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DIGITAL INTELLIGENCE-DRIVEN AND INTEGRATED EVALUATION-CONSTRUCTION: PARADIGM RECONSTRUCTION AND PRACTICAL EXPLORATION OF "INTERCULTURAL COMMUNICATION" COURSES IN HIGHER EDUCATION

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Abstract: Addressing critical bottlenecks in traditional intercultural communication instruction—specifically, fabricated communicative contexts, the decoupling of teaching and assessment, and superficial technology integration—this study introduces a synergistic mechanism of "data-intelligence driving" and "evaluation–construction integration" to construct a data-driven precision teaching framework for college foreign language courses. Adopting a backward design approach, the study reconstructs a four-dimensional curricular objective matrix comprising language proficiency, digital-intelligence literacy, intercultural communicative competence, and comprehensive qualities. By deconstructing typical tasks in international professions, it develops a multimodal digital case repository and a three-phase, five-step virtual-real hybrid training chain ("Orient–Instruct–Practice–Explore–Evaluate"). Furthermore, a tripartite attainment assessment model integrating process evaluation, summative evaluation, and value-added evaluation is established. Drawing upon multiple rounds of pedagogical implementation at Zhejiang Yuexiu University, this paper summarizes the implementation pathways, core mechanisms, and preliminary observations of the proposed paradigm, while reflecting on its inherent constraints. This research aims to provide a transferable operational framework for the digital-intelligence transformation of tertiary foreign language courses, acknowledging that its empirical efficacy warrants validation through larger-sample and longer-term empirical testing.
Keywords: Data-intelligence driving; Evaluation–construction integration; Intercultural communication; Pedagogical paradigm; Outcome attainment assessment; Practical exploration

1 INTRODUCTION

1.1 The Digital-Intelligence Transformation of Higher Education and Its Contemporary Mission

The rapid advancement of next-generation information technologies—exemplified by big data, artificial intelligence, and virtual reality—is triggering systemic transformations in higher education ecosystems and pedagogical paradigms worldwide. The digital-intelligence transformation of higher education extends beyond upgrading instructional tools and learning environments; it profoundly reshapes curricular philosophies, instructional organization, and quality assurance mechanisms. Against the macro backdrop of China's national educational digitalization initiative, tertiary foreign language education has been entrusted with a renewed mission. As a core course in cultivating foreign language professionals, Intercultural Communication bears the critical responsibility of equipping students to communicate precisely in multicultural settings, comprehend cultural nuances deeply, manage communicative conflicts effectively, and cultivate robust cultural confidence. However, given the heightened demands of the digital-intelligence era for interdisciplinary talent in international contexts, structural contradictions in traditional Intercultural Communication courses regarding resource supply, instructional organization, and efficacy evaluation have become increasingly pronounced.

The digital shift in higher education stems from the convergence of technological evolution and strategic national mandates. The Report to the 20th National Congress of the Communist Party of China explicitly called for "advancing educational digitalization and building a learning society and a learning nation featuring lifelong learning for all," elevating digital transformation to a national strategic imperative [1]. Simultaneously, under the strategic guidance of "accelerating the construction of Chinese discourse and narrative systems, telling China's stories well, and making China's voice heard," the educational mission of tertiary foreign language studies is undergoing a fundamental pivot. Traditional Intercultural Communication courses predominantly focused on unilateral Western cultural input and language skill drills, lacking systematic cultivation of students' capacity for equal dialogue and mutual learning between Chinese and foreign cultures. Driven jointly by the "New Liberal Arts" initiative and the imperative to enhance international communication capabilities, the Intercultural Communication curriculum must transition from conventional "unilateral cultural transmission" to "bidirectional cultural learning," striving to foster students' comprehensive capabilities in articulating Chinese perspectives and exemplifying cultural confidence through cross-cultural comparison and conflict resolution.

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1.2 Structural Obstacles Facing Traditional Instructional Models

Although tertiary foreign language education has achieved noticeable progress in digital infrastructure in recent years, the application of digital-intelligence technologies in Intercultural Communication practice remains largely at an instrumental and superficial level, failing to trigger systemic curricular reconstruction. Specifically, traditional instructional models confront three deep-seated structural barriers:

(1) Intertwined "Scene Scarcity" and "Contextual Rigidity": Disconnect Between Instructional Resources and Practical Application. The essence of intercultural communicative competence lies in strategic application and contextual adaptability within complex, dynamic communication settings. However, existing instructional resources consist mostly of static printed textbooks, slide decks, and pre-recorded audiovisual materials, suffering from a severe deficiency in authentic, dynamic, and interactive intercultural scenarios. This static representation induces a rigid instructional context, hindering students from engaging in real-time responses and strategy rehearsal within genuine or high-fidelity communicative conflicts and culture shocks, thereby severing theoretical instruction from practical skill development.

