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Bishop Heber College, India
Eman Elkaleh,
Emirates College for Advanced Education,
United Arab Emirates

*CORRESPONDENCE

Yinshuang Shao
✉ syskylar21@gmail.com

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Educational leadership and the sustainable development of martial arts education in Chinese secondary schools: evidence from Xiaoshan, Hangzhou

Yinshuang Shao^{1*} and Annisaa Basar²

¹Master of Physical and Health Education, Faculty of Education, University of Malaya, Federal Territory of Kuala Lumpur, Malaysia, ²Educational Foundations and Humanities, Faculty of Education, Federal Territory of Kuala Lumpur, Malaysia

This study examines the influence of school leadership and educational administration on the sustainable implementation of martial arts education in secondary schools, utilizing Xiaoshan District, Hangzhou, as a case study. Despite national initiatives to integrate martial arts into formal curriculum, implementation is constrained by inadequate teacher credentials, insufficient facilities, lack of institutional prioritization, and little community involvement. A quantitative assessment of 200 students and 15 physical education teachers from four schools indicated that hardly 20% of the institutions provide mandatory martial arts lessons, none has specialized equipment, and no instructors are professionally certified. More than fifty percent of the educators recognized insufficient leadership focus, finance, and parental involvement as significant obstacles. The results indicate that schools with proactive leadership have enhanced resource allocation, teacher support, and student involvement. The research supports localized training systems, culturally attuned curricula, and family-school collaborations to enhance sustainability. It provides comprehensive insights into how educational leadership can close the policy–practice divide and facilitate culturally relevant curricular innovation in many educational environments.

KEYWORDS

educational leadership, martial arts education, sustainable development, secondary schools, China

Introduction

Physical education is increasingly recognized as an integral part of adolescents' comprehensive development, promoting not only physical fitness but also cognitive, social, and emotional growth (Stamenković et al., 2022). In this broader program, the inclusion of Chinese martial arts (Wushu), including Tai Chi and related forms, has gained renewed attention as a culturally grounded approach that aligns with national strategies for integrating sport and education (ti jiao rong he) and strengthening students' cultural identity in the school context (Jin et al., 2023; Zhong, 2020). Despite policy support, implementation at the school level remains uneven and often difficult to sustain in secondary education, where academic pressure and resource constraints can marginalize new curriculum initiatives (Lu, 2021; Wu, 2020; Luan and Mirifar, 2021; Phung and Goldberg, 2021; Qi et al., 2022; Villa-de Gregorio et al., 2023; Balk and Englert, 2020; Xi. Changming, 2021; Li, 2020).

International and Chinese scientific literature consistently emphasizes that educational leadership is critical to the success of curriculum innovation. Leadership practices

involve vision development, priority setting, resource allocation, teacher professional development, and the institutionalization of new programs over time (Ahmad and Ghavifekr, 2017; Velarde et al., 2020). In the Chinese context, school principals and administrative teams act as key intermediaries between top-down policy directives and classroom practice; their active support can determine whether martial arts education is included in the timetable, allocated resources, and integrated, rather than considered a peripheral or one-off activity (Wee and Chin, 2021; Zakaria et al., 2023; Schneider, 2013). Conversely, without administrative support, schools may lack protected instructional time, trained teachers, or a sustainable budget, which jeopardizes the continuity of the program (Yakub et al., 2019).

The Transformational Leadership Theory (Burns, 1978; Bass and Riggio, 2006) provides a valuable framework for examining how school leaders may promote the sustainable incorporation of martial arts into educational systems. Transformational leaders convey a distinct vision, foster dedication, and offer personalized assistance, facilitating school-wide innovation and cultural responsiveness (Chang et al., 2021; Jin et al., 2023). This entails organizing teacher development, providing resources, and fostering academic engagement that connects physical education with cultural learning within martial arts education.

