

# Pathways for the Digital Transformation of Foreign Language Teaching in Smart Education

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**Abstract:** Based on the core connotations of smart education—"intelligence, digitalization, personalization, and diversification"—and combined with the disciplinary characteristics and talent cultivation goals of foreign language teaching, this paper systematically sorts out the main characteristics and core challenges of the digital transformation of foreign language teaching. From six dimensions—"reshape teaching concepts, build a technical foundation, reconstruct resource systems, reconstruct resource systems, optimize evaluation systems, and improve guarantee mechanisms"—it constructs the pathways for the digital transformation of foreign language teaching in smart education. The research aims to promote the in-depth integration of digital technology with the entire process of foreign language teaching, address the dilemmas in the digital transformation of foreign language teaching, build an intelligent foreign language teaching ecology, and improve teaching quality and talent cultivation effectiveness. It also provides practical guidance for cultivating compound foreign language talents with cross-cultural communication competence and digital literacy.

**Keywords:** Smart Education; Foreign Language Teaching; Digital Transformation; Characteristics; Challenges; Pathways

## 1. Introduction

With the rapid iteration of digital technologies such as artificial intelligence, big data, and virtual reality, the field of education is undergoing a profound transformation from informatization to smartization. Smart education is a new form of education in the digital age [1], driven by data, supported by technology, and centered on talent cultivation. It is committed to building a personalized, ubiquitous, and intelligent educational ecology. Its core essence is highly consistent with the goals of foreign language teaching, which are "cultivating cross-cultural communication competence, broadening international horizons, and shaping humanistic literacy", making it a core force leading the future development of education [2]. Currently, foreign language teaching faces traditional dilemmas such as students' uneven foundations, lack of practical scenarios, rigid teaching models, and single evaluation methods. Digital transformation has become a key grasp to solve these problems.

The national strategy for educational digitalization clearly proposes to promote the in-depth integration of information technology with education and teaching, and accelerate the construction of a smart education system. Through digital transformation, foreign language teaching can realize the organic combination of language knowledge transmission and competence cultivation, which is not only an inevitable requirement of educational modernization but also an important path to cultivate compound talents adapting to the needs of global competition and the digital age. Although some universities have carried out exploratory practices on the digital transformation of foreign language teaching and accumulated valuable experience, most universities still face common problems such as superficial application of technology, insufficient adaptability of resources, and weak digital literacy of teachers in the digitalization of foreign language teaching. Based on this, this paper systematically explores the effective pathways for the digital transformation of foreign language teaching, provides support for promoting the high-quality development of foreign language education, and enables students to improve their comprehensive foreign language application abilities in an intelligent and contextualized learning environment, so as to adapt to the needs of cross-cultural communication in the digital age.

## **2. Main Characteristics of the Digital Transformation of Foreign Language Teaching**

Under the background of smart education, the digital transformation of foreign language teaching presents systematic transformation characteristics, which are reconstructing the ecology of teaching and learning, and promoting the development of foreign language teaching from the traditional model to intelligence, personalization, and ubiquitousness.

### ***2.1 Intelligent Teaching Environment***

The teaching environment is the basic space for the development of teaching activities. Under the background of smart education, the foreign language teaching environment is transforming from the traditional classroom to an intelligent environment [3]. The core characteristics of the intelligent environment are data-driven and adaptive. It can collect learning behavior data in real time, automatically adjust the push of learning resources and the planning of learning paths, and provide environmental support for personalized learning. The intelligent environment also supports various ways such as collaborative learning and inquiry-based learning, and promotes in-depth interaction between teachers and students, and among students through intelligent grouping and interactive tools.

### ***2.2 Digital Teaching Content***

Teaching content is the core element of teaching activities. Digital transformation promotes the transformation of foreign language teaching content from paper textbooks to a digital resource system. Digital teaching content has the characteristics of multimodality, dynamism, and interactivity. The presentation form of teaching content is diversified, the sources are more abundant, it has the characteristic of dynamic update, and it is interactive. In addition, digital content supports personalized customization, and can push adaptive learning resources according to students' learning levels and interests, laying a foundation for teaching students in accordance with their aptitude.

### ***2.3 Personalized Teaching Process***

The teaching process is the implementation link of teaching activities. Digital transformation promotes the transformation of foreign language teaching from unification and standardization to personalization and differentiation. The core of personalized teaching is to provide each student with customized learning paths, resource recommendations, and learning support based on learning data analysis [4]. Personalized teaching emphasizes student-centeredness, respects students' individual differences, and stimulates learning initiative. Personalization does not mean complete autonomy; teachers play a key role in ensuring the effectiveness of personalized learning.

