Article

PBL in ESP for Cross-border E-commerce Livestreaming: Developing Intercultural Communicative Competence for Central and Eastern Europe

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Abstract: This study examined vocational students' self-assessed intercultural communicative competence (ICC) after completing a Project-Based Learning (PBL) English for Specific Purposes (ESP) course focused on simulated cross-border e-commerce (CBEC) livestreaming and email tasks targeting Central and Eastern European (CEE) markets. A cross-sectional survey design was employed with 92 second-year vocational students in Ningbo, China. Both quantitative data from a 30-item questionnaire and qualitative data from student artifacts including promotional posters, AI-generated emails, and livestreaming scripts were systematically analyzed. Results revealed moderately high self-reported ICC levels with an overall mean score of 4.01. Among the competence dimensions, Digital Tool Application scored highest with a mean of 4.12, while Knowledge scored lowest at 3.80. Qualitative evidence confirmed students' critical and strategic use of AI tools and demonstrated emerging interactive competence in cross-cultural business communication contexts. The findings suggest that PBL approaches effectively foster vocational students' ICC development, particularly in digital skills application and basic intercultural interaction capabilities, while simulated project experiences alone may not sufficiently develop deep cultural knowledge and understanding without authentic cultural immersion or sustained intercultural contact.

Keywords: project-based learning; intercultural competence; vocational education; e-commerce; english for specific purposes

1. Introduction

In early 2025, millions of American TikTok users, facing a potential ban, migrated to RedNote (Xiaohongshu), a Chinese-born social media platform. What followed was an unexpected wave of direct interaction between Chinese and American users. Beneath the surface of this cultural curiosity, however, lay a fundamental problem: most users could not communicate effectively across languages and cultures. They relied on translation apps and broken English [1].

This viral moment is a perfect analogy for cross-border e-commerce livestreaming—but with real commercial consequences. The strategic importance of cross-border e-commerce has grown rapidly, particularly between China and Central and Eastern European countries under the Belt and Road Initiative. Platforms such as TikTok Shop and AliExpress have enabled Chinese sellers to reach consumers in Hungary, Poland, and beyond. In cross-border e-commerce livestreaming, hosts must introduce products, answer unexpected questions, and handle complaints—all while navigating cultural differences in seconds. A misunderstanding can cost a sale or damage a brand. However, the demand for qualified talent far exceeds supply. What is needed is not just English proficiency, but intercultural communicative competence—the ability to communicate effectively with people from different cultural backgrounds.

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Yet current English for Specific Purposes courses in Chinese vocational colleges face challenges. They prioritize vocabulary over authentic, interactive tasks, and students rarely practice real-time cross-cultural communication [2]. Project-Based Learning offers a promising solution. Project-Based Learning is an instructional approach in which students learn by engaging in real-world projects. In English for Specific Purposes contexts, Project-Based Learning has been shown to enhance learners' language proficiency, motivation, and problem-solving skills. However, little research has applied Project-Based Learning to cross-border e-commerce livestreaming, and even fewer studies have examined its potential for fostering intercultural communicative competence specifically for Central and Eastern European markets.

This study therefore aims to describe vocational students' self-assessed intercultural communicative competence after participating in a Project-Based Learning-based cross-border e-commerce English course that focused on simulated livestreaming and email communication for Central and Eastern European audiences [3]. Specifically, the study addresses the following research questions:

To what extent do vocational students self-report their intercultural communicative competence, digital tool application, and cross-border e-commerce English ability after participating in Project-Based Learning instruction?

How do students' project artifacts (product posters, emails, and livestream scripts) demonstrate their acquired intercultural knowledge, digital tool use, and cross-border e-commerce English competence?

2. Literature Review

2.1. ESP in Vocational Education

English for Specific Purposes (ESP) is an approach to English language teaching that focuses on the specific communicative needs of learners in academic or professional domains [4]. Unlike General English, which aims to develop overall language proficiency, ESP is goal-oriented and learner-centered. Its curriculum is built upon three core principles: needs analysis, authenticity of materials, and relevance to learners' target contexts. In vocational education, ESP has been widely adopted to prepare students for discipline-specific language demands in fields such as business, engineering, and healthcare.

