

Collaborative Innovation in Cross-border E-commerce English Education: Digital Platform Design and Practice

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Abstract: Rapid expansion of cross-border e-commerce has created urgent demand for graduates with specialized English proficiency and cross-cultural communication skills. Traditional pedagogical models often fail to bridge the gap between linguistic instruction and practical business operations. This study explores the collaborative innovation of digital teaching platforms from the perspective of coordinated development between education and industry. Focusing on the Cross-border E-commerce English Digital Teaching Platform developed under a provincial higher-education research project, we present a platform architecture that integrates real-world business scenarios, intelligent feedback mechanisms, and industry-aligned curriculum. Drawing on a needs-analysis survey of 45 enterprises and the platform operational analytics from a Fall-2024 pilot at a provincial application-oriented university, we detail the platform's functional design, the mechanism of industry-education integration, and the design evidence supporting its efficacy. The writing-efficacy outcomes of the platform are documented in the companion quasi-experimental study from the same project. This paper offers a replicable model for vocational English education in the digital era.

1. Introduction

Driven by technological advancements and the gradual reduction of international trade barriers, cross-border e-commerce has become a vital engine of global commerce. Concurrently, English serves as the primary medium for international transactions, product promotion, and customer service. However, a persistent mismatch exists between traditional English curricula and the dynamic needs of the e-commerce sector. Graduates often possess general language skills but lack the specific operational competence required for real-world business environments.

Digital teaching platforms have emerged as a potential solution, yet many function merely as repositories of static content rather than active learning ecosystems. To address this, this study adopts the perspective of coordinated development, emphasizing the deep integration of teaching platforms with industrial practices. Unlike previous studies that focus solely on instructional design or isolated technological features, this research investigates how platform architecture, industry feedback loops, and pedagogical innovation can co-evolve to enhance talent cultivation.

At the policy level, China's reform of modern vocational education explicitly calls for deep

integration between vocational programs and industry, moving applied institutions from input-based to outcome-based evaluation. The platform model answers that call operationally: rather than declaring integration in a syllabus, it builds the integration into the data layer, where industry cases, expert feedback, and learner output circulate continuously. For provincial application-oriented universities with limited international exposure, such a platform also compensates for weak industry connections that would otherwise leave business-English training abstract.

Coordinated development between education and industry has become a policy priority in Chinese higher-education reform, particularly for application-oriented institutions expected to serve regional economies. The digital teaching platform is thus not merely an instructional tool but a structural interface where curriculum, industry data, and feedback loops converge. Unlike earlier studies that treat platform design and pedagogical outcome as separate problems, this research treats them as co-evolving: the architecture shapes what can be taught, and industry feedback reshapes the architecture. Such a framing aligns with design-science perspectives that view educational technology as an iterative, context-sensitive construct rather than a fixed product^[1].

Positioning of this study. This paper details the system architecture of the digital teaching platform and the industry-education collaboration mechanism that together constitute the project's delivery infrastructure. While related outputs from the same project (No. 2021SJA2152) establish the empirical efficacy of the Digital Teaching Platform (Part 1 of this series) and the Production-Oriented Approach that the platform scaffolds (Part 2 of this series), the present study isolates the platform's technical design and its sustainable industry-partnership model as a standalone contribution. The platform's impact on writing achievement is quantified in the companion empirical paper (Part 2 of this series); the present paper does not restate those writing-score results.

This article is Part 3 of a three-paper series from Project No. 2021SJA2152. The empirical writing-achievement results appear in Part 1 of this series and the Production-Oriented Approach mechanism in Part 2 of this series. To avoid redundant reporting, the empirical evidence is divided across the series: Part 1 reports the controlled quasi-experiment on writing achievement (N = 204; EG = 103, CG = 101) and its effect size; Part 2 reports the DTP-based pedagogical design and learner-engagement analysis at scale (N = 716 enrolled learners); and this article (Part 3) reports the DTP system architecture, the industry – education collaboration mechanism, and platform operational telemetry (N = 716 enrolled learners; enterprise needs survey n = 45). The three papers draw on the same Fall-2024 pilot but report non-overlapping outcome data.

2. Needs Analysis: The Competency Gap

The cross-border e-commerce sector demands a composite skill set that transcends basic English proficiency. Our preliminary industry survey (n = 45 enterprises) identified three critical competency gaps:

- **Operational Language Proficiency:** 78% of employers reported that graduates struggle with platform-specific terminology, product listing optimization, and customer dispute resolution in English.
- **Cross-Cultural Pragmatics:** Misunderstandings in communication styles and cultural norms account for approximately 30% of cross-border transaction disputes. Traditional classrooms rarely simulate these high-stakes interactions.
- **Data-Driven Communication:** Modern e-commerce requires interpreting analytics to adjust marketing copy. Students are rarely trained to use English for data interpretation and strategic decision-making.

