

Developing Intercultural Communicative Competence for Low-proficiency Junior High EFL Learners: an AI-mediated Pedagogic Framework

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Abstract

Intercultural Communicative Competence (ICC) development for low-proficiency junior high students could be overlooked due to the persistent prioritization of language accuracy over intercultural understanding in traditional instruction. To address this drawback, the present paper sought to propose an ICC pedagogy framework by synthesizing ICC Model as objectives, the Interacting Processes of Intercultural Learning (IPIL) as pathway, and AI-supported multimodality as mediators that collectively renders ICC development more accessible for these students. Unlike previous AI-mediated ICC intervention studies that have primarily targeted at proficient learners, this paper conceptualized AI-supported multimodality as constitutive mediators engaging low-proficiency learners throughout the ICC learning process. The framework comprises a fourfold cycle from cultural identification, structured comparison and scaffolded interactive simulation to critical reflection adjusted by AI-mediated multimodality, which may help reduce these students' linguistic burdens, facilitate participatory engagement and may have the potential to support self-efficacy throughout the entire process, possibly developing their ICC. By presenting specific teaching scenarios and illustrative examples, it yielded practical values for classroom practice and demonstrated how this proposed framework operates within the IPIL Model. It further advanced the argument that ICC Model, the IPIL Model and AI-mediated multimodality are not merely a theoretical aggregation but an organic integration that interweaves explicit learning goals, recursive learning trajectories, and adaptive, individualized mediation into a coherent ICC learning ecology specifically designed for low-proficiency junior high students.

Keywords

ICC development, ICC model, the IPIL Model, AI-mediated multimodality, low-proficiency junior high students

1. Introduction

The deepening globalization has accelerated intercultural communication, making it increasingly important to effectively master and use a language in intercultural encounters for developing international connections and communicating with people from different origins [1]. While in traditional language instruction, the development of ICC might be overlooked as the primary focus has been put on the grammar and vocabulary accuracy instead of helping EFL learners understand cultural differences, posing significant challenges for them to deal with real-time intercultural communication [2]. In this context, developing learners' ICC has

become a crucial objective in modern language education [1, 3]. To address ICC development, scholars have proposed ranges of theoretical foundations for decoding what competences ICC conveys [4-10]. Although these frameworks collectively specify what capabilities learners should acquire in ICC learning, they offered limited guidance for classroom implementation. To further address ICC classroom practice, Liddicoat and Scarino [11] developed the IPIL Model to describe a fourfold cyclical process facilitating learners ICC development. While the IPIL Model provides a valuable pedagogical orientation for ICC learning, how it could be practiced through technology support remains insufficiently investigated, particularly for traditional classrooms.

Traditional classroom instruction lacks individualized learning, interaction and practice, making it challenging to meet different learners' needs and apply their skills in authentic intercultural contexts [1, 12]. Low-proficiency junior high students are particularly disadvantaged in this typical instruction. Their quadruple learning constraints restrict the opportunities to meaningfully engage with ICC learning, calling for constructing an integrated intercultural learning ecology to describe how ICC development could be accessible for these students. Recently, the creation of Artificial Intelligence (AI) has introduced transformative opportunities for language education, which may help elevate students' language skills and ICC through tailored practice and interactive learning [2]. Empirical evidence indicates that intelligently designed multimodal input using AI may facilitate deeper intercultural comprehension [13, 14], while adaptive and individualized learning experience could provide learners with safe simulated rehearsals before face-to-face intercultural communication [15-17]. Existing AI-supported studies have examined linguistic outcomes, affective variables and learning participation [18-24], whether the potential of AI multimodality as a mediator for ICC learning needs further exploration. Some others investigated how AI-mediated multimodality could facilitate ICC development yet exclusively targeted at university students or adult learners [2, 25]. However, there are limited studies that explore AI-mediated multimodality in developing ICC particularly among low-proficiency junior high students. This gap underscored the need for more targeted research to examine how AI-mediated multimodality could be systematically integrated into classrooms to adjust ICC learning for this group of students.

