



Curriculum Leadership of Middle School Teachers in China in the Digital Intelligence Era

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Abstract. In the digital intelligence era, educational transformation places new demands on teachers' curriculum leadership, necessitating a transition from mere technology tool operator to intelligent curriculum designer, implementer, and evaluator empowered by intelligent tools. This study, utilizing the literature analysis method, explores the status quo, influencing factors, improvement strategies, and support mechanisms of middle school teachers' curriculum leadership in China as they respond to these demands. Findings indicate that teachers perform well in academic monitoring, yet they exhibit persistent gaps in deeply integrating digital technology into curriculum innovation and development. Influencing factors primarily encompass internal factors such as teachers' understanding of technology empowerment courses and identity recognition, alongside external conditions like the school's technology environment and cultural atmosphere. To address these, the study proposes a series of strategies to enhance teachers' curriculum leadership across multiple dimensions, including tiered training focusing on curriculum integration, innovation in evaluation, and an empowering organizational culture, to meet the new demands of the era.

Keywords: Digital Intelligence Era, Middle School Teachers, Curriculum Leadership, Digital Transformation, Enhancement strategies, Teacher Professional Development

1 Introduction

Curriculum leadership refers to the professional influence exerted by teachers throughout the process of curriculum design, implementation, and evaluation, to guide and promote curriculum and instructional innovation [1]. As digital intelligence has become the core driver reshaping the educational ecology, the widespread application of cutting-edge technologies such as artificial intelligence is transforming the educational landscape, including teaching, learning, and evaluation, presenting both new opportunities and challenges for the curriculum leadership of middle school teachers. For example, while some teachers attempt to use AI tools for personalized learning design, many still struggle with transitioning from basic technology application to deep curriculum integration and innovation, facing challenges such as insufficient digital literacy and a lack of training in pedagogical redesign.

Currently, the digital-intelligent transformation of curriculum leadership among middle school teachers in China is facing several challenges. Some teachers lack sufficient digital literacy and technological application skills, with their understanding of technologies such as artificial intelligence and big data remaining at a “basic operation” level. It is difficult for them to deeply integrate technology with curriculum design, implementation, and evaluation [2]. In China, these challenges are compounded by training that over-emphasizes tools while underdeveloping design thinking for technology integration and by limited guidance on technology-enabled curriculum leadership [3]. The misalignment between needs and competencies has hindered the realization of the educational value of digital-intelligent technologies through teachers’ curriculum leadership. Therefore, enhancing teachers’ technological literacy to strengthen their curriculum leadership is not only an imperative response to the digital transformation of education but also a crucial pathway to address the challenges of current middle school curriculum reform and elevate both teaching and learning quality.

Through a literature review, this study summarizes the state quo, influencing factors, enhancement strategies, and supports for curriculum leadership among Chinese middle school teachers in the context of digital literacy. It aims to promote teacher professional development, enhance educational effectiveness, help teachers transcend experiential limitations, and provide support for basic education to adapt to modernization. Practically, this study responds to the demand for digital intelligence-empowered teaching in middle school education reform. It can enhance their curriculum design capabilities, thereby driving the digital transformation of teachers’ curriculum leadership and ultimately improving educational and teaching quality. In this way, middle school teachers can gain better professional growth, improve educational effectiveness, and help secondary education adapt to modernization with a shift from experience-based routines to evidence-informed, technology-enabled practices.

2 Research Questions

RQ 1: What is the current status of curriculum leadership among middle school teachers in the context of digital intelligence?

RQ 2: What are the factors influencing curriculum leadership among middle school teachers in the context of digital intelligence?

RQ 3: How can the curriculum leadership of middle school teachers be enhanced in the context of digital intelligence?

RQ 4: What supports are required for the enhancement of curriculum leadership among middle school teachers in the context of digital intelligence?

3 Teachers’ Curriculum Leadership

From the perspectives of theory building and role transformation, the essence of teachers’ curriculum leadership is a transformative curriculum practice, which requires teachers to act as critical curriculum collaborators and creators of curriculum

meaning. Its core is a dynamic, student-centered process of design, implementation, evaluation, and ongoing innovation of the curriculum. It is a “distributed influence process,” in which teachers, as core curriculum developers and agents of change, conduct adaptive design and innovation of the curriculum through collaborative inquiry [4].

Zhong emphasizes teachers’ autonomy and creativity in curriculum leadership, and has provides localized interpretation in China. He focuses on elaborating its localized connotation and teachers’ professional autonomy, pointing out that curriculum leadership is the professional influence exerted by teachers in the entire process of school curriculum design and implementation, and its fundamental purpose is to guide and promote the innovation of curriculum and teaching [5][6]. In this view, every teacher should serve as a “creator” rather than a “passive executor” of the curriculum, and this is the core embodiment of teachers’ professional autonomy [7].