(2) Coexistence of "Static Evaluation" and "Lagging Feedback": Absence of Dynamic Tracking in Assessment Systems. Learning outcome attainment assessment serves as a closed-loop mechanism to evaluate the fulfillment of curricular goals and drive continuous instructional quality improvement. Nevertheless, assessment in traditional Intercultural Communication courses relies heavily on final examinations or term papers, operating essentially as a static, summative judging model. Core competencies—such as the tactical deployment of intercultural strategies, multicultural adaptability, and critical thinking skills—are inherently implicit and dynamically evolving. Consequently, a single summative assessment cannot capture or document the longitudinal trajectory of student competency development. Lacking scientific data collection and analytical tools, traditional evaluation fails to diagnose learning bottlenecks or generate continuous empirical feedback to inform instructional adjustments.

(3) Superficial Technology Integration and Role Displacement: Absence of Human–Machine Collaborative Precision Governance. In the process of embedding digital technologies, certain instructional practices fall into the trap of technological fetishism or superficial detachment. Technological tools are frequently relegated to slide presentation or homework collection, failing to integrate into the core stages of instructional design and learning analytics. Regarding teacher–student relationships, teachers persist as static authorities delivering unilateral lectures rather than evolving into designers of learning contexts, facilitators of practical inquiry, and curators of digital-intelligence resources. Conversely, students remain passive information recipients with little room for autonomous exploration, human–machine collaboration, and reflective practice. The absence of human–machine collaborative governance directly impedes the transition of instructional activities toward precision and efficiency.

1.3 Analytical Perspective and Research Positioning: Shifting from Causal Verification to "Framework Construction and Practical Pathways"

Faced with these pedagogical dilemmas, relying merely on extending instructional hours or introducing online platforms fails to address the root causes. A holistic reconstruction of the instructional paradigm must be pursued from the underlying logic of the curriculum system. This study proposes a systematic reconstruction of the precision teaching system in Intercultural Communication under the core framework of "data-intelligence driving and evaluation–construction integration". "Data-intelligence driving" aims to deeply integrate modern information technologies—such as big data, artificial intelligence, knowledge graphs, and virtual simulation—into all curricular components, serving as the core engine driving the reshaping of curriculum structures, instructional content, practical scenarios, and teacher–student roles. "Evaluation–construction integration" stresses dismantling the traditional separation between construction and evaluation ("construction first, evaluation second"), embedding learning outcome attainment assessment throughout the entire lifecycle of goal setting, content design, instructional implementation, and outcome evaluation. Through the longitudinal collection and analysis of process data, a closed-loop governance mechanism of "assessment–diagnosis–improvement–enhancement" is established to achieve evaluation-driven construction and integrated evaluation–construction.

Importantly, acknowledging that micro-level instructional reforms are subject to multiple uncontrollable variables and that school-based practices lack quasi-experimental conditions with strictly controlled variables, the positioning of this paper is not to "demonstrate the statistical causal efficacy of this paradigm". Instead, it aims to "propose an operational framework for curriculum reform, synthesize school-based implementation processes, typical practices, and preliminary observations, and reflect on genuine bottlenecks". This research provides a transferable practical framework for the digital-intelligence transformation of tertiary foreign language courses, while recognizing that its actual efficacy requires empirical validation through larger samples and longer-term investigations.

2 LITERATURE REVIEW

The reconstruction and practical exploration of pedagogical paradigms must be grounded in a solid theoretical foundation and deep dialogue with existing scholarship. This study primarily draws upon theories of Intercultural Communicative Competence (ICC), Outcome-Based Education (OBE), Formative and Value-Added Assessment, as well as Computer-Assisted Language Learning (CALL) and Technological Pedagogical Content Knowledge (TPACK).