### ***2.4 Diversified Teaching Evaluation***

Teaching evaluation is an important means to test teaching effects and promote teaching improvement. Digital transformation promotes the transformation of foreign language teaching evaluation from singleness and summativeness to diversification and process orientation. The multi-evaluation system includes multiple dimensions such as diverse evaluation content, diverse evaluation methods, and diverse evaluation subjects. The core value of multi-evaluation lies in comprehensively and objectively reflecting the level of student development and promoting the improvement of teaching and learning. The multi-evaluation system needs to be coordinated with teaching goals, teaching content, and teaching processes to form a virtuous circle.

### ***2.5 Transformed Teacher Roles***

Teachers are the organizers and guides of teaching activities. Digital transformation promotes the transformation of foreign language teachers' roles from knowledge transmitters to multiple roles. This role transformation is the result of the joint action of technology empowerment, the reform of educational concepts, and the innovation of teaching methods. Technology cannot replace teachers; teachers also need to assume roles such as data interpreters, learning diagnosticians, and professional developers. Role transformation puts forward higher requirements for teachers' professional literacy, requiring teachers to continuously learn new technologies and concepts and improve their teaching innovation capabilities.

### **3. Core Challenges of the Digital Transformation of Foreign Language Teaching**

In the actual promotion process, the digital transformation of foreign language teaching still faces many challenges, which not only restrict the depth and breadth of digital transformation but also affect the effective implementation of smart education concepts in foreign language teaching. An in-depth analysis of these core challenges provides a targeted basis for pathway design.

#### ***3.1 Lagging Transformation of Teaching Concepts***

Some foreign language teachers still adhere to the knowledge-infusion teaching concepts, have cognitive biases towards the core essence of digital transformation, and fail to deeply understand the connotation of the in-depth integration of technology with education and teaching. In practice, most teachers only use digital technology as a simple auxiliary teaching tool for superficial links such as playing courseware and assigning homework, and fail to integrate digital thinking into the entire process of teaching goal setting, content design, process implementation, and evaluation feedback. This formalistic tendency makes it difficult to give full play to the advantages of technology, and the teaching model still stays within the traditional framework, which cannot adapt to the precise talent cultivation orientation of smart education, affecting the overall quality of digital transformation.

#### ***3.2 Uneven Digital Literacy of Teachers***

The digital capabilities of the foreign language teacher team show a distinct polarization trend. A few young teachers have digital technology application capabilities and can skillfully use data analysis tools to carry out precise teaching. However, many middle-aged and elderly teachers lack systematic digital teaching skills training and have insufficient application capabilities in intelligent evaluation systems, AI-assisted teaching tools, VR immersive teaching technologies, etc. At the same time, some teachers lack data-driven teaching thinking and find it difficult to optimize teaching design and carry out personalized tutoring by analyzing student learning data. This uneven digital literacy makes it difficult to fully promote digital teaching models, and the digital transformation falls into a stagnant predicament.

#### ***3.3 Insufficient Adaptability of Teaching Resources***

There is a large number of digital foreign language teaching resources, but they generally have the problems of homogenization and fragmentation. Most of them are electronic replicas of traditional textbooks, lacking innovation and pertinence. These resources fail to fully combine the learning foundations and cognitive characteristics of students at different levels, nor do they adapt to the talent cultivation positioning of different universities. Whether it is academic English teaching in universities, vocational English teaching in higher vocational colleges, or foreign language enlightenment teaching in basic education, there is a lack of exclusive characteristic resources. In addition, the supply of digital resources for cross-cultural communication is insufficient, and the update and iteration speed of resources lags behind the development of language and teaching reform, which cannot provide strong support for personalized teaching.

#### ***3.4 Single Teaching Evaluation System***

The foreign language teaching in most universities still takes the final exam as the core evaluation basis, with a too high proportion of summative evaluation and inadequate implementation of formative evaluation. This single evaluation model only focuses on the mastery of language knowledge, ignoring the evaluation of students' core competencies such as language application ability, cross-cultural communication ability, and digital literacy. At the same time, due to the lack of effective use of digital evaluation tools, it is impossible to collect dynamic data of students' entire learning process in real time, making it difficult to accurately capture learning progress, ability shortcomings, and growth changes. The evaluation feedback is lagging and lacks pertinence, which can neither provide a reference for teachers to optimize teaching nor fully stimulate students' enthusiasm.