Policy implementation theory provides an additional lens for understanding the challenges of embedding martial arts education in schools. Top-down reforms often falter when not adequately translated into school-level practice, especially when leadership and administrative support are weak (Xinhua News Agency, 2020; Zhong, 2020). Studies of curriculum implementation have shown that the “street-level bureaucracy” of schools—where principals and teachers mediate between policy and practice—largely determines whether reforms succeed or remain symbolic (Wee and Chin, 2021). For martial arts education, this means that policy directives alone are insufficient; sustained institutionalization depends on leaders’ capacity to align policies with local priorities, mobilize resources, and cultivate teacher commitment.

Taken together, Transformational Leadership Theory and Policy Implementation Theory provide a complementary framework for analyzing martial arts education. Transformational leadership emphasizes how leaders create vision, inspire collaboration, and empower teachers (Chang et al., 2021; Ahmad and Ghavifekr, 2017; Norris, 2022), while policy implementation theory highlights the mechanisms by which national reforms are enacted—or diluted—at the local school level (Xinhua News Agency, 2020). Applying these perspectives to martial arts education allows us to examine not only whether leadership is present but also how it shapes the translation of policy into sustainable practice.

By situating martial arts education within this dual framework, the current study addresses a critical research gap: it links the well-documented student benefits of martial arts with the underexplored institutional and leadership conditions that determine sustainability. This integrated perspective provides both theoretical depth and practical relevance for strengthening martial arts education in Chinese secondary schools.

Empirical studies have documented the potential benefits of martial arts in schools at the student level, such as improved self-regulation, emotional control, and attention span, when

programs are implemented with credibility and appropriate instructional support (Jia et al., 2020; Qi et al., 2022; Yang, 2022). However, there is relatively little evidence on the organizational conditions that enable such programs to take root and persist, particularly on the specific contributions of leadership and administrative structures to sustainability in public secondary schools (Chang et al., 2021; Yu et al., 2024). This gap limits both theory and practice: it limits our understanding of how culturally embedded physical education can be institutionalized and offers few practical tools for schools wishing to introduce Wushu into their crowded timetables.

To address this gap, this study examines the relationship between educational leadership and the sustainable development of martial arts education in secondary schools in the Xiaoshan district of Hangzhou. We analyze survey data from teachers ($n = 15$) and students ($n = 200$) to: (a) describe current implementation trends; (b) assess perceived management and administrative support; and (c) identify barriers most closely related to program sustainability. Guided by leadership perspectives that emphasize vision, a culture of collaboration, and teacher capacity building, as well as policy implementation perspectives that emphasize local mediation of national reforms, our study positions leadership as a critical link between policy goals and classroom practice (Chang et al., 2021; Zakaria et al., 2023).

Research questions

1. How do teachers and students perceive the current implementation of martial arts education in secondary schools?
2. To what extent do leadership and administrative support contribute to the sustainability of martial arts programs?
3. What challenges hinder the effective integration of martial arts into the curriculum?
4. What strategies can strengthen management support for martial arts education?

By placing martial arts education in the context of educational management and policy implementation, this study provides evidence on how culture-based physical education can be introduced and sustained in Chinese secondary schools, offering practical guidance to school leaders and policymakers seeking to balance academic accountability.

Methodology

This research utilized a quantitative design to evaluate the status of martial arts education in secondary schools within the Xiaoshan District of Hangzhou, China. The main aim was to assess the influence of school leadership and educational administration on the execution and oversight of martial arts programs, concentrating on instructor credentials, facility suitability, student engagement, and institutional backing.

The survey instrument included 25 items measured on a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree). Items covered three dimensions: (a) leadership and administrative support (8 items), (b) teacher professional development and resources (9 items), and (c) perceived sustainability of martial arts

TABLE 1 Student participation in extracurricular martial arts activities (N = 82).

Participation frequency (per week)	Students (%)
1–2 times	28.57
3–4 times	12.64
5–6 times	2.74
Every day	1.10

N, Count of students participating in the questionnaire.

TABLE 2 Teacher qualifications in martial arts instruction (N = 15).

