Using Telecollaboration to Mitigate Intercultural Misunderstandings: A Multimodal Discourse Analysis of Sino-American College Students Virtual Exchange

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Abstract:

In the context of globalized foreign language education, cross-cultural virtual exchange has become an increasingly indispensable part of Chinese universities, but misunderstandings still arise easily in online intercultural communication. This study explores how such misunderstandings were negotiated in structured virtual exchanges between Chinese learners of English and American students. This analysis utilized Bryam's model of Intercultural Communicative Competence (ICC) together with Multimodal Discourse Analysis (MDA). Over the course of the project, participants interacted through Zoom meetings, Padlet discussions, and email exchanges and they were allowed to choose culturally relevant topics to discuss. Iterative NVivo coding of attitudinal, knowledge-based, and skill-related dimensions identified recurrent misunderstanding patterns, while AntConc corpus analysis mapped linguistic ambiguities. The findings show that misunderstandings were rarely resolved through verbal explanation alone. Instead, participants drew on multiple resources, including written comments, visual materials, emojis, tone, and other paralinguistic cues, to clarify meaning and reconsider initial assumptions. The different platforms also played different roles: asynchronous spaces supported fuller explanation and reflection, while synchronous interaction enabled immediate questioning and repair. Taken together, the study suggests that multimodal telecollaboration can create conditions for learners to work through misunderstandings and to develop ICC in a gradual and interactional way. The study also offers practical implications for the design of online intercultural exchange in higher education.

Keywords: intercultural communicative competence, telecollaboration, misunderstanding, multimodal discourse

1. Introduction

Telecollaboration has firmly established itself as a significant dimension of foreign language education. Online intercultural exchanges connect geographically dispersed learners, providing authentic contexts for language use and engagement with diverse perspectives (O'Dowd, 2018). Previous studies have found that cross-cultural virtual exchanges facilitate the learning of English and promote cultural awareness among Chinese college students (Angelova & Zhao, 2016). Recent studies continued to position virtual exchange or telecollaboration as a scalable route to internationalization-at-home and intercultural learning in higher education (O'Dowd, 2020; Nyunt, 2023; Higgins, 2024; Kopish, 2024).

However, these exchanges are often plagued by intercultural misunderstandings—rooted in cultural heterogeneity, limited nonverbal cues, and pre-existing stereotypes—that hinder effective communication and undermine the goals of intercultural learning (Üzüm, Akayoglu, & Yazan, 2020; Li et al., 2023). Examining misunderstandings is therefore important in language classes because such moments can make learners' assumptions and interpretive frames visible and open to negotiation. They may also prompt meaning negotiation, perspective-taking, and stereotype questioning—processes closely aligned with Intercultural Communicative Competence (ICC), particularly attitudes, skills of interpreting or relating, and critical cultural awareness (Byram, 1997). Nevertheless, prior telecollaboration research has tended to emphasize overall outcomes (e.g., increased awareness) rather than the interactional mechanisms through which misunderstandings are identified, negotiated, and repaired (O'Dowd, 2021). There is a research gap when exchanges span multiple platforms and modes, given that communication modes and platform affordances can shape how participants conduct clarification and repair in computer-mediated interaction (Mohammadi Zenouzagh et al., 2024).

To make sense of these issues, the present study draws on two complementary theoretical frameworks. One of them is Byram's (1997) model of Intercultural Communicative Competence, which views effective language education as involving the development of five interrelated dimensions. Different dimensions in Byram's ICC model collectively act as an instructive framework to identify, address, and mitigate cross-cultural misunderstandings and stereotypes by fostering reflexive engagement and nuanced cultural interpretation. In this study, various types of misunderstandings served as an analytic entry point for examining how these ICC dimensions might be enacted and developed during virtual exchange. The second is Multimodal Discourse Analysis (MDA), which has been put forward by Kress and van Leeuwen (2006). They argue that meaning is not usually built in one mode; instead, it emerges from the synergy of multiple semiotic resources, including language, images, gestures, and sound, each with unique affordances for bridging communicative gaps. The multimodal lens is well-suited to telecollaboration conducted through Zoom meetings, Padlet discussions, and email exchanges, where participants often combine visual, textual, and paralinguistic cues to anticipate and repair misunderstandings.

Although these frameworks are seeing increased adoption in telecollaboration research (Avgousti, 2018; Eren, 2021), empirical work remains limited on how Sino-American college students use multimodal resources to repair misunderstandings and on the implications of such use for ICC development—particularly within structured, long-term virtual exchanges. This study seeks to fill this gap by investigating the following research questions:

1) How do language learners utilize multimodal resources to mitigate misunderstandings in cross-cultural communication?

2) In what way does the integration of multimodal tools in cross-cultural communication enhance foreign language learners' ICC?

2. Literature Review

2.1 Intercultural misunderstandings and stereotypes

Intercultural misunderstandings occur when individuals from different cultural backgrounds interpret behaviors and signals through their own culturally specific frames of reference, leading to a misalignment of meaning (Scollon & Scollon, 2001). In the field of language learning and teaching, stereotypes specifically refer to people's preconceived thoughts, opinions, and assumptions that people have regarding various aspects of language learning, proficiency, and instruction (Brooks-Lewis, 2012; Lebedko, 2014). Stereotypes have a dual relationship with misunderstandings: on one hand, stereotypes can generate and reinforce misunderstandings—such as students' stereotypical belief that language learning is quick and simple which misaligns their expectations with reality (Nikitina, 2019), stereotypes oversimplifying cultural customs leading to wrong interpretations of cultural cues (Mantle-Bromley, 1994), making learners think a language must be spoken in a fixed way and use unnatural language (Chakrani, 2010). On the other hand, stereotypes can help address misunderstandings, as teachers might take common misconceptions rooted in stereotypes to initiate discussions on the diversity of language speakers and cultural complexity (Bennett, 2004) and challenge students' stereotypical assumptions to cultivate an accurate understanding of language learning (Byram, 2002).