To address this gap, the present paper seeks to propose a pedagogic framework synthesizing ICC Model as objectives, the IPIL Model as pathway and AI-mediated multimodality as a mediator specifically tailored for low-proficiency junior high students, exploring how ICC development could be rendered more accessible for them. In light of this, the proposed integration necessitates a critical examination of how existing theoretical foundations and research have separately addressed ICC objectives and pathway, technological mediator, the target students, and the potential mutually reinforcing interconnections between all these elements.

2. Literature Review

2.1 ICC Model

ICC refers to the ability to negotiate meaning, maintain a common understanding effectively and appropriately in intercultural communication [26], where people from diverse cultures respect for their backgrounds to achieve goals of communication [27, 28]. It could also be characterized as the dynamic and integrative capability, facilitating learners engagement with cultural diversity and enabling them to co-construct the environment for meaningful interaction across linguistic and cultural boundaries.

Scholars have proposed different models to describe ICC since the 1950s [29], exhibiting a gradual shift from static models toward process-focused frameworks foregrounding higher-order thinking and cultural adaptation. Bennett's Developmental Model of Intercultural Sensitivity (DMIS) [4-6] illustrated the process of adaptation and integration with different cultures. Deardorff [9, 10] outlined a pyramid model distinguishing internal outcomes from external outcomes, emphasizing that ICC could be built upon learners' attitudes, knowledge and skills. The ICC foundation culminated in Byram's ICC Model in 2021 [8] as it integrated ICC into language learning, transforming it from general capabilities into an ICC pedagogical foundation [30]. While these models collectively advance ICC theoretical framework, they differ from each other in fundamental focus: Bennett [4-6] primarily traced the developmental progression, Deardorff [9, 10] distinguished individuals' affective outcomes from behavioral performance, and Byram [7, 8] uniquely embedded ICC with language education as a multidimensional framework, describing that the five components

altogether might be formulated as learning objectives, which are listed in Table 1:

Table 1: ICC Components by Byram [8]

Components	Descriptions
Attitudes	• Be curious, open, ready to question learners' own and other cultures
Knowledge	• Specific knowledge: social groups, products, practices in different contexts • General knowledge: social, interpersonal communication
Skills of Interpreting and Relating	• Be able to understand different cultural elements, relate them to learners' own experience
Skills of Discovery and Interaction	• Be able to acquire cultural knowledge, attitudes, skills, apply them to authentic communication
Critical Cultural Awareness	• Be able to critically evaluate values, assumptions, cultural products and practices in different contexts

This model underscored individual's awareness in evaluating cultural products, practices and underlying values, leading them to move from a cultural knowledge recipient toward an interpreter and participant in intercultural communication. However, Matsuo [31] critiqued that this framework did not clarify the interconnections between these five components and developmental sequences. For Hoff [32], this model presumed face-to-face interaction in physical contexts and Western norms, thereby neglecting virtual exchange and cultural complexity.

Despite these critiques, researchers integrated this model into classroom practice through digital photography project, telecollaboration, speaking and differentiated courses, finding that these ICC Model-oriented instructions developed learners' intercultural identification, apprehension and comparison, enabling them to interpret cultural conflicts, connect with native speakers, relate themselves to the target cultures [33-37]. Further empirical evidence demonstrated that while learners confidently absorbed new cultures, they found it challenging to critically evaluate different cultural elements [38]. Although the online ICC-based instruction offered intercultural contact, it could not provide sufficient face-to-face interaction, posing difficulties in monitoring learners' behaviour and comprehension, further reducing their engagement [28].

Nevertheless, this framework presents an unachievable checklist for low-proficiency junior high students by presupposing advanced comprehension and reflection that they have not acquired. Without adaptive mediation, these five components remain abstract and linguistically demanding for them, lacking a developmental sequence and an accessible starting point for ICC learning. From this perspective, this theoretical-pedagogical disjunction necessitates the combination of ICC Model and the IPIL Model, through which ICC could be progressively fostered.