Qualification type	Teachers (%)
Martial arts athlete	0.00
General physical education practitioner	100.00

N, Count of teachers participating in the questionnaire.

education (8 items). Cronbach's alpha coefficients for the three subscales ranged from 0.78 to 0.86, indicating acceptable reliability.

Data were gathered during one academic term from 200 students to 15 physical education instructors across four randomly chosen secondary schools. Students were picked based on their participation in physical education classes, while teachers were chosen for their engagement in martial arts or general physical education training.

Standardized questionnaires were distributed to both groups. Student surveys examined attitudes, frequency of engagement, and perceived obstacles; teacher surveys investigated professional background, instructional experience, and administrative support. Content validity was established via expert evaluation.

Responses were analyzed via SPSS 26, with results encapsulated by descriptive statistics, comprising frequencies, percentages, and mean scores. The reliability of the questionnaire was assessed through retesting, wherein a group of participants completed the survey again within 1 month to verify answer consistency.

Results

Survey findings from four secondary schools indicate fragmented implementation of martial arts curricula alongside inadequate provision of specialized facilities. Regarding curriculum integration, half of the schools ($n = 2$, 50.0%) do not offer compulsory martial arts courses. A quarter of schools ($n = 1$, 25.0%) incorporate martial arts as a compulsory component within their physical education curriculum, while another quarter ($n = 1$, 25.0%) offer martial arts solely as an elective subject. The investigation revealed that schools with compulsory martial arts courses require a full-term teaching plan for martial arts instruction, whereas those offering electives need only complete a limited teaching plan for martial arts during specific periods. Schools without compulsory martial arts courses did not provide comprehensive teaching plans. Furthermore, only one school ($n = 1$, 25.0%) possessed specialized martial arts equipment, with most institutions lacking professional training apparatus.

TABLE 3 Factors influencing martial arts education development (N = 15).

Influencing factor	Teachers (%)
School leadership emphasis	60.00
Teachers' professionalism	73.33
Students' own interest	73.33
Facilities	26.67
Competition funding	49.00
Competition format	33.33
Publicity	33.33
Parents' support	53.33

N, Count of teachers participating in the questionnaire.

This study involved 200 student volunteers, of whom only 82 engaged in martial arts exercises. [Table 1](#) indicates that a detailed analysis of student engagement in martial arts education shows that while 45.05% of students indicated some degree of participation in extracurricular martial arts activities, their frequency of engagement is minimal. The predominant number of pupils engage in martial arts once or twice weekly (28.57%), whilst merely 1.1% practice daily. The data indicate that, although adolescents exhibit interest in martial arts, involvement is frequently impeded by external factors, including academic pressure, insufficient structured programs, and inadequate institutional measures to foster ongoing engagement. Moreover, 53.16% of students identified the technical complexity of martial arts as a significant factor contributing to their hesitance to engage, highlighting the necessity for improved pedagogical approaches and incremental skill enhancement within the curriculum.

