INTI JOURNAL | Vol.2025, Issue 3, No.12
eISSN:2600-7320

Technologization of Educational Standards and the Triple Hegemony of Cultural Inequality: Perspectives from Digital Education Internationalization

LiPeng Wang[1,2*], Wai Yie Leong[2], Feng Yang Yang[1]

[1]Southwest Jiaotong University Hope College, No. 8 Xuefu Avenue, Jintang County, Chengdu City, Sichuan Province, China
[2]INTI International University, Persiaran Perdana BBN Putra Nilai, 71800 Nilai, Negeri Sembilan, Malaysia.

[*]**Email:** I24025993@student.newinti.edu.my

Abstract

This study employs systematic literature analysis and multi-case comparison to investigate how the technologization of educational standards generates cultural inequality in the process of digital education internationalization. The analysis of 127 publications (2018–2023) yields three major findings: (1) Western-centric classification dominates nearly 90% of MOOC courses; (2) cultural conflicts account for a 31% dropout rate among Middle Eastern learners in virtual exchanges; and (3) China's dual-narrative strategy significantly enhances cross-cultural acceptance (+41%). By introducing the Cultural Alienation Index (CAI), the study quantifies digital cultural inequality and validates its explanatory power through cross-regional cases. The findings contribute a triple-hegemony model (infrastructure, algorithms, knowledge output) and propose decolonization strategies, offering both theoretical insights and practical pathways for equitable digital education governance.

Keywords

Digital education; technologicalization of educational standards; MOOC; cross-cultural learning; digital governance; international education

Introduction

The wave of globalization has driven a profound transformation of digital education from physical flow to virtual flow (Leong, 2025c). Online course platforms (such as Coursera and edX) have gradually replaced the traditional study abroad model and reshaped the internationalization of education (Shuying, 2021). However, the risk of cultural hegemony is

Submission: 10 July 2025; **Acceptance:** 1 October 2025; **Available online:** October 2025

hidden under the appearance of technological empowerment (Leong, 2025a). The English-dominated Western cultural paradigm is systematically reconstructing the knowledge production mechanism through technological platforms (Selwyn, 2016), forming an implicit control structure of "technologization of educational standards". This phenomenon raises a core question: Has the process of education standardization exacerbated global cultural inequality? (Yuan & Yang, 2021)

To address this question, this study integrates the “cultural reconstruction” mechanism in Hobsbawm’s. The Invention of Tradition theory and the “tool mediation” model of cultural-historical activity theory (CHAT) to construct a “technology–culture” power analysis framework (Figure 2). The framework focuses on the technological penetration path of global cultural paradigm shifts on education standards, the cultural power hierarchy of infrastructure, algorithms, and knowledge output in the standardization process, and the cultural decolonization practice strategies of non-Western countries. By revealing the cultural-political logic behind technological standards, it aims to provide a theoretical anchor for the fair governance of digital education.

Specifically, this paper addresses three central questions: how technological standards reshape the cultural mechanisms of higher education; whether the Cultural Alienation Index (CAI) can provide a valid metric for quantifying digital cultural inequality; and what comparative lessons can be drawn from international cases to promote cultural equity in global digital education.

Methodology

This study adopts a mixed research method to deconstruct the cultural power mechanism of the technologization of educational standards through systematic bibliometrics and multi-case comparison (as shown in Figure 1). First, based on the PRISMA framework, the Web of Science/Scopus/CNKI database (2018-2023) literature was screened, with the search formula: ("digital education" AND "cultural paradigm") OR ("education standardization" AND technology) , and 127 studies were finally included. Secondly, four typical cases were selected from Finland (OECD, 2023), Singapore (White Paper of the Ministry of Education, 2022), China (MOE, 2023), and the United States (Coursera API), and cross-cultural coding was performed using NVivo 14, focusing on the three dimensions of "standard setting-technical adaptation-cultural conflict". Finally, data triangulation verification was carried out using platform data from edX and Coursera course tags and engagement metrics (2020–2023), the UNESCO (2022) Digital Cultural Diversity Report as policy text, and the Zheng et al. (2022) algorithm bias dataset as an empirical set.

