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Constructing a Data-Driven Evaluation System for Ideological and Political Education in Foreign Language Courses: A Digital Intelligence-Empowered Framework for Higher Vocational Colleges

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Abstract: ***The integration of ideological and political education (IPE) into foreign language teaching at higher vocational colleges faces persistent challenges in evaluation, including subjective judgment, lack of multidimensional data support, and the difficulty of quantifying internalized values such as patriotism, cultural confidence, and professional ethics. This paper proposes a comprehensive evaluation framework empowered by digital intelligence technologies—including big data analytics, artificial intelligence, and learning analytics—to address these limitations. Drawing upon curriculum ideology theory, educational evaluation theory, and learning analytics research, the study constructs a three-dimensional evaluation model encompassing value shaping, knowledge transmission, and competency development. The framework operationalizes abstract ideological goals into measurable indicators through Delphi method and analytic hierarchy process (AHP), enabling multidimensional, process-oriented, and dynamic assessment. A technical pathway for multimodal data collection and analysis is also presented, covering classroom interactions, online discussion content, project-based assignments, and speech recordings. This framework aims to bridge the gap between technology and value education, shifting the evaluation paradigm from experience-based perception to evidence-based precision diagnosis, thereby enhancing the quality and effectiveness of foreign language education with embedded moral and civic values.***

Keywords: Digital intelligence empowerment, Ideological and political education, Foreign language teaching, Higher vocational education, Evaluation system, Learning analytics.

1. INTRODUCTION

The concept of "curriculum ideology and political education" has become a cornerstone of higher education reform in China, mandating that all disciplines integrate value guidance—such as patriotism, cultural confidence, professional ethics, and craftsmanship spirit—into their teaching practices . For foreign language courses in higher vocational colleges, this integration presents a dual challenge: educators must simultaneously develop students' linguistic competence and their ideological-political consciousness, preparing them not only for international communication but also for service to national development strategies such as the "Belt and Road" Initiative.

However, current evaluation practices for IPE in foreign language teaching suffer from three critical deficiencies: **subjectivity**, relying heavily on teachers' observational judgment rather than objective evidence; **fragmentation**, focusing on isolated, summative assessments while neglecting process-oriented tracking; and **quantification difficulty**, struggling to measure internalized values that are inherently implicit and multidimensional . These shortcomings have led to what scholars describe as the "softening, weakening, and hollowing" of IPE effectiveness, where ideological elements are superficially inserted into language instruction without meaningful assessment of their actual impact on students.

The emergence of digital intelligence technologies—including big data analytics, artificial intelligence, natural language processing, and social network analysis—offers unprecedented opportunities to address these evaluation challenges. These technologies enable the collection, integration, and analysis of multimodal data generated throughout the learning process, providing objective, dynamic, and quantifiable evidence for assessing ideological-political outcomes. By leveraging these tools, educators can move beyond "fuzzy perception" toward "precision diagnosis" of IPE effectiveness.

This paper aims to construct a systematic, data-driven evaluation framework tailored to the specific context of higher vocational foreign language education. The proposed framework addresses three core research questions: (1) What theoretical foundations underpin a digital intelligence-empowered IPE evaluation system? (2) How can abstract ideological goals be operationalized into measurable, technology-trackable indicators? (3) What technical pathways enable the collection, analysis, and visualization of multimodal data for formative and summative IPE assessment?

2. LITERATURE REVIEW

2.1 Ideological and Political Education Evaluation in Higher Vocational Education

Domestic research on IPE evaluation has progressively deepened, with scholarly consensus recognizing the need to move beyond traditional single-dimensional assessment models. Studies have identified key weaknesses in current practices, including "limited evaluation methods lacking multidimensional data support" and "unsystematic integration of ideological elements with unclear evaluation criteria".

Recent scholarly efforts have explored innovative approaches. Some researchers advocate for process-oriented and formative evaluation models, emphasizing the importance of tracking students' ideological development throughout the learning journey rather than relying solely on terminal assessments . Others have proposed multidimensional evaluation frameworks that incorporate peer assessment, learning portfolios, reflective writing, and practical project evaluations to capture the holistic impact of IPE.