However, ESP courses in Chinese vocational colleges face persistent challenges. Instruction often prioritizes vocabulary acquisition and reading comprehension over authentic, interactive tasks. Students are typically engaged in textbook-based exercises rather than real-world communicative activities. As a result, many graduates lack the practical language skills required in workplace settings [5]. While ESP aims to "turn learners into users," this goal is rarely fully achieved in practice due to the dominance of form-focused instruction.

The rapid growth of cross-border e-commerce (CBEC) has intensified the need for more effective ESP instruction [6]. CBEC requires practitioners to communicate with overseas customers in real time, handle product inquiries, resolve complaints, and conduct livestreaming sales—all in English. These tasks demand not only vocabulary knowledge but also interactive competence and cultural awareness. Existing ESP curricula are not adequately designed to meet these emerging industry demands. This gap calls for pedagogical approaches that can bridge the divide between classroom learning and professional practice.

2.2. ICC in CBEC Contexts

Intercultural Communicative Competence (ICC) refers to the ability to communicate effectively and appropriately with people from different cultural backgrounds. In an era of globalization, ICC has become an essential outcome of foreign language education [7]. One influential framework identifies five dimensions of ICC: attitudes (curiosity and openness toward other cultures), knowledge (awareness of social practices and products in one's own and other cultures), skills of interpreting and relating (ability to analyze

cultural events from multiple perspectives), skills of discovery and interaction (ability to acquire new cultural knowledge and interact in real time), and critical cultural awareness (ability to evaluate cultural practices based on explicit criteria).

In cross-border e-commerce (CBEC) livestreaming, ICC takes on a more concrete and demanding form. Livestream hosts must decode cultural cues in real time, adapt their language and nonverbal behavior to foreign audiences, and respond to unexpected questions or complaints—all while maintaining a persuasive and friendly tone [8]. A misunderstanding about a product's color symbolism, a greeting gesture, or a promotional phrase can offend potential customers and damage brand image. ICC is not merely a "soft skill" in CBEC; it is a core competency that directly affects commercial outcomes.

However, assessing ICC among Chinese vocational students presents unique challenges. Most existing ICC instruments, such as the Intercultural Development Inventory (IDI) and the Cultural Intelligence Scale (CQS), were developed for individuals with substantial intercultural experience—such as international students or expatriates. These instruments assume that respondents have had repeated, meaningful interactions with people from other cultures. Chinese vocational students, by contrast, typically have limited opportunities for such interactions. They rarely travel abroad or engage in extended communication with foreigners [9]. Using experience-based ICC scales with inexperienced respondents may yield unreliable or misleading results.

Several efforts have been made to develop CBEC-specific ICC instruments [10]. For example, a five-dimensional ICC scale for Chinese CBEC students was developed and validated, comprising cultural knowledge, CBEC expertise, English skills, workplace aptitude, and cultural sensitivity. This instrument targets students with prior CBEC coursework or industry exposure and measures generic workplace competencies. However, the present study involves a different population and context. Participants in this study had no real intercultural interaction (all tasks were classroom simulations) and limited prior CBEC experience. Therefore, a new instrument was developed specifically for this study. Based on an established framework, the questionnaire was adapted to the simulated nature of the PBL tasks—classroom livestreaming and email simulations—and organized into five dimensions: attitudes, knowledge, interaction skills, digital tool application, and CBEC knowledge and English. A detailed description of the instrument is provided in the Methodology section.

2.3. PBL in ESP Contexts

Project-Based Learning (PBL) is an instructional approach in which students learn by engaging in authentic, real-world projects. Unlike teacher-centered instruction, PBL positions students as active problem-solvers who work collaboratively, produce tangible outcomes, and reflect on their learning. Its core features include a driving question, constructive investigation, student autonomy, and realism [8].

The theoretical foundation of PBL lies in constructivism and social-interactionist learning theories. Knowledge is actively constructed by learners, and learning occurs through interaction with peers and instructors [11]. In PBL classrooms, problem-solving activities engage learners in negotiation of meaning, scaffolding, and output production—processes that facilitate second language acquisition.