#### ***3.5 Inadequate Support from Guarantee Mechanisms***

At the policy level, some regions and universities lack coordinated policy guidance, the goals, tasks, and pathways of digital transformation are not clear enough, the division of responsibilities among

various departments is not clear, and there is a phenomenon of buck-passing and shirking of responsibilities. In terms of funding investment, the guarantee of special funds is insufficient, which is difficult to support key work such as the upgrading of intelligent teaching facilities, the development of digital resources, and the training of teachers' digital literacy. The hardware facilities of some grass-roots universities are outdated, which cannot meet the basic needs of digital teaching. In addition, data governance and ethical norms are not perfect, the mechanisms for educational data security and privacy protection are inadequate, and the collaborative linkage mechanism among multiple subjects is missing, which exacerbates the difficulty of promoting digital transformation.

#### **4. Pathways for the Digital Transformation of Foreign Language Teaching for Smart Education**

The pathway of digital transformation should run through the entire teaching process and cover all aspects of guarantee. It is necessary to make precise breakthroughs from six dimensions: concepts, technology, resources, models, evaluation, and guarantee. Only by addressing the current transformation bottlenecks and building an intelligent foreign language teaching ecology based on long-term development can the in-depth breakthrough of the digital transformation of foreign language teaching be realized.

##### ***4.1 Reshape Teaching Concepts and Establish a Smart Education-oriented Goal***

First, schools and educational departments should carry out concept training and seminars, organize teachers to thoroughly study smart education theories, student-centered teaching concepts, personalized learning theories, etc. [5], and help teachers understand the connotation and value of digital transformation through expert lectures, case sharing, and workshops. Second, educational institutions should establish a concept-leading mechanism, integrate modern educational concepts into teachers' professional development, teaching evaluation, and school management, and form an institutional guarantee for concept renewal. Third, relevant departments and schools should strengthen the publicity and promotion of concepts, create an atmosphere for concept transformation through the display of excellent cases and experience exchange, and improve teachers' recognition of digital transformation. Fourth, schools should encourage teachers to carry out teaching reflection and practical exploration, guide them to experience the changes brought about by concept transformation in real teaching scenarios, and help them realize the transformation from cognition to behavior. Finally, the whole education field should form a concept system centered on student development, supported by technology empowerment, and dedicated to smart talent cultivation.

##### ***4.2 Build a Technical Foundation and Consolidate the Basis for Digital Teaching***

First, schools should improve infrastructure, build hardware environments such as smart classrooms, language laboratories, and online learning platforms, and realize the intelligent upgrading of teaching spaces. Second, educational departments and schools should promote the application of key technologies, focusing on strengthening the educational application of technologies such as big data, artificial intelligence, virtual reality, and blockchain. They should establish a student learning data collection and analysis system, develop intelligent speech recognition systems, use virtual reality technology to create real language scenarios, and apply blockchain technology to establish a learning achievement certification system. Third, relevant educational authorities should construct unified technical standards and data interfaces, break data silos, and realize the interconnection of educational data. Fourth, schools should strengthen technical operation and maintenance support, establish a professional technical service team, and provide teachers with timely technical support and training. The construction of the technical foundation should adhere to the principles of demand orientation and appropriate advancement, not only meeting the current teaching needs but also reserving space for future development.

##### ***4.3 Reconstruct Resource Systems to Achieve Precise Supply***

First, educational departments at all levels should establish a multi-level linked resource construction mechanism. At the national level, the central educational authority should build a public service platform for foreign language teaching resources; at the regional level, local educational departments should establish regional resource centers; at the school level, schools should encourage teachers to develop school-based resources. Second, relevant departments and schools should

strengthen the quality construction of resources, establish a resource review and update mechanism, and ensure the scientificity, timeliness, and applicability of resources. They should focus on developing diverse resource types such as microcourses, animations, virtual simulations, and corpora. Third, schools and educational technology enterprises should promote precise resource supply, use big data and artificial intelligence technologies to establish intelligent recommendation systems, and push adaptive learning resources according to students' learning levels, interests, and learning progress. Fourth, educational authorities and resource providers should improve the resource sharing mechanism, promote the open sharing of high-quality resources through cloud platforms and resource alliances, and narrow the resource gap between schools. Fifth, schools and educational departments should strengthen the introduction of high-quality international resources, enrich resource content, and broaden students' international horizons.

#### ***4.4 Innovate Teaching Models and Promote Human-machine Collaborative Education***

First, teachers should construct a student-centered blended teaching model, organically combining online autonomous learning with offline interactive teaching. Second, schools and teachers should promote personalized teaching, and provide each student with customized learning paths, resource recommendations, and learning support based on learning data analysis. They should realize teaching students in accordance with their aptitude through technologies such as intelligent diagnosis and adaptive learning. Third, teachers should explore human-machine collaborative teaching methods, where teachers and intelligent systems perform their respective duties and complement each other's advantages. Intelligent systems are responsible for repetitive work such as knowledge transmission, exercise feedback, and data collection, while teachers focus on work such as personalized guidance, emotional support, and value guidance. Fourth, teachers should strengthen collaborative learning and inquiry-based learning, and promote in-depth interaction and knowledge construction among students through online collaborative tools and virtual learning communities. The innovation of teaching models requires teachers to transform their roles, and at the same time requires the collaborative support of multiple elements such as technology, resources, and evaluation.