Against the backdrop of digital transformation, curriculum leadership has been endowed with new connotations against the backdrop of digital transformation. In the context of digital transformation, teachers’ curriculum leadership encompasses three dimensions: cognitive ability, practical ability, and recognition ability for curriculum leadership, among which recognition ability is the most critical dimension driving practical behaviors [8]. Specifically, the cognitive ability for curriculum leadership in the digital intelligence era refers to teachers’ understanding and awareness of connecting digital transformation with contemporary curriculum concepts, and forming leadership in the process of technology-empowered curriculum design, implementation, and evaluation. The practical ability involves to the systematic practice where teachers appropriately integrate digital technology into curriculum development, implementation, evaluation, and reflection to improve teaching effectiveness. The recognition ability concerns teachers’ belief that they can develop students’ competencies through technology empowerment in the curriculum, and that they should lead the curriculum construction, management, and decision-making under technology empowerment.

4 Research Methods

This study mainly adopts the literature research method, with deductive thematic analysis serving as the core analytical strategy. Relying on Chinese and international academic databases CNKI (China National Knowledge Infrastructure) and Google Scholar, a literature search and screening were conducted on studies closely related to themes including “teacher curriculum leadership”, “digital transformation in education”, “teacher digital literacy”, “teacher leadership”, “curriculum leadership”, and “digital teaching competency”.

Based on clarifying the core connotation and structural elements of teacher curriculum leadership, the study focuses on the developments, new challenges, influencing factors, and enhancement paths of teacher curriculum leadership in the context of digital transformation among Chinese middle school teachers. During the analysis process, an analytical framework (covering themes such as “current status”, “digital

context”, “influencing factors”, and “enhancement strategies”) was pre-constructed. Subsequently, the literature was coded, categorized, and interpreted in depth to systematically address the research questions.

5 State of Middle School Teachers’ Curriculum Leadership in the Digital Intelligence Context

5.1 State Quo of Middle School Teachers’ Curriculum Leadership in the Context of Digital Intelligence

Curriculum leadership among Chinese middle school teachers is characterized by “strong execution but limited innovation.” They demonstrate relatively strong capabilities, generally excelling at classroom instruction and student academic progress. Particularly in achieving exam-oriented objectives, teachers exhibit robust professional execution, ensuring the effective completion of teaching tasks. However, their focus remains largely on exam-oriented goals, resulting in insufficient leadership in curriculum innovation and development. Teachers are largely viewed as passive implementers of curricula, generally lacking opportunities and authority to participate in school curriculum planning, design, or resource allocation. Their role as curriculum leaders is severely constrained by traditional hierarchical management structures (a top-down, hierarchical management model in which curriculum decisions are highly centralized within the school administration, leaving teachers little professional autonomy beyond implementing directives) [9]. In this sense, grassroots teachers need greater empowerment in course design, implementation, and evaluation.

5.2 Influencing Factors of Curriculum Leadership Among Middle School Teachers in China

Under the dual backdrop of educational digital transformation and the new curriculum reform, the development of middle school teachers’ curriculum leadership in China is influenced by a complex interplay of individual and contextual factors.

At the individual level, key factors include internal cognition and personal traits. Internal cognition refers to teachers’ understanding of the essence, value, and their own role in curriculum leadership, encompassing their awareness of core functions such as curriculum design, implementation, and innovation, as well as their comprehension of integrating digital technology into curriculum leadership. Personal traits comprise stable individual characteristics and professional qualities that influence curriculum leadership practices, including innovative awareness, collaborative ability, sense of responsibility, and resilience. Specifically, teachers’ digital literacy and technology acceptance significantly and positively influence their cognitive understanding and identification with curriculum leadership, thereby indirectly promoting practical leadership behaviors. While technological self-efficacy does not exert a direct effect on leadership practices, it demonstrates strong correlations with both digital literacy and technology acceptance.

At the contextual level, a school's technological environment and innovation culture play crucial roles in fostering teachers' curriculum leadership. These factors indirectly foster curriculum leadership practices by enhancing teachers' sense of identification and empowerment. A supportive technological environment provides necessary infrastructure and resources, and a strong innovation culture encourages experimentation and collaboration, ultimately facilitating the development and implementation of curriculum leadership [8].