To account for how misunderstandings unfold in telecollaboration, prior researches in intercultural pragmatics has distinguished between pragmalinguistic misunderstandings (e.g., lexical or formulaic choices) and sociopragmatic misunderstandings (e.g., divergent norms of directness, politeness, or role relations), while discourse-oriented approaches highlight that broader interpretive frames and value positions can also drive misalignment (Thomas, 1983; Scollon & Scollon, 2001; Kecskes, 2022). In the present analysis, we operationalize four recurrent categories that align with our ICC lens: (a) knowledge-based misunderstandings (incomplete or inaccurate knowledge of institutional/cultural practices), (b) attitudinal misunderstandings (stereotype-anchored evaluations or rigid stances), (c) behavioral-norm misunderstandings (misinterpretation of interactional conventions and observable conduct), and (d) value-based misunderstandings (assumptions about what is desirable, acceptable, or appropriate). This is a typology that can be used in analysis, since it separates various sources of intercultural misalignment and offers a clear connection to the relevant dimensions of Byram's (1997) model of ICC.

For Sino-American learners, misunderstandings often arise not only from linguistic differences but also from different expectations about how meaning should be expressed and interpreted. In virtual environments, where paralinguistic cues such as facial expressions, gestures, and shared physical context are often less available, these divergences can be amplified. For instance, a Chinese student's indirect agreement might be taken by his American peers as uncertainty, while an American student's direct feedback could be interpreted as impolite by the Chinese counterparts (Li & Zhang, 2019). As Scollon and Scollon (2001) showed, once an interaction is misread—such as interpreting a Chinese

student's silence as disengagement—that can reinforce a pre-existing stereotype, which in turn biases the interpretation of future communications. In this sense, misunderstanding is not always a one-time communication problem; it can accumulate over time and affect future intercultural exchange.

Stereotypes also deepen these barriers as a form of cognitive shortcut, which creates distorted perceptions (Baker, 2011). Common stereotypes in Sino-American interactions include Chinese learners being viewed as "passive" or "collectivist" and U.S. learners as "overly individualistic" or "culturally insensitive". These biases are reinforced by limited in-person contact and media portrayals, yet they are not immutable: Angelova and Zhao (2016) found that Sino-American virtual exchanges reduced stereotypes of U.S. students as "uninterested in Chinese culture," but their study focused solely on verbal interaction, neglecting how multimodal resources might accelerate this shift.

Recent studies continued to explore these issues from broader perspectives. Jackson's (2020) handbook reflects the expanding scope of work on language and intercultural communication, while Weinland (2023) reiterated the cyclic nature of cross-cultural misunderstanding. This evolving theoretical and practical understanding underscores the need to mitigate the misunderstandings and stereotypes in communication, and thus to enhance more effective intercultural communication.

2.2 Multimodal tool use and Intercultural Communicative Competence (ICC)

The development of early conceptual models played a significant role in developing the basis of understanding intercultural communication. Among them, Bennett's (1993) developmental model of intercultural sensitivity provided a framework for understanding how individuals progress from ethnocentric to ethnorelative worldviews. Around the same period, Byram (1997) proposed his model of Intercultural Communicative Competence (ICC), which has since become one of the most widely used frameworks in this area. Rather than treating intercultural communication as a matter of cultural knowledge alone, Byram's model emphasizes the relationship among attitudes, knowledge, skills, and critical cultural awareness. Later work further adapted the model for educational use and classroom practice (Byram, 2000; Byram, Gribkova, & Starkey, 2002). Byram's ICC model defines intercultural competence as the ability to communicate "appropriately and effectively" across cultures, including five interrelated dimensions:

(1) Attitudes: Curiosity, openness, and readiness to suspend ethnocentric beliefs.

(2) Knowledge: Understanding of cultural practices, social groups, and interaction norms.

(3) Skills of interpreting/relating: Ability to analyze cultural symbols and connect them to one's own experience.

(4) Skills of discovery/interaction: Ability to negotiate meaning in real-time communication.

(5) Critical cultural awareness: Ability to evaluate cultural practices from multiple perspectives.