2.2 The IPIL Model

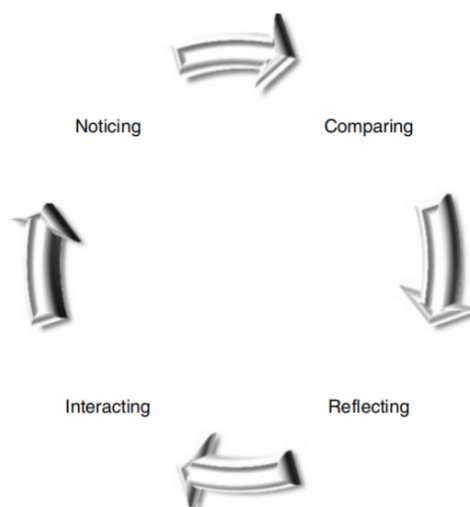
To address pedagogical procedures for classroom implementation, scholars have been exploring ICC in language education since the 1990s [39]. Liddicoat [40] initiated an original cyclical process encompassing Input, Noticing, Reflection, Output, Noticing and Reflection, regarding ICC development as an on-going acquisition. Another five-principle pedagogy [41-43] was critically developed, involving Active Construction, Making Connections, Social Interactions, Reflection and Responsibility, laying a solid theoretical foundation for methodology, assessment and curriculum design [41]. The ICC pedagogy framework reached its mature formulation in Liddicoat and Scarino [11], who consolidated the four-process IPIL Model into a coherent and dynamic sequence for ICC classroom implementation, which is shown in Figure 1.

This model structures how learners advance from surface-level cultural observation toward deep intercultural reflection. Instead of a linear progression, it emphasizes that learners may revisit the earlier stage through recursive refinement as their ICC develops. It does not necessarily have an entry point as learners may focus on anything challenging their assumptions or prompting them to raise questions at any stage [11].

From what has been discussed above, the IPIL Model precisely maps onto the five components of ICC Model. Noticing facilitates the opportunities to acquire cultural knowledge and activate openness and curiosity, aligning with Attitudes and Knowledge. Comparing enables students to think about new cultures and their experiences, targeting Skills of Interpreting and Relating. Reflecting sustains higher-order thinking, corresponding to Critical Cultural Awareness. Interacting creates the moments to apply target cultural elements,

echoing Skills of Discovery and Interaction. Accordingly, ICC Model could be understood as the intercultural learning objectives, while the IPIL Model may implicate a pathway for classroom implementation.

Figure 1: the IPIL Model



Note: sourced from Liddicoat and Scarino [11] (p.60)

Drawing upon the IPIL Model, empirical studies testified that movie segments, culture-related texts and activities, critical incident exercises and virtual exchange could enhance linguistic skills, intercultural awareness and understanding, facilitate learner engagement, autonomy, and curiosity toward different cultural elements [44-46]. Others also found that although telecollaboration and context-adapted learning materials elevated students' language skills and intercultural awareness, they struggled with deeper cultural reflection in oral and written production, and the opportunities for interaction were limited [47, 48].

While the integration of ICC and IPIL specifies learning outcomes and pathway, intercultural learning remains difficult for low-proficiency junior high students without adaptive and individualized mediation. Their constraints disengage them from cultural input to critical output. Without differentiated instruction, ICC learning will fall into an overwhelming sequence. However, traditional instruction, driven by static textbooks or ready-made multimodality, cannot support it. Accordingly, these difficulties call for a mediator facilitating an adaptive and individualized learning experience.

2.3 AI-mediated Multimodality

2.3.1 AI in Language Education

AI generally refers to a technology producing meaningful content, such as images, audios, music and videos [49, 50], and simulating human cognition to undertake traditional tasks [51]. This conception remains theoretical until the emergence of generative AI tools. Generative AI tools, such as ChatGPT, have attracted increasing attention from language researchers [52]. Studies have examined the effectiveness of ranges of AI-mediated multimodality applications in language education, such as "Google Assistant", "Ellie", "Echodot" and "Microsoft Xiaoying", finding that they could help enhance speaking, vocabulary acquisition, pronunciation and willingness to communicate, and reduce anxiety to engage learners with practicing expressions in oral production [19-24]. Prior research also identified that while ChatGPT improved learners' overall writing skills, it did not help strengthen grammatical accuracy and diversity [18]. However, these AI tools predominantly focused on the affordances on linguistic competence enhancement rather than ICC development. This drawback, therefore, necessitates AI-mediated multimodality for intercultural pedagogy.