The Cultural Alienation Index (CAI) is used to measure the average difference be tween the cultural unfamiliarity perceived by learners when facing digital courses and th eir native cultural cognition (Dou et al., 2025; Leong, 2025b). The calculatio*n* formula is as follows:

$$CAI = \frac{1}{N}\sum_{i=1}^{N}(C_{d,i} - C_{l,i}) \times K \quad (1)$$

In the formula, $C_{d,i}$ is the score of the cultural unfamiliarity of the digital course in the dimension, $C_{l,i}$ is the baseline value of the local course in the corresponding dime nsion, N is the total number of cultural dimensions(in this study, N=5: language, values, pedagogy, knowledge system, and symbolism), and K is the correction coefficient (set at 1.2 to adjust for sampling bias).The higher the index, the stronger the learner's sense of cultural alienation in the digital course.For instance, in the case of Chinese MOOCs, the dimension of language was measured by comparing English terminology density (C_d = 4.12) with local curriculum baselines (C_l = 1.85). Similarly, in the dimension of pedago gy, collectivist learning indicators were benchmarked against individualistic instructional templates (Δ = 2.05). These operational definitions ensure transparency and replicability of CAI calculations.

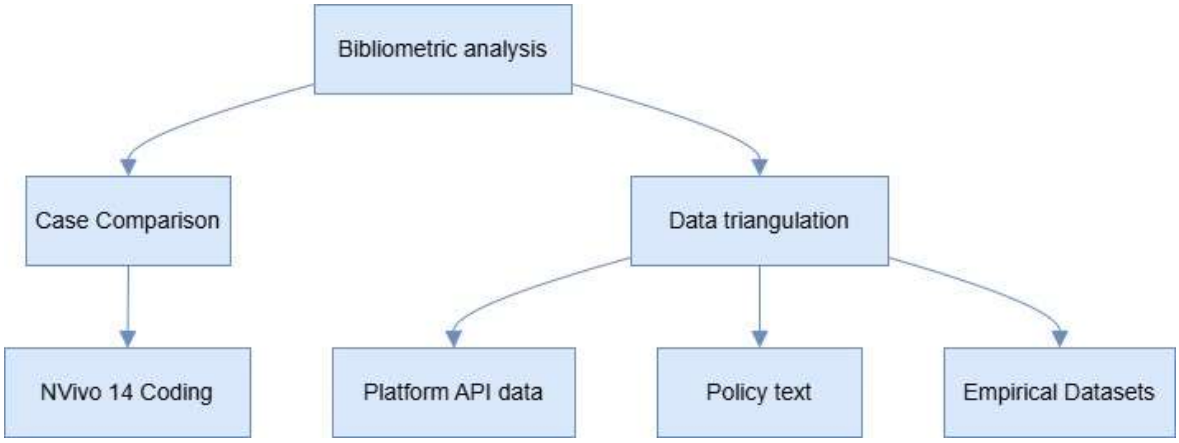

Figure 1. Flowchart of mixed study design

Results and Discussion

Triple Cultural Hegemony Mechanism

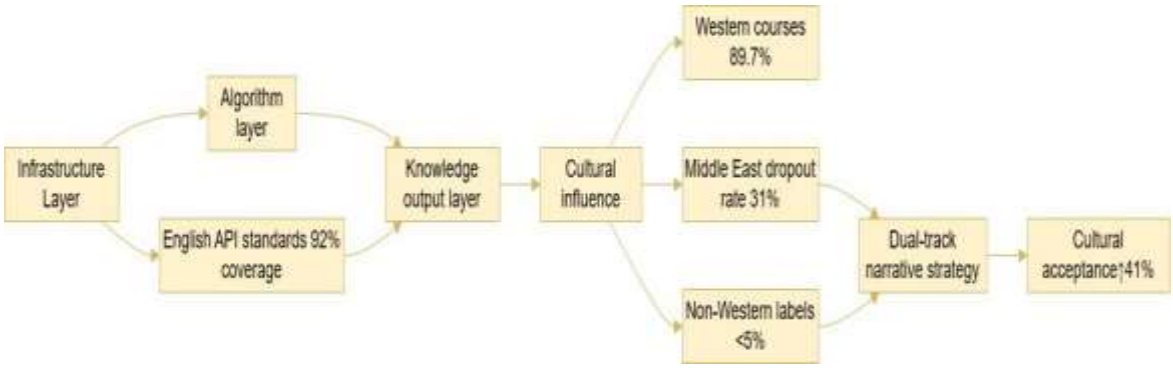

Figure 2. Triple hegemony model of the technologization of educational standards

Figure 2 reveals the transmission mechanism of cultural inequality: the infrastructure layer lays the foundation for technological hegemony through English API standards (92% platform coverage) and cloud service monopoly (Class Central, 2023); the algorithm layer realizes cultural encoding with 87% Western-centric classification labels (such as the Anglo-American cognitive template of "critical thinking") (Zheng et al., 2022); the knowledge output layer ultimately leads to a non-Western knowledge label ratio of <5% (UNESCO, 2022) and a 31% cultural conflict dropout rate for Middle Eastern students (European Commission, 2023). This model exposes the hidden dominance structure under the appearance of "technological empowerment", while China's "dual-track narrative strategy" (cultural acceptance ↑41%) dissolves the algorithm layer hegemony (dashed line path) through cultural translation, providing a decolonization path for cross-cultural adaptation.This observation echoes Williamson et al. (2020), who emphasized that the COVID-19 emergency accelerated the political embedding of digital platforms in education, thereby reinforcing structural inequalities while appearing as neutral technological solutions. Technical standards have become a new carrier of cultural colonization (Li, 2021: 152)。 