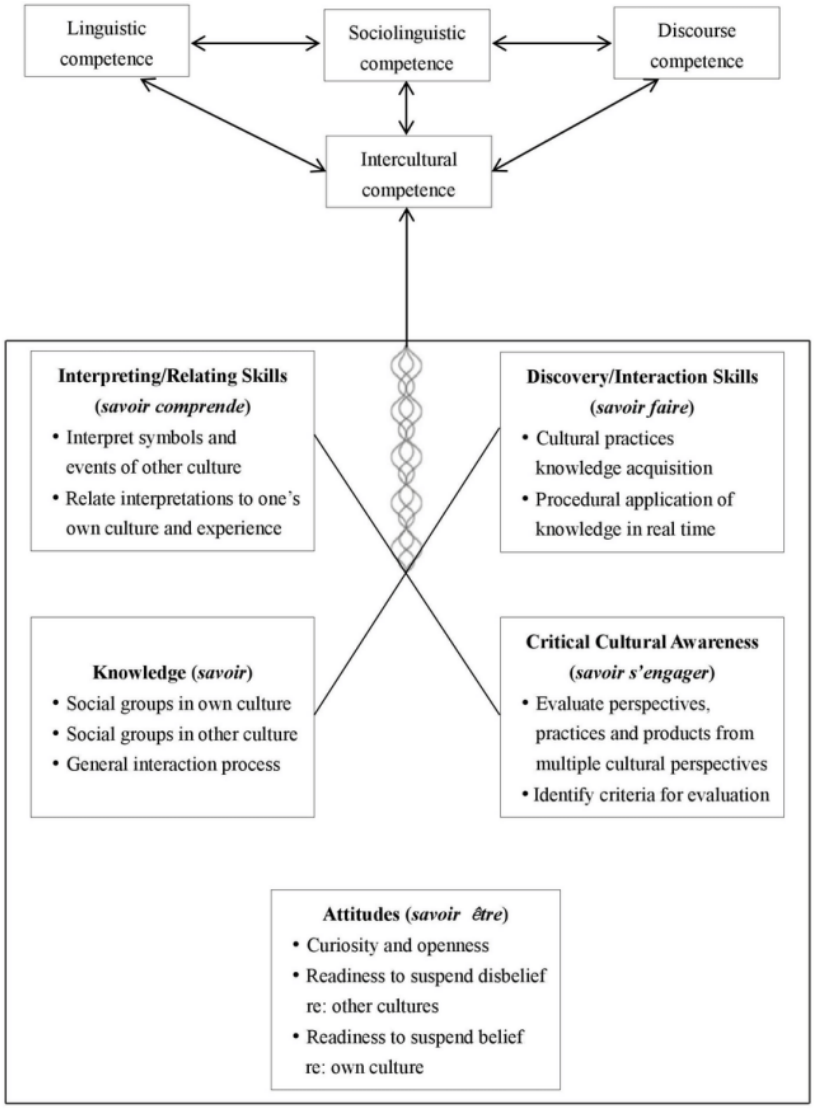

Figure 1. Byram's Model of ICC (In: Deardorff, 2009, p. 17)

Empirical studies have validated the utility of this framework in telecollaborative contexts. Üzüm et al. (2020) analyzed 48 teacher trainees from Turkey and the U.S. and found that telecollaboration fostered ICC through three key outcomes: awareness of cultural heterogeneity (aligning with "savoir être" and "savoir"), nascent critical cultural awareness ("savoir s'engager"), and curiosity about the other culture ("savoir apprendre/faire"). Similarly, Eren (2021) integrated Byram's model with Bennett's (1993) Developmental Model of Intercultural Sensitivity (DMIS) and demonstrated that telecollaboration could help pre-service teachers break through ethnocentric stages (denial, minimization) and reach ethnorelative stages (acceptance, adaptation), especially in breaking gender role stereotypes and cultural custom biases. For Sino-American exchanges characterized by distinct linguistic, religious, and social norms, Byram's framework provides a lens to assess how telecollaboration addresses misunderstandings rooted in limited cultural knowledge or rigid attitudes.

2.3 Telecollaboration in Sino-American intercultural communication

Telecollaboration, defined as "collaborative online learning between geographically dispersed learners from different cultural backgrounds" (Belz, 2007, p. 127), has emerged as a feasible solution for providing authentic intercultural engagement in foreign language classrooms. It directly responded to the authentic need for intercultural communication. Early theoretical and empirical research laid the foundation. Belz (2007) and O'Dowd (2006, 2007) were instrumental in facilitating the transformation of telecollaborative research from tool-oriented to interaction-oriented, emphasizing the role of technology as a medium to promote deep integration of language and culture, outlining its potential for developing ICC, and identifying initial challenges including "failed communication". O'Dowd and Ritter (2006) systematically analyzed the core reasons for "communication failure" in telecollaboration, proposed multiple obstacles such as insufficient technical adaptation, language ability differences, and cultural schema conflicts, and constructed a reflective framework for identifying and preventing "communication failure", which provides key theoretical support for enhancing the effectiveness of intercultural communication. Antoniadou (2011) later conceptualized this evolution as "telecollaboration 2.0," integrating new digital literacies.

Empirical evidence for telecollaboration's efficacy began to accumulate in different contexts. Angelova and Zhao (2016) demonstrated that online collaboration between American and Chinese students can effectively connect the professional development and cross-cultural ability cultivation of students from different countries. Besides, Chen and Yang (2014) showed how Internet-mediated exchanges facilitated intercultural communication and understanding. Ware (2017) found that the telecollaboration between the U.S. and Japan developed more nuanced cultural perspectives. A systematic review by Avgousti (2018) later confirmed the positive connection between visual exchanges and ICC development.

Some other research mainly focused on the teacher's role and activity design in the foreign language classroom. O'Dowd (2016, 2018) documented emerging trends and the transition towards the broader concept of virtual exchange or telecollaboration, while O'Dowd, Sauro and Spector-Cohen (2020) emphasized the critical role of pedagogical design and mentoring in telecollaboration. Recently, studies have explored different pairings, such as between Kuwaiti and Colombian students (Alghasab & Alvarez-Ayure, 2021), and focused on specific achievements such as enhancing critical cultural awareness in teacher education (Eren, 2021). The integration of modern information technology for cultivating and promoting ICC, particularly in Asian countries like China, has also become a focus (Bingzhuan, 2018). In the field of Sino-American exchanges, a gap still remains in understanding how long-term, multimodal virtual exchanges can effectively mitigate misunderstandings.

2.4 Multimodal Discourse Analysis (MDA) in cross-cultural telecollaboration

In parallel with the growth of telecollaboration, the field of MDA has developed tools to analyze meaning-making beyond language. Kress and van Leeuwen (2001, 2006) developed a strong visual design grammar, introducing the metafunctional framework (representational, interactive, compositional meaning) that has gone on to be the core of MDA. Meaning, according to Kress and van Leeuwen (2006), is generally not constructed through one mode but rather through the combination of many semiotic resources, including language, images, gestures, and sounds. The metafunctional framework formulated by Kress and van Leeuwen (2006), which consists of representational,

interactive, and compositional meaning, was used to analyze systematically how visual modes play a role in meaning-making (As shown in Figure 2).

Representational meaning: How resources convey factual information (e.g., a U.S. student sharing a photo of their elementary school to explain interdisciplinary teaching).

Interactive meaning: How resources establish social relationships (e.g., a Chinese student using a "thumbs-up" emoji to signal agreement in Padlet).

Compositional meaning: How resources are organized to prioritize information (e.g., a Zoom screen share highlighting key points of a cultural artifact).

