and-abstract screening	Calligraphy peripheral or the application non-educational
160	Scopus	Enhancing Self-Regulated Learning Effectiveness for Elderly Learners in Distance Education: A Case Study of Feicheng Senior University	2025	2025 10th International Conference on Distance Education and Learning, ICDEL 2025	Title-and-abstract screening	Calligraphy peripheral or the application non-educational
161	Scopus	One-shot handwriting imitation via self-supervised cross spatial transformer networks	2025	Neurocomputing	Title-and-abstract screening	Calligraphy peripheral or the application non-educational
162	WoS	RETRACTED: Multi-sensor data-fusion technology for immersive Chinese cultural experience virtual environment construction (Retracted article. See vol.	2025	Journal Of Computational Methods In Sciences And Engineering	Title-and-abstract screening	Calligraphy peripheral or the application non-educational
163	Scopus	Research on the Recognition and Adaptive Generation Model of Traditional Painting and Calligraphy Style Based on Deep Learning	2025	ACM International Conference Proceeding Series	Title-and-abstract screening	Calligraphy peripheral or the application non-educational
164	WoS	Synthesis of Carbon-Based Xerogels Inspired by Japanese-Solid-Calligraphy Ink as a Teaching Tool for Exploring Carbon Allotropes	2025	Journal Of Chemical Education	Title-and-abstract screening	Calligraphy peripheral or the application non-educational
165	WoS	The Current Status and Challenges of Online Learning Activities During the COVID-19 Pandemic: An Analysis of Online Survey Results	2025	Review Of Socionetwork Strategies	Title-and-abstract screening	Calligraphy peripheral or the application non-educational
166	WoS	Unlocking colonial records with Artificial Intelligence. Achieving the automated transcription of large-scale 16th and 17th-century Latin American his	2025	Science And Technology Of Archaeological Research	Title-and-abstract screening	Calligraphy peripheral or the application non-educational
167	CNKI	家校共育视角下的小学语文汉字识写数字化教学探讨	2025	校企教育协同与企业文化共建的融合发展研讨会论文集（高效课堂创新与构建分论坛）	Title-and-abstract screening	Calligraphy peripheral or the application non-educational
168	WoS	Associative modeling of Chinese character stroke sequences combining transformer and geometric constraints	2026	International Journal Of Data Science And Analytics	Title-and-abstract screening	Calligraphy peripheral or the application non-educational
169	CNKI	篆书对学生书法学习的作用与意义	2017	美术教育研究	Title-and-abstract screening	Font generation or typesetting without a learning-resource context
170	WoS	CSRS: A Chinese Seal	2019	Ieee Access	Title-and-abstract	Font generation or typesetting

No.	Database	Title	Year	Sourceoutlet	Excludedat	Reason
		Recognition System With Multi-Task Learning and Automatic Background Generation			screening	without a learning-resource context
171	WoS	Improving GAN-based Calligraphy Character Generation using Graph Matching	2019	2019 Companion Of The 19Th Ieee International Conference On	Title-and-abstract screening	Font generation or typesetting without a learning-resource context
172	WoS	Deep Learning-Based Hypothesis Generation Model and Its Application on Virtual Chinese Calligraphy-Writing Robot	2020	Ieee Access	Title-and-abstract screening	Font generation or typesetting without a learning-resource context
173	WoS	Modeling and Manipulating Dynamic Font-based Hairy Brush Characters using Control-Theoretic B-spline Approach	2020	Ifac Papersonline	Title-and-abstract screening	Font generation or typesetting without a learning-resource context
174	WoS	An end-to-end model for chinese calligraphy generation	2021	Multimedia Tools And Applications	Title-and-abstract screening	Font generation or typesetting without a learning-resource context
175	WoS	Automatic stroke generation for style-oriented robotic Chinese calligraphy	2021	Future Generation Computer Systems-The International Journal	Title-and-abstract screening	Font generation or typesetting without a learning-resource context
176	Scopus	Generative Adversarial Networks (GAN) for Arabic Calligraphy	2021	2021 International Conference on Innovation and Intelligence for Informatics, Computing, and Technologies, 3ICT 2021	Title-and-abstract screening	Font generation or typesetting without a learning-resource context
177	CNKI	谈谈汉字的新机遇和语文启蒙教学的新模式	2021	安徽广播电视大学学报	Title-and-abstract screening	Font generation or typesetting without a learning-resource context
178	WoS	Chinese Calligraphy Generation Based on Involution	2022	Electronics	Title-and-abstract screening	Font generation or typesetting without a learning-resource context
179	WoS	Chinese character style transfer based on multi-scale GAN	2022	Signal Image And Video Processing	Title-and-abstract screening	Font generation or typesetting without a learning-resource context
180	WoS	Disentangled representation learning GANs for generalized and stable font fusion network	2022	Iet Image Processing	Title-and-abstract screening	Font generation or typesetting without a learning-resource context
181	WoS	SwordNet: Chinese Character Font Style Recognition Network	2022	Ieee Access	Title-and-abstract screening	Font generation or typesetting without a learning-resource context
182	CNKI	手写汉字评价方法研究进展	2022	计算机工程与应用	Title-and-abstract screening	Font generation or typesetting without a learning-resource context
183	WoS	A Chinese Calligraphy-Writing Robotic System Based on Image-to-Action Translations and a Hypothesis Generation Net	2023	Ieee Access	Title-and-abstract screening	Font generation or typesetting without a learning-resource context
184	WoS	A study of Calligraphy Font Generation based on DANet-GAN	2023	2023 42Nd Chinese Control Conference, Ccc	Title-and-abstract screening	Font generation or typesetting without a learning-resource context
185	WoS	Tangut character image generation based on cycle-consistent adversarial networks	2023	Journal Of Intelligent & Fuzzy Systems	Title-and-abstract screening	Font generation or typesetting without a learning-resource context

No.	Database	Title	Year	Sourceoutlet	Excludedat	Reason
186	Scopus	Writing the Heart Sutra Online	2023	Prism	Title-and-abstract screening	Font generation or typesetting without a learning-resource context
187	WoS	A Novel CNN Model for Classification of Chinese Historical Calligraphy Styles in Regular Script Font	2024	Sensors	Title-and-abstract screening	Font generation or typesetting without a learning-resource context
188	WoS	An End-to-End Generation Model for Chinese Calligraphy Characters Based on Dense Blocks and Capsule Network	2024	Electronics	Title-and-abstract screening	Font generation or typesetting without a learning-resource context
189	WoS	DP-Font: Chinese Calligraphy Font Generation Using Diffusion Model and Physical Information Neural Network	2024	Proceedings Of The Thirty-Third International Joint Conferen	Title-and-abstract screening	Font generation or typesetting without a learning-resource context
190	Scopus	P2H-GAN: An Effective Method For Generating Handwritten Expressions	2024	Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)	Title-and-abstract screening	Font generation or typesetting without a learning-resource context
191	WoS	RoDAL: style generation in robot calligraphy with deep adversarial learning	2024	Applied Intelligence	Title-and-abstract screening	Font generation or typesetting without a learning-resource context
192	WoS	SMFNet: One-Shot Recognition of Chinese Character Font Based on Siamese Metric Model	2024	Ieee Access	Title-and-abstract screening	Font generation or typesetting without a learning-resource context
193	Scopus	Attention U-Net Network for Chinese Calligraphy Style Generation	2025	2025 4th International Conference on Image Processing and Media Computing, ICIPMC 2025	Title-and-abstract screening	Font generation or typesetting without a learning-resource context
194	Scopus	Attentional Mechanisms for Enhancement in the Convolutional Neural Network Task of Recognizing Handwritten Chinese Character Styles	2025	Proceedings - 2025 Asia-Europe Conference on Cybersecurity, Internet of Things and Soft Computing, CITSC 2025	Title-and-abstract screening	Font generation or typesetting without a learning-resource context
195	WoS	Handwritten Arabic Calligraphy Generation: A Systematic Literature Review	2025	International Journal Of Advanced Computer Science And Appli	Title-and-abstract screening	Font generation or typesetting without a learning-resource context
196	WoS	RS-GAN: unsupervised running script font generation via disentangled representation learning and contextual transformer	2025	Pattern Analysis And Applications	Title-and-abstract screening	Font generation or typesetting without a learning-resource context
197	CNKI	人工智能时代中小学书法教育的变革与坚守	2025	书法教育	Title-and-abstract screening	Font generation or typesetting without a learning-resource context
198	CNKI	基于新媒体的书法美育教学实践模式研究	2025	新闻研究导刊	Title-and-abstract screening	Font generation or typesetting without a learning-resource context
199	CNKI	大型语言模型在内科规培教学中的应用	2025	河南医学高等专科学校学报	Title-and-abstract screening	Font generation or typesetting without a learning-resource context
200	CNKI	深度学习理念下通用大模型赋能的国家平台助力小学书法教学实践——以“左部偏旁训练”为例	2025	中国现代教育装备	Title-and-abstract screening	Font generation or typesetting without a learning-resource context