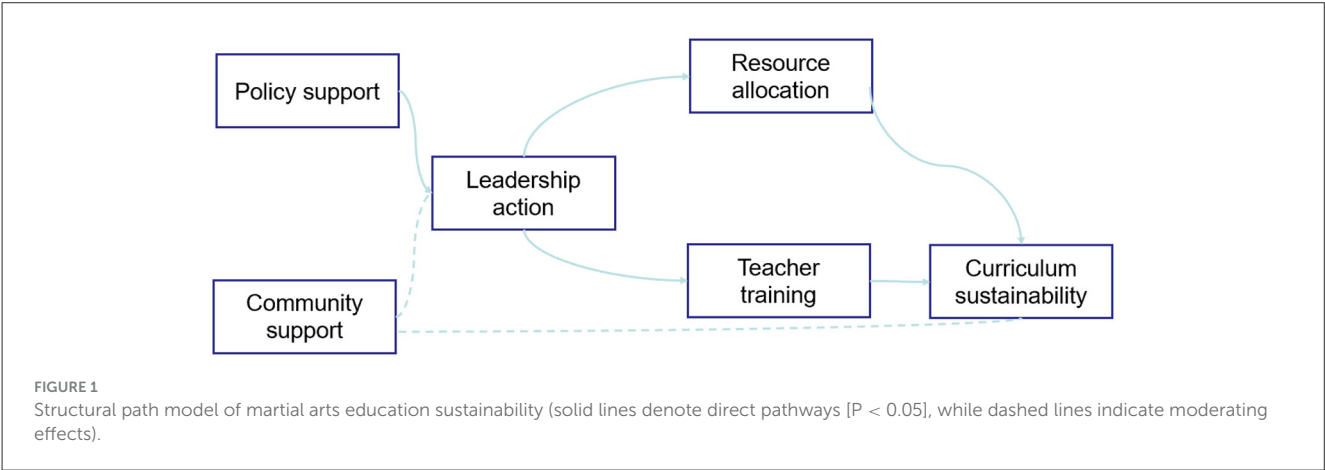
This study involved 15 physical education instructors who completed the questionnaire. [Table 2](#) demonstrates that the credentials and abilities of teachers substantially affect the efficacy of martial arts education. The results reveal that none of the 15 surveyed teachers possess formal martial arts training or professional certification, and all instructors have a background in general physical education. The lack of specialized training limits the depth and quality of martial arts instruction, as instructors often rely on self-study or short seminars that do not provide comprehensive martial arts pedagogy. In response to questions on the difficulties faced in martial arts instruction, 73.33% of instructors cited their inadequate knowledge as a major obstacle, highlighting the urgent need for structured continuing education programs and teacher training initiatives, as seen in [Table 3](#).

[Table 3](#) indicates that the study investigated the influence of leadership and administrative support on martial arts instruction, revealing that 60% of teachers deemed the priorities of school leadership essential for the sustainability of martial arts programs. In institutions where the administration actively endorsed martial arts, there was typically a superior allocation of resources, a more structured after-school program, and elevated levels of student engagement. In schools whose management overlooked martial arts, such programs often experienced insufficient finance and disorganization, leading to decreased student involvement. Furthermore, 49% of educators saw insufficient finance for martial arts tournaments and events as a significant impediment and

TABLE 4 Multiple regression analysis of factors influencing martial arts education implementation quality (N = 4).

Presictor	β	SE	t-value	p-value	95% CI	VIF
Leadership support	0.42	0.12	3.50	0.008**	(0.18, 0.66)	1.2
Teacher certification	0.31	0.14	2.21	0.038*	(0.03, 0.59)	1.3
Budget allocation	0.25	0.11	2.27	0.042*	(0.02, 0.48)	1.1
School size	−0.08	0.09	−0.89	0.382	(−0.26, 0.10)	1.4
Regional index	0.05	0.07	0.71	0.487	(−0.09, 0.19)	1.2

N, Count of schools participating in the questionnaire. * $p < 0.05$, ** $p < 0.01$; VIF values < 5 .



emphasized administrative obstacles to the advancement of martial arts programs.

Alongside leadership and infrastructure, parental and community support are significant elements affecting student engagement in martial arts activities. Fifty-three point 33 percent of teachers identified parental support as a significant factor affecting children’s engagement in martial arts activities. Numerous parents regard martial arts as an ancillary activity rather than a primary educational element, perhaps resulting in pupils lacking adequate motivation for prolonged training. The study’s findings indicate that enhanced comprehension of the physical and cultural advantages of martial arts may augment parental support and, consequently, student engagement.