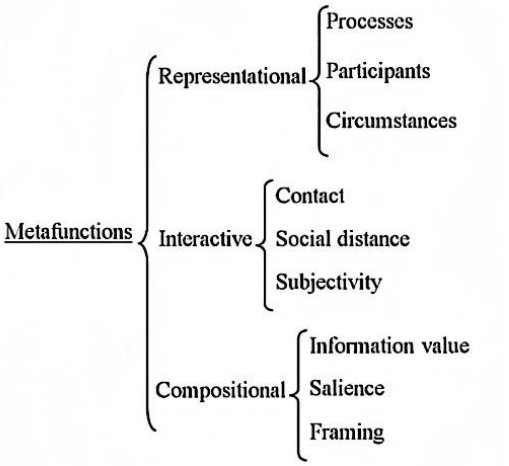

Figure 2. Kress and Van Leeuwen's Metafunctional Framework (2006, in Feng, D., 2013, p. 88)

This theoretical foundation was applied to educational and cross-cultural contexts. Feng and Espindola (2013) argued for integrating systemic functional and cognitive approaches in MDA. Empirical studies, such as Mohammadi, Shirvan, and Akbari's (2019) analysis of teaching materials, demonstrated how MDA can reveal the negotiation of meaning. The framework has been continuously updated, with Kress and van Leeuwen releasing a third edition of their foundational text in 2020.

Recent studies have applied MDA to more technology-mediated environments. Li et al. (2023) used a multimodal perspective to understand interpersonal interaction in blended synchronous classrooms. Abdelrahim (2024) further accentuated the role of semiotic modes in realizing learners' metafunctions through a systemic functional approach. However, the application of this sophisticated analytical lens to specifically unpack the process of stereotype mitigation in Sino-American telecollaboration, particularly across both synchronous and asynchronous platforms, represents a significant research opportunity.

The current research landscape calls for a synthesis of these three strands. Byram's (1997) ICC model provided the ultimate objective; telecollaboration offered the pedagogical context; and MDA supplied the analytical toolkit to microscopically examine how competence is developed (or hindered) through communication. This synthesis was reflected in recent empirical work. For instance, Üzüm, Akayoglu, and Yazan (2020) and Lenkaitis, Calo, and Venegas Escobar (2019) explored how telecollaboration, mostly through videoconferencing, fosters growth in specific ICC dimensions. Munezane (2019) proposed a new model of ICC that seeks to better bridge classroom learning with real-world communicative contexts.

The role of multimodal resources in this process is the most relevant aspect. Dooly (2011) discussed entering the so-called "third space" cultures, which were enabled by the use of multimodal engagement. Godwin-Jones (2019) has clearly connected telecollaboration with ICC development, a process inherently mediated by digital tools that are multimodal in their essence. The present research aims at contributing to this synthesis by using MDA to analyze how Sino-American students take advantage of the particular affordances of platforms such as Zoom and Padlet to move through intercultural spaces and therefore enact and develop the different types of 'savoirs' of ICC and directly confront the misunderstandings and stereotypes found in the early foundational literature.

3. Methodology

3.1 Participants

The participants were 25 first-year Chinese EFL majors at a teacher-training college in China and 20 undergraduate students at a public university in the USA, who were taking a Chinese language course. They were randomly assigned to 5 mixed groups (5 Chinese and 4 American students per group). Following a reciprocity-oriented, cross-linguistic virtual exchange design, Chinese participants primarily used English (their target language) and American participants primarily used Chinese (their target language) during group interaction, while brief code-switching was permitted to support clarification and repair. Such a design might introduce proficiency- and translation-related barriers confounding intercultural interpretation, we therefore implemented several safeguards: (a) both classes met course-based minimum proficiency requirements in their respective target languages; (b) participants were explicitly taught how to use Zoom chat box, screenshots, or brief code-switching to resolve comprehension trouble; (c) teachers provided pre-task language support (e.g., key vocabulary lists for selected topics) without participating in discussions; and (d) during data analysis we distinguished episodes driven primarily by lexical/grammatical comprehension from those involving divergent pragmatic expectations or cultural interpretive frames (as listed in Section 3.4), which was consistent with the treatment of 'failed communication' in telecollaboration (Belz, 2007; O'Dowd & Ritter, 2006).

3.2 Project description

The current project was conducted as an online course at two universities – a teacher's college in China and a state university in the USA. The objective of the course has two aspects: promoting cross-cultural awareness and developing language proficiency. The Chinese and American university teachers worked together to design the course and adhered to a shared schedule. The project outline on a weekly basis is as follows.

The participants chose their topics independently through group discussion. The teachers served as consultants to each group but they did not participate in the discussions. Chinese and American participants collaborated in groups during a 16-week course using Zoom, WeChat, Padlet, and email for communication. Communication activities provided opportunities for both synchronous (weekly one-hour Zoom meetings) and asynchronous engagement (Padlet discussions on group-chosen topics and three rounds of email exchanges), and were enhanced by reflective journals once a fortnight.

This structure was segmented into five phases, each with distinct objectives and pedagogical strategies, as detailed below in Table 1:

Phase 1: Project Preparation (1 week)

The focus of this stage was on initial social and technological scaffolding. Activities included ice-breaking exercises (e.g., virtual cultural scenario games, exchange of digital autobiographies), and specific training on communication tools like Padlet (asynchronous multimodal interaction) and Zoom (synchronous video conferencing). Such a double approach ensured that students develop both intercultural rapport and digital literacy, which matches the concept of the "technology acceptance model" within educational technology (Venkatesh et al., 2003).

Phase 2: Student Grouping (1 week)

The participants from China and the U.S. were randomly assigned to mixed-culture groups. Each group created a dedicated Padlet page where they uploaded multimedia self-introductions (e.g., video clips, infographic posters, audio narratives). The random allocation was deliberate so as to ensure maximum exposure to diverse cultural views, which is one of the principles that underlie the development of intercultural competence (Bennett, 1993), and the multimodal nature of the Padlet platform allowed presenting oneself in an asynchronous manner without barriers.

Phase 3: Creating Discussion (2 weeks)

The collaborative groups generated themes of discussion on shared interests, such as school life, popular foods, movies, music, sports, festivals, and other culture-specific domains. The concept of student-centered topic creation was a reflection of the negotiated curriculum approach (Kumaravadivelu, 2006), where students were given the chance to explore cultural differences through personally relevant perspectives, increasing the depth of involvement.