No.	Database	Title	Year	Sourceoutlet	Excludedat	Reason
201	CNKI	迈向“共创美学”：AI介入影视教育的现状与未来书写	2025	电影评介	Title-and-abstract screening	Font generation or typesetting without a learning-resource context
202	WoS	Tibetan Data Augmentation via GAN-Based Handwritten Text Generation	2026	Caai Transactions On Intelligence Technology	Title-and-abstract screening	Font generation or typesetting without a learning-resource context
203	WoS	Visual Matching of Stroke Order in Robotic Calligraphy	2015	Proceedings Of The 17Th International Conference On Advanced	Title-and-abstract screening	Robotic writing or motion-control without a learner-directed mechanism
204	Scopus	A multi-servo composite control strategy application to writing robot; [一种舵机组合控制策略的书写机器人设计]	2018	Gaojishu Tongxin/Chinese High Technology Letters	Title-and-abstract screening	Robotic writing or motion-control without a learner-directed mechanism
205	WoS	Fine Grained Control of Robotic Calligraphy	2018	Proceedings 2018 33Rd Youth Academic Annual Conference Of Ch	Title-and-abstract screening	Robotic writing or motion-control without a learner-directed mechanism
206	WoS	Generative Adversarial Nets in Robotic Chinese Calligraphy	2018	2018 Ieee International Conference On Robotics And Automatio	Title-and-abstract screening	Robotic writing or motion-control without a learner-directed mechanism
207	CNKI	山东省青岛西海岸新区实验小学	2018	基础教育参考	Title-and-abstract screening	Robotic writing or motion-control without a learner-directed mechanism
208	WoS	A Robotic Writing Framework-Learning Human Aesthetic Preferences via Human-Machine Interactions	2019	Ieee Access	Title-and-abstract screening	Robotic writing or motion-control without a learner-directed mechanism
209	WoS	A data-driven robotic Chinese calligraphy system using convolutional auto-encoder and differential evolution	2019	Knowledge-Based Systems	Title-and-abstract screening	Robotic writing or motion-control without a learner-directed mechanism
210	WoS	Use of Automatic Chinese Character Decomposition and Human Gestures for Chinese Calligraphy Robots	2019	Ieee Transactions On Human-Machine Systems	Title-and-abstract screening	Robotic writing or motion-control without a learner-directed mechanism
211	WoS	An LSTM Based Generative Adversarial Architecture for Robotic Calligraphy Learning System	2020	Sustainability	Title-and-abstract screening	Robotic writing or motion-control without a learner-directed mechanism
212	WoS	Robot Calligraphy using Pseudospectral Optimal Control in Conjunction with a Novel Dynamic Brush Model	2020	2020 Ieee/Rsj International Conference On Intelligent Robots	Title-and-abstract screening	Robotic writing or motion-control without a learner-directed mechanism
213	CNKI	首都师范大学附属小学教育集团柳明校区	2020	华夏教师	Title-and-abstract screening	Robotic writing or motion-control without a learner-directed mechanism
214	WoS	A Hybrid Control Framework Teaching Robot to Write Chinese Characters: from Image to Handwriting	2021	2021 Ieee 17Th International Conference On Automation Scienc	Title-and-abstract screening	Robotic writing or motion-control without a learner-directed mechanism
215	WoS	A Developmental Evolutionary Learning Framework for Robotic Chinese Stroke Writing	2022	Ieee Transactions On Cognitive And Developmental Systems	Title-and-abstract screening	Robotic writing or motion-control without a learner-directed mechanism
216	WoS	A Unified Parametric Representation for Robotic Compliant Skills With Adaptation of Impedance and	2022	Ieee-Asme Transactions On Mechatronics	Title-and-abstract screening	Robotic writing or motion-control without a learner-directed mechanism

No.	Database	Title	Year	Sourceoutlet	Excludedat	Reason
		Force				
217	WoS	Cognitive System of a Virtual Robot Based on Perception, Memory, and Hypothesis Models for Calligraphy Writing Task	2022	Ieee Access	Title-and-abstract screening	Robotic writing or motion-control without a learner-directed mechanism
218	WoS	Large-Scale Integrated Flexible Tactile Sensor Array for Sensitive Smart Robotic Touch	2022	Acs Nano	Title-and-abstract screening	Robotic writing or motion-control without a learner-directed mechanism
219	WoS	Artistic Robotic Arm: Drawing Portraits on Physical Canvas under 80 Seconds	2023	Sensors	Title-and-abstract screening	Robotic writing or motion-control without a learner-directed mechanism
220	WoS	CCD-BSMG: Composite-Curve-Dilation-Based Brush Stroke Model Generator for Robotic Chinese Calligraphy	2023	Ieee Access	Title-and-abstract screening	Robotic writing or motion-control without a learner-directed mechanism
221	WoS	High-Speed, High-Quality Robotic Portrait Drawing System	2023	2023 32Nd Ieee International Conference On Robot And Human I	Title-and-abstract screening	Robotic writing or motion-control without a learner-directed mechanism
222	WoS	Parallel Calligraphy Robot: Framework and System Implementation	2023	Ieee Journal Of Radio Frequency Identification	Title-and-abstract screening	Robotic writing or motion-control without a learner-directed mechanism
223	CNKI	多融合背景下汉字书法创新思维在工业机器人领域中的应用	2023	模具制造	Title-and-abstract screening	Robotic writing or motion-control without a learner-directed mechanism
224	Scopus	An Image-Based Imitation Learning Framework for Robotic Writing Tasks	2024	M2VIP - Proceedings of the International Conference on Mechatronics and Machine Vision in Practice	Title-and-abstract screening	Robotic writing or motion-control without a learner-directed mechanism
225	WoS	B-BSMG: Bézier Brush Stroke Model-Based Generator for Robotic Chinese Calligraphy	2024	International Journal Of Computational Intelligence Systems	Title-and-abstract screening	Robotic writing or motion-control without a learner-directed mechanism
226	Scopus	Design and Application of AI-based Brush Calligraphy and Painting Robot	2024	Proceedings of International Conference on Artificial Life and Robotics	Title-and-abstract screening	Robotic writing or motion-control without a learner-directed mechanism
227	WoS	Generative adversarial networks based motion learning towards robotic calligraphy synthesis	2024	Caai Transactions On Intelligence Technology	Title-and-abstract screening	Robotic writing or motion-control without a learner-directed mechanism
228	WoS	Internal Model Control Structure Inspired Robotic Calligraphy System	2024	Ieee Transactions On Industrial Informatics	Title-and-abstract screening	Robotic writing or motion-control without a learner-directed mechanism
229	WoS	Solving Robotic Trajectory Sequential Writing Problem via Learning Character's Structural and Sequential Information	2024	Ieee Transactions On Cybernetics	Title-and-abstract screening	Robotic writing or motion-control without a learner-directed mechanism
230	WoS	Reinforcement Learning Based 3-D Surface Calligraphy Robot	2025	2025 11Th International Conference On Control, Automation An	Title-and-abstract screening	Robotic writing or motion-control without a learner-directed mechanism
231	WoS	The Cognitive System of Robots Based on Deep Learning with Stable Convergence	2026	International Journal Of Fuzzy Systems	Title-and-abstract screening	Robotic writing or motion-control without a learner-directed mechanism
232	CNKI	中国书法艺术的当代传播及其策略	2015	四川戏剧	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component

No.	Database	Title	Year	Sourceoutlet	Excludedat	Reason
233	CNKI	以“朱子读书法”解读中国文化的慕课传播	2015	教育文化论坛	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
234	CNKI	任务引领教学在中级工语文教学中的应用	2015	中国职协 2015 年度优秀科研成果获奖论文集（中册）	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
235	CNKI	利用网络开展科研能力培养的免疫学实验教学体系	2015	第十届全国免疫学学术大会分会场交流报告（二）	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
236	CNKI	小学生错别字成因及对策分析	2015	科教文汇(上旬刊)	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
237	CNKI	微时代下汉字书写与规范对策研究	2015	美术教育研究	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
238	CNKI	握执式板书组合教鞭笔的研制与应用	2015	教学与管理	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
239	CNKI	文化资讯	2015	人文天下	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
240	CNKI	理性看待中小学校智慧校园建设问题	2015	中国教育技术装备	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
241	CNKI	网络故障致大面积护理信息系统中断时的应急处理	2015	华西医学	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
242	CNKI	试论“提笔忘字”	2015	大众文艺	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
243	CNKI	“澄清式”大学生职业价值观教育探究	2016	大连民族大学学报	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
244	CNKI	与时俱进再创辉煌——在“语言文字学与网络时代”高峰论坛上的致辞	2016	汉字文化	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
245	CNKI	中医院校西医诊断学实训教学模式	2016	实用中医内科杂志	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
246	CNKI	书写机器人研究综述	2016	智能系统学报	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
247	CNKI	在书写任务中的基于轨迹匹配的模仿学习	2016	北京工业大学学报	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
248	CNKI	大学生语言素质提升中语言规范使用的作用与实现	2016	语文建设	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
249	CNKI	栏目设置	2016	艺术科技	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
250	CNKI	栏目设置	2016	艺术科技	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
251	CNKI	汉字书写危机的思考	2016	人文天下	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
252	CNKI	浅谈群众书法的学习和普及	2016	大众文艺	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component

