Review on the Development Context and Current Situation of Chinese Children's Piano Learning -- Based on Literature Analysis

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ARTICLE INFO	ABSTRACT
	This study adopts a Systematic Literature Review (SLR) approach, strictly following the PRISMA 2020 guidelines, to systematically analyze 58 core literatures retrieved from CNKI, CSSCI, Wanfang and other databases, covering the period from the 1950s to June 2024. The research aims to sort out the evolutionary context of Chinese children's piano learning, analyze its current development status, and respond to core academic controversies. The results show that Chinese children's piano learning has experienced three distinct stages—germination period (1950s–1980s) characterized by elite professional orientation, exploration period (1990s–2000s) driven by popularization and grade examination, and development period (2010s–2024) featuring diversified goals and intensive policies—with the synergistic driving effect of policy, economic and family factors promoting its transformation from elite training to universal aesthetic education. From the four dimensions of policy implementation, family participation, resource distribution and teaching practice, the current development presents structural contradictions such as the "implementation temperature difference" of policies, the imbalance of family participation dimensions, the prominent urban-rural resource gap, and the localization dilemma of teaching methods. The core academic controversies including the conflict between grade examination orientation and aesthetic education orientation, and the selection of resource balance paths can be resolved through age-differentiated integration strategies and government-market synergy paths. This study fills the academic gap of systematic integration of development context and in-depth analysis of localized status in the field, and provides empirical support and practical reference for the high-quality and equitable development of Chinese children's piano education.

1. Introduction

Chinese children's piano learning has undergone a profound evolution over the past seven decades, transitioning from elite professional training in the mid-20th century to a universal aesthetic

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education choice in contemporary society [3]. Driven by the synergy of policy adjustments, economic growth, and changes in family education concepts, the number of child piano learners in China has exceeded 42 million by 2024, making it a core component of family quality education [33]. However, this rapid development is accompanied by prominent structural contradictions: the conflict between grade examination-oriented utilitarian tendencies and aesthetic education goals, significant urban-rural gaps in resource allocation, and imbalances in the quality of family participation [14,17]. These issues not only restrict the realization of the educational value of piano learning but also pose challenges to the fair and high-quality development of art education.

Existing studies have explored phase characteristics, influencing factors, and practical dilemmas of children's piano learning, but obvious academic gaps remain [25]. Most phase analyses are fragmented, lacking integration of the "policy-economy-family" synergistic driving mechanism; current status research often focuses on single dimensions, failing to comprehensively reveal differences across regions and family types; and there is a lack of systematic responses to core academic controversies such as resource balance paths [13,37].

Problem Statement: Existing systematic literature reviews (SLRs) and related studies on Chinese children's piano learning have three key limitations: First, phase analyses are fragmented, lacking integration of the "policy-economy-family" synergistic driving mechanism; second, current status research focuses on single dimensions (e.g., only family participation or resource distribution) and fails to comprehensively reveal regional and family differences; third, core academic controversies (e.g., grade examination vs. aesthetic education) have not been systematically resolved through long-term synthesis. A long-term (1950s–2024) synthesis is necessary because it covers the full evolutionary process of piano learning from elite training to universal aesthetic education, which cannot be achieved by short-term studies. The unique contribution of this study lies in: systematically integrating the development context with the "policy-economy-family" mechanism, comprehensively analyzing current contradictions from four dimensions with regional/family comparisons, and proposing evidence-based optimization paths to resolve core controversies—filling the academic gap of systematic integration and localized in-depth analysis in the field.

Based on this, this study uses the method of systematic literature review to systematically sort out the evolution of children's piano learning in China from the 1950s to 2024, analyze current characteristics and contradictions from four dimensions, and propose feasible optimization paths. This research aims to fill the academic gap of systematic integration and localized analysis, providing empirical support for family education decisions, institutional teaching optimization, and policy resource allocation.

2. Literature Review

Existing studies on Chinese children's piano learning have explored its development trajectory, influencing factors, and practical dilemmas from multiple perspectives, laying a foundation for systematic analysis. Research on the evolutionary context has mainly focused on phase division and characteristic refinement: Chen [3] identified three stages of "elite enlightenment, popularization-driven, and diversified development" based on policy and economic changes, emphasizing that the transformation of piano education from professional training to universal aesthetic education is closely linked to social transformation. Wang and Li [25] supplemented the historical details of the embryonic stage (1950s-1980s), pointing out that the scarcity of piano resources and the orientation of professional talent training restricted the participation of ordinary families. However, most of these studies are fragmented in phase analysis, lacking the integration of "policy-economy-family"

synergistic driving mechanisms, and rarely involve comparative analysis of regional and group differences in different stages.

Family participation, as a core influencing factor, has become a key focus of academic research. Grolnick and Slowiaczek [11] constructed a multidimensional framework of family participation, which was verified and localized in the Chinese context: Li [14] confirmed that cognitive participation (such as guiding music analysis) has the most significant positive impact on children's learning performance ($\beta=0.287$), while excessive behavioral intervention (such as mechanical supervision of practice time) may lead to a high dropout rate. Hu [13] further found that emotional participation can compensate for the lack of professional resources in low-income families, narrowing the learning performance gap by 20%. However, existing studies mostly focus on the impact of single participation dimensions, and there is a lack of in-depth discussion on the dynamic adaptation of participation modes to children's age stages and family background differences.