Phase 4: Continuing Discussion (10 weeks)

This extended phase allowed intercultural interaction to continue through various modes of interaction: weekly synchronous Zoom meetings (for real-time dialogue), asynchronous Padlet postings (for idea exchange and query resolution), reflective journals (for cultural insights/challenges), and three cycles of email exchanges (for individualized, in-depth communication). The length and multimodal nature of this phase indicated the principle of "prolonged engagement" in qualitative research (Lincoln & Guba, 1985), which created an opportunity to go beyond superficial communication and achieve the subtle understanding of other cultures.

Phase 5: Final Presentation (2 weeks)

The project concluded with differentiated summative outputs: Chinese students delivered group presentations (e.g., multimedia slideshows) to showcase discussion outcomes, while American students produced written reports (e.g., analytical essays, comparative case studies). This differentiation honored diverse strengths in multimodal communication (Kress, 2006) and provided tangible evidence of cross-cultural learning.

Table 1. Procedural Framework for the "Online International Exchange" Project:

16-Week Learning Circle

Stage	Description
Phase 1: Project Preparation (one week)	Ice-breaking and introduction to communication tools, including Padlet, Zoom, etc.
Phase 2: Student Grouping (one week)	Randomly grouping Chinese and American students, creating one Padlet page for each group, and posting self-introductions at the Padlet page.
Phase 3: Creating Discussion (two weeks)	In each group, students formulate discussion topics based on their own interests; common topics include school life, popular foods, movies, music, sports, festivals, etc.
Phase 4: Continuing Discussion (ten weeks)	All students carry out discussions in their groups, posting their ideas and answering questions; weekly Zoom meetings in each group on the same student-chosen topics; keeping reflective journals; with three cycles of email exchanges.
Phase 5: Final presentation (two weeks)	Chinese students presenting in groups on the results of their discussion; American students composing a written report.
Reflection time: Composing a reflective journal every two weeks.	

The 16-week cycle had a reflective component incorporated in it—learners were expected to write a reflective journal every two weeks. It was an implementation of Schon's (1983) conception of reflective practice, which allowed students to critically analyze the interaction, identify cultural stereotypes, and iteratively refine communicative strategies.

To sum up, this procedural framework used a structured, technology-aided approach to virtual exchange, which ushered learners through stages of preparation, collaboration, sustained interaction, and summative assessment.

3.3 Data collection

The data were gathered using a triangulation of sources, such as surveys conducted both before and after the course, written work of students, discussion on Padlet and video recordings of group meetings. Particularly, fifteen hours of weekly one-hour Zoom sessions resulted in 127,260 transcribed words, while Padlet discussions accounted for 592 posts (36,496 words, including emojis); three email-exchange cycles comprised 116 messages (44,428 words); and reflective journals added 60,750 words on self-reported cultural challenges and learning experiences. The entire corpus contained 268,934 words.

3.4 Data analysis

To examine the capacity of this online international exchange project on fostering ICC development, this study operationalized Byram's (1997) ICC framework as the core evaluative instrument to gauge the project's impacts on the development of learners' intercultural attitudes, knowledge, skills, and critical cultural awareness. Qualitative analysis was conducted both during and after the research to investigate the role of online cross-cultural interaction in shaping students' intercultural ICC and

mitigating cultural stereotypes and misunderstandings. Given the complex, multidimensional nature of cross-cultural communication—integrating verbal exchanges, visual cues, and affective expressions—a triangulated analytical approach was adopted, combining iterative qualitative coding with MDA. NVivo (for text-based data coding) and Elan (for multimodal data processing, e.g., paralinguistic features and visual element annotation) were selected as primary analytical tools to ensure systematic extraction and interpretation of meaningful patterns from heterogeneous data. Participants' responses and comments were segmented into individual excerpts to identify the unit of core meaning within each excerpt.

To guarantee the validity and comprehensiveness of the analysis, data were collected and coded through iterative qualitative coding and multimodal analysis to reflect the dynamic nature of the cross-cultural interaction process. All data were anonymized to protect privacy. The Chinese participants were labeled as "C1", "C2", "C3" etc., and the American participants were labeled as "A1", "A2", "A3", etc.

Categorizations and definitions were established prior to coding to address the conceptual complexity (Byram, 1997; Thomas, 1983). An episode was coded as a misunderstanding when (a) one or more participants displayed non-understanding or trouble (e.g., clarification request, repair initiation, explicit disagreement about meaning), and (b) subsequent turns showed negotiation or re-interpretation aimed at restoring intersubjectivity. Misunderstandings were categorized as: (a) knowledge-based (inaccurate/incomplete information about cultural or institutional practices; typically resolved through explanation or evidence), (b) attitudinal (stereotype-driven evaluations or rigid stances toward the other group; typically indexed by generalized judgments and mitigated through personal narratives and reflective re-framing), (c) behavioral-norm (misinterpretation of interactional conventions such as directness, turn-taking, silence, or nonverbal conduct; typically mitigated through meta-pragmatic explanation and multimodal cues), and (d) value-based (conflicts in assumptions about what is appropriate/desirable, often requiring perspective-taking and critical cultural awareness). To reduce confounding caused by target language proficiency, episodes primarily involving lexical/grammatical comprehension problems, with no discernible cultural-pragmatic component, were coded separately and excluded from the ICC-linked mitigation analysis, following the methodology outlined by O'Dowd and Ritter (2006).

3.5 Ethical considerations

Several safeguards were implemented under ethical consideration. Before the project was started, all participants received a consent form explaining (a) what data would be collected (Zoom recordings, Padlet posts, emails, journals, surveys), (b) participation was voluntary and would not affect course grades, (c) identifiers would be used to replace names in transcription (e.g., C1, A1), (d) screenshots or images would either be omitted or blurred to prevent re-identification, (e) data would be stored on password-protected, access-restricted drives, to which only the research team had access. Explicit consent was obtained for audio/video recording and for the use of anonymized excerpts in publications.