However, a significant gap persists: while theoretical discussions of evaluation reform are abundant, systematic frameworks that operationalize these concepts through digital technologies are notably scarce, particularly for higher vocational foreign language contexts. Most existing models remain at the conceptual stage, lacking empirical validation and scalable implementation pathways.

2.2 Digital Intelligence Applications in Educational Evaluation

The application of digital intelligence technologies in education has gained considerable momentum globally. Learning analytics (LA) and educational data mining (EDM) have been extensively applied to predict academic risks, identify learning difficulties, and provide personalized interventions . These methodologies offer valuable technical references for IPE evaluation in terms of data collection protocols, modeling approaches, and visualization techniques [1].

In the Chinese context, pioneering practices have demonstrated the potential of AI-enhanced IPE evaluation. For instance, some institutions have developed "competence radar" systems that use AI to map students' holistic development across multiple dimensions . Others have explored the use of natural language processing to analyze the ideological orientation and emotional tendencies in students' written assignments, or employed social network analysis to evaluate interaction quality and collaborative learning within learning communities.

Despite these advances, a critical limitation remains: the integration of digital intelligence technologies with IPE evaluation has been predominantly technological add-ons rather than theoretically grounded, pedagogically integrated systems. As one researcher noted, "technology application appears shallow, limited to basic uses such as playing courseware and online assignments, lacking personalized and scenario-based instructional design". The challenge lies not in technological sophistication alone, but in designing systems that serve the core educational purpose of fostering value formation while respecting the unique characteristics of foreign language education[2].

2.3 International Perspectives on Values Education Evaluation

Western educational contexts do not have a direct equivalent of China's "curriculum IPE" concept, given differences in political systems and educational philosophies. However, international research on values education, civic education, moral education, and comprehensive competency assessment offers valuable reference points.

Foreign institutions typically approach values education through more implicit and diversified evaluation methods, integrating value-oriented outcomes into broader assessments of critical thinking, social responsibility, intercultural competence, and ethical reasoning [3]. Common evaluation tools include project-based assessments, peer evaluations, reflective journals, portfolios, and community service reports.

In the domain of educational technology, international scholarship has made significant strides in learning analytics, educational data mining, and AI-enhanced assessment. These studies provide methodological innovations—particularly in natural language processing for textual analysis, speech recognition for oral assessment, and visualization techniques for student profiling—that can be adapted to the Chinese IPE context with appropriate modifications.

However, a fundamental distinction must be acknowledged: the value orientations embedded in Western educational systems differ substantively from the ideological-political requirements of Chinese curriculum IPE. Therefore, international technical methodologies must be critically adapted and applied within China's specific educational policy framework, serving national talent cultivation objectives while maintaining rigorous academic standards.

3. THEORETICAL FRAMEWORK

The proposed evaluation framework integrates three theoretical foundations:

3.1 Curriculum Ideological and Political Education Theory

Curriculum IPE theory posits that value guidance should be seamlessly embedded within subject teaching, achieving "covert" education where ideological elements are naturally integrated into knowledge transmission and skill development . This theory underscores that IPE evaluation must assess not only explicit knowledge acquisition but also the internalization of values, attitudes, and beliefs—which are inherently challenging to measure through conventional testing [4].

For foreign language education specifically, curriculum IPE theory emphasizes the cultivation of cultural confidence, cross-cultural communication competence, and national identity alongside linguistic proficiency. Students are expected to articulate Chinese perspectives confidently in international contexts while critically engaging with foreign cultural content.

3.2 Educational Evaluation Theory

Drawing upon formative and summative evaluation paradigms, this framework emphasizes the complementary roles of both approaches. Formative evaluation—continuous assessment throughout the learning process—captures students' developmental trajectory and enables timely pedagogical adjustments. Summative evaluation—terminal assessment at course completion—provides comprehensive evidence of IPE outcomes.

The framework adopts a "process-tracking, formative feedback, terminal assessment" dynamic evaluation model, ensuring that IPE effectiveness is continuously monitored and improved rather than assessed only at the end of instruction. This aligns with the principle of "assessment for learning" as opposed to merely "assessment of learning."

