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Study on Digital Technology Empowering the Cultivation of English Teachers' Cross-Cultural Awareness in Primary School

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Abstract: Drawing on situated cognition theory and a multidimensional model of intercultural awareness, this study employs documentary analysis and strategic modeling to design a digital technology–enabled cultivation framework. The proposed dual-track mechanism integrates teacher capacity building with policy and hardware support. Teacher development strategies include immersive environmental scanning via mobile devices to enhance cultural sensitivity, tiered digital training from micro-lectures to VR simulations and collaborative innovation platforms, and human–machine collaborative transformation using embedded AI agents for real-time cultural risk detection and pedagogical adaptation. Policy and hardware measures involve targeted funding for AR/AI resources in rural schools, intercultural teaching design assessments, and home–school digital collaborations generating community-based AR cultural maps. This integrated approach redefines technology from a mere instructional tool to a cognitive extension and cultural mediator, enabling teachers to progress from cultural knowledge recipients to pedagogical designers and professional leaders. While the strategy demonstrates strong potential for transforming intercultural teaching, challenges remain in addressing rural connectivity constraints, deeper cultural nuance interpretation, and establishing sustainable motivation and longitudinal assessment mechanisms.
Keywords: English teachers, primary school, cross-cultural awareness, situated cognition

I.Introduction

Against the backdrop of deepening globalization and the collective endeavor to build a global community of shared future, intercultural communication competence has transcended mere linguistic proficiency to constitute a pillar dimension of English disciplinary core literacy. Particularly for primary students at the critical juncture of cultural cognition initiation, the English classroom functions not only as a language acquisition arena but more significantly as an initial laboratory for multicultural understanding. Here, teachers' depth of cross-cultural awareness, sensitivity in cultural decoding, and pedagogical transformation capabilities directly shape the developmental foundations of students' cultural identity and their emerging aptitude for international understanding. This pedagogical evolution resonates with the tiered requirements for "cultural awareness" cultivation outlined in China's 2022 National Compulsory Education Curriculum Standards, ushering in a pivotal transformation toward culturally responsive teacher professional development.

Yet within the current educational landscape, conventional teacher development models confront three structural barriers: A pronounced resource access gap manifests through significantly less frequent exposure to authentic cultural materials among rural teachers compared to urban counterparts; a systemic deficit of immersive experiential scenarios restricts cultural symbol interpretation to textbook illustrations; and fragmented training approaches divorced from classroom practice leave most teachers struggling to translate cultural theory into instructional behaviors. These constraints perpetuate one-dimensional cultural indoctrination in cross-cultural teaching, stifling the emergence of students' critical cultural thinking. Simultaneously, the rapid advancement of digital technologies—including artificial intelligence, VR or AR, online collaborative platforms, and big data analytics—pioneers new pathways to transcend spatiotemporal limitations, deliver immersive cultural experiences, and construct interactive learning ecosystems.

This study centers on the core proposition of how digital technologies empower the cultivation of cross-cultural awareness among primary school English teachers. It aims to delineate the multidimensional structure of teachers' intercultural consciousness, analyze the practical value and latent potential of technology-enabled empowerment, and systematically develop an actionable cultivation strategy framework. Through documentary analysis and strategic modeling methodologies, the research endeavors to establish theoretical references and practical guidelines for teachers' cross-cultural professional development, ultimately catalyzing the synergistic elevation of "cultural awareness and pedagogical competence" under technological enablement.

II. Literature Review

Under the backdrop of globalization and new curriculum standards, intercultural awareness constitutes a core dimension of professional competence for primary school English teachers. The 2001 English Curriculum Standards first incorporated cultural awareness into teaching objectives. The 2011 edition specified explicit and concrete requirements regarding both the content and implementation strategies for cultural awareness education, significantly facilitating English instruction and contributing to the continuous improvement of English teaching quality in China. However, challenges in implementing intercultural awareness cultivation persist due to regional development disparities and