2.1 Theoretical Foundations and Evaluation Frameworks of Intercultural Communicative Competence

The theoretical construction of Intercultural Communicative Competence (ICC) has evolved from single-dimensional linguistic skills toward a multidimensional composite capacity. Byram's seminal ICC model conceptualized intercultural competence across five core dimensions: attitudes, knowledge, skills of interpreting and relating, skills of discovery and interaction, and critical cultural awareness, thereby establishing a foundational framework for intercultural education in foreign language pedagogy [2]. Utilizing the Delphi method, Deardorff developed a pyramid and process model of intercultural competence, positing that foundational attitudes (respect, openness, and curiosity) drive shifts in knowledge and comprehension, which subsequently translate into internal frame-of-reference outcomes and external appropriate and effective communicative behaviors [3]. Within Chinese foreign language education scholarship, Sun emphasized that ICC cultivation in higher education must strictly align a "Chinese stance" with an "international perspective," seamlessly integrating critical thinking, national identity, and global competence into the foreign language curriculum [4]. These theoretical frameworks provide the intellectual foundation for reconstructing the four-dimensional goal matrix in this study.

2.2 Outcome-Based Education (OBE) and Backward Design Frameworks

Outcome-Based Education (OBE), pioneered by Spady, posits that instructional design should be driven by the ultimate learning outcomes students are expected to achieve, guided by four core principles: clarity of focus, expanded opportunity, high expectations, and backward design [5]. At the curriculum development level, OBE dictates deriving instructional content, pedagogical activities, and assessment modalities retroactively from target competency objectives. Similarly, Wen's Production-Oriented Approach (POA) advocates a reverse pedagogical loop comprising "driving, enabling, and assessing," positioning output results as both the starting point and ultimate objective of instruction [6]. Furthermore, Wang and Jiang underscored that university foreign language curriculum construction should leverage quality assurance as a unifying thread to synchronously advance curriculum-based ideological-political pedagogy alongside disciplinary competence development [7-9]. These theoretical tenets constitute the core methodology for the backward reconstruction of curricular goals and the design of the three-phase, five-step training chain in this paper.

2.3 Formative Assessment, Value-Added Evaluation, and Learning Analytics

The theoretical foundation of formative assessment was firmly established by Black and Wiliam, who demonstrated that continuous assessment and immediate feedback embedded throughout the learning process significantly enhance learning efficacy [10]. Building upon this foundation, value-added evaluation focuses on an individual student's net growth over time. By longitudinally tracking student performance relative to an initial baseline, this approach controls for confounding background variables, thereby providing a more equitable and encouraging evaluative mechanism. Zhang, et al explored the construction of a formative assessment index system in college English, advocating the integration of multi-source data for dynamic learning diagnostics [11]. Concurrently, advancements in big data and learning analytics have enabled non-intrusive data collection and visual dashboards, serving as the central mechanism for assessment-driven continuous quality improvement.

2.4 Digital-Intelligence Technologies in Foreign Language Pedagogy and TPACK Theory

The Technological Pedagogical Content Knowledge (TPACK) framework, introduced by Mishra and Koehler, articulates the intrinsic mechanism governing the deep integration of technology, pedagogy, and content knowledge [12]. In the digital-intelligence era, technology has transcended its traditional status as an isolated auxiliary tool to generate deep synergistic effects with instructional content and pedagogical strategies. Hu and Qi examined the imperatives and responses of Chinese foreign language education amidst the rise of ChatGPT and Large Language Models (LLMs), observing that digital-intelligence technologies are reshaping the underlying ecology of language learning and instruction [13]. Tracing the 70-year trajectory of educational technology in Chinese tertiary foreign language education, Hu and Hu advocated constructing a data-intelligence integrated ecosystem for precision teaching [14]. Additionally, Cai and Chang emphasized the transformative value of digital technology in enabling comprehensive curricular reconstruction from the perspectives of interdisciplinary talent development and digital textbook creation, respectively [15-16].

In summary, extensive scholarship both domestically and internationally has laid a robust foundation across intercultural foreign language pedagogy, OBE backward design, process evaluation, and technology-enhanced learning. Nevertheless, existing literature remains largely concentrated on macro-level conceptual advocacy or the isolated application of specific technological tools. A critical gap persists regarding a holistic, operational framework that deeply integrates digital-intelligence technology with learning outcome attainment assessment across all micro-level curricular elements. Accordingly, the niche of this study lies not in conducting strictly controlled experimental trials to verify the statistical causal efficacy of a paradigm, but rather in addressing the absence of an operational, micro-level framework. This paper proposes a comprehensive, actionable framework for "data-intelligence driving and evaluation–construction integration" in college Intercultural Communication courses. It details an integrated implementation pathway involving backward goal reconstruction, multimodal resource provision, a hybrid practical training chain, and a tripartite assessment model, while transparently detailing school-based implementation processes and reflective insights.