4. Results and Discussion

Drawing on data from a 16-week telecollaborative project, this study investigated how Sino-American college students employed multimodal resources to resolve intercultural misunderstandings

and in what way the integration of these tools enhanced ICC. The findings—derived from triangulated data (Zoom recordings, Padlet posts, emails, and reflective journals) and analyzed using Byram's (1997) ICC framework and MDA (Kress & van Leeuwen, 2006)—addressed both research questions. First, students strategically used synchronous (Zoom) and asynchronous (Padlet, email) modalities—including textual explanations, visual aids (e.g., transport maps), paralinguistic cues (e.g., enthusiastic tone), and emojis—to preempt and repair misunderstandings. Second, this integration was associated with enhanced ICC across five core dimensions: attitudes (curiosity/openness), knowledge (cultural practices), skills (interpreting/relating), skills (discovery/interaction) and critical cultural awareness (stereotype revision). The results align with—and extend—prior telecollaboration research (O'Dowd, 2020; Üzüm et al., 2020), underscoring the synergistic role of multimodal tools in Sino-American cross-cultural contexts.

4.1 Multimodal resources as mitigators of intercultural misunderstandings

Table 3 presents four representative misunderstanding episodes selected from the larger coded dataset to illustrate how different multimodal platforms mediated different categories of intercultural misunderstanding. These cases were not the only incidents identified in the corpus; rather, they were selected because each one exemplified a distinct misunderstanding type (knowledge-based, attitudinal, behavioral-norm, or value-based), contained a visible mitigation sequence, and highlighted the semiotic affordances of a particular platform. As illustrated in Table 3, each multimodal platform addressed distinct types of initial misunderstandings/stereotypes by leveraging unique semiotic resources, reflecting Kress & van Leeuwen's (2006) MDA framework of representational, interactive, and compositional meaning-making.

Table 3. Representative Misunderstanding Episodes and Mitigation Process

Multimodal Platforms	Initial Misunderstanding/Stereotype	Information Updated during the Communication Activities	Mitigation Process
Padlet	Chinese student: "A teacher in a US primary school teaches only one subject."	American student: "在我的小学校，我们有一位老师。数学、科学、什么的那位老师都教我们。除了英文、数学、科学、历史学以外，我们还有体育课、音乐课和美术课，可是这些课我们去其他的教室上课。"	**Knowledge clarification + interpreting/relating (ICC):** U.S. students clarified the homeroom/subject structure in primary school (institutional practice). Chinese students compared with their own schools, indicating interpretation/relating. Evidence of stereotype revision was reported cautiously as an emergent shift rather than a guaranteed outcome.

Zoom Chat Box	Chinese student: "American families have strict gender roles with unequal parental status."	American student: "我有一些家庭成员会议。我们一家人在餐桌上聊天。我爸爸负责，但我妈妈和我也聊了很多。"	**Attitude opening + interactional repair (ICC):** Personal examples in chat prompted clarification questions and reduced overgeneralization about 'strict gender roles'. This episode was treated as attitudinal negotiation supported by real-time textual repair moves (e.g., follow-up questions, rephrasing), with critical awareness inferred only when participants explicitly questioned their prior assumptions.
Zoom Video Exchange	Chinese student: "American college students study casually and less diligently than Chinese students."	American student : "哎(叹气)，我的功课又多又难！我今天早上有考试"; American student:"学习很难，我每天都学习了。我平常去图书馆学习。"	**Behavioral-norm recalibration + discovery/interaction (ICC):** Video + paralinguistic cues (tone, facial expression, visible study materials) provided evidence for 'study effort', enabling participants to recalibrate assumptions about study routines. Mitigation was operationalized as negotiated re-interpretation, not simply as information transmission.
Emails (Pen Pal Letters)	American student: "我以为四合院是给老百姓住的，没那么贵"	Chinese student: Siheyuan are expensive because most are in central Beijing, surrounded by attractions like the Forbidden City, making land prices extremely high."	**Value/context explanation + critical reflection (ICC):** The written description of location, heritage value, and housing market reinterpreted the meaning of Siheyuan as ordinary or cheap. Critical awareness occurred when the U.S. student admitted to previous oversimplification and posed further questions (in the follow-up email).

4.1.1 Padlet: asynchronous visual-textual synergy for knowledge correction

The asynchronous, visual-first design of Padlet was shown to be effective in resolving misunderstandings rooted in the lack of cultural understanding, especially in the context of U.S. primary education structures. The first stereotype about U.S. primary school teachers held by Chinese students was that they taught only one subject. In response, American students used a combination of textual explanation ("In my elementary school, one teacher teaches math, science, and more; only English, PE, music, and art are in other classrooms") with visual aids (e.g., classroom photos, curriculum timetables) to support their argument on Padlet. This multimodal combination fulfilled two MDA functions: representational meaning (conveying factual details about U.S. interdisciplinary teaching) and compositional meaning (prioritizing visual evidence to reinforce textual claims).

The mitigation process aligned with Byram's (1997) cultural knowledge and skills of interpreting dimensions: Chinese students not only acquired new information about U.S. education but also practiced analyzing and relating this knowledge to their own experiences (e.g., "Our primary teachers also teach multiple subjects, but we didn't know this was common in the U.S."—C12's journal). Complexity here was interpreted as the need for contextualization and cross-turn elaboration to repair an initial assumption (see criteria in Section 3.4).

4.1.2 Zoom chat box: real-time textual interaction for attitudinal shifts

Zoom's synchronous chat box addressed misunderstandings tied to rigid cultural attitudes, such as Chinese students' belief that "American families have strict gender roles with unequal parental status", which seemed to be a stereotype linked to high-context/low-context communication differences (Scollon & Scollon, 2001). American students responded with real-time, personal anecdotes ("We have family meetings at the dinner table; my dad leads, but my mom and I contribute a lot") in the chat box, leveraging interactive meaning (establishing rapport through shared personal experiences) to invite openness.