2.3.2 AI-mediated Multimodality

From what has been discussed, AI-supported multimodality may function as a mediator sustaining the IPIL Model while making ICC achievable. Multimodality means a way of meaning making through image, text, symbolism, gaze, gesture, posture and sounds in social interaction [53]. While in educational domain,

multimodality could be synthesized as unified resources to optimize learning experience [54]. In this sense, AI-mediated multimodality may offer an alternative for ICC learning, transforming intercultural pedagogy from abstract instruction toward dynamic, simplified yet in-depth learning experience.

Drawing upon existing empirical studies and conceptual discussions on AI-mediated multimodality, four major potential AI mediators could be synthesized, which may facilitate (i) comprehensible Contextualization Input, possibly targeting Attitudes and Knowledge. Through simulated pictures, videos and immersive scenarios, AI systems (e.g., Claude Sonnet, GPT-4, and LEARN chatbot) could facilitate cultural knowledge and social practices input, engage learners and simplify word learning process [13, 14]; (ii) structured Contrastive Cultural Scaffolding, potentially corresponding to Skills of Interpreting and Relating. For example, Liu [2] found that Text-to-Speech could generate culture-embedded dialogues, guiding learners to focus on target contrast between English individualism and Chinese collectivism; (iii) personalized Simulated Interaction Scaffolding, perhaps aiming at Skills of Discovery and Interaction. Likewise, Liu [2] utilized Text-to-Speech to train learners to act as a Chinese employee to explain “face” to a British client using acquired knowledge; (iv) practice for Critical Reflection, possibly orienting toward Critical Cultural Awareness. For instance, Favero et al. [55] argued that Maike, a chatbot, could foster critical thinking by generating Socratic dialogues, enabling learners to make their explicit reasoning from different perspectives. Notably, these affordances do not imply direct empirical effects on ICC development. Instead, this analysis highlights the conceptual correspondences between AI-mediated multimodality and the core elements of ICC and IPIL, and the most closely-related components in both models are listed in Table 2:

Table 2: Correspondences between AI-mediated multimodality, ICC and IPIL components

AI-mediated Multimodality	Example Applications	Most Closely-related ICC Components	Most Closely-related IPIL Components
Contextualization Input (Mediator 1)	Claude Sonnet, GPT-4 LEARN chatbot	• Attitudes • Knowledge	• Noticing
Contrastive Cultural Scaffolding (Mediator 2)	Text-to speech	• Skills of Interpreting and Relating	• Comparing
Simulated Interaction Scaffolding (Mediator 3)	Text-to speech	• Skills of Discovery and Interaction	• Interacting
Facilitating Critical Reflection (Mediator 4)	Maike	• Critical Cultural Awareness	• Reflecting

Through AI-mediated multimodality, Contextualized Input may transform abstract cultural elements into vivid experience, making comprehension more accessible to low-proficiency junior high students. Contrastive Cultural Scaffolding could synthesize isolated observations into a coherent and simultaneous comparison, allowing them to relate themselves to intercultural experience. Simulated Interaction Scaffolding may create the moments to apply intercultural knowledge before real-time interaction, increasing learner autonomy. Facilitating Critical Reflection may accelerate their transition from comprehension to evaluation, helping build higher-order thinking. However, it is noteworthy that AI-mediated multimodality possesses one significant factor: facilitating an Adaptive and Individualized Learning Experience, including timely, relevant and contextual knowledge [56], interactive practice and private space for rehearsal [15-17]. While these affordances make AI-mediated ICC learning possible, the target learners are not yet examined: low-proficiency junior high students. Before such mediating affordances could be adopted, it is necessary to systematically investigate how their characteristics in daily learning affect ICC development.

2.4 Low-proficiency Junior High Students

2.4.1 Learning Characteristics and Performance

Based on Common European Framework of Reference for Languages: Learning, Teaching, Assessment (CEFR) [57] and English Curriculum Standards for Compulsory Education [58], low-proficiency junior high students might be described as adolescent EFL learners, who can merely understand basic meanings through fragmented words, chunks or formulaic expressions. They struggle with identifying cultural markers and making meaning, further posing challenges to sustain intercultural dialogues and build critical cultural perspectives.

