

An Analysis of Challenges and Implementation Pathways for AI Integration in Primary School Chinese Language Teaching

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Abstract: As artificial intelligence technology accelerates its penetration into the field of basic education, AI integration in primary school Chinese language teaching has become a core issue in deepening curriculum reform. However, the overall deficiency in teachers' digital literacy, the quality imbalance of intelligent educational resources, and the serious lag of process-based evaluation systems collectively constrain the substantive improvement of integration quality and effectiveness. By clarifying the structural causes of these challenges, this paper proposes implementation pathways from three dimensions: constructing a tiered training mechanism, optimizing subject-centered resource integration, and reshaping a data-driven evaluation system, aiming to promote AI genuinely serving the cultivation of core competencies in primary school Chinese language teaching.

Keywords: AI Integration; Primary School Chinese Language Teaching; Core Competencies; Digital Literacy; Implementation Pathways

1. Introduction

The 2022 edition of the Compulsory Education Chinese Language Curriculum Standards explicitly incorporated the concept of integrating information technology into Chinese language teaching into the curriculum implementation recommendations, and the Ministry of Education's Education Informatization 2.0 Action Plan also emphasizes that AI education must move from the shallow application of technological tools toward the deep shaping of thinking modes. Against the backdrop of "educational digital transformation" being listed as a national strategy, and artificial intelligence being incorporated into the overall framework of national core competitiveness building, theoretical exploration and practical advancement of AI integration in primary school

Chinese language teaching are accelerating, yet whether the introduction of technology can truly translate into substantive gains for subject competency cultivation fundamentally depends on a clear assessment of integration challenges and scientific design of implementation pathways.

2. The Real Challenges of AI Integration in Primary School Chinese Language Teaching

2.1 Uneven Teacher Digital Literacy Constrains the Deep Integration of Technology

As the core agents of AI-integrated teaching, teachers' digital pedagogical competence directly determines the depth and breadth of technology application. Judging from the current state of primary school Chinese language classrooms, the teacher group presents a marked polarization in the application of AI tools — some younger teachers with stronger technological foundations are able to initially master intelligent lesson planning platforms and natural language processing auxiliary tools, while a considerable number of middle-aged and older teachers, limited by an inherent lack of digital exposure experience, tend to stop at the superficial level of using multimedia devices to play videos, unable to truly activate the subject-empowerment potential of AI tools^[1]. More worthy of attention is that even teachers who possess operational skills generally exhibit a deep-seated contradiction of "having technology, but lacking instructional design," that is, treating the introduction of AI tools as an end in itself rather than as an organic means serving the cultivation of language application ability, leading to the alienating phenomenon of technology overshadowing the core learning objectives in the classroom, while the implementation of core competencies is instead marginalized, the fundamental problem reflected by this challenge is that the current teacher training system has not yet established a professional development

pathway that deeply integrates technological capability with subject pedagogy, and purely operational training cannot bridge the structural gap between technical literacy and pedagogical wisdom.

2.2 Uneven Quality of Instructional Resources Weakens Classroom Application Effectiveness

The volume of AI-assisted resources available on the internet for primary school Chinese language teaching is enormous but quality is highly dispersed, some intelligent question bank platforms' items lack precise alignment with the grade-level objectives of curriculum standards, and the reading comprehension questions provided include some that are excessively simplistic as well as some that seriously exceed the cognitive range of the grade level, making it difficult to achieve graduated development of students' thinking abilities, now that AI-generated content is widely applied in courseware production, resources with non-standard language expression or even factual inaccuracies appear from time to time, and the potential negative impact on elementary school students who are in the critical period of constructing their mother tongue language sense should not be underestimated. Meanwhile, intelligent resources targeting regional culture and school-based curriculum content are severely lacking, AI platforms generally tend toward large-scale supply of generic content with almost no deep development of Chinese language teaching materials with local characteristics, which objectively weakens the practical depth of the cultural confidence cultivation dimension in Chinese language teaching. It is further worth pointing out that the problem of resource quality is by no means a purely technical production problem; it reflects a deep misalignment between the commercialized logic of current AI education platforms and the specialized demands of subject disciplines — platform developers pursue rapid expansion of content scale while professional involvement in subject pedagogy is

often insufficiently valued, resulting in the subject appropriateness of vast resources remaining long in a gray zone where no one keeps watch^[2].