5.3 Strategies for Enhancing Course Leadership Among Chinese Studies Instructors

In the digital-intelligent era, schools can support middle school teachers' curriculum leadership development through multiple avenues. Some schools in Shunyi District, Beijing have equipped AI learning analytics platforms and VR devices to help teachers accurately assess student learning situations and deliver immersive instruction. For resource provision, schools should build dynamically updated, finely categorized digital and intelligent course resource libraries. Besides, it is necessary to integrate national platform resources and cross-school best practices, annotated with subject, grade level, and curriculum objective suitability for easy teacher access and use. Regarding training, schools should move beyond basic tool operation sessions. Especially, they should offer specialized topics like "AI learning analytics and curriculum objective optimization," focusing on core aspects of curriculum design, implementation, and evaluation. Training should be finely based on teachers' subject areas and years of experience. Beyond classroom observations and curriculum outcome evaluations, schools should incorporate quantitative data analytics from teaching platforms to track use frequency, student engagement metrics, and learning outcome improvements. Additionally, standardized rubrics focusing on technology-integrated instructional design and student competency development should be implemented across schools to ensure consistency and scalability. To facilitate large-scale assessment, a blended approach combining automated data collection, peer reviews, and expert evaluations can be adopted, providing efficient and holistic feedback for optimizing teaching practices. Besides, a supportive culture is also paramount. For example, Shunyi District shifts teacher perceptions through policy interpretation and case sharing, encourages cross-disciplinary curriculum co-creation, and activates teachers' initiative in curriculum leadership.

5.4 Supports for Enhancing Middle School Teachers' Curriculum Leadership in the Digital Intelligence Context

Policy Supports: National and local education authorities should promulgate policies clarifying teachers' leadership roles in curriculum reform and technology integration. Teacher curriculum leadership should be incorporated into professional development systems with corresponding incentives, timely funding, and project support to encourage digital curriculum innovation. Such policies provide suggestions and regula-

tions for institutions to build a tolerant and supportive to help teachers develop curriculum leadership.

Institutional Supports: Schools serve as the primary arena for teachers to practice curriculum leadership. Principals and administrative teams should cultivate environments and teaching cultures that support teacher participation in curriculum decision-making, technology integration, and instructional innovation. Principals must demonstrate transformational leadership, empowering teachers to pioneer curriculum-technology integration while granting them autonomy and decision-making opportunities in curriculum development, instructional experimentation, and technology application. Besides, targeted training and exchange seminars can help as well.

Technical Supports: Schools should provide stable network environments, multimedia classrooms, and digital teaching platforms. They should equip schools with digital tools supporting curriculum design, student learning analysis, personalized learning, and teaching evaluation. Schools should also build school-based resource repositories and online course platforms to support teacher curriculum development.

6 Conclusions

This study aims to explore the status quo, influencing factors, improvement strategies, and support mechanisms of curriculum leadership among middle school teachers in China during the digital intelligence era, in response to the new requirements for teachers' professional competence posed by educational digital transformation. Currently, while middle school teachers in China generally demonstrate strong academic monitoring capability, they still falls short in curriculum innovation and development, and significant regional differences are observed. Teachers often play the role of passive implementers of the curriculum, with insufficient power and opportunities to participate in curriculum planning and design. Influencing factors mainly include teachers' personal characteristics (such as internal cognition, innovation awareness, collaborative ability, and identity recognition), as well as external conditions such as the school's technological environment and innovation culture. Among these, internal cognition is a key driving factor for promoting curriculum leadership practice. Improvement strategies must be systematically designed and implemented across multiple dimensions, including training content and organizational culture, with a strong emphasis on shifting from technical operation training to fostering curriculum integration and innovation capabilities. Educational management departments should define teachers' leadership roles in curriculum and technology integration and integrate these roles into the teacher professional development system. Meanwhile, schools must provide a supportive technological environment and a collaborative platform, grant teachers autonomy in curriculum development, and enhance their curriculum leadership awareness and capabilities through tiered training and case-based guidance.

To comprehensively enhance teachers' curriculum leadership in the digital intelligence era, a multi-level approach is essential. Policy-makers should not only integrate "curriculum leadership" into teacher professional standards and evaluation systems

and provide dedicated funding for innovation, but also establish teacher collaboration networks and develop open national digital curriculum resource platforms. Additionally, tiered training focused on curriculum design is more helpful than mere technical skills, and fosters a supportive culture that encourages innovation and collaboration. Meanwhile, teachers must proactively develop their digital pedagogical capabilities, engage in professional teaching, and actively assume the role of curriculum creators rather than passive implementers.

Primarily based on literature analysis, this study lacks empirical support from firsthand data, and therefore, the generalizability of its conclusions requires further verification. Future research could combine methods such as questionnaire surveys and in-depth interviews to conduct regional or school-based case studies, delving into the development path and effectiveness mechanism of teachers' curriculum leadership under various background conditions, and further investigating the dynamic relationship between teachers' digital literacy and curriculum leadership, as well as their long-term development model.

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