Research on resource distribution and policy effects has highlighted structural contradictions in the development of piano education. Zhao [33] through national survey data, confirmed that there are significant regional gaps in piano learning resources, with the density of training institutions and the proportion of professional teachers in first-tier cities being much higher than those in rural areas. Zhang and Liu [30] analyzed the synergy effect of policies such as "double reduction" and aesthetic education, pointing out that policy adjustments have promoted the transformation of piano learning from "examination-oriented" to "interest-oriented", but there is a "implementation temperature difference" between urban and rural areas. Zhou and Wang [37] added that the uneven popularization of new resources such as smart pianos and online courses has further exacerbated resource inequality. However, existing studies lack quantitative analysis of the cost-effectiveness of resource balancing paths and insufficient discussion on the long-term impact of policy adjustments. In the field of teaching practice, relevant research mainly focuses on the localization of teaching methods and the integration of technology. Yang and Kim [29] found that Western teaching methods such as the Suzuki method face adaptation dilemmas in China, as the "interest-oriented" concept conflicts with family "examination-oriented demand", leading to the phenomenon of "learning techniques but not art". Sun *et al.*, [21] verified that the integration of intelligent technologies such as smart pianos can improve practice convenience, but excessive reliance on technology may weaken teacher-student emotional interaction. Liu and Zhang [17] pointed out that the uneven quality of teachers in different regions is a key factor restricting teaching effectiveness, especially in rural areas where the professional certification rate of teachers is less than 40%. However, existing research on localized teaching model innovation is still in the exploratory stage, and there is a lack of evidence-based research on the integration of national music elements and aesthetic education goals.

3. Research Question

Based on the core goals of sorting out the evolutionary context, analyzing the current development status, and responding to academic controversies in the field of Chinese children's piano learning, this study proposes the following three interrelated research questions:
What are the evolutionary stages and core characteristics of Chinese children's piano learning from the RQ1:1950s to 2024, and what are the synergistic driving effects of policy, economic and family factors in promoting the transformation of piano learning from elite professional training to universal aesthetic education?
RQ2:From the four dimensions of policy implementation, family participation, resource distribution and teaching practice, what are the current development characteristics and prominent structural

contradictions of Chinese children's piano learning, and how do these characteristics and contradictions differ among different regions (urban/rural) and family types (high/low resource)? RQ3:What are the core academic controversies in the field of Chinese children's piano learning (such as the conflict between grade examination orientation and aesthetic education orientation, the imbalance of resource distribution), and what feasible optimization paths can be derived based on the systematic sorting of existing literature?

4. Methodology

To systematically address the three research questions (RQs) and ensure the rigor and reliability of the study, this research adopts a Systematic Literature Review (SLR) approach, strictly adhering to the PRISMA 2020 guidelines [19,20]. This method is particularly suitable for synthesizing existing scholarly works, identifying evolutionary trends, and resolving academic controversies—all of which align with the core objectives of sorting out the development context, analyzing current status, and exploring optimization paths of Chinese children's piano learning.

Given the localization characteristics of the research topic, literature was retrieved from major Chinese academic databases to ensure the relevance and representativeness of the data. The primary database was CNKI (China National Knowledge Infrastructure), supplemented by Wanfang Data, VIP Chinese Science and Technology Periodicals Database, and CSSCI (Chinese Social Sciences Citation Index) for high-quality literature screening [23]. Core journals in music education and basic education, such as Journal of the Central Conservatory of Music, Music Art, and Educational Research, were prioritized to enhance the academic authority of the selected literature.

The search time span was set from 1950 to June 2024 to fully cover the evolutionary process of Chinese children's piano learning. Based on the three RQs, the core search terms were combined using logical operators "AND/OR" to ensure comprehensive coverage of key themes (see Table 1). The search fields included "title + keyword + abstract" to avoid missing relevant literature.

To refine the dataset and ensure alignment with the research focus, strict inclusion and exclusion criteria were established (see Table 2). Included literature must focus on Chinese children aged 3–12 years old who learn piano, adopt empirical research or systematic review methods, be peer-reviewed academic papers, and have accessible full Chinese texts. Excluded literature included those focusing on foreign piano education, non-academic works (e.g., newspaper comments, teaching case compilations), and studies with unclear research methods or insufficient data support.

Table 1
Search string and core themes

Database Group	Search String	Core Themes Corresponding to RQs
CNKI + Wanfang + VIP	TITLE-ABS-KEY (" Children's piano learning "OR" Piano education ") AND (" Development context "OR" policy "OR" economy "OR" family participation "OR" resource distribution "OR" teaching practice "OR" grade examination "OR" art education "OR" regional differences" OR "family type ")	RQ1 (policy/economic/family factors), RQ2 (four dimensions/regional/family differences), RQ3 (grade examination-aesthetic conflict/resource imbalance)
CSSCI	TITLE-ABS-KEY (" Children's piano learning "AND (" Current situation" OR "controversy" OR "optimization path "))	RQ2 (current characteristics/contradictions), RQ3 (controversies/optimization paths)

Table 2
Inclusion and exclusion criteria

Criterion	Inclusion Criteria	Exclusion Criteria
Research Object	Chinese children aged 3–12 years old; focusing on piano learning behaviors/phenomena	Foreign children; adult piano learning; other art education
Literature Type	Peer-reviewed academic journals, master's/doctoral dissertations	Non-academic works (newspaper articles, teaching manuals, industry reports)

Literature Retrieval and Screening Process

In accordance with the PRISMA 2020 guidelines, the literature retrieval and screening process followed four core stages, with specific quantities and operations as follows:
Identification: A total of 1,286 literatures were initially retrieved through the combined search strategy across CNKI, Wanfang Data, VIP Chinese Science and Technology Periodicals Database, and CSSCI.
Screening: After removing 324 duplicate literatures using database deduplication tools and manual verification, 962 literatures remained for preliminary evaluation.
Eligibility: First, 854 literatures that clearly did not meet the inclusion criteria were excluded through title and abstract screening (e.g., focusing on foreign piano education, non-academic works). Subsequently, full-text screening was conducted on the remaining 108 literatures, excluding 50 literatures with unclear research methods, insufficient data support, or inconsistent research objects.
Final inclusion: Ultimately, 58 core literatures that fully meet the research requirements were included for systematic analysis.