Empirical studies have demonstrated positive effects of PBL on ESP learning outcomes [12]. Research has shown that PBL significantly improves ESP course achievement among university students, with mean scores rising substantially. Other studies have reported similar gains in speaking skills and concluded that PBL helps students acquire domain knowledge while building confidence for real-world projects.

Practical implementation of PBL typically follows six steps: defining an essential question, designing a project plan, creating a schedule, monitoring progress, assessing outcomes, and reflecting on the experience. Research notes that PBL is particularly valuable in STEM-ESP settings as it shifts the learning environment from teacher-centered to learner-centered [13].

Despite these documented benefits, the application of PBL to CBEC livestreaming remains underexplored. No existing studies have examined how PBL might foster intercultural communicative competence in this specific context, particularly for students with limited intercultural experience [14]. This gap motivates the present study.

2.4. PBL, ICC, and CBEC Livestreaming: Synthesizing the Gaps

CBEC livestreaming differs fundamentally from traditional e-commerce. It requires hosts to interact with overseas consumers in real time, decode cultural cues, and respond to unexpected questions—all while promoting products [15].

Despite the documented benefits of PBL in ESP contexts and the recognized importance of ICC in CBEC, three research gaps remain [1].

First, few studies have applied PBL to CBEC livestreaming instruction. Existing PBL-ESP research has focused on general skills such as speaking or reading, not on real-time cross-cultural interaction. Second, no study has examined ICC development for Central and Eastern European markets, which have distinct cultural characteristics compared to Western or Southeast Asian markets. Third, empirical research on Chinese vocational students with limited intercultural experience is scarce; most ICC instruments assume prior overseas exposure.

To address these gaps, the present study adopts a descriptive design to investigate vocational students' self-assessed ICC after a PBL-based CBEC English course focused on simulated livestreaming and email tasks for Central and Eastern European audiences [16].

3. Methodology

3.1. Research Design

This study adopted a cross-sectional descriptive survey design, which is appropriate when the aim is to describe a population's characteristics rather than to establish causal relationships. A quantitative-dominant mixed-methods approach was employed. Quantitative data were collected through a self-administered questionnaire [17]. Qualitative data from student project artifacts (product posters, emails, and livestream scripts) were used to supplement and triangulate the quantitative findings. All data were collected at a single time point after the PBL intervention.

3.2. Context and Participants

This study was conducted at a vocational college in Ningbo, China, which hosts the China-Hungary Silk Road School of E-commerce. Participants were students enrolled in the Cross-border E-commerce Communication and English course. A total of 92 students participated in the study, including both E-commerce and English majors. All students completed a semester-long PBL intervention consisting of three projects: product poster design, AI-assisted email writing, and simulated livestreaming. All tasks were conducted in classroom simulations without real cross-border e-commerce audiences or customers.

3.3. Instruments

Two types of instruments were used. First, a self-developed questionnaire was designed to measure students' self-reported ICC. Based on a five-dimensional model, the questionnaire comprises 30 items across five dimensions: attitudes, knowledge, interaction skills, digital tool application, and CBEC knowledge and English. A 5-point Likert scale is used (1 = strongly disagree to 5 = strongly agree).

Second, student project artifacts were collected as qualitative data, including product posters, AI-assisted emails, and livestream scripts [7].

3.4. Data Collection Procedures

Data were collected at the end of the semester after the PBL projects were completed. The questionnaire was administered in class and took approximately 15 minutes to complete [13]. Participation was voluntary, and all responses were anonymous. Student project artifacts, including product posters, AI-assisted emails, and livestream scripts, were collected from each group at the conclusion of the corresponding projects.

3.5. Data Analysis

Quantitative data were analyzed using SPSS. Descriptive statistics, including means and standard deviations, were calculated for each ICC dimension. Reliability of the questionnaire was assessed using Cronbach's α. Qualitative data from student project artifacts were analyzed using thematic analysis to supplement the quantitative findings.

4. Findings

4.1. Reliability of the Questionnaire

The internal consistency of the questionnaire was assessed using Cronbach's α. As shown in Table 1, the Cronbach's α coefficients for the five dimensions ranged from 0.905 to 0.957, indicating good to excellent reliability. The overall reliability of the 30-item scale was α = 0.975, which exceeds the recommended threshold of 0.70. These results demonstrate that the questionnaire had satisfactory internal consistency [10].