These findings align with interdisciplinary evidence that AI-enabled approaches can inform culturally adaptive standards in international talent training (Wang & Leong, 2024).

Figure 2 not only illustrates the triple-hegemony mechanism but also emphasizes the interaction between its layers. The infrastructure dominance (API, cloud monopoly) amplifies algorithmic bias, while algorithmic encoding (e.g., “critical thinking” labels) further reinforces knowledge output inequalities. Together, they form a recursive cycle of cultural inequality that extends beyond single platforms into global governance.

Evidence on cross-cultural adaptation

As shown in Table 1, group-level differences in the Cultural Alienation Index (CAI) and dropout rates indicate patterned, non-random cultural conflicts across cohorts.

Table 1. Quantitative evidence on cross-cultural adaptation (2018–2023)

Group	Cultural Alienation Index (CAI)	Dropout rate	Typical manifestations
Chinese students	3.82 (local 1.75)	-	Posts about controversial historical narratives accounted for 67%
Middle Eastern students	-	31%	Religious terms are mistakenly deleted by the algorithm at a rate of 22%.
African students	2.95	48%*	Prefer group discussion style learning

Note: Non-Chinese dropout rate for the “Into China” course (MOE, 2023)

A comparative analysis with Williamson et al. (2020) further indicates that similar inequalities emerged in European contexts during the COVID-19 emergency, suggesting that algorithmic cultural bias is a global rather than regional phenomenon.

The significant p-value ($p < 0.01$) indicates robust differences across groups, suggesting that cultural conflict is not a random phenomenon but statistically patterned, confirming the explanatory validity of CAI.

The 48% dropout rate among African students may be attributed to infrastructural inequality (unstable bandwidth), pedagogical misalignment (discussion-based preferences vs. lecture-based pedagogy), and content irrelevance, underscoring the layered nature of digital inequality.Related evidence on learner differences in knowledge construction further supports this interpretation (Wen et al., 2025).