Figure 1 PRISMA Flow Diagram of Literature Retrieval and Screening. Note: The retrieval follows PRISMA 2020 guidelines.
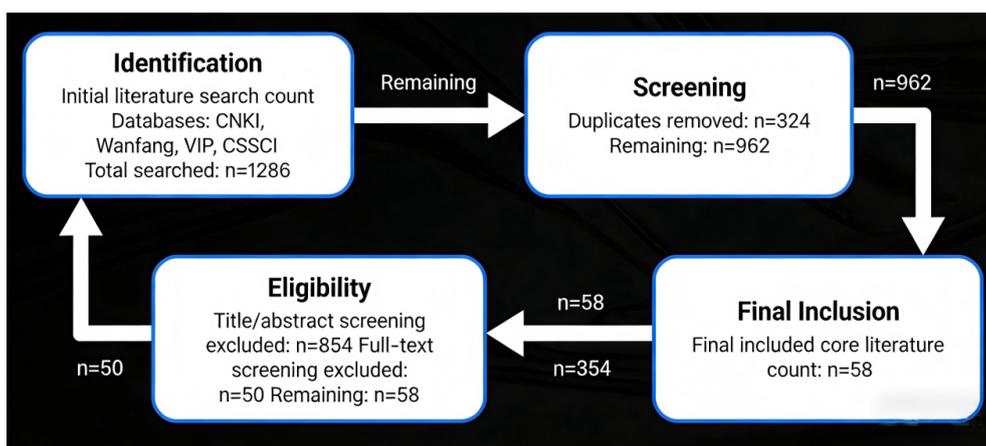
Fig. 1. PRISMA flow diagram of literature retrieval and screening
Note: The retrieval follows PRISMA 2020 guidelines

To address the three RQs, a mixed-methods analysis approach was adopted, combining thematic coding and comparative analysis:

Thematic Coding for RQ1: Literature was coded by "development stage" (germination period: 1950s–1980s; exploration period: 1990s–2000s; development period: 2010s–2024) and "driving factors"

(policy, economic, family). The synergistic effects of these factors in promoting the transformation from elite training to universal aesthetic education were extracted and summarized.

Dimension Classification for RQ2: Literature was categorized by the four dimensions (policy implementation, family participation, resource distribution, teaching practice). Within each dimension, sub-codes were set for "urban/rural regions" and "high/low resource families" to compare differences in current characteristics and structural contradictions.

Controversy Extraction for RQ3: Core academic controversies (e.g., grade examination vs. aesthetic education, resource balance paths) were identified through thematic analysis. Feasible optimization paths were summarized by synthesizing solutions proposed in existing literature.

To ensure the alignment between research questions and analytical procedures, each RQ is addressed through targeted methods: For RQ1 (evolutionary stages and driving factors), 58 core peer-reviewed articles are thematically coded by development stage (germination/exploration/development) and driving factors (policy/economy/family) to extract synergistic mechanisms. For RQ2 (current characteristics and contradictions), a subset of studies focusing on policy implementation, family participation, resource distribution, and teaching practice are classified by dimensions, with comparative analysis across urban-rural regions and high-low resource families. For RQ3 (academic controversies and optimization paths), studies discussing core debates (grade examination vs. aesthetic education, resource balance paths) are thematically synthesized to identify opposing views and integrate feasible solutions.

Table 3
Alignment of research questions, data sources, and analysis methods

Research Question	Data Source (SLR)	Analysis Method
RQ1: Evolutionary stages and synergistic driving factors	58 peer-reviewed journal articles (1950s–2024)	Thematic coding by development stage and driving factors (policy, economy, family)
RQ2: Current characteristics, structural contradictions, and regional/family differences	Subset of 58 studies addressing policy implementation, family participation, resource distribution, and teaching practice	Dimensional classification + comparative analysis (urban-rural; high-low resource families)
RQ3: Core academic controversies and feasible optimization paths	Subset of 58 studies discussing debates, policy implications, and solutions	Thematic synthesis of controversies + integrative interpretation of optimization paths

To ensure the reliability of the analysis, the two researchers independently coded the 58 core articles, and the inter-coder reliability (IRR) was calculated using Cohen's kappa coefficient ($\kappa = 0.83$), indicating good consistency [7]. Discrepancies were resolved through group discussions with a third music education scholar.

The rigor of this study is guaranteed by three aspects: First, adhering to PRISMA guidelines ensures the systematicity of literature retrieval and screening. Second, independent coding and IRR verification reduce subjective biases in data analysis. Third, focusing on core databases and high-quality journals enhances the validity of the research findings. However, limitations exist: First, gray literature (e.g., policy white papers, industry reports) was not included, which may lead to incomplete coverage of policy implementation details. Second, the number of literatures from the 1950s–1980s is relatively scarce, potentially affecting the depth of analysis on the germination period. Third, the analysis relies on existing literature data, and no additional primary research was conducted, which may limit the exploration of new emerging trends (e.g., the impact of AI-powered piano teaching

tools after 2023). These limitations are considered in the discussion and conclusion sections to avoid overgeneralization of the findings.

5. Result and Finding

Based on the systematic literature review and mixed-methods analysis (thematic coding + comparative analysis), this chapter presents the research findings corresponding to the three research questions, with data support from 58 core literatures and visualizations (tables and figures) to clarify key trends and contradictions.

A. RQ1: Evolutionary Stages, Core Characteristics, and Synergistic Driving Mechanisms
The analysis of 58 core literatures confirms that Chinese children's piano learning has experienced three distinct evolutionary stages from the 1950s to 2024, with the synergistic effect of policy, economic, and family factors driving its transformation from elite professional training to universal aesthetic education (see Table 4). To intuitively reflect the scale change during the evolutionary process, Figure 2 shows the trend of the number of Chinese children piano learners over the past 70 years.