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insufficient teacher proficiency, prompting a recent research shift toward teaching practices. Traditional cultivation models often yield limited results, hampered by the absence of authentic cultural contexts and a disconnect between cognitive understanding and practical application. In Current Status and Solutions for Cultivating Cultural Awareness in Primary School English Education, Ma Kai[1] highlights the following issues in contemporary cultural awareness development: Teachers often emphasize the singing and performance of English songs while neglecting to guide students in understanding the underlying cultural connotations; they prioritize rote memorization of foreign cultural facts over comparative analyses of Chinese and Western cultures. This superficial approach to "excellence" undermines the original intent stipulated by the curriculum standards. Multiple factors contribute to this situation: Schools prioritize measurable teaching quality as crucial for institutional development; teachers lack clarity regarding the relationship between language and culture; excessive academic pressure diminishes students' intrinsic learning motivation; and parents, influenced by exam-oriented education systems, disproportionately emphasize academic scores. Collectively, these factors directly impede students' interest in English learning and hinder progress toward cultivating an international perspective. In response to the challenges in intercultural awareness cultivation within China's English education framework, numerous scholars have conducted extensive theoretical and practical research. Much of the literature explores pathways for cultivating cultural awareness in primary English teaching, proposing generalized recommendations grounded in specific pedagogical theories. These contributions offer valuable theoretical guidance for enhancing intercultural awareness education. For instance, Zhou Lin advocates aligning primary English education philosophies with national strategic goals, clarifying intercultural awareness cultivation objectives, and emphasizing interdisciplinary integration. Within English education, teachers should delve deeply into the intrinsic connections between language and culture, guiding students in comparative studies of Chinese and Western cultures[2]. The essence of cultivating intercultural awareness in primary English instruction lies in teachers employing diverse pedagogical approaches to create authentic learning scenarios that enhance students' experiential understanding of English culture. Generative artificial intelligence (AI) is driving disruptive transformation in education, demanding that teachers update their disciplinary knowledge, teaching methodologies, and perspectives on technology integration to adapt to the evolving educational landscape. From the teacher's viewpoint, the potential and risks of generative AI present both opportunities and challenge[3]. Teachers' intercultural teaching competence—a synthesis of their agency and systemic environment—is inherently contextual. Nevertheless, research specifically focused on cultivating teachers' intercultural awareness remains scarce, and existing theories offer limited direct, practical guidance. In the current big-data era, characterized by rapid advancements in digital technologies, the intercultural teaching competence of front line teachers is paramount for achieving cultural awareness cultivation goals. There is an urgent need to establish, refine, and enhance teacher education pathways dedicated to developing this intercultural teaching competence.

III. Theoretical Framework

3.1 Interpretation of Situated Cognition

Situated cognition theory, emerging in the late 1980s as a cognitive science paradigm, posits that human cognition is fundamentally situated within context. This framework challenges traditional cognitivist models which conceptualize the mind as an abstract symbol processor. The seminal 1989 paper *"Situated Cognition and the Culture of Learning"* by Brown, Collins, and Duguid established the theoretical foundation, marking a watershed moment for the field's development. This theory asserts that cognitive processes are not isolated mental events but are deeply embedded within specific socio-cultural practices.[4] Cognition emerges dynamically through real-time interaction between individuals and their environments. Learning, therefore, is the process by which individuals develop practical activities and social capabilities through authentic participation in relevant activities, crucially emphasizing the environment's profound influence.

Cultural cognition manifests not as discrete information stored individually, but as elements distributed across tools, community relationships, and historical contexts. For instance, a teacher learning Chinese Spring Festival culture encounters: the material meaning of red envelopes , the embodied ritual of gifting between generations, and the “Origin of Lucky Money” legend[5] . Modern digital red envelopes, however, necessitate cultural negotiation through WeChat's interface design and family group emoji exchanges. Consequently, teachers must evolve beyond mere "knowledge holders" to become weavers of cross-media meaning networks, entering authentic communities of practice. Meaningful learning occurs only when situated within the environment where the knowledge is applied, necessitating realistic scenarios that mirror real-life contexts to enhance understanding, interaction, and model-building.