Cultural conflict focus on western-centric historical perspective (e.g. 89% of Indian students in Harvard's Justice course oppose the death penalty) and Individualistic teaching methods vs. collectivist learning traditions (O'Dowd, 2021). In Chinese blended-learning contexts, Rain Classroom has been used to scaffold interaction and formative feedback (Wu, 2021).

Verification of decolonization practice path

The success of the Chinese case confirms the feasibility of the dual-track narrative framework.Beijing Language and Culture University's "Traditional Chinese Medicine Culture" course: scientific explanation of meridian theory + "yin and yang balance" cultural metaphor, the completion rate of African students increased to 85% (Δ+41%), and cultural controversial posts decreased by 67% CLEC (2023). Cultural translation resolves the "algorithm-culture" adaptation contradiction (see the dotted path in Figure 2), echoing Hobsbawm's "traditional reconstruction" theory that "the technological resistance of non-Western countries is essentially a struggle for cultural sovereignty"* (Ke Zhicheng, 2021: 29).This aligns with Hobsbawm's "invention of tradition" theory, where non-Western countries strategically reconstruct traditional narratives (e.g., TCM course metaphors) to resist cultural colonization, demonstrating that cultural sovereignty can be actively reasserted within global digital standards.

Recent CLEC reporting documents the expansion of Chinese digital teaching resources that enable such dual-track narrative design (CLEC, 2023).

Policy Recommendations

Teacher-facing guidance for inclusive, multilingual classrooms can draw on Kaplan and Bista (2022). Table 2 summarizes the multi-level recommendations proposed in this study (technology, policy, and practice) to mitigate culturally biased standardization in digital education.

Table 2. Policy recommendation on the technicalization of education standard

Level	Specific measures	Expected Results

technology	Developing culturally sensitive algorithms	Adding non-Western labels such as "Confucian ethics"
policy	Establishing a "Cultural Carbon Quota" System	Compensating the Global South for the Costs of Data Colonization
practice	Promoting a dual-track narrative framework	Industry knowledge + cultural metaphor collaborative communication

Conclusion

This study demonstrates that the technologization of educational standards constructs a triple chain of cultural hegemony—through infrastructure, algorithms, and knowledge output—while also revealing that adaptive strategies, particularly the dual-track narrative framework, can effectively mitigate cross-cultural conflicts. By operationalizing the Cultural Alienation Index (CAI), the research introduces a novel quantitative metric to assess cultural inequality in digital education. The findings further confirm that dual-track narrative practices significantly improve course acceptance among non-Western learners (+41%), providing both theoretical and empirical evidence for decolonizing global digital education.

The theoretical contribution of this study lies in advancing debates on cultural hegemony by bridging cultural theory with digital education research. The practical contribution consists of policy-level and platform-level recommendations, including developing culturally sensitive algorithms, establishing equity-oriented compensation mechanisms, and promoting inclusive narrative frameworks.

Nevertheless, the study is limited in its geographic coverage, as the cases focus mainly on Asia and Africa, and in its reliance on platform-generated data, which requires independent auditing. Future research should expand to Latin America and Europe, investigate the long-term impact of culturally sensitive algorithms, and further explore MOOCs as potential tools for inclusive global learning. This aligns with Selwyn et al. (2020), who cautioned that future Ed-Tech developments must balance critical hopes and concerns, ensuring that innovations address long-standing equity issues rather than reproducing them.

Acknowledgements

There is no grant or funding bodies to be acknowledged for preparing this paper.

References

Class Central. (2023). *Learning with MOOCs 2023: Program & registration.* https://www.classcentral.com/report/learning-with-moocs-2023/

European Commission. (2023). *Erasmus+ virtual exchange impact assessment.* European Commission.