Grounded in everyday classroom learning, studies have testified that low-proficiency junior high students demonstrate: (i) Language difficulties, affecting knowledge acquisition. For example, Hu et al. [59] found that

despite years of English instruction, these students struggle to make short sentences using fundamental phonetic rules and words; (ii) Cognitive limitations, posing a hindrance to developing effective learning strategies. For instance, Bao and Peng [60] argued that these learners applied low-efficiency strategies to learn vocabulary, resulting in poor and incomplete lexical acquisition; (iii) Affective barriers, triggering negative and passive emotions. Researchers found that these students demonstrated low self-efficacy and interest in class, while others experienced less enjoyment and even a degree of anxiety in production tasks [61-65]; (iv) Behavioral reluctance, influencing immersive learning and critical analysis. Due to the fear of making mistakes, these students appeared distracted and disengaged from classroom activities [64, 66, 67].

2.4.2 Learning Constraints

Built upon the evidence above, each student's constraints may influence ICC development. The correspondences between these constraints and the most vulnerable ICC and IPIL components are shown in Table 3:

Table 3: Correspondences between learning characteristics aspects, ICC and IPIL components

Learning Characteristics Aspects	Learners' Barriers	Most Vulnerable ICC Components	Most Vulnerable IPIL Components
Language	Limited vocabulary	• Attitudes • Knowledge	• Noticing
Cognition	Ineffective learning strategies	• Skills of Interpreting and Relating	• Comparing
Affection	Anxiety, low self-efficacy	• Skills of Discovery and Interaction	• Interacting
Behavior	Low engagement	• Critical Cultural Awareness	• Reflecting

For low-proficiency junior high students, language difficulties may cut the tools through which target cultural elements are conveyed and shared. Cognitive limitations possibly trap them to have one-way thinking and consolidate comparison at a superficial level. Affective barriers may block their engagement with practicing cultural knowledge and intercultural pragmatic strategies. Behavioral reluctance potentially diminishes their intercultural reflection, causing them to gradually walk away from this culture-sharing ground where critical awareness grows. From these perspectives, these constraints call for constituting an ICC learning ecology mediated by AI-supported multimodality to make ICC development accessible for these students throughout an adaptive and individualized learning experience.

3. The Proposed AI-mediated ICC Pedagogy

The previous literature has demonstrated that existing ICC foundations lack a systematic mechanism for classroom implementation that supports low-proficiency junior high students throughout the intercultural learning process. To address this challenge, this paper proposed a pedagogy integrating ICC, the IPIL and AI-mediated multimodality into a coherent framework specifically targeted at this group of students in classroom practice.

3.1 An Overview of the Proposed Pedagogic Framework

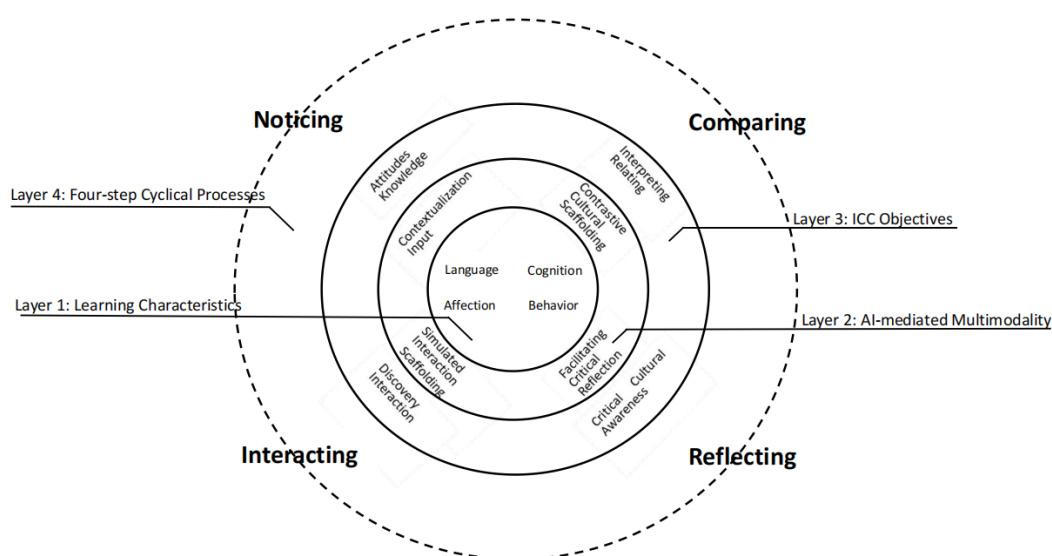
By utilizing AI-mediated multimodality to render the learning process more accessible and address an adaptive and individualized learning experience, this pedagogic framework proposes that these mediators could be integrated to activate the IPIL Model, transforming ICC development from a distant ideal to achievable learning procedures for the target students. All the major elements examined in literature and the interconnections in this proposed pedagogy are shown in Figure 2:

The innermost circle (Layer 1) corresponds to the four major constraints of these students in everyday classroom learning, which could be described as the origin of this proposed framework. Each of these learning constraints could be accordingly addressed through the four primary AI multimodality mediators, which are shown in Layer 2. The Adaptive and Individualized Learning Experience, though not marked in this figure, might be featured as intangible mediation ubiquitously functioning across the entire IPIL processes and learning activities. Components in Layer 3 explicitly specify what competences could be achieved throughout AI-mediated multimodality learning process. The outermost four cyclical processes, marked in Layer 4, are

interconnected with dotted line, highlighting that no single phase is necessarily prescribed as a mandatory beginning as any phase could serve as the entry point according to students' levels and the learning context, aligning with the IPIL Model.

Notably, this framework does not demonstrate one-to-one correspondences for ICC development. For instance, with limited language skills, these students may also struggle with structured comparison, simulated interaction and even critical reflection, not just cultural input. AI-mediated Critical Reflection may facilitate Critical Cultural Awareness, but also critically renew their reflective interacting and comparing skills. In other words, the correspondences mapped out in Figure 2 indicate a mutually reinforcing rather than an exclusive interconnection, and all students' constraints might be addressed through the dynamic and organic interplay of the AI-mediated multimodality across the entire IPIL Model.

Figure 2: The Proposed ICC Pedagogy Framework



This proposed framework operates through a dynamic AI-mediated mechanism transforming these fourfold learning constraints into productive resources for adaptive and individualized learning for low-proficiency junior high students. Through these mediating learning resources, AI could help reduce linguistic burdens and scaffold effective comparison strategies. Then it may enhance motivation and participation, inspire self-reflection, further fostering their critical awareness. These mediators could complement and reinforce one another throughout the entire process and may help develop their ICC step by step while mitigating their limitations, transforming them from passive recipients of intercultural knowledge toward active participants in ICC learning.

In this integrated design, ICC objectives may become achievable competences through explicit procedural specifications, the IPIL Model could sustain learning flow through competence-oriented targets, and the application of AI-mediated multimodality may precisely anchor ICC development through intercultural theory-based design. However, the contribution of the proposed framework lies not in the simple theoretical combination, but in their complementary functions that connect clarified orientation, recursive process, adaptive and individualized adjustments for low-proficiency junior high students.

3.2 Principles and Syllabus

3.2.1 Four Principles

Principle 1 Accessibility Before Complexity

AI-mediated multimodality input should prioritize continuous accessibility before presenting complex cultural elements. The input design should presuppose engaging and low-demanding animations rather than paper-based texts, facilitating noticing in concrete and experience-based materials.

Principle 2 Explicit Scaffolding Over Isolated Comparison

Cultural comparison should be structurally scaffolded instead of implicitly expected. Visible frameworks (e.g., AI-mediated multi-dimension matrices, contrastive diagrams) should be applied to help move beyond segmented superficial observation toward systematic, analytic and critical output.