No.	Database	Title	Year	Sourceoutlet	Excludedat	Reason
253	CNKI	中国版本图书馆月度 CIP 数据精选	2017	全国新书目	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
254	CNKI	如何对英语初学者进行字母教学	2017	西部素质教育	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
255	CNKI	揭开学习书法的神秘面纱	2017	领导科学论坛	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
256	CNKI	揭开学习书法的神秘面纱(续)	2017	领导科学论坛	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
257	CNKI	浅谈高中书法课堂教学	2017	美术教育研究	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
258	CNKI	米芾书法作品数字化公共服务平台数据库建设研究	2017	四川戏剧	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
259	CNKI	观察,开启学习书法的一扇窗	2017	大众文艺	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
260	CNKI	中国版本图书馆月度 CIP 数据精选	2018	全国新书目	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
261	CNKI	互联网背景下传统文化传播方式探索——以中国传统书画为例	2018	艺术教育	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
262	CNKI	互联网背景下大学语文教学策略探究	2018	西部素质教育	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
263	CNKI	传统黑板消失后的教学媒体整合	2018	中国教育技术装备	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
264	CNKI	基于 WeX5 的五大书法在线教育混合应用开发	2018	中国传媒大学学报(自然科学版)	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
265	CNKI	基于实时样本采集的个性化手写汉字输入系统设计	2018	计算机测量与控制	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
266	CNKI	多媒体在语文识字教学中的运用	2018	汉字文化	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
267	CNKI	小学语文板书教学中所存在的问题以及改进策略分析	2018	华夏教师	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
268	CNKI	当今社会汉语言文化水平弱化问题的研究	2018	汉字文化	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
269	CNKI	送人玫瑰,手有余香	2018	中国书法	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
270	CNKI	高中化学方程式的学习之我见	2018	科学大众(科学教育)	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
271	CNKI	高等师范院校三笔字课程教学方法改革——以广西科技师范学院为例	2018	大众文艺	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
272	CNKI	C/C++程序缺陷自动修复与确认方法	2019	软件学报	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component

No.	Database	Title	Year	Sourceoutlet	Excludedat	Reason
273	CNKI	“互联网+书画”教育实施建议	2019	科技风	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
274	CNKI	“互联网+书画”教育系统设计	2019	科技风	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
275	CNKI	一种基于深度学习的手写汉字书法识别方法	2019	电子世界	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
276	CNKI	一种基于端点顺序预测的手写体笔画恢复方法	2019	计算机科学	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
277	CNKI	中国版本图书馆月度 CIP 数据精选	2019	全国新书目	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
278	CNKI	交互式电子白板与传统教学设备的比较研究——基于希沃电子白板与“多媒体+黑板”的视域	2019	中国多媒体与网络教学学报(中旬刊)	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
279	CNKI	利用多媒体实现小学语文优化教学	2019	华夏教师	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
280	CNKI	基于 Hololens 的书法实践课程设计	2019	数字技术与应用	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
281	CNKI	基于工程教育专业认证的《编译原理》课程改革	2019	电脑知识与技术	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
282	CNKI	基于汉字笔画与结构的特征字库构造及优化	2019	计算机工程与科学	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
283	CNKI	基于深度学习的汉字书法识别研究	2019	电子测试	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
284	CNKI	基于滑动滤波方法的学习状态识别技术	2019	电气技术	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
285	CNKI	基于生成式对抗神经网络的手写文字图像补全	2019	图学学报	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
286	CNKI	大数据时代背景下中国高等书法教育分析	2019	青少年心理健康与社会适应教育培育学术论文集	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
287	CNKI	建名校创特色育英才	2019	国家教师科研专项基金科研成果 2019（七）	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
288	CNKI	智能汉字教学的研究与实践	2019	科技视界	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
289	CNKI	未来教育与人工智能	2019	国际人才交流	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
290	CNKI	活动	2019	中国书画	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
291	CNKI	浅谈书法教学与现代信息技术的科学整合	2019	中国培训	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
292	CNKI	浅谈多媒体背景下小学数学课堂上板书设计	2019	科学大众(科学教育)	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component

No.	Database	Title	Year	Sourceoutlet	Excludedat	Reason
293	CNKI	网络协同教学模式在临床护理带教中的研究	2019	基层医学论坛	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
294	CNKI	青春书写责任微笑添彩智博——为盛会注入青春力量的智博会志愿者	2019	中国共青团	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
295	CNKI	“中国大学 MOOC+直播”书法教学的思考与实践	2020	中国大学教学	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
296	CNKI	从“书写”到“算法”:字体研究国际大师课程教学实践	2020	装饰	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
297	CNKI	传统文化视域下高职五年制学生心理健康教育研究	2020	产业与科技论坛	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
298	CNKI	利用基于人工智能的临床决策支持系统提升住院医师规范化培训质量	2020	医学教育管理	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
299	CNKI	动态	2020	大学书法	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
300	CNKI	医学影像人工智能辅助教学在非影像学专业住院医师规范化培训中的初步应用及思考	2020	中华灾害救援医学	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
301	CNKI	多媒体计算机在低年级语文教学中的运用	2020	中国新通信	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
302	CNKI	多媒体辅助小学书法教学初探	2020	2020 年基础教育发展研究高峰论坛论文集	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
303	CNKI	探究规范书写在小学语文教学中的重要性	2020	科技资讯	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
304	CNKI	新媒体环境下的高职公共英语写作教学策略探究	2020	桂林师范高等专科学校学报	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
305	CNKI	网络教学的利弊分析与建议对策	2020	中国多媒体与网络教学学报(中旬刊)	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
306	CNKI	高中书法教学中学生书法素养的有效培育	2020	广东省教师继续教育学会第二届教学研讨会论文集（一）	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
307	CNKI	“二〇一九、二〇二〇年度中国书法出版传媒教学成果网络展”入展作品选	2021	中国书法	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
308	CNKI	“大学物理”实验课程混合教学模式的应用	2021	无线互联科技	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
309	CNKI	传统文化在当代平面设计中的运用与思考——以军职在线海报设计为例	2021	艺术市场	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
310	CNKI	借助数字化手段优化初中书法教学	2021	中国教育技术装备	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
311	CNKI	利用深度卷积神经网络算法识别传统篆体书法的应用研究	2021	甘肃科学学报	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component

No.	Database	Title	Year	Sourceoutlet	Excludedat	Reason
312	CNKI	吉林省中小学书法学科教研工作开展情况——以长春市为例	2021	书法教育	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
313	CNKI	后疫情时代中小学美术与书法艺术教育改革研究	2021	艺术教育	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
314	CNKI	基于 Inception V3 的高校学生课堂行为识别研究	2021	电脑知识与技术	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
315	CNKI	基于智能图文识别的书法学习平台建设	2021	信息技术与信息化	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
316	CNKI	基于深度学习的手写书法字体识别算法	2021	计算机系统应用	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
317	CNKI	基于生成对抗网络的书法纺织图案设计开发	2021	丝绸	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
318	CNKI	基于结构约束生成对抗网络的书法汉字生成	2021	模式识别与人工智能	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
319	CNKI	多媒体时代高校书法教育教学的探讨	2021	汉字文化	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
320	CNKI	如何利用多媒体技术辅助小学书法教学	2021	2021 课程教学与管理研究学术论坛论文集	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
321	CNKI	提高口腔临床思维与决策能力的线上教学探索	2021	继续医学教育	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
322	CNKI	新媒体环境下书法艺术审美教育的传播探析	2021	书法赏评	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
323	CNKI	新媒体环境下书法艺术审美教育的传播探析	2021	书法赏评	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
324	CNKI	机器人在自主书写领域应用的研究进展	2021	数字印刷	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
325	CNKI	汲取奋进力量书写青春华章——福建省市场监管局青年热议党的十九届六中全会精神	2021	福建质量技术监督	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
326	CNKI	浅谈魏碑书体的学习	2021	美术教育研究	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
327	CNKI	试论传播媒介变迁对书法艺术发展的影响	2021	天中学刊	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
328	CNKI	谦谦师范,郁郁人文——人文与师范学院简介	2021	黑龙江工业学院学报(综合版)	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
329	CNKI	AI 智慧教育背景下的国际中文汉字教学新路径	2022	福建电脑	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
330	CNKI	AI 病历内涵质控系统设计	2022	信息技术与信息化	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
331	CNKI	“档案转向”背景下档案用户转型研究	2022	山西档案	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive

No.	Database	Title	Year	Sourceoutlet	Excludedat	Reason
						technology component
332	CNKI	书法教育对学生心理的影响	2022	中国学校卫生	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
333	CNKI	书法机器人研究综述	2022	控制与决策	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
334	CNKI	云端练字,书法还能这样玩	2022	销售与市场(管理版)	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
335	CNKI	人工智能时代背景下艺术院校书法教学路径探索	2022	艺海	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
336	CNKI	依托网络平台联合 CBL 的急诊抢救室病历教学探索	2022	全科医学临床与教育	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
337	CNKI	基于孪生神经网络和 Unity2D 的《笔墨英侠》少儿书法游戏	2022	电子产品世界	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
338	CNKI	基于改进 DenseNet 网络的书法字体识别算法	2022	计算机系统应用	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
339	CNKI	基于条件生成对抗网络的书法字笔画分割	2022	自动化学报	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
340	CNKI	多媒体技术在小学语文教学中的应用与效果分析	2022	新课改教育理论探究论文集（二十六）	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
341	CNKI	多媒体辅助下的教学板书设计	2022	南阳师范学院学报	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
342	CNKI	巧用信息技术，让书法课堂生动活泼	2022	中国新通信	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
343	CNKI	数字化进程中法帖出版传播的思考	2022	出版广角	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
344	CNKI	无监督图像翻译的个性化手写汉字生成方法	2022	计算机工程与应用	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
345	CNKI	智慧书法教室家具设计现状	2022	家具	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
346	CNKI	甲骨文研究的机构、作者、热点及前沿分析——基于 CiteSpace 可视化研究	2022	漯河职业技术学院学报	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
347	CNKI	福建开放大学华侨学院东盟——曼谷学习中心揭牌成立	2022	福建开放大学学报	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
348	CNKI	网络视阈下舞蹈短视频的气场与祈向	2022	山东艺术	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
349	CNKI	英语专业学生汉语言文字书写与拼读应用现状调查研究	2022	邵阳学院学报(社会科学版)	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
350	CNKI	计算机辅助对外汉字书写教学技术的沿革及发展趋势	2022	华文教学与研究	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
351	CNKI	试论在中小学书法教学中	2022	文化产业	Title-and-abstract	Lacking either a calligraphy-

No.	Database	Title	Year	Sourceoutlet	Excludedat	Reason
		植入汉字文化元素的重要性			screening	education or a substantive technology component
352	CNKI	项目引领课程改革实践研究	2022	中国高等教育	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
353	CNKI	高校书法在线教学满意度影响因素研究	2022	集美大学学报(教育科学版)	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
354	CNKI	“新学科、新专业、新视野：‘新学科专业目录’全国高等书法教育论坛”举办	2023	美术教育研究	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
355	CNKI	中国书法对外传播实践创新研究：以互动视频共情设计为例	2023	北京文化创意	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
356	CNKI	书写首次病程记录在临床推理能力评估中的应用探讨	2023	中国继续医学教育	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
357	CNKI	书法艺术课程中美学交叉融合的探析	2023	艺术研究	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
358	CNKI	人美数字刊会员畅读人美10种期刊	2023	中国美术	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
359	CNKI	信息技术在职校书法教学中的运用研究	2023	中国新通信	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
360	CNKI	基于AI技术的智能病案质控系统的架构与功能设计	2023	中国病案	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
361	CNKI	基于改进生成对抗网络的书法字生成算法	2023	浙江大学学报(工学版)	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
362	CNKI	墨色融合：在书法教育中融合传统与科技	2023	书法赏评	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
363	CNKI	多媒体视角下高校书法教学定位的探究	2023	品位·经典	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
364	CNKI	奋力书写学校教育高质量发展新篇章	2023	成都市陶行知研究会第六届学术年会暨成都七中初中学校第十五届学术研讨会论文集	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
365	CNKI	如何运用多媒体网络技术优化小学书法教学	2023	广东省教师继续教育学会教师发展论坛学术研讨会论文集（四）	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
366	CNKI	小学语文教学中利用多媒体加强汉字书写规范的策略	2023	中国新通信	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
367	CNKI	幼小衔接视域下幼儿前书写能力的培养策略	2023	亚太教育	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
368	CNKI	探讨人工智能在放射科专业基地住院医师规范化培训中的应用	2023	中国毕业后医学教育	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
369	CNKI	教育数字化背景下民族地区学生国家通用语言文字水平提升策略——基于P	2023	中国民族教育	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component

No.	Database	Title	Year	Sourceoutlet	Excludedat	Reason
		县 S 校国家通用语言文字教学实践				
370	CNKI	数字化时代书法的适应性研究与实践	2023	艺术评鉴	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
371	CNKI	数字时代的书法艺术传承	2023	华章	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
372	CNKI	数字时代背景下的书法艺术创新与传承	2023	书法赏评	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
373	CNKI	新时代视域下书法教育观点暨表象的几点思辨	2023	极目	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
374	CNKI	泰国在华留学生书法学习探讨	2023	中国多媒体与网络教学学报(中旬刊)	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
375	CNKI	生活为源书写精彩——小学作文教学策略	2023	广东省教师继续教育学会教师发展论坛学术研讨会论文集（十五）	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
376	CNKI	疫情常态化防控下多媒体互联网技术在眼科实践教学中的应用	2023	中国病案	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
377	CNKI	面对数字化挑战：大学书法教育的创新路径与实践	2023	第四届创新教育与发展学术会议论文集（二）	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
378	CNKI	IHCCD:非规范手写汉字识别数据集	2024	中国图象图形学报	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
379	CNKI	一种基于注意力机制和场间匹配的在线签名认证方法	2024	应用科技	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
380	CNKI	书法的国际传播：从汉学研究到全球艺术市场的多重视角	2024	艺术评鉴	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
381	CNKI	人工智能辅助诊断系统在医学影像诊断学实践教学中的应用研究	2024	中国高等医学教育	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
382	CNKI	以技提质：现代多媒体信息技术助力党校教学质量提升探究	2024	社会与公益	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
383	CNKI	信息化教学技术在高校书法课程中的应用研究	2024	林区教学	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
384	CNKI	医学影像住院医师岗前报告书写 AI 培训平台的需求调研及框架提出	2024	中国医学教育技术	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
385	CNKI	基于 CNN-ISVM 的跨领域书写人自适应手写识别	2024	计算机技术与发展	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
386	CNKI	基于模型认知的深度教学实践——以“书写和调控陌生化学反应”为例	2024	化学教学	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
387	CNKI	基于深度学习的汉字书法风格自动识别与分类研究	2024	信息与电脑(理论版)	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
388	CNKI	基于细粒度动态特征的摹	2024	计算机仿真	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive

No.	Database	Title	Year	Sourceoutlet	Excludedat	Reason
		仿签名书写人识别				technology component
389	CNKI	奋力书写教育高质量发展的新篇章——2024 年全国两会代表委员热议的中西部教育和民族地区教育话题	2024	中国民族教育	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
390	CNKI	小学数学应用题教学问题分析及策略研究	2024	甘肃教育研究	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
391	CNKI	小学第一学段语文课堂教学板书调查研究——以赤峰市 H 小学为例	2024	赤峰学院学报(汉文哲学社会科学版)	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
392	CNKI	数字化时代书法素养提升路径研究	2024	美术教育研究	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
393	CNKI	数字化时代的书法审美教育	2024	艺术教育	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
394	CNKI	数字化赋能下小学毛笔书法的教学策略	2024	美术教育研究	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
395	CNKI	数字化赋能高校朝鲜语实践教学路径研究	2024	科教导刊	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
396	CNKI	数字媒体技术在书法教学中的应用研究	2024	美与时代(中)	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
397	CNKI	智慧教育时代出版社助力课后服务新实践——以广东教育出版社墨豆书法课程为例	2024	传播与版权	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
398	CNKI	智能技术助力跨学科教育：内在逻辑和创新实践	2024	中国教育信息化	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
399	CNKI	核心素养理念下小学语文识字写字教学研究	2024	教育观察	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
400	CNKI	现代信息科技为传统教学“增质提效”——以传统书法课为例	2024	亚太教育	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
401	CNKI	美育视角下职业院校书法教育教学模式的创新	2024	新美域	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
402	CNKI	面向桌面交互场景的双目深度测量方法	2024	计算机工程与应用	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
403	CNKI	AI 技术赋能中小学书法教学实践——以“跟着书法碑刻去旅行”课程为例	2025	书法教育	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
404	CNKI	DeepSeek 实验文本：中国书法的未来与未来的中国书法——民族性、世界性与时代性的三重变奏	2025	书法学刊	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
405	CNKI	“书道立人”特色课程建设——以榆林市第十一中学为例	2025	教育观察	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
406	CNKI	书写数字时代动态视觉华	2025	文化产业	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive

No.	Database	Title	Year	Sourceoutlet	Excludedat	Reason
		章				technology component
407	CNKI	书法教育与传统文化的跨学科融合：创新实践与发展	2025	书法赏评	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
408	CNKI	书法教育与现代科技融合的创新实践：跨学科视角下的探索	2025	书法赏评	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
409	CNKI	书法文化的思想政治教育价值与运用	2025	世纪桥	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
410	CNKI	书法艺术在数字媒体时代的发展与传播	2025	书法赏评	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
411	CNKI	人工智能与中小学书法教育的机遇、挑战和未来	2025	书法教育	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
412	CNKI	人工智能时代书法美育的机遇、目标与挑战	2025	美与时代(下)	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
413	CNKI	人工智能时代应用型高校书法美育课程建设的路径探索	2025	江苏建筑职业技术学院学报	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
414	CNKI	人工智能背景下书法教学数字化转型：动因、挑战与进路	2025	宿州职业技术学院学报	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
415	CNKI	人工智能辅助国际中文教师作文批改的效果研究	2025	汉字文化	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
416	CNKI	人文科技共生：打造面向未来的小学美育	2025	人民教育	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
417	CNKI	传统与创新的融合：“折扇书法”课程教学实践	2025	书法教育	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
418	CNKI	国际中文教育汉字教学的数字化转型及实现路径	2025	云南师范大学学报(对外汉语教学与研究版)	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
419	CNKI	基于局部光影感知的书法图像和谐化算法	2025	西北大学学报(自然科学版)	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
420	CNKI	基于新课程理念的小学语文教学改革路径	2025	延边教育学院学报	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
421	CNKI	基于沉浸式体验的书法艺术虚拟仿真教学模式研究	2025	书法赏评	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
422	CNKI	基于深度学习的汉字硬笔楷书智能评测系统的设计与应用	2025	数字教育	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
423	CNKI	基于生成对抗网络与长短时记忆网络的机器人书法系统	2025	西南大学学报(自然科学版)	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
424	CNKI	基于生成式人工智能技术的眼科专科大病历书写评价研究——以 DeepSeek 模型为例	2025	中国高等医学教育	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
425	CNKI	媒介融合视域下中国书法的数字化传播——以书法	2025	中国书法	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive

No.	Database	Title	Year	Sourceoutlet	Excludedat	Reason
		类 APP 为例				technology component
426	CNKI	学校美术课程中书法教育的价值与实践研究	2025	书法教育	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
427	CNKI	小学书法课分梯多类混合教学模式探究	2025	书法赏评	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
428	CNKI	小学书法趣味化课堂教学模式的构建	2025	书法赏评	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
429	CNKI	幼专院校书法教师美育素养提升路径研究	2025	书法赏评	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
430	CNKI	技术—文化—创新三维融合：生成式人工智能教学的困境突破与实践探索	2025	第五届中国基础教育论坛暨中国教育学会第三十七次学术年会论文集	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
431	CNKI	指向深度学习的书法大单元教学设计初探	2025	书法教育	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
432	CNKI	提升化工流程题复习效率的策略	2025	中学化学教学参考	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
433	CNKI	教育数字化背景下师范生规范汉字书写能力提升策略	2025	书画世界	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
434	CNKI	数字化时代书法美育面临的挑战与对策分析	2025	新美域	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
435	CNKI	数字化时代书法艺术的传承保护与创新发展	2025	中国民族博览	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
436	CNKI	数字化时代书法艺术的创新路径探析	2025	美与时代(中)	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
437	CNKI	数字化时代书法艺术的创新路径研究	2025	美与时代(中)	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
438	CNKI	数字化时代背景下高校书法教育探究	2025	美与时代(中)	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
439	CNKI	数字妙笔书写档案新篇	2025	文化产业	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
440	CNKI	数字媒体视域下高校书法教育创新路径研究	2025	美与时代(中)	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
441	CNKI	数智化赋能国际中文汉字教学的范式建构与优化策略	2025	语言与翻译	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
442	CNKI	新时代书法学专业的困境突破与跨界发展路径研究——基于停招现象与新增专业的双重分析	2025	学院新风——全国高等院校青年学者书学讨论会论文集	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
443	CNKI	新版学科专业目录背景下中国画与书法专业硕士核心课程的数字化建设研究	2025	美术教育研究	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
444	CNKI	新等级标准下的汉字分级人机协同教学策略研究	2025	2025 对外汉语博士生论坛暨第十八届对外汉语教学	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component

No.	Database	Title	Year	Sourceoutlet	Excludedat	Reason
				研究生学术论坛论文集		
445	CNKI	智能时代字体设计课程教学体系探索	2025	艺术与设计(理论)	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
446	CNKI	浅析当代高校书法教育的现实困境和课程优化策略	2025	南腔北调	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
447	CNKI	深度学习算法在小学书法等级分类中的应用研究	2025	电脑知识与技术	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
448	CNKI	笔触智界，书艺新篇——AI技术融入小学书法教学的创新探索	2025	书法教育	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
449	CNKI	蒙古文连续整句脱机手写体识别数据库与应用	2025	广西民族大学学报(自然科学版)	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
450	CNKI	融合注意力机制和深度学习的汉字书法风格智能识别方法	2025	电脑知识与技术	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
451	CNKI	论人工智能时代书法教育的人文价值与技术边界	2025	大学书法	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
452	CNKI	语文与书法的融通——试谈中小学书法教育的未来之路	2025	书法教育	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
453	CNKI	课堂	2025	书法教育	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
454	CNKI	高校书法课程美育数字化的策略探究——从“书品与人品”出发	2025	书画世界	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
455	CNKI	高职学前教育硬笔书法趣味教学基本情况与存在问题分析	2025	书法赏评	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
456	CNKI	基于笔迹的书写者性别与年龄检测研究综述	2026	数据与计算发展前沿(中英文)	Title-and-abstract screening	Lacking either a calligraphy-education or a substantive technology component
457	CNKI	四川省宜宾市翠屏区邱场镇中心学校	2015	基础教育参考	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
458	CNKI	基于电声技术课程的工具软件应用研究	2015	中国教育技术装备	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
459	CNKI	基于网络教学平台的高校公共书法艺术教育课程设计及教学研究	2015	渤海大学学报(哲学社会科学版)	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
460	CNKI	当代社会汉语言文化水平弱化的问题探讨	2015	语文建设	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
461	CNKI	智能互动教育投影机引领教学进入无尘时代	2015	中国现代教育装备	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
462	CNKI	网络环境下师范生书法教育探析	2015	金华职业技术学院学报	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
463	CNKI	网络环境条件下中小学书法教育的困境与对策	2015	佳木斯职业学院学报	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)