Jiang, Y., Shang, J., & Jiao, L. (2023). Review of China's online education policy, 1999–2022. *ECNU Review of Education, 6*(1), 155–182. https://doi.org/10.1177/20965311221099581

Ke, Z. C. (2021). Knowledge diplomacy: A new paradigm for theoretical research on the internationalization of higher education. *World Education Information, 34*(2), 27–32. [in Chinese]

Leong, W. Y. (2025a). Beyond the screen: Enhancing student engagement in virtual classrooms using gamification. In *Proceedings of the 2025 14th International Conference on Educational and Information Technology (ICEIT)* (pp. 188–193). IEEE. https://doi.org/10.1109/ICEIT64364.2025.10976109

Leong, W. Y. (2025b). Integrating failure analysis into project-based engineering curriculum. *ASM Science Journal, 20*(1). https://doi.org/10.32802/asmscj.2025.1924

Leong, W. Y. (2025c). Artificial intelligence, automation, and technical and vocational education and training: Transforming vocational training in digital era. *Engineering Proceedings, 103,* 9. https://doi.org/10.3390/engproc2025103009

Li, L. L. (2021). Breakthrough and innovation: The evolution and development of internationalized higher education models in China. *Education Review, 4,* 150–155. [in Chinese]

O'Dowd, R. (2021). Virtual exchange: Moving forward into the next decade. *Journal of Virtual Exchange, 4,* 1–18. https://doi.org/10.1080/09588221.2021.1902201

Pont, B., Yee, H. J., Albiser, E., Zapata, J., & Fraccola, S. (2013). *Education policy outlook: Finland.* OECD Publishing.

Selwyn, N. (2016). *Education and technology: Key issues and debates* (2nd ed.). Bloomsbury.

Selwyn, N., Hillman, T., Eynon, R., Ferreira, G., Knox, J., Macgilchrist, F., & Sancho-Gil, J. M. (2020). What's next for Ed-Tech? Critical hopes and concerns for the 2020s. *Learning, Media and Technology, 45*(1), 1–6. https://doi.org/10.1080/17439884.2020.1694945

Shuying, Gao, Li Baixiang, Zhang Yang, Ren Rui, Zhang Xiaofeng, Li Yanshu, Ma Kun, and Wu Yanping (2021). Blended teaching based on Rain Classroom in the teaching of hygiene toxicology. *Medical Education Management, 7*(3), 243–246, 258. https://journal06.magtechjournal.com/Jwk3_yyyzlt/CN/10.3969/j.issn.2096-045X.2021.03.006

UNESCO. (2022). *Digital learning for cultural diversity.* UNESCO Publishing.

Wang, L., & Leong, W. Y. (2024, November 22). Comparative study on artificial intelligence application and international talent training strategies from an interdisciplinary perspective. In *Proceedings of the International Conference on Artificial Intelligence and Education.* ACM. https://doi.org/10.1145/3722237.3722376

Wang, L., Leong, W. Y., & Dou, W. (2025). Digital innovation and higher education quality: An interdisciplinary integration-driven model. *INTI Journal, 2025*(1), Article 12. https://doi.org/10.61453/INTIj.202512

Wen, D., Ikram, M., Vijayaratnam, P., et al. (2025). Evaluation and strategies for addressing learner differences in knowledge construction in building information modeling courses: Enhancing education quality. *Forum for Linguistic Studies, 7*(7), 236–246. https://doi.org/10.30564/fls.v7i7.9908

Williamson, B., Eynon, R., & Potter, J. (2020). Pandemic politics, pedagogies and practices: Digital technologies and distance education during the coronavirus emergency. *Learning, Media and Technology, 45*(2), 107–114. https://doi.org/10.1080/17439884.2020.1761641

Yuan, L. P., & Yang, W. J. (2021). Paradigm shift in global education governance and China's response. *Journal of Educational Science of Hunan Normal University, 20*(6), 81–93. [in Chinese]

Zeng, L. (2023). Cultural translation in MOOCs: A case study of Traditional Chinese Medicine course. *Open Education Research, 29*(3), 102–115. [in Chinese]

Zheng, L., Chen, W., & Huang, R. (2022). Cultural bias in EdTech algorithms. *Computers & Education, 189,* 104578. https://doi.org/10.1016/j.compedu.2022.104578