Principle 3 Rehearsal Before Human Interaction

Interactive practice should be repeated in adaptive and low-stakes simulated dialogues and role-plays with AI interlocutors before real-time communicative interaction with peers. The practice helps students refine their answers without the fear of making mistakes or embarrassment.

Principle 4 Progressive Reflection Toward Critical Awareness

AI-mediated reflective dialogues should be progressively scaffolded from descriptive observations to evaluative comments through structured critical question chain, in which these students are encouraged to critically re-examine their own cultural awareness and assumptions.

3.2.2 Four-step ICC Syllabus

The proposed pedagogic framework includes four major steps, possibly starting from comprehensible input at Noticing, building through intensive practice and corrective production at Comparing and Interacting, and culminating in critical output at Reflecting. Each step covers ranges of AI-mediated multimodality, all participants' behaviors and expected learning outcomes, which are listed in Table 4:

Table 4: Four-step ICC Syllabus

IPIL Stage	AI-mediated multimodality	Teachers' Role	Students' Role	Expected ICC outcomes
Noticing	Multimodal input	- Verify AI content - Facilitate cultural input	- Identify cultural markers - Explore multimodal input	- Attitudes - Knowledge
Comparing	- Contrastive diagram - Prompting answers	- Facilitate contrastive scaffolds - Guide comparative analysis	- Compare cultural features - Explain cultural values	Skills of Interpreting and Relating
Interacting	Private dialogues	- Facilitate scenarios - Monitor	- Rehearse dialogues - Refine answers	Skills of Discovery and Interaction
Reflecting	Socratic questions	- Model self-reflection - Monitor	- Share insights, experience - Build cultural awareness	Critical Cultural Awareness

This table outlines a replicable pedagogic framework sustaining the IPIL Model through these four interdependent dimensions by embedding AI-mediated multimodality within relevant structured learning activities, specifying how teacher-student responsibilities are differentiated alongside specific ICC targets and describing the progressive shift from structured cultural input toward autonomous intercultural performance.

3.3 Illustration of Possible Learning Activities

The following illustrated examples translate this Four-step syllabus into classroom practice, using a comparative unit on "A Contrast Between Chinese and British Dining Etiquette" as the unifying theme. Each step specifies the targeted ICC objectives, AI-mediated mechanism for low-proficiency junior high students, possible activities and how AI-mediated multimodality addresses their constraints to yield ICC learning outcomes.

3.3.1 Noticing

It is designed to facilitate simplified factual cultural input for deeper apprehension, openness and curiosity. AI-mediated animations may help reduce linguistic demands placed on these students so that they may identify cultural facts with basic mastery of grammar, vocabulary and sentence construction. Split-screen videos, driven by simple language, could illustrate different behaviors (e.g., cutlery usage) and may help mitigate language difficulties while simultaneously fostering intercultural Knowledge and Attitudes.

3.3.2 Comparing

It is aimed at transforming these students' attention from fragmented observations into systematic analysis, engaging them in exploring the underlying reasons and values. AI-mediated multimodality may indirectly prompt or directly highlight distinctions in activities, guiding them to focus on the target comparison and apply effective learning strategies to intercultural self-exploration, interpretation and relation. Contrastive diagram, for example, could directly show divergent cultural elements on both tables, which may help overcome cognitive limitations while enhancing Skills of Interpreting and Relating.

3.3.3 Interacting

It is intended to convert intercultural understanding into performative interaction, training these students to apply acquired intercultural knowledge and communication skills in simulated exchange. Rather than face-to-face interaction with peers or teachers, they are highly free to conduct tailored and safe dialogues according to their proficiency with AI interlocutors while experiencing less potential embarrassment or anxiety. For example, students could engage with a simulated British host to practice the intercultural dialogues using the cultural elements, which may lessen affective barriers while developing Skills of Discovery and Interaction.

3.3.4 Reflecting

It is aimed at leading these students to become critical intercultural communicators, strengthening their skills to examine cultural assumptions and position themselves within a broader perspective in intercultural communication. AI-mediated multimodality facilitates adaptive, individualized progressive critical-questioning, transferring their focus from existing cultural knowledge toward the breadth and depth of reflection on cultural perspectives. For instance, students may construct and renew their cultural awareness through AI-generated chains of Socratic questions, which may address behavioral reluctance while cultivating Critical Cultural Awareness.