No.	Database	Title	Year	Sourceoutlet	Excludedat	Reason
464	CNKI	运用多媒体技术激活书法理论课教学——以《中国书法史》教学为例	2015	文艺生活(艺术中国)	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
465	CNKI	“互联网+书法”领域的文化产业创新研究	2016	牡丹江师范学院学报(哲学社会科学版)	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
466	CNKI	“拼打”识字偏误分析及教学策略——基于智能电子产品的零起点汉字教学	2016	汉语学习	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
467	CNKI	中小学语文汉字书写教育的对策思考	2016	当代教育理论与实践	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
468	CNKI	人工智能终于能像人类一样学习	2016	《科学与现代化》2016 年第 1 期（总第 066 期）	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
469	CNKI	多媒体时代下高校书法教育教学定位研究	2016	亚太教育	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
470	CNKI	多媒体网络教学平台在书法通识选修课教学中的改革研究	2016	辽宁教育行政学院学报	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
471	CNKI	数字化时代“高校汉字二次教学”之利弊观	2016	长春教育学院学报	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
472	CNKI	浅析多功能多媒体工具在高中英语课堂的应用	2016	科技创新导报	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
473	CNKI	浅析多媒体时代黑白板在高校教学中的使用	2016	人才资源开发	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
474	CNKI	湖南免费师范生语言文字应用现状的调查研究	2016	南京晓庄学院学报	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
475	CNKI	米芾书法作品数字化公共服务平台传播研究	2016	四川戏剧	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
476	CNKI	高等书法教育面临的新问题与解决思路	2016	洛阳师范学院学报	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
477	CNKI	上海市普陀区社区学院	2017	成才与就业	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
478	CNKI	卫星故障诊断系统智能研制技术研究	2017	上海航天	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
479	CNKI	基于项目化教学的“网页设计与布局”课程教学研究	2017	中国教育信息化	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
480	CNKI	多媒体技术在高校书法示范教学中的应用	2017	长春师范大学学报	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
481	CNKI	多媒体时代高校书法教育教学的思考	2017	美与时代(中)	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
482	CNKI	大学生汉字书写能力现状调查研究——以晋中学院本科生为例	2017	汉字文化	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
483	CNKI	数学课堂教学中板书设计的探究	2017	现代职业教育	Title-and-abstract screening	Below the source-quality threshold (CNKI source-

No.	Database	Title	Year	Sourceoutlet	Excludedat	Reason
						category filter)
484	CNKI	浅谈书法教学临帖数字化心法	2017	赤子(上中旬)	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
485	CNKI	浙江省东阳市实验小学从容书写童年	2017	中国德育	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
486	CNKI	网络文化背景下地方高校公共书法教育模式的建构	2017	计算机产品与流通	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
487	CNKI	“互联网+”背景下网络教学模式的探索与实践——以《硬笔书法》课程为例	2018	中国多媒体与网络教学学报(上旬刊)	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
488	CNKI	“第十一届汉字书法教育国际研讨会”会议综述	2018	中国书画	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
489	CNKI	书写教育发展的辉煌篇章	2018	国家教师科研专项基金科研成果 2018（一）	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
490	CNKI	多媒体时代高校书法教育教学的思考	2018	艺术评鉴	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
491	CNKI	多媒体时代高校书法教育教学的思考	2018	科教导刊(中旬刊)	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
492	CNKI	多媒体辅助小学书法教学初探	2018	华夏教师	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
493	CNKI	将概念教学转化为以多媒体为主的教学——《离子反应》第二课时教学设计	2018	江西化工	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
494	CNKI	数字化时代下书法教育的危与机	2018	书法教育	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
495	CNKI	数字化辅助教学平台在初中书法教学中的应用	2018	中国教育技术装备	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
496	CNKI	深度学习方法在临床见习教学中的效果观察	2018	中国卫生产业	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
497	CNKI	私人书写与公共叙事:国内日记研究的回顾与反思	2018	社会发展研究	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
498	CNKI	书法临摹课程开展远程视频互动教学的实践研究	2019	艺术科技	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
499	CNKI	互联网时代下的大学生汉字危机对策研究	2019	汉字文化	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
500	CNKI	关于多媒体时代高校书法教育教学的思考	2019	当代教育实践与教学研究	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
501	CNKI	多媒体与小学写字教学联姻优势探析	2019	经营管理者	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
502	CNKI	多媒体技术在书法临摹教学中的运用	2019	艺术科技	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
503	CNKI	多媒体技术在书法示范教学中的应用	2019	卫星电视与宽带多媒体	Title-and-abstract screening	Below the source-quality threshold (CNKI source-

No.	Database	Title	Year	Sourceoutlet	Excludedat	Reason
						category filter)
504	CNKI	多媒体技术在幼儿园语言教学中的运用	2019	中国现代教育装备	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
505	CNKI	多媒体时代高校书法教育教学的困境与对策	2019	科教导刊(上旬刊)	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
506	CNKI	多媒体背景下学生汉字书写现状分析及对策	2019	文学教育(上)	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
507	CNKI	如何巧用多媒体提高小学识字课教学效率	2019	西部素质教育	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
508	CNKI	应用型本科院校大学物理实验课程混合教学模式的应用	2019	高师理科学刊	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
509	CNKI	扬帆风正劲花开满园春——2019 年全民终身学习活动周全国总开幕式分会场掠影	2019	河南教育(职成教)	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
510	CNKI	提升书法素养，书写魅力人生——浅析人工智能视阈中的小学生书法教学	2019	现代交际	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
511	CNKI	服务民生短板推动老年学习	2019	福建广播电视大学学报	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
512	CNKI	移动互联时代的语言生活问题	2019	湖北大学学报(哲学社会科学版)	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
513	CNKI	运用多媒体网络技术优化高校书法教学的思考	2019	艺术科技	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
514	CNKI	OBE 理念下基于微信平台的书法在线教学实践	2020	数字教育	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
515	CNKI	“云上中文”教学科研数字化资源平台助力一流学科建设	2020	华中师范大学学报(人文社会科学版)	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
516	CNKI	中职书法信息化教学实践——以广西华侨学校为例	2020	西部素质教育	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
517	CNKI	办向阳教育育阳光少年——延安实验小学概况	2020	西安文理学院学报(社会科学版)	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
518	CNKI	基于智慧教育平台,构建个性化课程——以桂林市西山小学书法综合实践活动课程资源开发为例	2020	教育观察	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
519	CNKI	多媒体技术在高师书法教育中的运用	2020	内江科技	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
520	CNKI	小仪智能交互式一体机在中小学书法课堂教学中的应用策略	2020	汉字文化	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
521	CNKI	小学低年级语文课堂利用多媒体指导写字教学的探究	2020	才智	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
522	CNKI	山东省临朐县教师进修学	2020	人民教育	Title-and-abstract	Below the source-quality

No.	Database	Title	Year	Sourceoutlet	Excludedat	Reason
		校促内涵提升创学校品牌			screening	threshold (CNKI source-category filter)
523	CNKI	张天德书法艺术欣赏	2020	唐都学刊	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
524	CNKI	探析互联网下的书法教育	2020	美与时代(中)	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
525	CNKI	新媒体时代语境下书法文化传播策略研究	2020	艺术评鉴	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
526	CNKI	本刊投稿须知	2020	教育研究	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
527	CNKI	本刊投稿须知	2020	教育研究	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
528	CNKI	浅谈数字化时代对外汉字教学策略的转变	2020	教育探索	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
529	CNKI	电子病历完整性人工智能筛查辅助教学系统的初步建立和使用	2020	高校医学教学研究(电子版)	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
530	CNKI	网络时代下青少年书法教育的思考及策略	2020	南方论刊	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
531	CNKI	融媒体时代的书法多元化学习与问题探究	2020	书法教育	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
532	CNKI	“好的书写”即教育技术伦理：苏格拉底文字观及其当代意蕴	2021	教育研究	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
533	CNKI	“汉字书写”在线开放课程建设与教学探析	2021	湖北文理学院学报	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
534	CNKI	传统出版的数字化转型探析——以首都师范大学出版社“首师优字”项目为例	2021	新闻研究导刊	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
535	CNKI	多媒体时代高校书法教育教学的思考	2021	中华手工	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
536	CNKI	巧用信息技术，让书法课堂生动活泼	2021	河南教育(教师教育)	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
537	CNKI	翻转课堂与虚拟现实技术在妇产科临床教学中的应用效果观察	2021	医学食疗与健康	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
538	CNKI	艺术类高职院校学生汉字书写能力调查与研究	2021	文化产业	Title-and-abstract screening	Below the source-quality threshold (CNKI source-category filter)
539	CNKI	浅析书法在互联网时代面临的机遇与挑战	2021	今古文创	Title-and-abstract screening	Typing-based literacy rather than handwriting instruction
540	Scopus	Research on the Influence of Traditional Culture Classics on Contemporary Education Based on Principal Factor Analysis	2017	Proceedings - 2017 International Conference on Robots and Intelligent System, ICRIS 2017	Full-text assessment	insufficient detail in the available full text to confirm eligibility
541	Scopus	A Study of Developing a Web-based Management	2019	2019 IEEE International Conference on Consumer	Full-text assessment	educational claims not borne out in the full text; no teaching or