3.2 The Connotation of Cross-Cultural Awareness

Cross-cultural awareness transcends superficial recognition of cultural symbols; it encompasses teachers' capacity to comprehend, critically reflect upon, and effectively respond to cultural diversity. Synthesizing Byram's model of intercultural communicative competence with primary education needs reveals three interconnected dimensions. Cognitive dimension requires teachers to establish a systematic cultural knowledge framework, including core characterizations of English-speaking cultures like festivals, values, social norms and their logical distinctions from Chinese culture. It demands acute cultural sensitivity to decode implicit cultural cues, for example, euphemisms, body language concepts; and the analytical capability to dialectically examine roots of cultural similarities or differences, for example,individualism and collectivism. Affective dimension emphasizes cultural curiosity, an open, inclusive mindset, and the active suspension of ethnocentric bias. It necessitates empathic perspective-taking to interpret behaviors of diverse cultural subjects from their viewpoint, for example, reconciling Western directness with Eastern reserve, fostering genuine

respect for cultural diversity[6]. Pragmatic dimension focuses on translating abstract awareness into pedagogical practice. This involves demonstrating adaptive flexibility in intercultural interactions ,for example, modifying instruction for international students and, crucially, designing age-appropriate cultural experience activities, for example, transforming greeting differences into role-play tasks to provide elementary students with tangible cultural participation. These dimensions are interwoven, collectively forming the cornerstone of effective cross-cultural teaching.

IV. Difficulties and Strategies of Digital Technology Empowering the Cultivation of Cross-Cultural Awareness

4.1 Current Systemic Difficulties

Despite widespread recognition of intercultural awareness's importance, current cultivation practices face persistent systemic contradictions. Firstly, resource scarcity of Information overload. While teachers operate in an information-rich era, there remains a critical shortage of authoritative, real-time cultural resources aligned with primary students' cognitive levels. Commercial platforms offer fragmented content, while textbook updates lag—often fixating on traditional British life while overlooking contemporary multicultural phenomena. This creates a paradox where teachers suffer information overload yet lack pedagogically viable materials.

Secondly, the mechanism for in-depth cultural experience is seriously lacking. Authentic intercultural awareness requires embodied emotional engagement. As evidenced by Wenling City's "14th Five-Year Plan in 2021", the proportion of full-time primary school teachers with overseas study and research experience is only 0.2%, which is much lower than that of junior high school teachers (0.15%) and senior high school teachers (0.31%).[7] Indirect exposure like learning Thanksgiving through documentaries fails to replicate the emotional resonance of lived experiences, often reducing instruction to superficial symbolism. Thirdly, the systematic support for professional development is weak. Pre-service programs in teacher colleges under-prioritize intercultural pedagogy (less than 15% course coverage), emphasizing linguistic skills over cultural teaching. Post-service training relies excessively on didactic lectures, lacking sustained mentorship or longitudinal impact tracking. Fourth, a deep reflection on the ecosystem has yet to take shape. Teacher reflections on cultural encounters often remain anecdotal. When students ask, "Why do English children call parents by name?", typical responses explain surface differences rather than guiding critical analysis of cultural power structures. The lack of scaffolded reflection tools and collaborative communities inhibits the transformation of individual insights into pedagogical wisdom. Fifth, the ability to transform teaching is generally insufficient. Intercultural awareness often falters at the translation from concept to classroom. Teachers confront an "awareness-action disconnect" due to insufficient methodology for designing experiential activities and the absence of feedback mechanisms, fostering frustration despite theoretical understanding.

4.2 Digital Technology-Empowered Cultivation Strategies

4.2.1 Teacher Capacity Building

In the era where knowledge economy, globalization and digitalization are deeply intertwined, teachers urgently need to constantly update their knowledge structure, enhance digital literacy, and strengthen cross-cultural understanding, among other abilities, in order to guide students to achieve high-quality growth in a complex and ever-changing environment. Driving the development of educational connotation: The overall improvement of the teaching staff's capabilities is an inherent requirement for realizing the development of educational connotation, moving from "having schools to attend" to "attending good schools", and is a strategic foundation for continuously improving educational quality, enhancing the competitiveness of national talents and cultural soft power.