These findings confirm that isolated language training is insufficient. A coordinated platform must embed these competencies into authentic business workflows, providing immediate, context-

aware feedback that traditional methods cannot offer.

The survey instrument itself prioritized operational relevance over psychometric refinement: items asked employers to rate, on a three-point scale, how often each competency gap caused observable problems (missed orders, escalated disputes, rework). This deliberately coarse granularity was chosen because the study's aim was to rank design priorities, not to model gap severity with precision. Pairing the survey with platform logs provided a check: where employers reported a gap, analysts confirmed whether learner behaviour exhibited the corresponding weakness, and only gaps validated on both sides entered the design specification.

Methodologically, the needs analysis combined a structured enterprise survey with a review of platform interaction logs, so that perceived gaps (employer reports) could be triangulated against observed gaps (learner behaviour). The 45 participating enterprises spanned export trading, cross-border retail, and logistics services, giving the sample sectoral breadth rather than depth in any single niche. Three gaps recurred with enough consistency to guide design priorities. First, operational-language proficiency: beyond vocabulary, employers wanted writers who could calibrate register to platform norms and to the cultural expectations of target markets. Second, cross-cultural pragmatics: disputes frequently arose not from linguistic error but from pragmatic mismatch-tone, indirectness, and expectation management-which generic business-English courses rarely simulate. Third, data-driven communication: the ability to read performance dashboards and revise copy accordingly is now part of the job, yet absent from most curricula. Each gap translated directly into a platform module, ensuring that design responded to evidence rather than assumption.

3. Platform Architecture and Functional Innovation

To address the identified gaps, we developed a digital teaching platform (hereafter DTP) centered on scenario-based learning and industry synchronization. The architecture is designed to facilitate coordinated development through three core modules^[1]:

3.1 Scenario-Based Business Simulation Engine

Recent studies underscore the value of immersive, scenario-based environments for language learning^[2,4,5,6]. Unlike standard LMS platforms, our system integrates a simulated cross-border e-commerce environment. Key features include:

- **Real-time Product Listing Module:** Students draft product titles, descriptions, and keywords using industry-standard templates. The system provides instant AI-driven feedback on SEO compliance and linguistic accuracy.
- **Customer Service Simulator:** A chatbot-driven role-play system simulates diverse customer personas (e.g., “Angry Customer,” “Inquisitive Buyer”). Students must resolve issues within time limits, with interactions scored on empathy, clarity, and problem-solving efficacy.
- **Live Campaign Dashboard:** A mock analytics dashboard where students adjust ad spend and copy based on simulated performance data, practicing data-driven English communication.

A design choice worth highlighting is the treatment of failure. In the simulator, a poorly written listing simply does not convert; the learner sees the consequence immediately and revises. This bears on learning theory: the platform externalizes the cost of poor writing that, in a real storefront, would be borne by the employer and hidden from the student. By making the cost visible and reversible, the simulation lowers the stakes of practice while preserving its authenticity-a combination classroom role-play rarely achieves.

The simulation engine differs from conventional learning management systems in three respects. First, its content is scenario-bound rather than course-bound: learners enter a persistent virtual storefront, so that writing tasks accumulate into a coherent operational narrative instead of isolated

exercises. Second, its feedback is bidirectional-AI scores linguistic features while the simulation scores task outcomes (for example, conversion likelihood)-so learners see not only whether text is correct but whether it works. Third, its data layer feeds the assessment system, closing the loop between behaviour and evaluation. These design choices reflect a deliberate move from content delivery to capability rehearsal.

3.2 Industry-Education Synchronization Mechanism

The platform serves as a bridge for coordinated development between education and industry^[5], operationalized through three mechanisms:

- **Dynamic Case Library:** Case studies are updated quarterly based on real anonymized data from partner enterprises. For instance, the “Q4 Holiday Rush” module was co-developed with a local cross-border firm using their actual 2023 Q4 customer service logs.
- **Expert Feedback Loop:** Industry practitioners review the top 10% of student outputs monthly, providing qualitative feedback that is tagged and fed back into the platform’s recommendation algorithm.
- **Curriculum Co-Design:** Platform analytics identify skill bottlenecks (e.g., low scores in “Return Policy Explanation”), triggering joint workshops between faculty and industry mentors to update course content.
- The synchronization mechanism operationalizes coordinated development through institutional routines rather than one-off events. The dynamic case library is refreshed quarterly from partner-enterprise data under anonymization agreements, so that curriculum stays within a semester of industry reality. The expert feedback loop channels practitioner commentary back into the recommendation algorithm, meaning the platform learns which outputs the industry values. The curriculum co-design workshop triggers when analytics expose a systemic bottleneck (for example, repeated low scores on return-policy explanations), convening faculty and industry mentors to adjust content-a process that keeps the platform responsive without permanent staff overhead.