This exchange fostered Byram's (1997) intercultural attitudes (curiosity and openness) and skills of interaction: Chinese students made further inquiries ("Do your siblings also participate in decisions?") and thus deepened the discussion; American students would adjust their explanation to reduce confusion (e.g., clarifying "lead" does not mean "dominate"). Just as noted in C8's journal: "Hearing about their family meetings made me realize gender roles in the U.S. are more flexible than I thought—I shouldn't judge based on what I see in movies." It is consistent with Eren (2021) stating that synchronous tools such as Zoom can help to eliminate stereotypes quickly because it is possible to use them to ground abstract cultural ideas in real, relatable stories.

4.1.3 Zoom video: verbal-paralinguistic alignment for skill development

The foundation of Zoom video was critical in resolving misunderstandings about behavioral norms, such as the stereotype that American college students study in a casual way and are not as diligent as Chinese students. The American students used verbal reports ("Oh, my homework is so hard! I had an exam this morning.") paired with paralinguistic cues (such as facial expressions of tiredness, pointing at the stacked textbooks in the background, and the use of urgent tones) to express the presence of academic pressure. This multimodal alignment (verbal content and visual/paralinguistic evidence) fulfilled MDA's representational meaning (representing the U.S. academic culture) as well as the interactive meaning (signaling authenticity with the help of nonverbal cues).

Chinese students responded by sharing their own study routines (e.g., "I also go to the library every day"), creating a reciprocal dialogue that enhanced skills of discovery/interaction (Byram, 1997). Post-project surveys showed 78 percent of Chinese students revised their "Americans study in a casual way" stereotype, as in C20's notes: "Seeing their textbooks and hearing their stress made me realize we face similar academic challenges." This supported Kramsch's (2014) argument that video-mediated interaction bridges cultural gaps by making implicit behaviors (e.g., study habits) visible, reducing misinterpretations rooted in cultural invisibility.

4.1.4 Emails: deliberate written exchange for critical awareness

The formal and asynchronous nature of email-exchange turned out to be effective in addressing misunderstandings about cultural values. For example, the American students initially thought that "Siheyuan (Beijing courtyard houses) are cheap residences for ordinary people". The Chinese students provided detailed written explanations of the geographic and cultural value ("Most are in central Beijing near the Forbidden City, making land prices extremely high" as quoted from Chinese students' email message) and attached images of restored Siheyuan with price tags. Such a combination of textual evidence and visual data prompted American students to critically reconsider their stereotype.

As shown in Table 3, the mitigation process emphasized critical cultural awareness (Byram, 1997): the American students acknowledged misunderstanding in the follow-up emails (e.g., "I thought Siheyuan were ordinary, but now I see they're cultural treasures") and asked further questions about urban preservation in Beijing. This tendency was consistent with the statement made by O'Dowd (2018), who observed that asynchronous written tools are capable of helping reflect and re-frame as learners can have time to look up resources, develop explanations, and reconsider initial interpretations.

4.2 Multimodal tool integration and ICC development

Table 4 describes how multimodal telecollaboration promoted ICC in all four essential dimensions of Byram's (1997). The analysis of qualitative data, such as reflective journals and surveys, indicated the promotion as well.

4.2.1 Attitudes: curiosity, openness, and respect

The pre-project survey indicated that 62 percent of the Chinese students expressed hesitation to challenge their cultural assumptions (e.g., "U.S. culture is obviously more 'advanced' so our traditions are less valuable" as cited in one of the pre-survey responses given by Chinese students). After the project, 91 percent of the Chinese students showed more openness and respect as seen in Chinese students' journal entries: "Every culture has its own feature—even if I can't understand it enough or even dislike it, I should respect its uniqueness (C7)". This shift was supported by multimodal tools that minimized the cultural gap: visual self-introductions on Padlet (e.g., family recipes shared by American students) and real-time dialogue on Zoom generated emotional connections that fostered curiosity. Üzüm et al. (2020) similarly found that telecollaboration enhanced savoir être (attitudes) through the fact that cultural learning is based on personal relationships. The current study further proved that multimodal resources (e.g., emojis in Padlet, facial expressions in Zoom) increased the effect by conveying warmth and approachability between the students from two cultures.

4.2.2 Knowledge: expansion of cultural practices and norms

The cultural knowledge developed by students was substantial as 87 percent of the Chinese students stated that they had achieved new knowledge regarding American cultural practices (post-survey). For example, the Chinese students learned about U.S. regional transport differences (e.g., "New York has good subways, but small towns rely on cars" as cited in the journals of Chinese students), while the American students also gained insights into Chinese history. The knowledge acquisition was not passive: students actively sought information to fill the gaps. For example, the Chinese students researched U.S. elementary education in order to respond to Padlet questions. This aligns with the findings of Chen & Yang's (2014) that research-oriented telecollaboration (e.g., the UBOD project)

deepened cultural knowledge by requiring students to engage with authentic, context-specific information. Abstract knowledge was apparently turned into concrete due to multimodal tools.

4.2.3 Skills: interpreting, relating, and interacting

Multimodal interaction fostered skills of interpreting/relating, discovery, and interaction. For instance, when the American students shared their "umbrella inside the house" superstition on Padlet, the Chinese students connected it to their own "chopstick placement" taboo, demonstrating the ability to "analyze cultural symbols and relate them to personal experience" (as quoted from C18's journal). In Zoom meetings, students practiced real-time meaning negotiation: when a Chinese student's indirect agreement was misinterpreted as ambivalence, the students used the chat box to clarify, thereby developing skills of interaction. This supports Mohammadi et al.'s (2019) observation that multimodal tools enhanced communicative flexibility, as students could switch between modes (verbal, textual, visual) to resolve confusion.