Table 4
Evolutionary stages and core characteristics of Chinese children's piano learning

Evolutionary Stage	Time Span	Core Characteristics	Synergistic Driving Factors
Germination Period	1950s–1980s	Elite participation; professional talent orientation; scarce resources; "master-apprentice" teaching	Policy: Focus on professional art talent training [25]; Economy: Low per capita income, limited piano accessibility [3]; Family: Only privileged families participate with simple economic support (Liu, 2023)
Exploration Period	1990s–2000s	Popularization; grade examination-driven; middle-class participation; Western teaching method localization	Policy: "Quality education" and art specialty bonus (Zhao & Liu, 2020); Economy: Rising urban disposable income (Zhang & Li, 2022); Family: Economic support + behavioral supervision [11]
Development Period	2010s–2024	Diversified goals; intensive policies; three-dimensional family participation; technology integration	Policy: "Double reduction" + aesthetic education synergy [30]; Economy: Smart piano popularization and online course penetration (Sun et al., 2023); Family: Behavioral + emotional + cognitive participation differentiation [14]
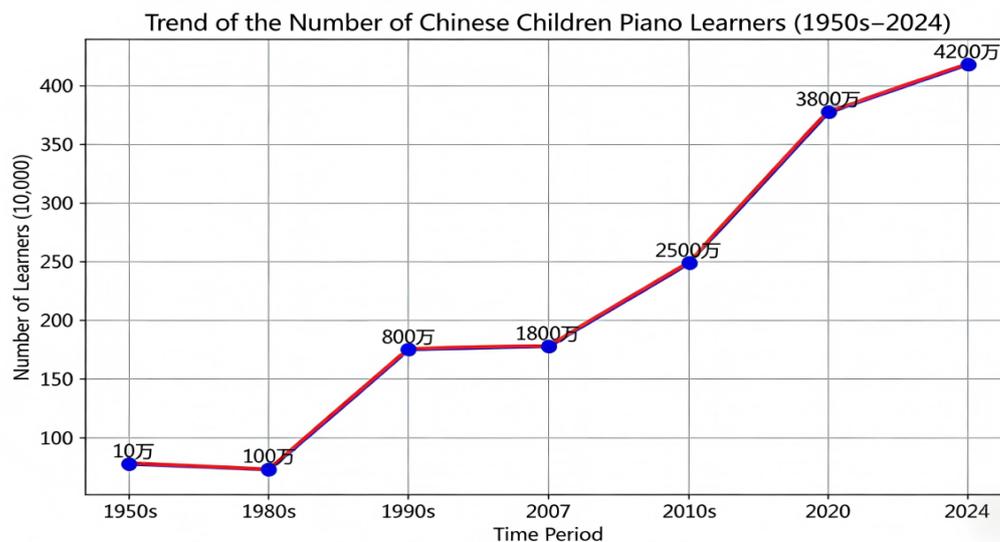
Fig. 2. Trend of the number of Chinese children piano learners (1950s–2024)

In the germination period (1950s–1980s), policy factors played a dominant role: the state concentrated educational resources on professional music colleges to cultivate artistic talents, and piano education was incorporated into the enrollment system of professional colleges [25]. Economically, the low level of social and economic development made pianos a luxury, with an annual output of less than 2,000 units in 1980, and over 90% allocated to professional institutions [3]. Family participation was extremely limited, restricted to art practitioners and privileged families, with parents unable to provide professional guidance and only relying on high-cost professional training institutions (Liu, 2023). The synergistic effect of these three factors led piano learning to remain in the elite professional training stage, as reflected in Figure 2, where the number of learners was less than 100,000 before the 1990s.

In the exploration period (1990s–2000s), economic growth became a key driving force: the per capita disposable income of urban residents increased nearly 10 times compared with the 1980s, making piano purchases and course fees affordable for middle-class families [35]. Policies such as "quality education" and art specialty extra points further stimulated family demand, triggering a nationwide "piano grade examination boom" [32]. Family participation expanded from simple economic support to behavioral supervision, but due to the lack of professional background, parents mainly supervised practice time and urged grade examinations, with low participation quality [11]. The synergy of economic and policy factors promoted the popularization of piano learning, and the number of learners surged to 18 million by 2007 (Figure 2), laying the foundation for large-scale development.

In the development period (2010s–2024), policy, economic, and family factors formed a strong synergistic effect: intensive policies such as "double reduction" and aesthetic education oriented piano learning towards interest and aesthetic cultivation [30].; the popularization of smart pianos and online courses reduced learning thresholds, with online learning penetration rising from 12% in 2021 to 25% in 2024 [22]; family participation evolved into a three-dimensional model, with high-education families focusing on cognitive participation (e.g., guiding music analysis) and low-income families relying on emotional participation to compensate for resource shortages [14]. This synergy promoted the transformation of piano learning from grade examination-driven to diversified goals of "skill + aesthetic + interest", and the number of learners stabilized at around 42 million by 2024 (Figure 2).

B. RQ2: Current Characteristics, Structural Contradictions, and Regional/Family Differences

From the four dimensions of policy implementation, family participation, resource distribution, and teaching practice, Chinese children's piano learning presents obvious structural characteristics and contradictions, with significant differences between urban/rural regions and high/low resource families (see Table 5, Figure 3, and Figure 4).