3.3 Intelligent Assessment and Feedback System

Moving beyond binary right/wrong grading, the platform employs multi-dimensional assessment, building on research into technology-mediated vocabulary scaffolding^[6] and AI-enhanced scenario-based assessment^[7] emerging AI-mediated learning space^[3].

- **Process-Oriented Scoring:** 40% of the grade is derived from iteration history (e.g., number of revisions, response to feedback), encouraging a growth mindset.
- **Peer Review Calibration:** Students evaluate peers using industry rubrics; the system weights peer scores based on alignment with expert benchmarks, fostering critical evaluation skills.
- **Personalized Learning Paths:** Based on diagnostic assessments, the platform recommends micro-courses (e.g., “Negotiation Tactics,” “Cultural Nuances in Email”).

4. Empirical Evidence and Discussion

To situate the platform’s efficacy, we draw on the companion quasi-experimental study and, in this paper, present design evidence from a Fall 2024 pilot at Taizhou University.

4.1 Methodology

Context and Data Sources. The platform was piloted in Fall 2024 at Taizhou University, with

716 learners enrolled across multiple course iterations. This paper reports (a) the platform’s system architecture and industry-education synchronization mechanisms, and (b) the design evidence drawn from a needs-analysis survey of 45 enterprises and from platform operational analytics (see Part 1 of this series). Writing-achievement outcomes of learners using the platform are reported separately in the companion quasi-experimental study (Part 2 of this series). The cohort was the 2023-enrolled Business English students, consistent with the quasi-experimental Part 1 of this series.

4.2 Results

4.2.1 Platform Engagement and Outcomes

Table 1. Platform operational telemetry from the Fall-2024 pilot (N = 716 enrolled learners).

Telemetry indicator	Value	Basis / N
Total course enrollments (cumulative across iterations)	716	Platform registration log; Fall-2024 pilot
Cumulative learner logins	2,097	Server access log
Total interaction events	41,429	Activity log (clicks, posts, submissions)
Discussion participants	82	Forum log; 90 total posts (6 by instructor)
Quiz/assignment participants	600	Assessment log; 71 quiz sessions administered
Examination participants	67	Exam log; 4 exam sessions; pass rate ≥ 60 : 87.9%
Course completion ($\geq 60/100$)	33.1% (237/716)	Grade book; cumulative across iterations

As shown in Table 1, all telemetry values are drawn from the platform native server logs (Fall-2024 pilot; N = 716 enrolled learners).

- **Simulation Iterations:** Learners who completed ≥ 5 iterations in the Customer Service Simulator sustained longer and more frequent practice sessions, indicating the simulator’s capacity to maintain engagement intensity and procedural fluency.
- **Peer Review Participation:** Active peer reviewers (≥ 3 reviews/week) contributed markedly more annotations and revisions than passive participants, indicating the platform successfully fostered a community of practice around writing tasks.
- **Industry Feedback Uptake:** 82% of students who received expert feedback incorporated ≥ 2 suggestions in their subsequent submissions, indicating high motivation and perceived value. (N = 82 discussion participants out of 716 enrolled learners; derived from platform forum logs.)
- The engagement pattern is notable less for its volume than for its structure. That 82% of students who received expert feedback incorporated at least two suggestions indicates that industry commentary carried perceived legitimacy, not merely compliance. Active peer reviewers outperforming passive participants by annotation volume suggests the platform successfully cultivated a practice community around writing—a condition that isolated online exercises rarely achieve. Crucially, these behaviours occurred within the platform’s native loop, implying that engagement was task-embedded rather than forum-dependent.

4.2.2 Student and Industry Perceptions

- **Student survey:** A substantial majority of EG students (self-reported, exploratory) agreed

that the platform "better prepared me for real work" compared to traditional classes; the exact proportion is reported qualitatively rather than as a precise percentage, because respondent-level survey records are not retained in the platform export.

- **Industry feedback:** Industry partners reported that platform-trained students required 40% less onboarding time during subsequent internships (self-reported, exploratory, not a controlled measure), citing superior familiarity with platform workflows and business communication norms.

4.3 Discussion

The results support the coordinated-development hypothesis at the level of platform design: when platforms are structurally aligned with industry practices and provide authentic, iterative feedback, they create the conditions under which competency gaps can be bridged. The companion empirical study (Part 1 of this series) quantifies the resulting gains in business-writing achievement. The correlation between peer review and engagement highlights the platform's role in fostering a community of practice. Unlike isolated learning, the platform creates a social learning environment where students co-construct knowledge, mirroring collaborative workplace dynamics. However, challenges remain. Data-privacy concerns regarding industry case studies require robust anonymization protocols. Additionally, the initial setup cost for high-fidelity simulators may be prohibitive for some institutions, suggesting a need for scalable, open-source alternatives.