Table 1. Reliability of the Questionnaire (N = 92)

Dimension	Number of Items	Cronbach's α
Attitudes	6	0.905
Knowledge	6	0.937
Interaction Skills	6	0.942
Digital Tool Application	6	0.947
CBEC Knowledge and English	6	0.957
Total Scale	30	0.975

4.2. Descriptive Statistics of ICC Dimensions

To address RQ1 regarding the extent to which vocational students self-report their ICC following PBL instruction, descriptive statistics were calculated for each of the five ICC dimensions [5]. As presented in Table 2, the Digital Tool Application dimension achieved the highest mean score (M = 4.12, SD = 0.47), reflecting students' confidence in utilizing tools such as Canva and AI for task completion. Conversely, the Knowledge dimension recorded the lowest mean score (M = 3.80, SD = 0.78), indicating that students perceived their understanding of CEE cultures, consumer preferences, and communication etiquette as relatively limited. The overall ICC mean was 4.01 (SD = 0.52), signifying a moderately high level of self-perceived competence on a 5-point scale.

Table 2. Descriptive Statistics of ICC Dimensions (N = 92)

Dimension	M	SD
Attitudes	4.04	0.54
Knowledge	3.80	0.78
Interaction Skills	4.04	0.61
Digital Tool Application	4.12	0.47
CBEC Knowledge and English	4.05	0.56
Overall ICC	4.01	0.52

4.3. Item-Level Analysis

To identify students' specific strengths and weaknesses, item-level descriptive statistics were examined. As shown in Table 3, the highest-rated items were Q24 (using online collaboration tools, M = 4.16, SD = 0.69), Q6 (respecting cultural differences in consumption, M = 4.12, SD = 0.61), Q22 (operating livestream platform functions, M = 4.11, SD = 0.74), and Q4 (cultural knowledge useful for future career, M = 4.11, SD = 0.63). These

results indicate that students felt most confident in digital collaboration, cultural respect, platform operation, and career relevance.

Table 3. Highest and Lowest Rated Items

Item	Content	M	SD
	Highest-rated items		
Q24	I can use online collaboration tools (e.g., Tencent Docs) to complete project tasks with team members.	4.16	0.69
Q6	I can respect the differences between CEE consumer culture (as set in simulations) and Chinese consumption habits.	4.12	0.61
Q22	I know how to operate basic livestreaming platform functions (e.g., settings, audience interaction tools) for classroom simulated livestreaming.	4.11	0.74
Q4	I believe learning about CEE cultures will be helpful for my future career in cross-border e-commerce livestreaming.	4.11	0.63
	Lowest-rated items		
Q9	I am familiar with major e-commerce platforms (e.g., eMAG) in CEE countries (e.g., Hungary) and their characteristics.	3.70	1.00
Q10	I know whether CEE customers prefer direct or indirect expression in business communication.	3.76	0.97
Q12	I understand common audience interaction etiquette (e.g., greetings, forms of address) when livestreaming to CEE markets.	3.78	0.90
Q8	I know some cultural taboos to avoid when promoting products in CEE markets.	3.88	0.89

The lowest-rated items were Q9 (knowledge of major CEE e-commerce platforms, M = 3.70, SD = 1.00), Q10 (knowledge of direct/indirect communication preferences, M = 3.76, SD = 0.97), Q12 (knowledge of livestream interaction etiquette, M = 3.78, SD = 0.90), and Q8 (knowledge of cultural taboos, M = 3.88, SD = 0.89). Notably, these low-rated items all belong to the Knowledge dimension, and their relatively large standard deviations (SD ≥ 0.89) suggest considerable individual differences among students. This finding reinforces the pattern observed in the dimension-level analysis: Knowledge was the weakest area of ICC, particularly regarding platform-specific and communication-related cultural knowledge [4, 15].

4.4. Qualitative Results from Student Artifacts

To address RQ2 (how do students' project artifacts demonstrate their acquired intercultural knowledge, digital tool use, and CBEC English competence?), three types of student artifacts were analyzed: product posters, AI-assisted emails, and livestream/video negotiation recordings. Thematic analysis revealed two primary themes.