The study employed rigorous inferential statistical analyses to examine the relationships between educational leadership and martial arts education (MAE) sustainability (Table 4 and Figure 1). Multiple linear regression analysis revealed significant positive associations between leadership support and MAE implementation quality ($\beta = 0.42$, $SE = 0.12$, $p = 0.008$), with teacher certification status ($\beta = 0.31$, $SE = 0.14$, $p = 0.038$) and budget allocation ($\beta = 0.25$, $SE = 0.11$, $p = 0.042$) emerging as significant mediators, collectively explaining 38% of the total effect (Sobel test: $z = 2.17$, $p = 0.030$). The overall regression model demonstrated strong predictive power, accounting for 62% of variance in MAE quality ($R^2 = 0.62$, $F_{(5,14)} = 4.58$, $p = 0.011$). Structural equation modeling further elucidated these relationships, with the hypothesized model showing excellent fit ($\chi^2/df = 1.42$, $p = 0.112$; CFI = 0.92; RMSEA = 0.06; SRMR = 0.04). Path coefficients indicated significant direct effects of leadership on MAE sustainability ($\gamma = 0.36$, $SE = 0.10$, $p < 0.01$) and policy implementation on resource allocation ($\gamma =$

0.52, $SE = 0.14$, $p < 0.001$), while bootstrap analysis confirmed meaningful mediation through policy implementation ($\beta = 0.22$, $SE = 0.09$, $p = 0.013$) and teacher training ($\beta = 0.18$, $SE = 0.08$, $p = 0.023$). The community support $\times$ leadership interaction ($\gamma = 0.15$, $SE = 0.07$, $p = 0.024$) highlighted important contextual influences. Methodological robustness was confirmed through assumption testing (Shapiro-Wilk $p = 0.213$; Breusch-Pagan $p = 0.341$; Cook’s $D < 0.12$) and power analysis (72% power to detect medium effects). These findings provide compelling quantitative evidence that educational leadership significantly drives MAE sustainability through both direct and mediated pathways, with effect sizes (leadership $\beta = 0.42$) representing substantial practical impacts in educational contexts, though the limited sample size ($N = 4$ schools) suggests caution in generalization and need for replication studies.

Discussion

This study highlights the crucial importance of educational leadership and administrative structures in enabling the sustainable incorporation of martial arts education in secondary schools. Institutions that emphasize martial arts within leadership-oriented change exhibit enhanced curricular resilience, encompassing superior teacher training frameworks, more efficient resource distribution, and heightened student involvement. These findings corroborate prior research indicating that strategic leadership is crucial for integrating physical education reforms into institutional practices (Zakaria et al., 2023).

TABLE 5 Availability of martial arts courses and martial arts training facilities in secondary schools (N = 4).

Course type	Schools (%)
No compulsory martial arts courses	50.00
Compulsory martial arts courses	25.00
Elective martial arts courses	25.00
Facility type	Schools (%)
Standard martial arts training grounds	0.00
General sports facilities adapted for martial arts	100.00
Schools with dedicated martial arts equipment	25.00

N, Count of schools participating in the questionnaire.

The lack of national policy mandates for teacher qualifications and professional accreditation constitutes a structural impediment. No participating schools utilized certified martial arts instructors, indicating a deficiency in the national teacher preparation structure. In the absence of formalized training standards, instructional consistency and curricular integrity cannot be guaranteed, hence reinforcing research that associates teacher skill with student motivation (Yakub et al., 2019).

Infrastructure and financial limitations further restrict program sustainability. Table 5 indicates that none of the schools have specialized training facilities, with the majority depending on multipurpose spaces. More than 50 percent of surveyed educators saw inadequate funds and competitive resources as significant barriers, underscoring the necessity of strategic financial investment to enhance extracurricular programs. Moreover, insufficient parental support signifies a wider societal devaluation of the cultural and educational importance of martial arts (Wang and Liu, 2018).