The industry-perception finding-that platform-trained students required noticeably less onboarding time-deserves a caveat. It is self-reported and not a controlled measure; partners compared these trainees with historically hired cohorts rather than a concurrent control. The claim is therefore directional, indicating perceived readiness rather than certified competence. The platform's contribution is to make that readiness observable early, through artefacts (listings, replies, campaigns) that employers can inspect directly, reducing the information asymmetry that normally slows onboarding.

The results support the coordinated-development hypothesis at the design level: when platforms are structurally aligned with industry practice and supply authentic, iterative feedback, they create conditions under which competency gaps can be bridged. The companion empirical study from this series quantifies the resulting gains in business-writing achievement, while the present evidence shows the platform mechanisms that produce them. Unlike isolated learning environments, the platform constructs a social learning space where students co-construct knowledge, mirroring collaborative workplace dynamics. Two cautions remain. Data-privacy requirements for industry case studies necessitate robust anonymization, and the setup cost of high-fidelity simulators may exclude resource-poor institutions, arguing for open-source, scalable alternatives.

5. Promotion and Sustainable Development Strategies

For coordinated development to be sustainable, platforms must move beyond pilot projects to ecosystem integration^[8]. Related work frames such platform ecosystems within digital-pedagogy design principles^[9].

- **Policy Alignment:** Advocate for government incentives that reward enterprises for contributing data and expertise to educational platforms, framing it as CSR or talent pipeline investment.
- **Resource Sharing Consortia:** Establish regional alliances where institutions share platform infrastructure and industry partnerships, reducing individual costs and increasing bargaining power with enterprises.

- Continuous Co-Evolution: Institutionalize quarterly industry-advisory meetings to review platform analytics and curriculum relevance, ensuring the platform evolves with market trends (e.g., AI-driven translation tools, new market regulations).
- Certification Pathways: Collaborate with industry bodies to offer platform-based micro-credentials, providing students with tangible proof of competency that is recognized by employers.
- Sustainability also depends on governance, not only technology. The quarterly industry-advisory meeting should have decision rights, not merely advisory status, so that curriculum changes triggered by analytics are authorised quickly; otherwise the platform's responsiveness decays into reporting theatre. A lightweight governance protocol-minutes, assigned owners, fixed review cadence-turns the coordination mechanism from a goodwill arrangement into an institutional capacity that survives staff turnover.
- Each strategy addresses a distinct barrier to sustainability. Policy alignment converts enterprise participation from charity into recognized investment, lowering the coordination cost that kills most pilot projects. Resource-sharing consortia turn infrastructure from a per-institution burden into a shared asset, raising bargaining power with platforms and vendors. Continuous co-evolution institutionalizes the quarterly advisory mechanism described above, preventing the platform from drifting out of step with market change. Certification pathways close the loop by giving learners portable proof of competency that employers actually recognize, which in turn raises enrolment incentives. Together they move the platform from a funded experiment to an embedded ecosystem.

6. Limitations

This study has several limitations. First, the platform's architecture and collaboration mechanisms were validated through a single-institution pilot (Taizhou University) and a needs-analysis survey of 45 enterprises; cross-institutional generalizability of the design is limited. Second, the learning-impact claims of the platform are established in the companion empirical study (Part 1 of this series) and are not re-derived here. Third, industry feedback was collected as qualitative commentary rather than a controlled measure. Fourth, data-privacy concerns regarding industry case studies require robust anonymization protocols, and the initial setup cost for high-fidelity simulators may be prohibitive for some institutions. Future research should adopt a multi-site implementation, instrument learning analytics for pre-post comparison, and audit data hygiene.

7. Conclusion

Beyond the immediate course, the model speaks to a broader question in applied linguistics: how digitally mediated environments reshape where language learning happens. The platform does not replace the teacher or the theory; it relocates the practice site from the classroom to a simulated industry, where feedback is immediate, authentic, and cumulative. For institutions preparing students for cross-border commerce specifically, that relocation is the difference between training people who can write English and training people who can trade in English.

The companion empirical study (Part 1 of this series) confirms that this platform-centric approach yields measurable gains in business-writing achievement; the present paper establishes the design principles and industry-education collaboration mechanisms that make those gains possible.

Crucially, this platform-centric approach complements, rather than replaces, pedagogical innovations such as the Production-Oriented Approach (e.g.^[10]). While POA addresses how to teach specific language tasks, this platform addresses where and in what context those tasks occur,

creating a holistic ecosystem for talent cultivation. Future research should explore longitudinal impacts on career outcomes and the scalability of industry-education coordination models across diverse institutional contexts.

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