3 CONSTRUCTION OF THE "DATA-INTELLIGENCE DRIVEN AND EVALUATION–CONSTRUCTION INTEGRATION" PEDAGOGICAL PARADIGM

Deeply embedding digital-intelligence technologies into foreign language instruction is by no means a simple accretion of technical instruments; rather, it represents a systemic overhaul of the underlying operational logic of the curriculum through the organic integration of technological empowerment and assessment reform. This study constructs a data-driven model of synergistic pedagogical elements for higher education foreign language courses.

3.1 Deconstruction of Core Concepts and Theoretical Implications

3.1.1 Connotation and technological manifestations of "Data-Intelligence Driven"

Against the backdrop of the digital transformation of education, "data-intelligence driving" transcends the narrow view of traditional educational informatization that reduces technology to a mere "instructional auxiliary tool." Instead, it emphasizes leveraging modern information technologies—such as big data, artificial intelligence, knowledge graphs, and virtual simulation—as the primary engine for reconstructing the curriculum system and improving instructional quality. Its technological manifestations operate across three dimensions: first, the collection and documentation of process data, wherein students' learning pathways, interaction behaviors, and task completion are continuously recorded via online learning platforms and smart instructional environments; second, the dynamic matching of instructional resources, which utilizes knowledge graphs and intelligent analytics to align instructional content with student diagnostic needs; and third, the virtual-real integration of contextual creation, which employs technology to build high-presence learning spaces that provide contextual support for intercultural communicative practice.

3.1.2 Closed-loop mechanism and governance logic of "Evaluation–Construction Integration"

The core of "evaluation—construction integration" lies in dismantling the fragmented state of traditional foreign language pedagogy characterized by "construction prior to assessment" or the "decoupling of teaching and assessment." Learning outcome attainment assessment is a process that evaluates whether students achieve the predefined curricular goals and competency requirements based on evidence generated during the learning process, thereby supplying continuous feedback for pedagogical refinement. Embedding learning outcome attainment assessment across the entire lifecycle—from goal setting and content development to instructional execution and feedback calibration—fosters a virtuous cycle of "driving construction through assessment, enhancing learning through assessment, and integrating assessment with construction." This governance logic dictates that assessment no longer functions as the terminal point of a teaching cycle, but rather transforms into a real-time source of feedback and diagnosis that drives the continuous iteration of curricular elements.

3.2 Synergistic Model of Pedagogical Elements from the Perspective of "Evaluation–Construction Integration"

The pedagogy of Intercultural Communication constitutes a dynamic ecosystem comprising multiple interacting subsystems. Under the digital-intelligence transformation, taking learning outcome attainment assessment as the unifying link facilitates the co-evolution of six core elements: curricular objectives, instructional content, pedagogical activities, learning assessment and feedback, instructors and students, and the learning environment.

3.2.1 Directional reshaping of curricular objectives

The design of curricular objectives is guided by the attainment assessment model, expanding from isolated language skill cultivation into a four-dimensional synergistic matrix comprising "language proficiency, digital-intelligence literacy, intercultural communicative competence, and comprehensive qualities." The dynamic feedback provided by attainment data serves as an empirical foundation for the backward design of curricular goals.

3.2.2 Deconstruction and reorganization of instructional content

Instructional content evolves from static, linear, unilateral knowledge transmission into multimodal, comprehensive learning resources. Informed by outcome attainment assessment and instructional logs, this approach strives to align case studies with practical applications and students' cognitive levels, attempting to assemble and push personalized learning resources tailored to different student groups.

3.2.3 Virtual-real synergy between pedagogical activities and learning environments

The design of pedagogical activities is seamlessly aligned with outcome attainment assessment to establish a blended online-offline practical training pathway. Supported by smart classrooms and online learning platforms, the learning environment expands from a singular physical classroom into a hybrid learning space.

3.2.4 Closed-loop control of learning assessment

Learning assessment drives a shift in evaluative modes from "static single standards" toward "multidimensional process analytics." By capturing student behavioral records during pre-class preparation, in-class drills, and post-class practice through learning management systems, language expressions and communicative strategies are observed across multiple dimensions, thereby striving to drive the adaptive adjustment of the pedagogical process.