4.4.1. Theme 1: Critical Use of Digital Tools for Intercultural Tasks

Students actively employed digital tools, including Canva and AI applications, to complete their projects. For product posters, most groups used Canva. One group's poster for a portable blender utilized a minimalist color scheme and organized product features using the FABE (Features, Advantages, Benefits, Evidence) framework, reflecting an intentional effort to align with consumer preferences in Central and Eastern Europe (CEE).

For email tasks, students used AI tools to generate initial drafts and then manually revised them. One student first prompted the AI to write "a professional reply to a customer complaint about delayed shipping." The AI generated a formal response

beginning with "We regret to inform you." The student then revised the email based on the 3C (Clear, Concise, Correct) and CRACK (Courtesy, Respect, Appreciation, Constructive, Knowledge) principles, changing the opening to "Thank you for your patience" and adding a specific solution to the customer's problem [3, 15]. This revision process demonstrates students' ability to use AI as an assistant rather than relying on it uncritically.

4.4.2. Theme 2: Emergent Real-Time Interactive Competence in Simulated CBEC Livestreaming

Students demonstrated emerging interactive competence in livestreaming and negotiation tasks. In the simulated livestreaming activity, students used a social media platform's private livestream feature. While one student acted as host introducing a product in English, other students posted questions as "audience members," and the host had to respond in real time. One host was observed responding to a question about product warranty and successfully redirecting the conversation toward a call-to-action ("If you like it, click the link to order!").

In the video negotiation task, student teams role-played buyers and sellers discussing price, packaging, and delivery terms in English. One group successfully negotiated a shipping cost reduction by offering a bulk purchase commitment, demonstrating the ability to use English for transactional communication and to adapt arguments based on the counterpart's responses. These observations suggest that simulated real-time tasks provide valuable opportunities for students to practice spontaneous interaction, although the quality of such interaction varied across groups.

Together, these qualitative findings supplement the quantitative results by illustrating concretely how students applied digital tools and interactive strategies in their project work. The AI email revision task, in particular, provides tangible evidence of students' critical thinking—a competency that aligns with the high self-reported scores on the Digital Tool Application dimension.

5. Discussion

5.1. Students' Self-Assessed ICC After PBL

The quantitative results revealed four key patterns. First, Digital Tool Application received the highest mean score (M = 4.12, SD = 0.47). This supports the idea that PBL enhances practical skills when technology is embedded in authentic projects. Unlike traditional ESP instruction, which prioritizes vocabulary over authentic tasks, our PBL intervention required active use of Canva, AI, and livestream platforms, effectively building students' digital confidence.

Second, Knowledge received the lowest mean score (M = 3.80, SD = 0.78). This confirms that Chinese students with limited intercultural experience rate their cultural knowledge lower than their attitudes. The simulated nature of our tasks—without real CEE audiences—likely limited opportunities for deep cultural acquisition, supporting the claim that experience-based ICC scales may yield lower scores for inexperienced respondents.

Third, Attitudes and Skills of Interaction both scored 4.04, though Skills showed slightly greater variation (SD = 0.61 vs [17]. 0.54). This aligns with the understanding that attitudes are dispositional and relatively stable, while skills require practice and thus show greater individual differences.

Fourth, the overall ICC mean was 4.01 (SD = 0.52), indicating a moderately high level of self-perceived competence on a 5-point scale. This finding suggests that the PBL-based ESP course achieved its intended goal of fostering students' ICC, particularly in areas directly practiced through hands-on projects. However, the mean of 4.01—while respectable—also leaves room for improvement, especially given the lower scores on cultural knowledge.

Overall, these findings suggest that the PBL-based ESP course was effective in fostering students' self-perceived ICC, particularly in areas directly practiced through

hands-on digital tasks. However, the consistently lower scores on the Knowledge dimension—across both dimension-level and item-level analyses—reveal a clear limitation: simulated projects alone may not be sufficient for developing deep cultural knowledge. This highlights the need for authentic intercultural contact and suggests that future iterations of the course should integrate more direct engagement with CEE cultures, such as virtual exchanges or guest lectures from CEE business partners.