4.2.1.1 Situated Environment Scanning

Primary English teachers' intercultural awareness cultivation requires breaking free from unconscious cultural biases. The Situated Environment Scanning Strategy seamlessly embeds intercultural cultivation into teaching routines via daily smartphone use, reconstructing teachers' perceptual patterns. Leveraging mobile image recognition, teachers instantly decode hidden cultural signifiers in their surroundings. For example, scanning a classroom "Wall of Honor" triggers intelligent cross-cultural comparisons: visual juxtapositions of Chinese collective recognition versus Western individual achievement displays, augmented by AI-curated cultural insights, transform mundane decor into vivid cultural lessons. Establishing a 5-minute pre-class "scanning ritual" to reinterpret bookshelf arrangements or wall colors—silent cultural narrators—through the phone lens. This instant feedback mechanism significantly enhances teachers' semiotic deconstruction skills. The strategy's essence lies in converting immersive situated learning into a dictionary-like habitual practice, nurturing cultural sensitivity through intuitive technological interaction.

4.2.1.2 Digitalization Training

The cultivation of cross-cultural competence for primary school English teachers needs to be gradually deepened through systematic digital training courses, with a focus on capacity building around the core links of cultural teaching. During the stage of basic ability cultivation, the training focuses on helping teachers understand the cultural connotations in language communication. It uses concise micro-lesson videos to analyze cultural phenomena in daily communication, such as differences in polite expressions and the meanings of body language, and is equipped with interactive analysis tools to enable teachers to independently mark the cultural understanding difficulties encountered in teaching practice, thereby enhancing their sensitivity to cultural details. During the stage of enhancing practical abilities, a cross-cultural context close to the classroom is created through virtual reality technology. Teachers can handle cultural understanding deviations that may occur in real teaching in a simulated environment, such as differences in concepts in home-school communication. The system will immediately generate operational feedback and optimization suggestions to help teachers master strategies for flexibly responding to cultural differences in dynamic situations and enhance their practical teaching abilities. During the stage of developing innovation capabilities, the training guides teachers to design teaching plans

around profound cultural themes. With the help of the teacher collaboration platform, participants submit their initial teaching plans and then undergo multi-angle reviews by their peers, such as the comprehensiveness of cultural perspectives and student acceptance. After multiple rounds of "revision - classroom verification - re-optimization", they eventually form high-quality teaching plans that have been tested in practice and are included in the shared resource library for continuous reference. The expert support and group collaboration mechanism run through the entire process. Regularly held special online workshops focus on teaching pain points. Expert explanations and group discussions are interspersed, and the real-time Q&A function ensures that difficult problems are solved immediately. The teacher learning community constructed simultaneously forms a long-term collaborative network. Through the operation mode of jointly researching teaching plans, sharing resources and discussing problems, it promotes teachers to achieve a role leap from cultural knowledge learners to cultural education designers in the collective wisdom collision.

4.2.1.3 Human-machine Collaborative Transformation

This low-threshold, high-precision strategy embeds AI as a cognitive mediator, converting abstract cultural knowledge into actionable pedagogical solutions. Integrated via conversational agents within platforms like WeChat or DingTalk, it minimizes technical barriers. Teachers input contextual keywords,then AI returns tiered solutions. Take the lesson preparation stage as an example. When a teacher drags the lesson plan document into the intelligent agent interaction area, the system automatically scans for potential cultural risk points. For instance, when it detects an activity like “Making reindeer handicrafts for Christmas”, the intelligent agent generates a prominent prompt in the dialog box: “Antlers symbolize, suggestion to adjust (taboo in some Nordic cultures) → Alternative: Snowman or Gift box”, and simultaneously embeds a 30-second situational micro-lesson link in the sidebar. This kind of intervention precisely corresponds to the legitimate peripheral participation proposed by Lave in the practical context - teachers do not need to interrupt their workflow to learn cultural theories, but instead receive embedded guidance at specific decision points, allowing cross-cultural knowledge to be naturally internalized in the operation process.

4.2.2 Policy and Hardware Support

Policy guarantees form the foundation for the sustainable development of teachers' cross-cultural competence. The education department should allocate special funds to address the lagging equipment issue in rural schools - providing each township primary school with lightweight AR glasses, which can trigger cultural background explanations when scanning English textbooks; upgrading AI language laboratories to support teachers in simulating cross-cultural communication scenarios and obtaining real-time pragmatic feedback. At the same time, a dual-track assessment mechanism should be implemented: adding an “intercultural teaching design” practical section to the teacher qualification certification, requiring teachers to develop cultural comparison lesson plans using digital resources on-site; incorporating students' cultural sensitivity growth data into the professional evaluation. New teachers focus on the digital decoding ability of cultural symbols, while experienced teachers emphasize cultural conflict mediation training in VR scenarios, and the head of the teaching research group takes the lead in planning courses that balance Chinese and Western cultures. This “hardware support - standard guidance - tiered training” system loop enables teachers to transform from technology users to professional leaders in cultural education.