This proposed Four-step ICC pedagogy, with the integration of AI-mediated adaptive and individualized learning experience across all learning activities, constitutes an organic and mutually reinforcing mechanism for ICC development among low-proficiency junior high students. It builds a recursive architecture that each learning step organically leads to the subsequent phase, laying necessary foundations for this developmental trajectory, and all consecutive steps are integrated to form a complete closed-loop learning cycle, equipping these students to re-engage with the input through renewed critical ICC perspectives.

3.4 Implications and Challenges

This proposed ICC pedagogy yields three layers of implications. For teachers, AI-mediated multimodality does not replace but re-define their role from a traditional knowledge-transmitter to a supportive facilitator, requiring not only technological mastery, but the ability to coordinate transitions between whole-class input, AI individualized rehearsal, collaborative output and affective intervention throughout experiential learning. For curriculum designers, this framework demonstrates that an explicit course structure originates from sustained cultural themes, driven by comprehensible simulations mediated by AI multimodality, and ICC objectives could be integrated into EFL learning alongside language skills. For researchers, the proposed integration of ICC, the IPIL and AI-mediated multimodality reveals that examining these significant components independently would miss the pedagogical value on how they collectively support low-proficiency junior high students.

Despite its theoretical coherence, this framework might be constrained by human [68, 69], technological [70-72] and infrastructural challenges [73, 74], which are listed in Table 5:

Table 5: Fourfold Implementation Challenges

Dimensions	Core challenges
Teachers	• Technology resistance • Insufficient training
Students	• AI over-reliance
AI Technology	• Data security, privacy, ethical concerns • Inaccurate information, unnatural language
Resource Accessibility	• Uneven availability of devices, network, AI-based platforms

Rather than undermining the framework, these challenges specify the conditions indispensable for practical implementation. Addressing them necessitates simultaneous focus on educators' professional development, learner-autonomy support, ethical AI control and equitable resource distribution to make this abstract intercultural ecology a tangible reality in authentic classroom settings.

4. Limitations and Future Research Suggestions

This conceptual framework has several limitations. Firstly, it is grounded in synthesizing theoretical foundation instead of empirical classroom verification. Future studies could adopt quasi-experimental or design-based research methods to investigate how and in what circumstances it may develop low-proficiency junior high students' ICC. Secondly, the possible examples are limited within a single cultural theme, constraining how far this proposal can be applied into other culture-related topics. Future research may draw on multiple cultural themes, such as greetings, festival celebrations, or gift-giving to examine its applicability across varied contexts. Also, this framework targets exclusively at low-proficiency students, leaving its applicability to advanced learners unexplored. Future research may simultaneously examine how mixed-ability learners benefit throughout the process.

5. Conclusion

This paper proposed an innovative AI-mediated pedagogic framework integrating ICC Model and the IPIL Model specifically designed for low-proficiency junior high students. By targeting at these adolescent students rather than regarding them as exceptions, this framework describes ICC development as a realistic destination for all EFL learners, constituting a more inclusive ICC learning ecology aligning with learners' diverse needs. While ICC Model indicates what intercultural learning outcomes they could acquire, the IPIL Model specifies their learning trajectories, functioning complementarily to establish a cohesive theoretical foundation. Nevertheless, ICC learning may remain theoretically abstract unless these students are provided with appropriate mediating resources for more engagement. Throughout the process, AI-mediated multimodality serves as this mediating resource within the ICC learning ecology, facilitating new forms of comprehensible cultural input, systematic comparison, scaffolded interactive simulation and critical reflection through human-machine collaboration supporting learners' preparation for and engagement in authentic intercultural communication. This framework further reveals that the AI-mediated multimodality constitutes a recursive architecture through which this group of students may progressively cultivate and refine their Critical Cultural Awareness with continuously renewed critical perspectives. In a broader sense, it reminds us that the ICC education may move beyond the assumption that language proficiency is a prerequisite, and may provide accessible opportunities for different learners to engage with critical, meaningful and experiential ICC learning.

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Conflicts of Interest

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