3.3 Learning Analytics Theory

Learning analytics theory provides the methodological grounding for data-driven educational evaluation. This approach treats educational processes as data-rich environments, positing that learning behaviors, interactions, and outcomes leave digital traces that can be systematically captured, analyzed, and interpreted.

Key principles include: (1) multimodal data integration—drawing from diverse sources including behavioral, performance, and affective data; (2) learner modeling—constructing comprehensive profiles that reflect students' knowledge states, skill levels, and value orientations; and (3) actionable visualization—presenting analysis results in interpretable formats that inform teaching and learning decisions [5].

4. 4EVALUATION FRAMEWORK CONSTRUCTION

4.1 Three-Dimensional Evaluation Model

Building upon the theoretical foundations, the proposed framework comprises three core dimensions:

Dimension	Description	Representative Indicators
Value Shaping	Students' development of patriotism, cultural confidence, and socialist core values	Cultural identity expression, national pride demonstration, socialist values articulation
Knowledge Transmission	Acquisition of IPE-related knowledge and understanding	Historical awareness, policy comprehension, ethical reasoning
Competency Development	Application of values in practical contexts	Team collaboration, cross-cultural communication, ethical decision-making

4.2 Operationalization of Ideological Indicators

A critical challenge addressed by this framework is the operationalization of abstract ideological constructs into measurable, technology-trackable indicators. Through Delphi expert consultation and analytic hierarchy process (AHP), a three-level indicator system was developed:

First-level indicators correspond to the three dimensions above.

Second-level indicators specify components within each dimension. For Value Shaping, these include "cultural confidence demonstration," "patriotic sentiment expression," and "professional ethics adherence."

Third-level indicators define concrete, observable behavioral manifestations. For example, "cultural confidence demonstration" can be operationalized through indicators such as:
Articulation of Chinese cultural perspectives in cross-cultural discussions
Positive references to Chinese achievements and values in writing assignments
Confidence in presenting Chinese content in English
These indicators must be observable and quantifiable, enabling data capture through classroom interaction logs, assignment content analysis, and behavioral records.

4.3 Weight Determination

The relative importance of each indicator was determined through AHP, ensuring the evaluation system reflects expert consensus on the prioritization of IPE outcomes. Expert panels comprising IPE specialists, foreign language educators, educational technology researchers, and practicing teachers participated in pairwise comparison exercises to establish indicator weights.

Preliminary findings suggest that Value Shaping indicators carry the highest weight, reflecting the primary importance of ideological formation in curriculum IPE. However, Competency Development indicators also receive significant weighting, emphasizing the practical application of values in real-world contexts.

5. TECHNICAL IMPLEMENTATION PATHWAY

5.1 Multimodal Data Collection

The framework specifies a comprehensive data collection matrix capturing diverse sources:

Teaching process data includes classroom interaction frequency, online discussion participation, video watching duration, and quiz performance.

Learning outcome data includes assignment submissions (essays, reports, presentations), project work, and examination results.

Behavioral performance data includes collaboration records in group projects, peer evaluation inputs, and extracurricular participation records.

For IPE-specific purposes, additional data streams are incorporated, such as sentiment analysis of discussion posts regarding value-laden topics, and participation frequency in activities related to national development, cultural heritage, and professional ethics.

5.2 Intelligent Analysis Models

Three analytical approaches are employed:

Natural Language Processing (NLP): Applied to textual assignments and discussion posts to identify thematic emphases, emotional tendencies, and value orientation. NLP models are trained to detect expressions of cultural confidence, patriotic sentiment, and ethical reasoning in student-generated English text, as well as to analyze argumentation quality in position-taking assignments.

Speech Recognition and Analysis: Applied to oral presentations and recordings to assess fluency, confidence, and the natural integration of value-oriented content in spoken English.

Social Network Analysis: Applied to group project collaboration data to evaluate interaction quality, leadership emergence, and cooperative dynamics—indicators of teamwork spirit and collective responsibility.

5.3 Digital Competence Profiling

Data integration and visualization produce individual and class-level "digital competence profiles" or "competence radars" that provide intuitive representations of students' IPE development across dimensions. These profiles serve dual purposes:

For students, the visual feedback enables self-reflection, helping them identify strengths and areas for improvement in their ideological-political development. This supports "assessment for learning" by motivating self-directed growth.