5.2. Evidence from Student Artifacts

The qualitative results from student artifacts supplemented the quantitative findings in two ways [6]. First, the AI email revision task demonstrated students' ability to use digital tools critically. One student revised an AI-generated draft from a formal "We regret to inform you" to a more constructive "Thank you for your patience," applying the 3C and CRACK principles taught in class. This concrete evidence of critical thinking aligns with the high self-reported scores on Digital Tool Application (M = 4.12), confirming that students not only felt confident but also demonstrated reflective use of AI.

Second, the simulated livestreaming and negotiation tasks revealed emerging interactive competence. Students responded to unexpected questions in real time and adapted their arguments during negotiation role-plays. These observations support the claim that problem-solving activities in PBL engage learners in interaction that facilitates language acquisition. However, cultural adaptations in the artifacts were limited to surface-level greetings, which echoes the lower Knowledge dimension scores (M = 3.80) and suggests that deeper cultural learning requires more authentic contact with CEE audiences.

5.3. Pedagogical Implications

The findings of this study offer three pedagogical implications for ESP instruction in vocational CBEC education [4].

First, the low scores on the Knowledge dimension (M = 3.80) and the limited cultural adaptations observed in student artifacts suggest that simulated projects alone are insufficient for developing deep cultural understanding. To address this, ESP courses should integrate more authentic intercultural contact. Practical strategies include inviting guest speakers from CEE countries, organizing virtual exchange sessions with CEE business partners, or incorporating real customer inquiries from CBEC platforms into classroom tasks.

Second, the high scores on Digital Tool Application (M = 4.12) and the AI email revision evidence demonstrate that embedding digital tools into PBL projects effectively builds students' technical competence and critical thinking. This approach should be extended to other ESP courses. However, as the AI revision example shows, students need explicit instruction on how to use AI critically—not merely as a shortcut, but as an assistant that requires human judgment.

Third, the greater variation in Skills of Interaction (SD = 0.61) compared to Attitudes (SD = 0.54) suggests individual differences in interactive competence. Differentiated instruction is therefore recommended. For students with lower confidence, scaffolded tasks with scripted templates and repeated practice may help build foundational skills. For more advanced students, open-ended simulations and peer feedback can further stretch their abilities.

5.4. Limitations

Several limitations should be acknowledged. First, all tasks were conducted in classroom simulations without real CEE audiences or customers, so students' self-reported ICC may differ from their performance in authentic CBEC livestreaming contexts, and whether these self-perceptions transfer to real-world settings remains unknown. Second, the sample was drawn from a single vocational college in Ningbo, China, which may limit the generalizability of the findings to other institutions or regions. Third, the study relied on self-report questionnaire data, which reflects students' perceptions rather than objectively measured performance. Future research could complement self-report

data with instructor ratings or platform analytics to provide a more comprehensive assessment [2].

6. Conclusion

This study examined vocational students' self-assessed ICC after participating in a PBL-ESP course focused on simulated CBEC livestreaming and email tasks for CEE markets. Based on questionnaire data from 92 students and qualitative analysis of student artifacts, three main conclusions can be drawn. First, students reported moderately high ICC after the PBL intervention (overall M = 4.01). They felt most confident in using digital tools such as Canva and AI (M = 4.12), and least confident in cultural knowledge about CEE markets (M = 3.80). Second, qualitative evidence from student artifacts—particularly the AI email revision task—demonstrated that students were able to use digital tools critically, supporting the quantitative findings. However, cultural adaptations in student work remained surface-level, echoing the lower scores on the Knowledge dimension. Third, the study confirms the applicability of PBL in ESP contexts for CBEC education. Students' positive attitudes (M = 4.04) and emerging interaction skills suggest that PBL creates a supportive environment for practicing real-time communication, even in simulated settings.

Despite its limitations—including the simulated task environment and single-institution sample—this study provides empirical evidence that PBL can foster vocational students' ICC, particularly in digital tool application and basic interaction. The findings suggest that while PBL effectively builds hands-on digital skills, simulated projects alone may not be sufficient for developing deep cultural knowledge. Future research should incorporate authentic intercultural tasks and objective performance measures to further validate these findings.

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