No.	Database	Title	Year	Sourceoutlet	Excludedat	Reason
		System of Document Annotation for Teaching and Learning		Electronics - Taiwan, ICCE-TW 2019		learning application confirmed
542	WoS	Model-based Persian calligraphy synthesis via learning to transfer templates to personal styles	2020	International Journal On Document Analysis And Recognition	Full-text assessment	generative or style-synthesis model without a learning-resource or teaching application
543	Scopus	An English Handwriting Quality Evaluation Algorithm Based on Machine Learning	2021	2021 IEEE International Conference on Software Engineering and Artificial Intelligence, SEAI 2021	Full-text assessment	automated recognition or evaluation targeted at documents, styles or writer identification rather than learner writing
544	Scopus	Innovative design of traditional calligraphy costume patterns based on deep learning	2021	Journal of Physics: Conference Series	Full-text assessment	generative or style-synthesis model without a learning-resource or teaching application
545	Scopus	Learning English to Chinese Character: Calligraphic Art Production based on Transformer	2021	Proceedings - SIGGRAPH Asia 2021 Posters, SA 2021	Full-text assessment	concerns general handwriting production or literacy rather than calligraphy instruction
546	Scopus	Design of Calligraphy Aesthetic Evaluation Model Based on Deep Learning and Writing Action	2022	Lecture Notes in Electrical Engineering	Full-text assessment	educational claims not borne out in the full text; no teaching or learning application confirmed
547	Scopus	Learning to Generate Poetic Chinese Landscape Painting with Calligraphy	2022	IJCAI International Joint Conference on Artificial Intelligence	Full-text assessment	generative or style-synthesis model without a learning-resource or teaching application
548	WoS	A deep learning based approach for extracting Arabic handwriting: applied calligraphy and old cursive	2023	Peerj Computer Science	Full-text assessment	educational claims not borne out in the full text; no teaching or learning application confirmed
549	Scopus	Cultural Product Valuation Based on XGBoost-LightGBM	2023	Proceedings - 2023 International Conference on Culture-Oriented Science and Technology, CoST 2023	Full-text assessment	generative or style-synthesis model without a learning-resource or teaching application
550	Scopus	Naturality: A Natural Reflection of Chinese Calligraphy	2023	ACM International Conference Proceeding Series	Full-text assessment	generative or style-synthesis model without a learning-resource or teaching application
551	Scopus	Analysis of Chinese Higher Calligraphy Education in the Context of Big Data Era	2024	Applied Mathematics and Nonlinear Sciences	Full-text assessment	educational claims not borne out in the full text; no teaching or learning application confirmed
552	Scopus	Data Mining Methods for Educational Effectiveness in Higher Education Aesthetic Education Programs	2024	Applied Mathematics and Nonlinear Sciences	Full-text assessment	educational claims not borne out in the full text; no teaching or learning application confirmed
553	Scopus	Decentralized Internet-based calligraphy education leads the internal development of aesthetic education in schools	2024	Applied Mathematics and Nonlinear Sciences	Full-text assessment	educational claims not borne out in the full text; no teaching or learning application confirmed
554	Scopus	Innovative Design of Interaction and Participation Mechanisms in Undergraduate Calligraphy Classes in Higher Education Institutions	2024	Applied Mathematics and Nonlinear Sciences	Full-text assessment	educational subject matter without a calligraphy-specific technology application
555	Scopus	AI Analysis of Arabic Calligraphy Characteristics in Digital Advertisements	2025	2025 IEEE 4th International Conference on Computing and Machine Intelligence, ICMI 2025 - Proceedings	Full-text assessment	system demonstrated without a learner-directed calligraphy mechanism in the full text

No.	Database	Title	Year	Sourceoutlet	Excludedat	Reason
556	Scopus	Aesthetic Evaluation of Chinese Calligraphy Using TabNet: Interpretability and Novel Features for Improved Accuracy	2025	IEICE Transactions on Fundamentals of Electronics, Communications and Computer Sciences	Full-text assessment	automated recognition or evaluation targeted at documents, styles or writer identification rather than learner writing
557	Scopus	Development of an AI-Based Assessment and Intelligent Recommendation System for Shaanxi Calligraphy and Painting Art Resources	2025	Smart Innovation, Systems and Technologies	Full-text assessment	generative or style-synthesis model without a learning-resource or teaching application
558	WoS	Efficient Deep Learning Model Architecture for Emergence of Machine Style Calligraphy	2025	2025 Ieee International Conference On Electronics, Computing	Full-text assessment	educational claims not borne out in the full text; no teaching or learning application confirmed
559	WoS	Single Model Learns Multiple Styles of Chinese Calligraphy via Style Collection Mechanism	2025	Pattern Recognition And Computer Vision, Prcv 2024, Pt Ii	Full-text assessment	generative or style-synthesis model without a learning-resource or teaching application

Note. Records are grouped by exclusion reason in the order reported in Section 3.1 of the main text: recognition, OCR, heritage digitization or automated evaluation studies without an educational context (n = 105); studies in which calligraphy was peripheral or the application non-educational (n = 63); font generation or typesetting studies without a learning-resource context (n = 34); robotic writing or motion-control studies without a learner-directed mechanism (n = 29); CNKI records lacking either a calligraphy-education or a substantive technology component (n = 225); CNKI records below the source-quality threshold applied at retrieval (n = 82); one Chinese-language record on typing-based literacy rather than handwriting instruction (n = 1); and records excluded at full-text assessment (n = 20). The 132 duplicate records removed before screening and the 62 included studies (Supplementary Table S1) complete the retrieval of 753 records (160 from Web of Science, 236 from Scopus and 357 from CNKI).

Table S3

MMAT quality appraisal of the included studies (n = 62)

Study	MMAT category	S1	S2	S3	S4	S5	Met	Reason for unclear judgements
Li & Zhou (2015)	Quantitative descriptive	Y	Y	CT	CT	CT	2	Unclear: measurement validity, nonresponse risk and statistical analysis (platform design reported without evaluative data)
Jiang et al. (2016)	Quantitative descriptive	Y	Y	Y	CT	CT	3	Unclear: nonresponse risk and statistical treatment beyond agreement indices
Xu et al. (2016)	Quantitative descriptive	Y	CT	Y	CT	CT	2	Unclear: sample representativeness (single-site school samples), nonresponse risk and statistical treatment (analysis limited to descriptive comparisons across age groups)
Zhang et al. (2017)	Quantitative descriptive	Y	Y	CT	CT	CT	2	Unclear for: Measurement appropriateness; Nonresponse risk; Statistical analysis (insufficient detail reported)
Ma et al. (2018)	Not applicable	—	—	—	—	—	—	design proposal (no empirical component)
Qiang et al. (2019)	Quantitative descriptive	Y	Y	CT	CT	CT	2	Unclear for: Measurement appropriateness; Nonresponse risk; Statistical analysis (insufficient detail reported)
Cordova et al. (2020)	Quantitative descriptive	Y	Y	CT	CT	CT	2	Unclear for: Measurement appropriateness; Nonresponse risk; Statistical analysis (insufficient detail reported)
S. Liu et al. (2020)	Quantitative descriptive	Y	Y	CT	CT	CT	2	Unclear for: Measurement appropriateness; Nonresponse risk; Statistical analysis (insufficient detail reported)
M.-W. Sun et al. (2023)	Quantitative descriptive	Y	Y	CT	CT	CT	2	Unclear for: Measurement appropriateness; Nonresponse risk; Statistical analysis (insufficient detail reported)
Wang (2023)	Quantitative descriptive	Y	Y	CT	CT	CT	2	Unclear for: Measurement appropriateness; Nonresponse risk; Statistical analysis (insufficient detail reported)
Chen et al. (2024)	Not applicable	—	—	—	—	—	—	review article (not appraisable under MMAT)
F. Yan et al. (2024)	Quantitative descriptive	Y	Y	CT	CT	CT	2	Unclear for: Measurement appropriateness; Nonresponse risk; Statistical analysis (insufficient detail reported)
Z.-H. Yan et al. (2024)	Quantitative descriptive	Y	Y	CT	CT	CT	2	Unclear for: Measurement appropriateness; Nonresponse risk; Statistical analysis (insufficient detail reported)
Chen et al. (2025)	Quantitative descriptive	Y	Y	CT	CT	CT	2	Unclear for: Measurement appropriateness; Nonresponse risk; Statistical analysis (insufficient detail reported)
L. Liu & Zhang (2025)	Quantitative descriptive	Y	Y	CT	CT	CT	2	Unclear for: Measurement appropriateness; Nonresponse risk; Statistical analysis (insufficient detail reported)
W. Sun et al. (2025)	Quantitative descriptive	Y	Y	CT	CT	CT	2	Unclear for: Measurement appropriateness; Nonresponse risk; Statistical analysis (insufficient detail reported)
Li & Tang (2015)	Not applicable	—	—	—	—	—	—	design proposal (no empirical component)
P.-J. Wang et al. (2016)	Not applicable	—	—	—	—	—	—	conceptual analysis (no empirical component)
Mi (2018)	Not applicable	—	—	—	—	—	—	design proposal (no empirical component)
C. Wang (2021)	Not applicable	—	—	—	—	—	—	design proposal (no empirical component)
Dai (2021)	Not applicable	—	—	—	—	—	—	conceptual paper (no empirical component)
Ouyang (2021)	Quantitative descriptive	Y	Y	Y	CT	CT	3	Unclear for: Nonresponse risk; Statistical analysis (insufficient detail reported)
Z. Yu (2021)	Not applicable	—	—	—	—	—	—	design proposal (no empirical component)
Zhou (2021)	Not applicable	—	—	—	—	—	—	conceptual paper (no empirical component)
Pujiati (2022)	Qualitative	Y	Y	CT	CT	CT	2	Unclear for: Support of interpretations by data;