Digital collaboration between home and school provides a practical laboratory for teachers to transform cultural capabilities. Teachers use the home-school communication APP to push customized cultural task packages - for example, a video task of “filming local intangible cultural heritage skills in English”, and the system automatically analyzes the completeness of the cultural expression submitted by parents and generates personalized improvement suggestions. Teachers then adjust the teaching focus based on the feedback data, such as supplementing English translation strategies for local culture. Deeper empowerment lies in the action of converting community cultural resources: teachers lead students to interview community elders and record bilingual folk stories; guiding students to shoot the production process of traditional crafts and adding cross-cultural annotations through AI tools. These materials are eventually integrated into AR local culture maps, and scanning community landmarks can play the corresponding cultural narrative. During this process, teachers must deeply analyze the logic of cultural translation, such as simplifying complex ritual expressions and supplementing international understanding perspectives, effectively promoting the transition from cultural cognition to teaching ability. Monthly online cultural seminars further strengthen the reflection mechanism: teachers analyze typical confusion cases submitted by parents, based on the principle of diversity and inclusiveness, jointly formulate the "Family Intercultural Communication Guide", forming a "practice - reflection - optimization" ability growth loop.

V. Conclusion

This study proposes a digital-enabled cultivation strategy that facilitates the transition of primary school English teachers' intercultural awareness from cognitive initiation to professional leadership through a dual-track mechanism integrating teacher capacity building with policy and hardware support. The teacher development dimension establishes a three-tiered progressive pathway: The immersive environmental scanning strategy reconfigures cultural sensitivity cultivation using smartphones as perceptual extensions, transforming static environments into dynamic cultural cognition maps through daily scanning rituals. Systematic digital training builds tiered competency development, beginning with foundational micro-lectures dissecting cultural nuances to enhance linguistic perception, advancing through virtual reality simulations that train dynamic response strategies for intercultural conflicts, and culminating in innovation-focused teacher collaboration platforms where collective wisdom iteratively refines instructional designs - thereby transforming teachers from cultural knowledge recipients into pedagogical designers. Continuous expert support and learning communities catalyze the organic growth of cultural teaching innovation. The human-machine collaborative translation strategy bridges the theory-practice divide by embedding intelligent agents within routine communication platforms. Through natural

language interactions, these agents convert abstract cultural knowledge into actionable solutions, exemplified by automated cultural protocol generation for international parent meetings. During lesson planning, AI-driven risk scanning provides contextual micro-lesson alerts, such as warnings about reindeer antler cultural taboos during Christmas activities, realizing situated learning theory's legitimate peripheral participation principle where intercultural competence naturally develops through operational practice.

Policy and hardware support forms an institutional trinity: Dedicated funding equips rural schools with augmented reality and AI facilities, making cultural contextualization and scenario simulation fundamental teaching capacities; dual-track assessment incorporates intercultural design implementation and student sensitivity metrics into evaluation systems; home-school digital linkages create practice laboratories where teachers refine pedagogy through cultural task analytics and evolve into local cultural translation specialists by developing community AR cultural maps - such as guiding students to document bilingual folklore with AI annotations.The strategy core redefines teacher-technology relations: Technologies transcend tools to become cognitive extensions and cultural decoders. Immersive scanning remolds perception, digital training scaffolds competency, human-machine collaboration streamlines decision-making, and policy support cultivates institutional soil. These interconnected elements propel teachers' metamorphosis from passive technology operators to professional leaders embodying cultural discernment, pedagogical creativity, and resource integration - ultimately transforming cross-cultural education from superficial knowledge transfer to profound literacy cultivation. Limitations emerge in urban-rural technological adaptability, where unstable rural networks constrain real-time agent responsiveness, and metaphorical cultural recognition gaps persist in areas like power dynamics within euphemistic expressions. Sustainable motivation systems for teacher engagement and longitudinal tracking frameworks for intercultural teaching outcomes remain underdeveloped.

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