3.3 Reconstruction of Pedagogical Agents and Boundaries of Human–Machine Collaboration

The digital-intelligence upgrade profoundly reconstructs the agent roles and interaction modalities within the pedagogical process. Under this new pedagogical paradigm, instructors shed their identity as unilateral knowledge transmitters, actively exploring transitions into designers of learning contexts, facilitators of practical inquiry, and

curators of digital-intelligence resources. Simultaneously, students attempt to transition from passive information recipients into active explorers and practitioners within immersive contexts. Consequently, the instructional relationship evolves from traditional "one-to-many" linear, unidirectional transmission into an open, "many-to-many" networked ecosystem encompassing teacher–student and human–machine interactions.

To counteract tendencies toward "technological fetishism" or "technophobia" during technology integration, this study delineates a mechanism for human–machine collaboration. Artificial intelligence and big data platforms act as intelligent teaching assistants, undertaking standardized tasks such as data logging, basic Q&A, and learning analytics. Meanwhile, instructors firmly retain their primary position in pedagogical decision-making and humanistic mentoring, concentrating on complex scenario creation, deep cultural value guidance, and individualized mentoring. This complementary synergy between humans and AI aims to ensure that technological empowerment remains firmly anchored to the fundamental educational essence of "character building and human-centered development."

4 RECONSTRUCTION OF THE INTERCULTURAL COMMUNICATION CURRICULUM SYSTEM

The core mechanism for reconstructing the Intercultural Communication curriculum resides in leveraging outcome attainment assessment to shift from experience-guided curriculum development toward data-driven curriculum design. Based on the competency requirements of international professions, the project team backward-designed the curricular objective system, deconstructed typical work tasks, and developed a hybrid, dynamic content framework alongside a practical training chain.

4.1 Backward Design of Objectives and the "Four-Dimensional Competency" Topology Matrix

Through structured interviews with international practitioners, consultations with industry experts, and pedagogical group seminars, the project established a set of core competencies targeting practical scenarios, such as international business negotiation, international protocol and etiquette, intercultural academic exchange, and international tourism. Drawing upon years of collective instructional experience, the team distilled four core curricular objectives: Language Proficiency, Digital-Intelligence Literacy, Intercultural Communicative Competence, and Comprehensive Qualities, formulating the "Four-Dimensional Competency" Topology Matrix (Table 1).

Table 1 Topology and Evaluation Observation Matrix of "Four-Dimensional Competency" Objectives for Intercultural Communication

Competency Dimension	Core Connotation and Instructional Focus	Assessment Evidence and Observation Points
Language Proficiency	Precise multimodal expression (listening, speaking, reading, writing, translating); mastery of core vocabulary and syntax in foreign-related communication; appropriate linguistic transformation and strategic adjustment capabilities.	Scores in unit impromptu speeches, linguistic accuracy in micro-videos, and platform scores on knowledge-point assessments.
Digital-Intelligence Literacy	Retrieval of digital learning resources; assisted application of AI intelligent tools; discernment of digital communicative information; autonomous learning path planning.	Frequency of AI smart Q&A interactions, completion rate of knowledge-graph pre-study, and digital case retrieval reports.
Intercultural Communicative Competence	Perception of complex foreign affairs scenarios; sensitivity to cultural differences; deployment of communicative conflict-resolution strategies; multicultural empathy, openness, and adaptability.	Rubric scores in situational drama rehearsals, analysis reports on intercultural conflict cases, and peer-evaluation satisfaction rates.
Comprehensive Qualities	Critical thinking skills; cross-cultural collaborative inquiry within teams; national pride, cultural confidence, and a grounded "Chinese stance" demonstrated through cross-cultural comparison.	Quality scores in classroom debate and discussion, presentation defense scores in final comprehensive simulation drills, and team project collaboration evaluations.

4.2 Reshaping Instructional Content and Multimodal Resources

Aligning with real-world workflows in international professions, the project team deconstructed authentic intercultural communication scenarios into modular, digital-intelligence learning tasks. Each module explicitly defines its corresponding communicative strategies, linguistic skill requirements, and supporting digital-intelligence tools. Throughout task execution, the learning management system captures completion records, providing real-time data to inform adaptive pedagogical adjustments.