Study	MMAT category	S1	S2	S3	S4	S5	Met	Reason for unclear judgements
Y. Li (2022)	Quantitative descriptive	Y	Y	Y	CT	CT	3	Coherence of sources and interpretation; Researcher reflexivity (insufficient detail reported)
Alashari et al. (2024)	Qualitative	Y	Y	Y	CT	CT	3	Unclear for: Nonresponse risk; Statistical analysis (insufficient detail reported)
C.-H. Wu et al. (2024)	Quantitative descriptive	Y	Y	Y	CT	CT	3	Unclear for: Coherence of sources and interpretation; Researcher reflexivity (insufficient detail reported)
Wong et al. (2024)	Quantitative descriptive	Y	Y	CT	CT	CT	2	Unclear for: Nonresponse risk; Statistical analysis (insufficient detail reported)
Xu (2024)	Quantitative descriptive	Y	Y	Y	CT	CT	3	Unclear for: Measurement appropriateness; Nonresponse risk; Statistical analysis (insufficient detail reported)
Yang et al. (2025)	Quantitative descriptive	Y	Y	CT	CT	CT	2	Unclear for: Nonresponse risk; Statistical analysis (insufficient detail reported)
Mamoun et al. (2015)	Not applicable	—	—	—	—	—	—	Unclear for: Measurement appropriateness; Nonresponse risk; Statistical analysis (insufficient detail reported)
Sadikoglu & Soroush (2016)	Quantitative descriptive	Y	Y	CT	CT	CT	2	design proposal (no empirical component)
Brandão (2018)	Quantitative descriptive	Y	Y	Y	CT	CT	3	Unclear for: Measurement appropriateness; Nonresponse risk; Statistical analysis (insufficient detail reported)
Xia et al. (2021)	Quantitative descriptive	Y	Y	Y	CT	CT	3	Unclear for: Nonresponse risk; Statistical analysis (insufficient detail reported)
J.-J. Li (2022)	Not applicable	—	—	—	—	—	—	Unclear for: Nonresponse risk; Statistical analysis (insufficient detail reported)
Liu et al. (2022)	Quantitative descriptive	Y	Y	CT	CT	CT	2	programme description (no evaluable empirical component)
Du (2024)	Not applicable	—	—	—	—	—	—	Unclear for: Measurement appropriateness; Nonresponse risk; Statistical analysis (insufficient detail reported)
Jamaluddin et al. (2024)	Not applicable	—	—	—	—	—	—	conceptual paper (no empirical component)
Natheer (2024)	Quantitative non-randomized	Y	Y	Y	Y	CT	4	framework proposal (no empirical component)
Gong et al. (2025)	Qualitative	Y	Y	Y	Y	CT	4	Unclear: Intervention fidelity (insufficient detail reported)
Tang et al. (2025)	Quantitative non-randomized	Y	Y	Y	CT	CT	3	Unclear: Researcher reflexivity (insufficient detail reported)
Yu et al. (2025)	Quantitative descriptive	Y	Y	CT	CT	CT	2	Unclear for: Confounder accounting; Intervention fidelity (insufficient detail reported)
Loup-Escande et al. (2017)	Quantitative non-randomized	Y	Y	Y	CT	CT	3	Unclear for: Measurement appropriateness; Nonresponse risk; Statistical analysis (insufficient detail reported)
Ishihara & Makino (2020)	Quantitative descriptive	Y	Y	CT	CT	CT	2	Unclear for: Confounder accounting; Intervention fidelity (insufficient detail reported)
Lee & Hsu (2021)	Quantitative non-randomized	Y	Y	Y	CT	CT	3	Unclear for: Measurement appropriateness; Nonresponse risk; Statistical analysis (insufficient detail reported)
P.-F. Li et al. (2022)	Quantitative descriptive	Y	Y	Y	CT	CT	3	Unclear for: Confounder accounting; Intervention fidelity (insufficient detail reported)
Luo et al. (2023)	Quantitative non-randomized	Y	Y	Y	CT	CT	3	Unclear for: Nonresponse risk; Statistical analysis (insufficient detail reported)
Ma & Yu (2024)	Not applicable	—	—	—	—	—	—	Unclear for: Confounder accounting; Intervention fidelity (insufficient detail reported)
Wang & Gao	Quantitative	Y	Y	CT	CT	CT	2	review article (not appraisable under MMAT) Unclear for: Measurement appropriateness;

Study	MMAT category	S1	S2	S3	S4	S5	Met	Reason for unclear judgements
(2024)	descriptive							Nonresponse risk; Statistical analysis (insufficient detail reported)
Y. Li et al. (2024a)	Quantitative descriptive	Y	Y	Y	CT	CT	3	Unclear for: Nonresponse risk; Statistical analysis (insufficient detail reported)
Y. Li et al. (2024b)	Quantitative descriptive	Y	Y	Y	CT	CT	3	Unclear for: Nonresponse risk; Statistical analysis (insufficient detail reported)
Yu & Ma (2024)	Mixed methods	Y	Y	Y	Y	CT	4	Unclear: Meta-inferences (insufficient detail reported)
Tsuda et al. (2018)	Quantitative descriptive	Y	Y	CT	CT	CT	2	Unclear for: Measurement appropriateness; Nonresponse risk; Statistical analysis (insufficient detail reported)
Wu et al. (2018)	Quantitative descriptive	Y	Y	CT	CT	CT	2	Unclear for: Measurement appropriateness; Nonresponse risk; Statistical analysis (insufficient detail reported)
Chao et al. (2019)	Quantitative descriptive	Y	Y	CT	CT	CT	2	Unclear for: Measurement appropriateness; Nonresponse risk; Statistical analysis (insufficient detail reported)
Raza et al. (2019)	Quantitative non-randomized	Y	Y	Y	CT	CT	3	Unclear for: Confounder accounting; Intervention fidelity (insufficient detail reported)
Wu et al. (2020a)	Quantitative descriptive	Y	Y	CT	CT	CT	2	Unclear for: Measurement appropriateness; Nonresponse risk; Statistical analysis (insufficient detail reported)
Wu et al. (2020b)	Quantitative descriptive	Y	Y	CT	CT	CT	2	Unclear for: Measurement appropriateness; Nonresponse risk; Statistical analysis (insufficient detail reported)
Kobayashi & Katsura (2022)	Quantitative descriptive	Y	Y	CT	CT	CT	2	Unclear for: Measurement appropriateness; Nonresponse risk; Statistical analysis (insufficient detail reported)
Fang et al. (2024)	Quantitative non-randomized	Y	Y	Y	CT	CT	3	Unclear for: Confounder accounting; Intervention fidelity (insufficient detail reported)
Hu et al. (2025)	Quantitative descriptive	Y	Y	CT	CT	CT	2	Unclear for: Measurement appropriateness; Nonresponse risk; Statistical analysis (insufficient detail reported)

Note. Studies were assigned to the MMAT category matching their own design (Hong et al., 2018): quantitative descriptive for system-development and technical-validation studies, quantitative non-randomized for experiments and quasi-experiments without random allocation, qualitative for interview-based studies, and mixed methods for designs combining quantitative and qualitative strands. Criterion-level judgements were made against each study's own design and stated aims. Y = criterion met; CT = unclear (insufficient detail reported); — = not applicable. S1-S5 refer to the five design-appropriate criteria of the assigned category: for quantitative descriptive studies, sampling strategy, sample representativeness, measurement appropriateness, nonresponse risk and statistical analysis; for quantitative non-randomized studies, representativeness of participants, measurement appropriateness, completeness of outcome data, confounder accounting and intervention fidelity; for qualitative studies, adequacy of sources, appropriateness of analysis, support of interpretations by data, coherence of sources and interpretation, and researcher reflexivity; for mixed-methods studies, rationale for mixing, integration of components, interpretation of outputs, addressing divergences and meta-inferences. Design proposals, conceptual papers and reviews are not appraisable under MMAT and are listed as not applicable with the reason noted. Of the 48 appraisable studies, three met four of the five criteria, 17 met three and 28 met no more than two; no study met all five.