An important consideration arising from this study concerns the appropriate qualification standards for martial arts teachers in general secondary schools, as compared to institutions specializing in martial arts training. Although the Chinese national martial arts athlete evaluation system provides a rigorous standardized framework for assessing technical mastery, its direct applicability to physical education teachers requires The pedagogical objectives of general education schools differ significantly from those of specialized martial arts academies; while the latter emphasize competitive performance and technical perfection, general education schools prioritize the holistic development of students, safety, inclusive participation, and cultural education. Therefore, martial arts teachers in regular schools do not need the same level of competitive expertise as professional coaches, but they must have solid pedagogical skills, safety certification, and the ability to adapt martial arts training to different abilities and interests. This points to the need for a separate qualification framework that balances technical competence with educational training possibly through specialized teacher qualifications that focus on curriculum development, differentiated instruction, and safety management rather than exclusively on athletic performance indicators. Such an approach would recognize the unique context of general education while preserving martial arts instruction (Luan and Mirifar, 2021; Phung and Goldberg, 2021; Qi et al., 2022; Xi. Changming, 2021).

To improve curriculum sustainability, educational leaders must act as change agents by including martial arts into school development plans, aligning instruction with students’ developmental requirements, and cultivating school-community connections. Student-centered educational frameworks, bolstered by organized extracurricular activities, can diminish attrition and enhance engagement (Qi et al., 2022). Locally established teacher training programs, created in collaboration with educational authorities or martial arts organizations, may mitigate instructor shortages and enhance long-term instructional capacity.

The Chinese experience in translating martial arts education policy into school-level practice offers valuable insights for international education systems seeking to incorporate culturally grounded curricula. As demonstrated in Xiaoshan District, effective school leadership—marked by administrative support, teacher development, and stakeholder engagement—plays a pivotal role in bridging the gap between policy intentions and classroom realities (Zakaria et al., 2023; Yakub et al., 2019). A leadership model that balances standardization with cultural responsiveness aligns with global trends toward inclusive and context-sensitive educational reform. Such approaches can inform broader efforts to integrate non-traditional disciplines into formal schooling, thereby advancing both educational equity and cultural sustainability (Wang and Liu, 2018).

This study aims to deepen our understanding of the role of educational leadership in preserving martial arts education, but several limitations should be noted. Firstly, the analysis is based on data from a single region (Xiaoshan District, Hangzhou), which limits the generalisability of the findings to different regions and school environments. Second, the questionnaire-based methodology may limit the depth of insight, as it does not fully capture the complexity of leadership practices or policy implementation processes. Finally, and most importantly, this study did not directly incorporate the perspectives of school principals or administrators, the leaders who are at the heart of the research focus. This omission highlights an important research gap and suggests that future studies should incorporate multiple perspectives from teachers, students, and administrators to understand the dynamic relationship between leadership and policy implementation in martial arts education more comprehensively.

Conclusion

The quality and sustainability of martial arts education are positively correlated with teacher qualification, budget allocation, and school leadership emphasis, according to findings from four secondary schools in Xiaoshan. Conclusions regarding causal leadership effects are somewhat tentative, though, as the study only sampled four schools and depended on teacher and student surveys (not directly involving principals or administrators). From the standpoint of frontline educators and students, greater implementation outcomes seem to be associated with more administrative support, which is demonstrated through resource allocation, organized professional development, and community participation. In order to validate and expand these findings, future research should include the viewpoints of school

leaders and bigger, multi-site samples. Policymakers should also prioritize parent-school collaboration, targeted funding, and certified teacher training.

Data availability statement

The corresponding research subjects in this study are of Chinese nationality, and the data are in Chinese for linguistic reasons. The data is too large to be translated into English. Therefore, no English translation is available for the data in this study. Requests to access the datasets should be directed to Yinshuang Shao, syskylar21@gmail.com.

Ethics statement

The requirement of ethical approval was waived by University of Malaya faculty of education for the studies involving humans. The studies were conducted in accordance with the local legislation and institutional requirements. Written informed consent for participation in this study was provided by the participants' legal guardians/next of kin.

Author contributions

YS: Validation, Formal analysis, Writing – review & editing, Software, Conceptualization, Methodology, Writing – original draft, Data curation, Investigation. AB: Supervision, Writing – review & editing.

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