To overcome the scenario rigidity inherent in static textbooks, the team integrated internal and external resources to construct a multimodal digital case repository spanning international business negotiations, international protocol and etiquette, diplomatic affairs, and people-to-people exchanges. This repository currently compiles numerous authentic project cases, integrating audio-visual media, bilingual scripts, and task cards. Regarding content dissemination, students are encouraged to convert their own foreign-related practical experiences into instructional materials. Concurrently, utilizing learning management system dashboards, personalized supplementary learning resources are pushed to students based on individual learning logs.

4.3 Instructional Scenarios and the Hybrid Practical Training Chain

To provide students with authentic, immersive practice, the project team designed a three-stage hybrid practical training chain consisting of "Pre-class Autonomous Orienting—In-class Deep Constructing—Post-class Transfer Application," while implementing a "Five-Step" pedagogical methodology ("Orient—Instruct—Practice—Explore—Evaluate") during classroom instruction:

4.3.1 Pre-class autonomous orienting

Instructors release pre-study resources and knowledge-graph assignments via the online platform. Students utilize smart teaching assistants to complete pre-reading and diagnostic tests, gaining prior awareness of their knowledge mastery and skill gaps.

4.3.2 In-class deep constructing

Supported by smart classrooms, instruction executes a five-step closed-loop process comprising: Context Orienting (Orient): Importing themes of communicative conflicts using multimedia case videos; Theoretical Instruction (Instruct): Delivering targeted lectures on core intercultural communication theories; Task-Driven Drills (Practice): Assigning collaborative, group-based practical training tasks; Inquiry-Based Practice (Explore): Engaging students in role-playing, communicative strategy rehearsal, and conflict-resolution exploration; Multidimensional Evaluation (Evaluate): Having student teams present their performance outcomes, followed by multidimensional feedback from instructors and peers.

4.3.3 Post-class transfer application

Students retrieve expanded cases and record speech micro-videos to upload to the platform. Instructors and platform algorithms provide process evaluation feedback, guiding students in reflective practice to consolidate communicative strategies.

5 DESIGN OF THE ASSESSMENT MODEL

The assessment architecture represents a critical operational mechanism for gauging curricular goal attainment and guiding instructional refinement. Attempting to transcend the inherent limitations of single summative testing, this study establishes an "Assessment-for-Learning and Assessment-for-Teaching" orientation. It designs a tripartite evaluation scheme encompassing "Process Evaluation (60%) + Summative Evaluation (40%) + Value-Added Evaluation (Bonus Incentive, ≤10 points)".

5.1 All-Process Multidimensional Evaluative Metrics and Weight Allocation

Process Evaluation (Weighting: 60%). Process evaluation relies on online learning management systems to continuously capture and log students' longitudinal learning behaviors: Regular Speech Assignments (30%): Observing students' linguistic accuracy and strategic deployment during impromptu speeches and case analyses; AI Learning Engagement (10%): Tracking pre-class preparation, knowledge-graph study completion, and interactions with smart Q&A platforms; Classroom Discussion and Critical Thinking (10%): Observing peer-evaluation quality, collaborative problem-solving, and critical inquiry during group seminars; Knowledge Point Mastery Tests (10%): Assessing theoretical knowledge retention via in-class diagnostic quizzes.

Summative Evaluation (Weighting: 40%). Summative evaluation is conducted at the conclusion of the semester through comprehensive situational simulation drills and presentation defense. Students are required to perform on-site simulations within given foreign-related conflict scenarios, providing evaluators with holistic evidence to observe the strategic application of high-order intercultural communicative competencies.

5.2 Operational Mechanics of the Value-Added Evaluation Scheme

Value-added evaluation is anchored in a baseline diagnostic assessment administered at the beginning of the academic term, alongside three progressive learning tasks assigned throughout the semester. Based on individual students' relative growth in communicative strategy deployment, public speaking confidence, and critical expression, instructors award bonus incentive points not exceeding 10 points. Detailed scoring rubrics are specified in the course syllabus, while maintaining a mechanism for manual teacher audit and student appeals. Because the value-added algorithmic model requires calibration across larger student samples, this study refrains from treating value-added scores as empirical evidence of pedagogical efficacy, incorporating it strictly as an illustrative component of the conceptual evaluation framework.