Table 5
Current characteristics and contradictions of piano learning by dimension

Dimension	Current Characteristics	Structural Contradictions	Regional/Family Differences
Policy Implementation	Four-dimensional policy framework; "de-utilitarian" orientation [30]	Top-level design vs. grassroots implementation deviation; urban-rural policy implementation gap [15]	Urban: 89% of institutions adapt to aesthetic education; Rural: Public welfare course coverage <30% [33]
Family Participation	Three-dimensional differentiation (behavioral/emotional/cognitive); cognitive participation has the strongest effect ($\beta=0.287$) [14]	Dimensional imbalance; excessive behavioral intervention; utilitarian tendency [8]	High-resource families: Cognitive participation dominant; Low-resource families: Emotional participation as compensation [13]
Resource Distribution	Traditional resources dominant; new resources (smart piano/online courses) rising [22]	Urban-rural resource gap; new resource popularization inequality [37]	Urban: 12 training institutions/km², smart piano coverage >60%; Rural: 0.1 institutions/km², coverage <10% [33]
Teaching Practice	Western teaching method localization; technology integration; diversified courses [29]	Localization adaptation dilemma; uneven teacher quality; utilitarian evaluation [17]	Urban: 73.6% of teachers with professional background; Rural: Teacher certification rate <40% [17]
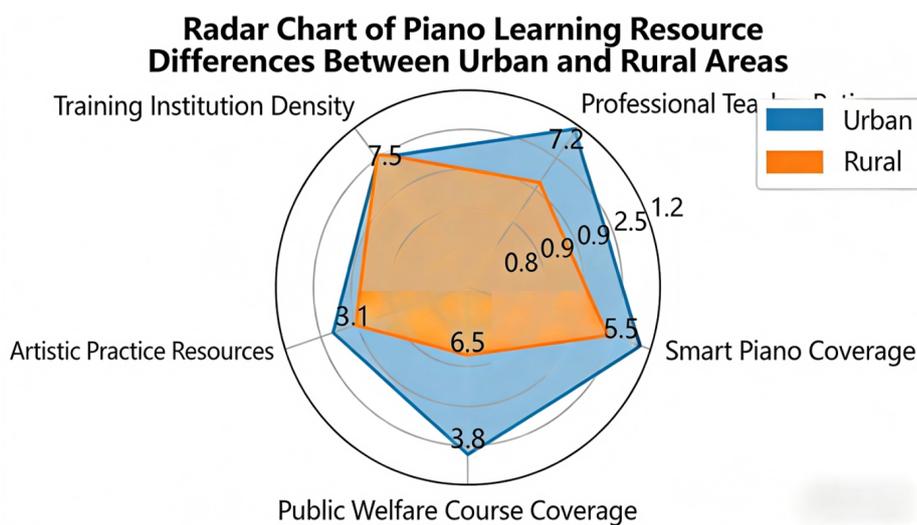
Fig. 3. Radar chart of piano learning resource differences between urban and rural areas
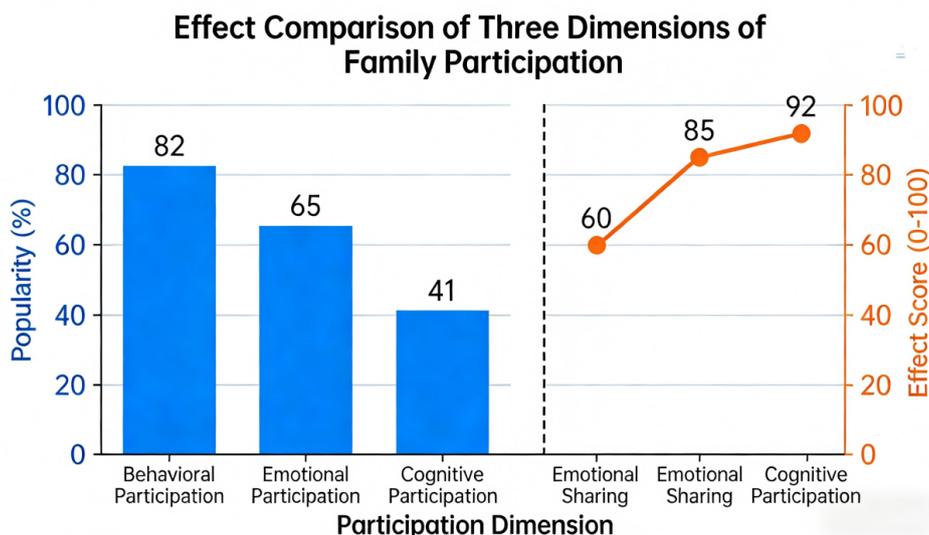
Fig. 4. Effect comparison of three dimensions of family participation

1. Policy Implementation

The "de-utilitarian" top-level design has not been fully implemented at the grassroots level: 38% of families still take grade examinations as their primary goal, and some institutions continue to use grade examination pass rates as core evaluation indicators [17]. There is a significant "implementation temperature difference" between urban and rural areas: urban families have a high awareness of policies such as "double reduction", and institutions actively adjust their curriculum systems; while rural low-income families have a policy awareness rate of only 56%, and public welfare piano courses are severely inadequate [15].

The "implementation temperature difference" persists due to dual constraints: urban areas benefit from strong economic foundations and mature educational ecosystems—local governments can allocate special funds for aesthetic education, and institutions have the capacity to update curricula quickly; in rural areas, however, limited fiscal investment in public welfare education leads to a lack of qualified teachers and teaching facilities, and families' utilitarian education concepts (prioritizing grade examinations for academic advantages) further hinder policy penetration [15,33]. This gap cannot be narrowed in the short term without targeted resource input and concept guidance.

2. Family Participation

Figure 4 clearly shows that behavioral participation has the highest popularity (82%) but the lowest effect score (60), emotional participation has a moderate popularity (65%) and high effect score (85), and cognitive participation has the lowest popularity (41%) but the highest effect score (92). Differences among family types are prominent: high-resource families (annual expenditure >20,000 yuan) focus on cognitive participation, such as guiding children to analyze musical structures, and their children's artistic expression accuracy is 22% higher than that of ordinary families (China Music Education Association, 2020); low-resource families rely on emotional participation (e.g., weekly encouragement and family music sharing) to narrow the learning gap by 20% [13]; however, 28.7% of utilitarian families with excessive behavioral intervention have a high dropout rate [8].