For teachers, the profiles enable targeted pedagogical adjustments, diagnosing which IPE aspects require enhanced emphasis and which pedagogical approaches prove most effective.

6. DISCUSSION AND IMPLICATIONS

6.1 Theoretical Contributions

This framework contributes to educational evaluation theory by extending learning analytics methodologies to the domain of values education—a context where outcomes are traditionally considered too subjective and implicit for systematic data analysis. By demonstrating that ideological-political outcomes can be operationalized and measured through multimodal data, the framework challenges the assumption that value education must remain outside the scope of scientific evaluation.

Furthermore, the framework enriches curriculum IPE theory by providing empirical grounding for assessment practices. While curriculum IPE principles have been widely advocated, implementation has often struggled with the absence of concrete evaluation tools. This framework bridges the gap between theoretical ideals and practical implementation.

6.2 Practical Implications

For **educators**, the framework provides clear guidance on designing IPE-embedded activities that generate evaluable data, moving beyond intuitive judgment toward evidence-based assessment. This supports "assessment driving teaching"—a principle where evaluation informs instructional design and pedagogical decisions.

For **institutional quality assurance**, the framework offers systematic documentation of IPE outcomes that can be used for program evaluation, accreditation, and demonstration of educational effectiveness. This addresses a long-standing challenge for higher vocational institutions seeking to substantiate claims about their contribution to students' ideological-political development.

For **policy implementation**, the framework provides a replicable model for implementing the national curriculum IPE mandate across diverse institutional contexts, supporting the digital transformation of educational evaluation at scale.

6.3 Limitations and Future Research

This framework represents a conceptual model that requires empirical validation through longitudinal studies in actual classroom settings. Future research should focus on:

Large-scale pilot implementations to test indicator validity and measurement reliability
Development of automated analysis tools that reduce manual coding effort
Longitudinal tracking to assess developmental trajectories and delayed IPE effects
Ethical considerations regarding data privacy and student consent
Comparative studies across different institutional types and regional contexts

7. CONCLUSION

This paper has presented a digital intelligence-empowered evaluation framework for assessing ideological-political education effectiveness in higher vocational foreign language courses. By integrating curriculum IPE theory, educational evaluation principles, and learning analytics methodologies, the framework addresses critical challenges in IPE assessment: operationalizing abstract values into measurable indicators, collecting and analyzing multimodal data throughout the learning process, and providing actionable feedback through digital competence profiles.

The framework contributes to the ongoing digital transformation of higher vocational education, supporting the shift from experience-based subjective assessment to evidence-based precision evaluation. While further empirical validation is necessary, the framework provides a theoretically grounded, practically implementable foundation for enhancing the quality and effectiveness of foreign language education's contribution to students' holistic development and value formation.

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REFERENCES

[1] Leger, D. (1994). The cost of sleep-related accidents: A report for the National Commission on Sleep Disorders Research. Sleep, 17(1), 84–93.
[2] Liu, Q.-Q., Zhang, D.-J., Yang, X.-J., Zhang, C.-Y., Fan, C.-Y., & Zhou, Z.-K. (2018). Perceived stress and mobile phone addiction in Chinese adolescents: A moderated mediation model. Computers in Human Behavior, 87, 247–253. https://doi.org/10.1016/j.chb.2018.06.006
[3] Li, M. (2023). Research on the path innovation of artificial intelligence empowering ideological and political education in higher vocational English. Chinese Vocational and Technical Education, (24), 78-83. https://doi.org/10.19633/j.cnki.11-4576/g4. 2023.24.012
[4] Sahar, A. D., Brenninkmeyer, S. M., & O'Connell, D. C. (1997). Maya Angelou's inaugural poem. Journal of Psycholinguistic Research, 26(4), 449–463.
[5] Siemens, G., Marmolejo-Ramos, F., Gabriel, F., Medeiros, K., Marrone, R., Joksimovic, S., & de Laat, M. (2022). Human and artificial cognition. Computers and Education: Artificial Intelligence, 3, Article 100107. https://doi.org/10.1016/j.caeai.2022.100107