2.3 Severely Lagging Evaluation Mechanisms Are Insufficient to Support Intelligent Teaching Transformation

The current primary school Chinese language evaluation system is still dominated by summative examinations, with almost no effective means of capturing process-oriented indicators such as students' thinking trajectories displayed in the AI-assisted learning process, language generation ability, and changes in aesthetic perception, etc. There is a fundamental structural tension between this evaluation logic and the personalized learning pathways pursued by AI-integrated teaching — when teachers design differentiated learning tasks for students at different learning levels with the help of intelligent platforms, if the evaluation dimensions remain singular and fixed, the innovative investment in instructional design will inevitably fail to be reflected in quantifiable effectiveness indicators, thereby weakening teachers' intrinsic motivation to deeply advance AI integration^[3]. Furthermore, schools generally lack the professional capacity to convert AI learning behavior data into the basis for instructional decisions, large volumes of valuable process data have long been in a dormant state, and the institutionalized operation of data-driven evaluation has not yet been truly established, the deeper contradiction lies in the fact that the lag of evaluation reform does not stem solely from technological constraints; relevant educational administration departments have not yet formed systematic institutional arrangements for the recognition standards and usage norms of process-based evaluation results, which causes evaluation innovation at the school level to often lack sufficient institutional endorsement, making it difficult to move from individual experiments to routine promotion (As shown in Figure 1).

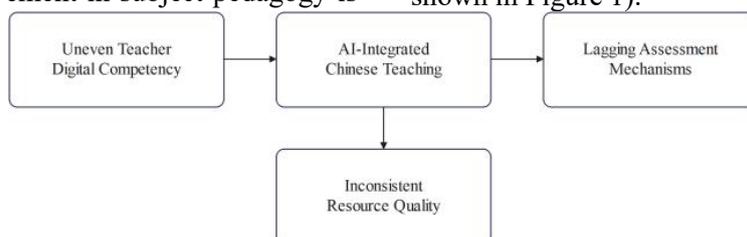


Figure 1. Three Core Challenges in AI-Integrated Chinese Language Teaching

3. An Analysis of the Causes of Problems in AI Integration in Primary School Chinese Language Teaching

3.1 Absence of Top-Level Design Leads to Vague Implementation Pathways

Although the national level has established the strategic direction of educational digital transformation through a series of policy documents, specific operational norms and quality assessment standards for AI integration in the primary school Chinese language subject are currently still lacking, and the vast majority of schools lack a subject-specific implementation framework to reference when advancing AI-integrated teaching. Teachers tend to rely on personal experience for tentative exploration rather than advancing in a standardized manner based on systematic professional support, which causes the overall practice to exhibit fragmented characteristics and a fragmented pattern of each going its own way, making it difficult to form a unified force. Meanwhile, training standards for teachers' AI-integrated teaching competence have not yet been refined and implemented at the subject level, and there is an obvious disconnect between general information technology training

and Chinese language teaching practice, making it difficult to convert training investment into visible improvements in classroom quality.

3.2 Inherent Tension Exists Between Technological Logic and Subject Logic

The core value of the Chinese language subject lies in the perceptive quality of language and the experiential nature of humanistic meaning, which has a natural cognitive misalignment with the structured analysis and standardized processing at which AI technology excels. Over-reliance on the quantitative feedback of AI tools tends to reduce Chinese language learning to a computable sequence of skill training, while concealing the non-quantifiable dimensions involving emotional resonance and cultural identity^[4]. Some teachers exhibit a marked tendency toward "technological worship" when introducing AI tools, equating the frequency of technology use with the depth of teaching innovation, while ignoring the humanistic dialogic relationship between teachers and students in Chinese language education that cannot be replaced by algorithms, and this cognitive bias fundamentally constrains the full realization of the educational value of AI integration (As shown in Figure 2).

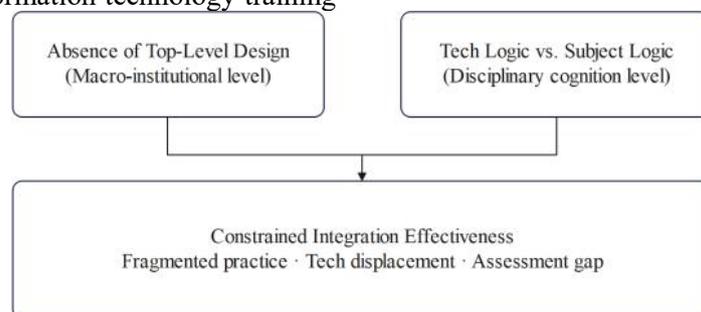


Figure 2. Structural Causes of AI-Integration Challenges

4. Feasible Implementation Pathways for AI Integration in Primary School Chinese Language Teaching

4.1 Constructing a Tiered Training Mechanism to Enhance Teachers' Digital Pedagogical Competence

The design of teacher professional development pathways should break through the traditional uniform training model and shift toward a tiered advancement mechanism based on competency diagnosis. For teacher groups with a weak technological foundation, the training focus should be on the operational norms of intelligent