Existing studies on family participation show distinct similarities and differences: Li (2023) and Grolnick and Slowiaczek [11] both confirm that cognitive participation has the strongest positive

impact on learning performance, reflecting the universal value of deep parental involvement in educational practice. However, Hu [13] emphasizes emotional participation as an effective compensation path for low-income families, while Li [14] focuses more on cognitive participation among high-education families. This discrepancy stems from variations in research samples: Li's study targets first-tier cities where parents often have higher educational backgrounds and time to engage in cognitive guidance, while Hu's research focuses on third-tier cities and rural areas, where low-income families lack professional resources and rely on emotional support to sustain children's learning motivation [13,14].

3. Resource Distribution

Figure 3 intuitively reflects the significant urban-rural gap: urban areas score high across all five indicators, especially in training institution density (6.8) and artistic practice resources (7.5), while rural areas score extremely low in training institution density (0.8) and smart piano coverage (0.9). The density of training institutions in first-tier cities is 120 times that of rural areas, and the proportion of professional teachers with bachelor's degrees or above is 2.4 times higher [33]. The popularization of new resources further exacerbates inequality: the penetration rate of smart pianos and online courses in urban families is 58%, compared to less than 10% in rural families [22].

A key contradiction in resource distribution research lies in the trade-off between different balance paths: Zhao [33] finds that government-led rural public welfare courses improve rural children's learning performance by 18%, but Zhou and Wang [37] points out that such courses face unsustainable operations due to high financial investment and scattered rural populations. Meanwhile, Zhao and Chen [34] argue that market-driven solutions like smart piano rental offer low costs and wide coverage, but Sun *et al.*, [22] notes that backward rural network infrastructure and limited children's self-discipline restrict their effectiveness. This contradiction persists because rural areas have complex geographical and demographic characteristics—single-path resource allocation cannot simultaneously address effectiveness, sustainability, and accessibility [34,37].

4. Teaching Practice

The localization of Western teaching methods faces dilemmas: the Suzuki method's "interest-oriented" concept conflicts with Chinese families' "grade examination demand", leading most institutions to adopt only its technical training methods while ignoring interest cultivation [29]. Teacher quality varies drastically by region: the professional certification rate of urban teachers exceeds 60%, and they regularly participate in training; rural teachers are mostly part-time, with a certification rate of less than 40% and insufficient professional skills [17].

Existing studies consistently recognize the localization dilemma of Western methods but differ in interpreting its causes: Yang and Kim [29] attribute the core conflict to the mismatch between Chinese families' utilitarian demands (pursuing grade examination results) and Western methods' educational concepts. Liu and Zhang [17] supplement that uneven teacher quality exacerbates this dilemma—urban teachers with high professional competence can balance interest cultivation and skill training, while rural teachers with insufficient capacity can only focus on simple technical training to meet family grade examination expectations. This difference arises from varying research focuses: Yang and Kim [29] emphasize family demand, while Liu and Zhang [17] highlight teacher capacity as a mediating factor.

C. RQ3: Core Academic Controversies and Feasible Optimization Paths

Through thematic analysis of core literatures, two core academic controversies in the field of Chinese children's piano learning are identified, and feasible optimization paths are proposed based on existing research findings (see Table 6).

Table 6
Core controversies and feasible optimization paths

Core Controversies	Opposing Views	Feasible Optimization Paths
Conflict between grade examination orientation and aesthetic education orientation	Pro-grade examination: As a phased goal, it improves learning persistence by 23% [27]; Anti-grade examination: It suppresses interest and deviates from aesthetic education [17]	Family: Age-differentiated strategy (3-6 years old: interest enlightenment; 7-12 years old: grade examination + aesthetic integration) [14]; Institution: Diversified evaluation system (skill + aesthetic + literacy) [28]
Resource balance path selection (government-led vs. market-driven)	Government-led: Public welfare courses improve rural performance by 18% [27]; Market-driven: Smart piano rental/online courses have low cost [34]	Policy: Increase rural public welfare investment + establish urban-rural teacher exchange mechanism [33]; Market: Promote low-cost smart piano rental and public digital resource platforms [22]

The first core controversy is the conflict between grade examination orientation and aesthetic education orientation. Supporters of grade examinations argue that grade examinations provide clear phased goals, enhancing children's learning persistence by 23% [27]; opponents contend that excessive emphasis on grade examinations leads to mechanical practice, suppressing children's musical interest and deviating from aesthetic education's core goals [17]. The optimization path adopts a differentiated strategy: for children aged 3–6, families and institutions focus on interest enlightenment to avoid premature grade examination pressure; for school-age children (7–12), grade examinations serve as phased evaluation tools, with aesthetic education content (e.g., musical emotion analysis, cultural background interpretation) integrated into learning [14]. Institutions need to establish diversified evaluation systems, reducing the weight of grade examination results and increasing qualitative evaluation of artistic expression and musical literacy [28].

The second core controversy is the selection of resource balance paths. The government-led path (e.g., rural public welfare piano courses) directly improves rural children's learning performance by 18% but faces challenges of large financial investment and unsustainable operations [27]; the market-driven path (e.g., smart piano rental, online courses) offers low costs and wide coverage but is limited by rural network conditions and children's self-discipline [34]. The feasible path is "government-market synergy": the government increases rural piano education investment, expands public welfare course coverage, and establishes an urban-rural teacher exchange and training mechanism [33]; the market promotes low-cost smart piano rental services and builds public digital resource platforms, providing free online courses and teaching guidance manuals for low-resource families [22].