#### ***4.5 Optimize Evaluation Systems to Achieve Comprehensive and Precise Evaluation***

First, educational departments and schools should establish an evaluation content system for core competencies, which not only focuses on the mastery of language knowledge but also attaches importance to comprehensive competencies such as language application ability, cross-cultural communication ability, learning strategies, and cooperative ability. Second, teachers and educational institutions should promote the diversification of evaluation methods, combining formative evaluation with summative evaluation, and quantitative evaluation with qualitative evaluation. They should focus on strengthening formative evaluation, and use learning platforms to record learning process data to realize the continuous monitoring of the learning process. Third, schools and teachers should expand evaluation subjects, and establish a multi-subject evaluation system involving teacher evaluation, student self-evaluation, and peer evaluation [6]. Fourth, educational departments and schools should strengthen the application of intelligent evaluation technologies, and use technologies such as speech recognition, natural language processing, and learning analysis to improve evaluation efficiency and scientificity. Fifth, teachers should strengthen the application of evaluation results, and use evaluation results for teaching improvement, learning diagnosis, and student development guidance to form a full-process virtuous circle.

#### ***4.6 Improve Guarantee Mechanisms to Ensure Orderly Progress of Transformation***

First, educational authorities at all levels should strengthen policy guarantees, issue policy documents supporting the digital transformation of foreign language teaching, and clarify development goals, key tasks, and guarantee measures. They should establish a supervision and evaluation mechanism, regularly check the progress of transformation, and ensure the implementation of various measures. Second, governments and educational departments should increase capital investment, set up special funds to support projects such as digital resource construction, teacher training, and technology application, and ensure the sustainability and effectiveness of capital investment. Third, schools should improve organizational guarantees, establish an inter-departmental coordination mechanism, clarify the division of responsibilities among academic affairs, technology, and teaching and research departments, and form a working pattern of collaborative promotion. Fourth, educational departments and schools should improve institutional guarantees, establish mechanisms such as teacher digital literacy

assessment and evaluation mechanisms, resource construction incentive mechanisms, and data security management systems to provide institutional support for transformation. Fifth, relevant departments and schools should strengthen security guarantees, establish data security and privacy protection mechanisms, ensure information security, and ensure the orderly progress and sustainable development of transformation.

## 5. Conclusions

The digital transformation of foreign language teaching in smart education is a systematic project involving multiple dimensions such as concepts, technology, resources, models, evaluation, and guarantee. Its core is to empower by digital technology, address the dilemmas of traditional foreign language teaching, build a personalized, intelligent, and ecological new foreign language teaching system, and cultivate compound foreign language talents adapting to the needs of the digital age and globalization. In the future, the digital transformation of foreign language teaching will move towards a more precise, intelligent, and in-depth direction. Foreign language teachers need to actively adapt to technological changes and the needs of the times, continuously explore new pathways and methods for digital transformation, promote the high-quality development of foreign language education, and cultivate foreign language talents meeting the needs of the times.

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## References

- [1] Y. Xuan. *The Reconstruction of the Teaching Ecosystem in the Context of Smart Education*[J]. *Educational materials*, 2025, 68(24): 204-206.
- [2] P. Zheng, Q. J. Xie, J. C. Zhang, et al. *Challenges and Strategies for Teaching Method Reform in Higher Education Institutions Under the Background of Smart Education*[J]. *Journal of Heilongjiang Institute of Teacher Development*, 2026, 45(01): 62-65.
- [3] L. J. He. *Research on the Cultivation Strategy of College English Teachers' Literacy in the Era of Smart Education*[J]. *Journal of Science and Education*, 2025, 22(20): 41-44.
- [4] Y. Wu, W. J. Li, X. Liu, et al. *The Evolution and Trend Outlook of Smart Education Research*[J]. *Journal of Xi'an Jiaotong University(Social Sciences)*, 2025, 45(06): 37-45.
- [5] J. Li. *Exploring the Digital Transformation Pathway of College English Courses Under the Background of Smart Education*[J]. *Journal of Changchun Normal University*, 2025, 44(01): 175-178.
- [6] Q. H. Chen, Y. H. Tu. *Smart Education Empowering the Digital Transformation of Teaching in Higher Education*[J]. *Education and Examinations*, 2025, 20(03): 64-70+77.