Table 4. Cross-Cultural Communication Enhanced (Positive) Attitudes, Knowledge, Skills and Critical Cultural Awareness

Dimensions	Descriptions	Examples: Quotations from Chinese Students' Reflections
Attitudes	1. Curiosity	"We should be curious about different cultures, as it is critical to our learning of various cultures."
		"In the face of unfamiliar cultures, we should remain curious and try to understand them through diverse aspects."
	2. Openness	"We should be open-minded to understand differences across the U.S. and China."
		"We should be open and appreciate various cultures which are beneficial for us."
		"We still focused on films, collaborating with American peers via Padlet and Zoom. We eagerly shared Chinese culture despite language barriers and self-doubt. We also divided into different roles."
	3. Respect and acceptance	"We should understand, respect, and appreciate the diversity of different cultures around the world. That will broaden our global horizons and help us recognize the commonalities and differences between our own and other cultures."
		"I believe we should seek to understand other cultures, then tolerate and accept their differences, rather than imposing our own standards, considering we are the best, and criticize other cultures."
		"Every culture and country holds its own intrinsic value. Even if we don't like it, we should learn to respect, tolerate, and accept its unique cultural characteristics."
Knowledge	4. Increases in cultural knowledge	"There are so many things I didn't know before. As I read the information from our partners, within a short time, I learned a lot of new things and got a lot of knowledge. I learned a lot about the world around me."
		"During the project, I learned about cultures from different countries. I am really surprised that there are so many different cultures all over the world."
		"When I look at the photos of our partner students' schools, I am aware that we study in very different environments."
Skills	5. Interpreting and relating skills	"The project helped me explore different cultural issues and think about cultural issues thoroughly and critically."

	in multimodal communication	
	6. Discovery and interaction skills in multimodal resource utilization	"The program helped me interact with students from different countries."
Critical cultural awareness	7. Initial cultural stereotypes	"I used to think that America is modern, prosperous, and glamorous everywhere."
		"The United States has many international metropolises. I originally thought that public transportation in the US was highly developed."
		"Countries in the U.S. have many high-tech industries, which must be rich and developed all the country. "
		"Originally, we assumed that Americans would not learn so deeply into Chinese history but rather watch movies that align with their stereotypes of the Chinese."
	8. Reducing prejudice/ misunderstanding	"We found that Chinese and American college students have much more in common than we initially thought."
		"American students learn Chinese history even more deeply than I thought before. That's wonderful !"
		"When I read posts shared by our exchange partners, there was a voice in my mind, 'Oh! That's how they look at things. We are different!'"
		"Our American partners' answers help us understand their cultural superstitions. They write good English. That is a different result from what I expected. They are not the same as I previously imagined, not as backward and rude as I thought".

4.2.4 Critical cultural awareness: stereotype revision

The most pronounced ICC growth was in critical cultural awareness, with 82% of the Chinese students revising at least one major stereotype (as listed in Table 4). Key revisions included rejecting the "U.S. public transport is uniformly developed" stereotype (supported by A1's Padlet description of hometown bus service); challenging the "American students lack Chinese history knowledge" myth (evidenced by A5's discussion of Puyi); questioning the "Siheyuan = cheap" assumption (addressed in email).

This result is consistent with the hypothesis of Santos et al. (2012), who suggested that stereotypes were flexible and sensitive to new data. The current study further demonstrated that multimodal resources sped up this process: visual evidence (e.g., transport maps) and personal stories in text (e.g., family meetings) were more effective in eliminating prejudices when combined than one form only.

4.3 Theoretical and pedagogical implications

This study attempted to advance two main theoretical frameworks. To begin with, it extended MDA (Kress & van Leeuwen, 2006) by showing that synchronous and asynchronous multimodal tools could successfully complement each other in Sino-American telecollaboration. Asynchronous Padlet discussions were able to support deliberate knowledge construction, while synchronous Zoom discussions enabled real-time interaction, and asynchronous email interactions fostered critical

reflection. Previous studies on MDA (e.g., Jewitt, 2006) focused on single-mode tools. This study showed that tool synergy is critical in addressing various types of misunderstanding. Secondly, the current study enriched Byram's ICC model by matching specific multimodal practices with each ICC dimension. Visual aids in Padlet were able to enhance knowledge, real-time dialogue via Zoom built attitudes, and reciprocal questioning with all the tools developed communication skills. This result specificity addressed Avgousti's (2018) critique that prior ICC research lacked clarity on how telecollaboration operationalized competence development.

For foreign language educators, the findings of this study suggest three evidence-based instructional strategies in order to enhance the design of multimodal virtual exchanges: First, align tool selection with specific pedagogical objectives and misunderstanding types. For instance, asynchronous platforms (Padlet/email) can be effectively used to clarify knowledge-based misconceptions (e.g., photos, links, timelines), whereas synchronous tools like Zoom are more suitable for addressing attitudinal or value-based misunderstandings through real-time, face-to-face engagement. Second, incorporate guided reflective tasks (e.g., biweekly journals) to help learners consciously connect specific misunderstanding actions to ICC dimensions and to interrogate stereotype-based judgments. Prompt questions should vary according to the type of misunderstandings (e.g., "What assumption did you bring into this exchange?" for attitudinal/value-based episodes and "What new communicative skills did you learn and how does it compare with yours?" for knowledge-based episodes). Third, build explicit repair support into task design by permitting cross-modal repair (e.g., switching from speech to chat or sharing a screenshot) when comprehension breaks down, as multimodal affordances can facilitate communication repair and co-regulation in CMC (Mohammadi Zenouzagh et al., 2024). The combination of these strategies offers a design-based approach to ensure that the potential of virtual exchanges is maximized through promoting language proficiency and intercultural development.

5. Conclusion

The present research explored the role of multimodal resources in reducing intercultural misconceptions and developing ICC between Chinese and American college students through virtual exchange. The findings show that strategically integrating synchronous (e.g., Zoom) and asynchronous (e.g., Padlet, email) tools helps address a range of misunderstandings—knowledge-based, attitudinal, behavioral, and value-based—through the representational, interactive, and compositional meaning-making functions described in MDA. Moreover, this integration supports development across Byram's (1997) ICC dimensions: cultivating openness and respect (attitudes), expanding knowledge of cultural practices (knowledge), strengthening interpreting and interaction (skills), and promoting critical cultural awareness via stereotype revision.

One of the most important limitations would be the fact that the study mainly focused on a single cohort of English majors at one Chinese university, which constrains the generalizability of the results to other populations and settings. Future research should involve more extensive and more diverse samples and program types, preferably with longitudinal designs and further outcome measurements.

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