6. Discussion and Conclusion
A. Discussion

The systematic literature review of 58 core studies reveals the evolutionary logic and current structural contradictions of Chinese children's piano learning, with findings that respond to existing academic gaps and provide practical guidance for educational practice.

1. Interpretation of Evolutionary Context (RQ1)

Regarding the evolutionary context (RQ1), the identification of three stages (germination, exploration, development) and the "policy-economy-family" synergistic driving mechanism supplements the fragmented phase analysis of previous research [3,25]. Existing studies show similarities in phase division [3] also identifies three stages) but differ in integrating driving factors: previous research mostly emphasized single-factor driving (e.g., policy or economy), while this study confirms that the synergy of three factors is the core driver of transformation. For example, Wang and Li [25] only highlighted policy's role in the germination period, but this study finds that policy-led talent training, economic resource scarcity, and elite family participation jointly confined piano learning to an elite field—this difference stems from previous studies' lack of systematic integration of multi-dimensional factors [3,25].

In the germination period (1950s–1980s), policy-led professional talent training, economic scarcity of piano resources, and elite family participation jointly confined piano learning to a niche field; the exploration period (1990s–2000s) saw economic growth as the primary driver, supported by quality education policies and middle-class behavioral supervision, triggering large-scale popularization; the development period (2010s–2024) features multi-factor synergy, with intensive policies such as "double reduction" guiding the shift to aesthetic education, technological economy lowering learning thresholds, and diversified family participation (behavioral, emotional, cognitive) meeting differentiated needs [14,22]. This mechanism explains how piano learning transformed from elite professional training to universal aesthetic education, filling the gap in integrating multi-dimensional driving factors in existing studies.

2. Interpretation of Current Status and Contradictions (RQ2)

For the current status and contradictions (RQ2), the four-dimensional analysis (policy implementation, family participation, resource distribution, teaching practice) uncovers dual differences (urban-rural, high/low resource families) and structural imbalances.

In policy implementation, the "implementation temperature difference"—where 89% of urban institutions adapt to aesthetic education but rural public welfare course coverage is less than 30% [33] reflects the mismatch between top-level design and grassroots practice [15]. This contradiction persists due to significant urban-rural differences in economic foundations, institutional capacity, and family awareness: urban areas have sufficient financial support and high-quality educational institutions to implement policies, while rural areas are constrained by weak economic strength and low family education awareness, making policy landing difficult [15].

In family participation, the paradox that behavioral participation (82% popularity) has the lowest effect (60 points) while cognitive participation (41% popularity) has the strongest positive impact (β=0.287) [14] is closely related to family educational resources and parental cognition. Most families lack professional musical knowledge, so they tend to adopt simple behavioral supervision (e.g., checking practice time) rather than cognitive participation (e.g., guiding music analysis); low-resource families further rely on emotional participation due to limited access to professional resources, forming a "resource-capacity-participation" chain that shapes current participation patterns [13,14].

In resource distribution, the prominent urban-rural gap and new resource inequality are rooted in long-term unbalanced regional development. Urban areas have concentrated educational resources and economic advantages, attracting high-quality teachers and promoting new technologies (e.g., smart pianos); rural areas, however, face "double deprivation" of traditional and new resources—insufficient traditional training institutions and teachers, coupled with backward

network infrastructure that limits access to online courses and smart equipment [22,33]. This gap is further widened by the market's tendency to allocate resources to high-demand, high-return urban areas.

In teaching practice, the localization dilemma of Western methods and uneven teacher quality are mutually reinforcing. Western teaching methods' interest-oriented concepts conflict with Chinese families' utilitarian demands, and rural teachers' insufficient professional capacity prevents them from adapting methods to local contexts, leading to simplified technical training [17,29]. Urban teachers, by contrast, can balance technical training and interest cultivation due to higher professional competence, forming a "quality gap" in teaching effectiveness between urban and rural areas.

3. Interpretation of Core Controversies and Optimization Paths (RQ3)

Regarding core controversies and optimization paths (RQ3), this study resolves the binary debates of "grade examination vs. aesthetic education" and "government-led vs. market-driven resource balance" through evidence-based integration. Unlike one-sided advocacy for abandoning or retaining grade examinations [17,27], the proposed age-differentiated strategy—interest enlightenment for 3–6-year-olds and grade examination-aesthetic integration for 7–12-year-olds—balances goal setting and interest protection [14]. For resource balance, the "government-market synergy" path combines public welfare investment (improving rural performance by 18%) and market-driven solutions (low-cost smart piano rental, online courses) to address the limitations of single-path approaches [27,34]. These paths bridge the gap between theoretical debates and practical implementation.

This study also has limitations consistent with its methodological framework: the exclusion of gray literature (e.g., policy white papers) may limit the depth of policy implementation analysis; scarce literatures from the 1950s–1980s affect the comprehensiveness of the germination period discussion; and reliance on secondary data prevents exploration of emerging trends such as AI-powered piano teaching (2023 onwards) [7]. These limitations should be considered when generalizing findings and guide future research directions.

B. Theoretical Contributions

Theoretical Contributions: First, this study extends the existing evolutionary framework of children's piano learning by identifying three distinct stages (germination/exploration/development) and integrating the "policy-economy-family" synergistic driving mechanism—supplementing the fragmented phase analysis of previous studies [3,25]. Second, it integrates fragmented findings on family participation, resource distribution, and policy effects into a four-dimensional analytical framework (policy/family/resource/teaching), providing a systematic theoretical tool for future research. Third, it resolves binary debates (grade examination vs. aesthetic education, government-led vs. market-driven) through evidence-based integration, enriching the theoretical system of Chinese art education equity. Finally, it verifies the localization adaptability of foreign frameworks (e.g., Grolnick's family participation framework) in the Chinese context, laying a foundation for constructing localized piano education theories.