5.3 Visualized Data Cockpit and the "Assessment–Diagnosis–Improvement" Quality Loop

The ultimate imperative of digital-intelligence evaluation resides in empowering precision instructional governance and targeted pedagogical interventions. Utilizing learning management systems, the project team developed a visualized "Data Cockpit," establishing a closed-loop quality improvement circuit of "Assessment–Diagnosis–Improvement":

5.3.1 Panoramic visualization of learning analytics

The Data Cockpit continuously aggregates multi-source process behavioral logs, generating dynamic learning analytics dashboards at both class and individual levels. These dashboards intuitively present attainment levels across the four

target dimensions—language proficiency, digital-intelligence literacy, strategy deployment, and comprehensive qualities—supplying empirical references for instructional calibration.

5.3.2 Diagnostic alerts and targeted pedagogical interventions

By analyzing platform interaction records, the system automatically flags potential learning bottlenecks (e.g., deficient non-verbal communicative strategies or weak critical argumentation). Informed by these diagnostic alerts, instructors recalibrate subsequent teaching paces and push targeted "personalized learning packages" to assist students in adjusting their learning strategies.

6 SCHOOL-BASED PRACTICE PROCESS AND REFLECTIONS

To explore the operational pathways for enacting the "Data-Intelligence Driven and Evaluation–Construction Integration" paradigm, the project team conducted multiple rounds of school-based practical exploration at the School of Applied Foreign Languages, Zhejiang Yuexiu University. This chapter aims to summarize the target audience, implementation pathways, typical practices, and instructor observation points, while transparently reflecting on the structural bottlenecks exposed during implementation.

6.1 Target Audience and Implementation Conditions

The school-based practice was progressively rolled out across 12 instructional classes of the Applied English major within the School of Applied Foreign Languages, Zhejiang Yuexiu University, cumulatively involving over 1,000 student participations across multiple rounds. Implementation relied upon the college's Smart Language Laboratories, online learning management systems (e.g., Mosoteach and Chaoxing), and the university's educational administration system, co-executed by core instructors of the course team.

Crucially, all behavioral data generated during the practice were collected under informed consent from students. De-identified platform logs were utilized solely for course diagnostics and pedagogical reflection. AI automated feedback served exclusively as an auxiliary reference for instructors rather than the sole grading criterion. Furthermore, value-added bonus scoring retained channels for manual teacher review and formal student appeals.

6.2 Implementation Pathway and Operational Flow

The school-based practice unfolded along a five-stage roadmap: "Backward Goal Reconstruction → Case Repository Construction → Three-Phase Five-Step Execution → Tripartite Evaluation → Data Cockpit Feedback." The teaching team convened bi-weekly pedagogical seminars to deliberate on micro-adjustments to instructional pace and task difficulty based on process data logs and diagnostic platform feedback.

6.3 Practicum Components and Observation Points

During implementation, the project team compiled and organized the operational practices, instructor observation focus areas, and identified bottlenecks across all practicum components (Table 2).

Table 2 Summary of School-Based Practicum Components, Observation Points, and Reflections in Intercultural Communication

Practicum Component	Typical Practices	Instructor Observation Points	Identified Bottlenecks and Challenges
Case Repository Construction	Developed multiple authentic project cases across international business, international protocol and etiquette, and intercultural conflicts, integrating audio-visual media, bilingual scripts, and task cards.	Real-world relevance to foreign affairs positions; efficacy in triggering vibrant classroom debates on cultural conflicts.	Slower update frequency for certain cases; potential copyright licensing risks for a few cases involving real corporate practices.
Three-Phase Five-Step Training	Implemented the "Pre-class Orienting – In-class Five-Step (Orient–Instruct–Practice–Explore–Evaluate) – Post-class Transfer" chain, conducting human–machine speech drills in smart classrooms.	Students' willingness to speak in class, engagement in group role-plays, and impromptu adaptability in conflict scenarios.	Tendency toward superficial "platform check-ins" among a minority of academically weaker students; uneven pre-class preparation quality.
Tripartite Evaluation	Enforced "Process Evaluation (60%) + Summative Evaluation (40%) + Value-Added Bonus (≤10 pts)," leveraging Mosoteach and Chaoxing platforms for non-intrusive behavioral data capture.	Mitigation of anxiety among students with lower starting baselines; protection and stimulation of initiative in classroom inquiry.	Controversy regarding the scientific validity of initial baseline diagnostic standards; equity concerns raised by high-baseline students regarding bonus allocation.