tools and case-based application in teaching scenarios, lowering the psychological threshold for technology entry through "mentor-apprentice" paired practice; for teachers who already possess basic operational capabilities, the focus should be on deeply integrating AI tools with Chinese language subject pedagogy, guiding them to shift from the tool-oriented thinking of "using AI to teach Chinese language" toward the subject-specific thinking of "commanding AI with the logic of Chinese language." Schools should regularly organize lesson study activities on AI-integrated teaching, refine high-quality integrated teaching practices into replicable school-based case

resources, and use these as the core to continuously nourish the growth of professional learning communities, enabling teachers to achieve the coordinated advancement of technological literacy and subject wisdom in authentic teaching contexts^[5]. Particularly important is that the sustainable operation of the tiered training mechanism depends on incorporating teachers' AI teaching application capabilities into the formal evaluation system of professional title assessment and annual performance review, using institutional incentive orientation to drive teachers from passively receiving training toward actively updating their practice, thereby genuinely activating the endogenous motivation for professional growth.

4.2 Optimizing the Selection and Integration of Intelligent Resources Guided by Subject-Centered Orientation

The improvement of resource quality depends on establishing selection and evaluation standards anchored in subject core competencies rather than purely using technological advancement as a procurement basis. Schools can organize backbone Chinese language teachers to conduct special reviews of the resource content of various intelligent learning platforms for grade-level appropriateness and language normativity based on the 2022 edition of the curriculum standards, and establish school-level recommended lists of high-quality AI resources to reduce the risk of inferior resources entering the classroom from the source. On this basis, schools should actively encourage teachers to combine regional cultural resources with AI-assisted content generation technology, exploring school-based intelligent resource development models so that the cultural confidence cultivation dimension in Chinese language teaching obtains more

locally-grounded material support. It must be emphasized that AI tools always play an auxiliary role in the resource integration process, and subject teachers' professional judgment of the educational value of resources is a professional authority that cannot be replaced by algorithms.

4.3 Reconstructing the Process-Based Evaluation System to Achieve Data-Driven Precise Diagnosis

The reconstruction of the evaluation system should take "seeing the learning process" as its core orientation, systematically collecting multi-dimensional data such as students' thinking trajectories in reading comprehension tasks, revision behaviors in the writing generation process, and phonetic features in oral expression practice through AI learning management platforms, forming dynamically updated individual learning profiles to provide a data foundation for teachers' precise instructional interventions, on this basis, organically embedding self-assessment and peer assessment mechanisms into the daily teaching process, using AI tools to provide students with immediate language quality feedback, transforming evaluation from post-event result judgment into a diagnostic tool that accompanies the entire learning process. At the school level, efforts should be made to explore establishing a structured student growth portfolio system, deeply integrating AI-generated learning behavior analysis reports with teachers' qualitative evaluations, and forming a more three-dimensional picture of student development through the complementarity of quantitative data and humanistic judgment, thereby providing more persuasive professional basis for personalized instructional design (As shown in Figure 1).

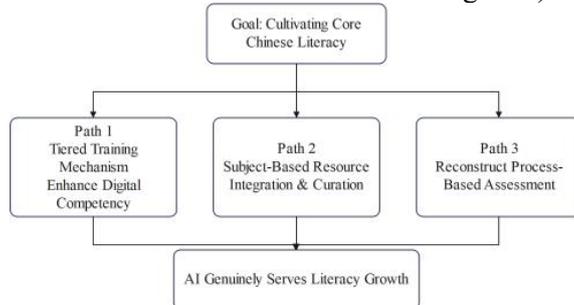


Figure 3. Implementation Pathway Framework for AI-Integrated Teaching

5. Conclusion

The deep advancement of AI integration in

primary school Chinese language teaching is both a response to the era's demands of the educational digital transformation strategy and a

realistic pathway for breaking through the bottleneck of cultivating Chinese language core competencies. The key to resolving integration challenges lies in clarifying the fundamental position that technology serves the subject, consolidating the foundation of teachers' professional practice through a tiered training mechanism, activating the inherent tension of the classroom through subject-centered resource selection logic, and releasing the diagnostic value of data-driven approaches through a dynamic evaluation system, enabling AI to truly transform from a "technological supporting role" in Chinese language classrooms into a powerful support for competency growth. Looking toward the future, technology is always a means, and cultivating people is always the ultimate destination.

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