C. Implications for Policy and Practice

Implications for Policy and Practice: For policy makers: Increase rural public welfare investment in piano education, expand the coverage of public welfare courses, and establish an urban-rural teacher exchange mechanism to narrow regional resource gaps [33]. Promote public digital resource platforms to provide free online courses for low-resource families. For training institutions: Optimize curriculum systems by integrating aesthetic education content into grade examination training, establish a diversified evaluation system (skill + aesthetic + literacy), and strengthen professional training for rural teachers. For families: Adopt age-differentiated participation strategies (interest enlightenment for 3–6-year-olds, grade examination-aesthetic integration for 7–12-year-olds); low-resource families can leverage emotional participation (e.g., weekly music sharing) to compensate for resource shortages. For future empirical research: This study provides a systematic framework for exploring regional/group differences, long-term effects of policy adjustments, and application of emerging technologies (e.g., AI piano teaching), guiding targeted follow-up studies.

D. Conclusion

Chinese children's piano learning has undergone a 70-year evolution driven by "policy-economy-family" synergy, transforming from elite professional training to universal aesthetic education through three distinct stages. Current development is characterized by interwoven structural contradictions: policy "de-utilitarian" orientation vs. grassroots "exam-oriented" practice; family participation "three-dimensional differentiation" vs. "dimensional imbalance"; urban-rural resource "enrichment vs. scarcity"; and teaching practice "method innovation" vs. "localization adaptation dilemmas". The core controversies of grade examination-aesthetic conflict and resource imbalance can be addressed through age-differentiated integration and government-market synergy.

These findings have clear practical implications for multiple stakeholders: families should adopt stage-specific participation strategies, with low-resource families leveraging emotional participation to compensate for resource shortages; training institutions need to optimize curriculum systems, establish diversified evaluation mechanisms, and strengthen rural teacher training; policy makers should increase rural public welfare investment, build urban-rural teacher exchange platforms, and promote public digital resources to narrow regional and family gaps [22,28,33].

7. Suggestion for Future Research

Based on the research findings, limitations, and existing academic gaps identified in this study, future research should focus on addressing unresolved issues, expanding research boundaries, and deepening theoretical and practical exploration, with the following specific directions:

First, expand sample coverage and optimize research scenarios to improve the external validity of findings. Existing studies are predominantly concentrated in first-tier cities and institutional learning scenarios [31], with insufficient attention to rural areas, third- and fourth-tier cities, and special family groups (e.g., single-parent families, left-behind children). Future research should adopt a multi-regional, multi-scenario sampling strategy, incorporating rural children, low-income families, and non-institutional learning scenarios (e.g., community public welfare courses, family self-study) to systematically explore the development characteristics and needs of different groups. This will help clarify the regional and group differences in piano learning resource allocation and participation modes, providing more targeted support for promoting educational equity.

Second, enrich research methods and strengthen longitudinal tracking to reveal dynamic causal relationships. Most current studies rely on cross-sectional surveys and quantitative analysis [15], making it difficult to capture the long-term evolution of children's piano learning and the dynamic interaction between influencing factors [7]. Future research should increase the application of longitudinal tracking methods, conducting follow-up surveys of children aged 3–12 for 3–5 years to explore the long-term effects of family participation modes, policy adjustments, and resource input on learning persistence, musical literacy, and aesthetic development. Additionally, mixed-methods research (combining quantitative surveys with qualitative interviews, case studies) can be used to deeply analyze the micro-interaction mechanisms between parents, children, and teachers, complementing the limitations of single-method research.

Third, construct a localized theoretical model and deepen the exploration of mechanism relationships. Existing research lacks a systematic theoretical framework integrating Chinese policy context, cultural characteristics, and practical realities [8], failing to fully explain the interaction mechanism among "policy-family-resource-learning performance". Future research should based on Bourdieu's cultural capital theory and Grolnick's family participation framework, integrate the unique factors of Chinese piano education (e.g., the impact of the "double reduction" policy, the grade examination system's transformation, and the integration of folk music elements), construct a localized theoretical model. It is necessary to further verify the mediating or moderating roles of resource allocation (e.g., teacher quality, smart equipment) between policy implementation and learning outcomes, as well as the boundary conditions of family participation effects (e.g., children's age, parental educational level), to provide more precise theoretical guidance for practice.

Fourth, focus on emerging technical applications and practical intervention research. With the popularization of smart pianos, AI teaching tools, and VR music experiences [22], the integration of technology and piano education has become an important development trend, but relevant empirical research is still in its infancy. Future research should explore the application effects and optimization paths of emerging technologies: for example, evaluating the impact of AI intelligent error correction, personalized practice plans, and VR immersive teaching on children's learning interest, skill improvement, and emotional experience; analyzing the potential risks of excessive reliance on technology (e.g., weakened teacher-student emotional interaction) and proposing mitigation strategies. At the same time, intervention studies can be carried out to verify the effectiveness of targeted practices such as age-differentiated family participation strategies, localized curriculum optimization, and urban-rural teacher exchange mechanisms, providing operable solutions for improving the quality of piano education.

Fifth, strengthen research on the cost-effectiveness of resource balance and policy implementation effects. Current research on resource balance paths (government-led vs. market-driven) lacks quantitative cost-benefit comparison [34], and the long-term implementation effects of policies such as "double reduction" and aesthetic education still need to be tracked. Future research can adopt cost-benefit analysis methods to compare the input-output ratio of different resource allocation strategies (e.g., rural public welfare courses, smart piano rental services, online public courses). It is also necessary to conduct policy evaluation studies, exploring the factors influencing policy implementation effects (e.g., regional economic level, institutional execution capacity, family acceptance) and proposing targeted policy optimization suggestions to narrow the urban-rural and inter-family gaps in piano education.

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