Practicum Component	Typical Practices	Instructor Observation Points	Identified Bottlenecks and Challenges
Data Cockpit	Automatically generated class and individual analytics dashboards and four-dimensional goal attainment charts, delivering weekly diagnostic alert reports to instructors.	Instructors' ability to accurately interpret dashboard analytics and apply insights to adjust subsequent teaching paces and mentoring strategies.	Proliferation of data dimensions increased instructors' cognitive workload in data interpretation; AI feedback lacked precision in evaluating complex emotional nuances.

6.4 Observational Feedback and Reflection on Constraints

Synthesizing classroom observations, student reflective journals, and seminar discussions, the project team observed preliminary qualitative improvements in students' willingness to speak, classroom engagement, and sensitivity toward complex intercultural conflicts. Concurrently, the course team has accumulated considerable assets over recent years in curriculum construction, digital case development, and student competition mentoring, providing essential resource support for enacting this paradigm.

It must be explicitly stated that these preliminary curricular assets and competition accolades should be viewed as foundational environmental conditions facilitating implementation, rather than empirical causal evidence demonstrating the efficacy of this paradigm. Furthermore, qualitative instructor observations have not undergone systematic quantitative measurement and serve strictly as diagnostic clues for future pedagogical refinements.

In the school-based practice, the project team engaged in deep reflection on several underlying bottlenecks: The evaluative precision of smart technologies regarding non-verbal cues (e.g., micro-expressions, kinesics) and deep cultural-emotional resonance remains limited, rendering technology incapable of replacing humanistic mentoring by teachers; Establishing baseline diagnostics for value-added evaluation sparked debates regarding equity, highlighting the need to manage the psychological expectations of high-baseline students reasonably; A small segment of students exhibited utilitarian tendencies toward online learning, engaging in superficial "check-in" behaviors; The aggregation of multi-source data and interpretation of dashboard analytics objectively increased the digital workload borne by instructors.

7 CONCLUSION

The digital-intelligence transformation of higher education constitutes a systemic transformation encompassing educational philosophies, curricular systems, evaluation mechanisms, and pedagogical ecosystems. Grounded in national educational digitalization strategies and the "New Liberal Arts" initiative, this study addressed the bottlenecks of traditional Intercultural Communication courses by constructing a "Data-Intelligence-Driven and Evaluation–Construction Integration" precision teaching paradigm, supported by school-based practical exploration.

7.1 Major Research Contributions

Proposed an Operational Framework for "Data-Intelligence Driving and Evaluation–Construction Integration" at the Curriculum Level. This study demonstrates that big data, AI, and knowledge graphs can reorganize core pedagogical elements. Embedding outcome attainment assessment across goal setting, content delivery, task execution, and outcome evaluation establishes a functional quality closed-loop of "Assessment–Diagnosis–Improvement–Enhancement."

Constructed a "Four-Dimensional Competency" Matrix and a Three-Phase Five-Step Hybrid Training Chain. Deconstructing positional requirements across international careers, the paper articulated four core targets (Language Proficiency, Digital-Intelligence Literacy, Intercultural Communicative Competence, and Comprehensive Qualities). It developed a multimodal case repository and a three-phase, five-step ("Orient–Instruct–Practice–Explore–Evaluate") training chain, bridging knowledge transmission with competency development.

Designed a Tripartite "Process–Summative–Value-Added" Evaluation Scheme. Establishing an assessment model comprising Process Evaluation (60%), Summative Evaluation (40%), and Value-Added Evaluation (Bonus Incentive, ≤10 points), this study attempted to incorporate individual growth into the evaluative scope, offering exploratory insights into alleviating anxiety among lower-baseline learners.

7.2 Research Limitations

The primary limitations of this study are threefold. First, positioned as a framework proposal and descriptive account of school-based practice, the study did not employ a controlled quasi-experimental design. Lacking large-sample verifiable data and inferential statistical testing, it cannot draw causal conclusions asserting that this paradigm unconditionally improves learning outcomes. Second, the practical exploration was confined to specific majors within a single institution, leaving the generalizability and transferability of these findings open to further empirical verification. Third, the evaluative accuracy of current AI tools regarding student emotions and higher-order critical thinking remains insufficient.

7.3 Future Outlook

The research team plans to initiate cross-institutional, multi-sample, long-term quasi-experimental studies, employing validated quantitative instruments and inferential statistics to rigorously test the empirical efficacy of this paradigm. Furthermore, the team will explore the integrated application of AI-Generated Content (AIGC) and Large Language Models (LLMs) across foreign language course clusters, striving to build an adaptive, precision teaching ecosystem for higher foreign language education.

COMPETING INTERESTS

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