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Original Paper

Supply-Demand Preferences and Compatibility between Sending and Recipient Parties in Shanghai–Yunnan Group-Based Paired Education Assistance

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Abstract

To examine the supply-demand matching status of the Shanghai–Yunnan "group-based" paired education assistance and to identify the supply-demand misalignments and their generative mechanisms between the sending and recipient parties, this study draws on supply-demand adaptation theory to construct an analytical framework of "supply preference—demand preference—supply-demand adaptation status—causes of contradiction—optimization path." Employing a mixed-methods design that combines a two-sided supply-demand importance matrix, independent-samples t-tests, and NVivo qualitative coding, the study uses 40 questionnaires from Shanghai teachers dispatched to Yunnan and 52 questionnaires from local teachers in recipient county-level general senior high schools in Yunnan as its primary data, triangulated with policy documents, symposium interviews, and typical assistance cases. The findings show that the two parties are highly aligned in teacher team building and curriculum resource development; significant cognitive misalignment emerges in the dimension of school management systems and institutional export, which falls into the Supply Surplus Zone; hardware facilities and teaching equipment support fall into the Supply Gap Zone; and the compatibility between policy and local learning conditions and the rationality of the assessment mechanism constitute the major practical obstacles. The supply-demand misalignment is rooted in the developmental gap in education between eastern and western China, the inertia of project-based supply, the absence of two-way communication mechanisms, and the risk of discontinuity caused by personnel rotation. The study proposes an operating mechanism of "front-end demand diagnosis—two-way dynamic adaptation—localized transformation and

implementation—closed-loop evaluation and feedback," so as to shift assistance from supply-driven to demand-oriented and move from "one-way embeddedness" toward "two-way integration and symbiosis."

Keywords

Shanghai–Yunnan collaboration, group-based paired education assistance, supply-demand preference, supply-demand compatibility, two-sided supply-demand importance matrix

Introduction

China's national group-based educational talent assistance initiative directs high-quality educational resources from eastern to western China, representing a vital institutional arrangement for advancing regional educational equity and rural revitalization. As a flagship case of East-West paired collaboration, Shanghai-Yunnan paired assistance has moved beyond basic resource provision toward quality-driven improvement. Precise alignment between assisting-side supply and recipient-side demand has therefore emerged as a critical determinant of assistance outcomes. Prior scholarship predominantly concentrates on assistance frameworks, resource distribution and practical experience, with limited empirical work examining both supply-demand fit and misalignment from dual-party perspectives. Addressing this gap, this study applies supply-demand fit theory to construct a bilateral supply-demand importance matrix, combining independent-samples t-tests and qualitative analysis based on dual-respondent questionnaire evidence. It unpacks manifestations and root causes of supply-demand misalignment and puts forward optimization strategies, offering empirical insights for evidence-informed educational assistance policy implementation.

1. Statement of the Problem

1.1 Policy Background and Practical Demands

Education is the fundamental solution to breaking the intergenerational transmission of poverty and achieving common prosperity. Since 2021, with the comprehensive victory in the fight against poverty and the shift of policy focus toward comprehensively advancing rural revitalization, education assistance has faced the deeper question of transforming from "addressing basic schooling conditions" to "improving the quality of education and teaching." In 2022, eight central departments including the Organization Department of the CPC Central Committee jointly deployed the "group-based" assistance of education personnel for county-level schools in national key counties for rural revitalization. This initiative replaced the traditional scattered, short-term, point-based teaching-support model with a normalized mechanism of institutional group dispatch of "management cadres + subject teachers," focusing on shoring up weaknesses in county-level general senior high schools in western China. It has become an important policy instrument for serving educational revitalization and promoting regional educational equity.

As one of the provinces bearing the heaviest tasks of consolidating and expanding the achievements of

poverty alleviation, Yunnan's county-level general senior high schools generally face practical difficulties such as a shortage of high-quality teachers, lagging educational concepts, weak teaching and research capacity, and crude school governance. As a benchmark of east-west paired assistance for poverty alleviation, the Shanghai–Yunnan collaboration has seen Shanghai continuously dispatch group-based education assistance teams to multiple county-level senior high schools in Yunnan, giving rise to multi-dimensional assistance practices in cadre mentoring, teacher cultivation, curriculum co-construction, teaching and research collaboration, and cultural development. A number of observable and replicable recipient school models have emerged, such as Xuanwei No. 10 Senior High School and Menglian County No. 1 Senior High School. In terms of policy evolution, Shanghai–Yunnan group-based assistance has moved from the resource-coverage stage of "whether it exists" to the quality-improvement stage of "whether it is good" · making precise supply-demand matching the deeper issue that determines assistance effectiveness.

1.2 Review of Existing Research

Scholarship on "group-based" education assistance has accumulated considerably and can be broadly classified into three strands. The first is research on policy models, which summarizes from an institutional-design perspective the organizational forms, operating mechanisms, and comparative advantages of group-based assistance. Xie Zhiju defines "group-based" education assistance as "a model in which the paired eastern region, according to the assistance needs of the recipient area, dispatches in groups teaching teams and training-and-guidance teams; with outstanding principals selected and introduced to provide leadership, all parties are mobilized to assist according to needs and cooperate in a coordinated manner, targeting one poor county or one weak school for management input, demonstration and guidance, and training and mentoring, so as to implement a 'reshaping' and 'implanting' form of assistance"[1]. This definition indicates that "according to needs" and "coordination" should be inherent requirements of group-based assistance. The second strand is research on practical effectiveness and problems. Based on surveys of western county-level senior high schools, Guo Congbin et al. found that group-based assistance still faces "practical contradictions such as overloaded teaching pressure, limited assistance cycles, imperfect coordination mechanisms, insufficient supply-demand docking, and regional value conflicts"[2]. Rong Chengyang further summarizes current difficulties as "latent conflicts among stakeholders, imbalance and disconnection in assistance supply and demand, and lagging sustainable development", and advocates building a "system—resources—technology—culture" four-in-one resource allocation system[3]. The third strand is research on value transformation and endogenous development. From the perspective of embedded governance, Jiang Xingling and Li Xiaoyong point out that group-based education assistance forms a networked governance structure through "multiple embedding mechanisms including political and cultural embedding, structural and relational embedding, and professional embedding", and advocate "transforming one-way embedded governance into a good-governance pattern of two-way integration, coordination and symbiosis"[4]. Li Xiang and Qi Hang propose that group-based assistance empowering

the endogenous development of education in ethnic regions should achieve “alignment of goals, cohesion of subjects, convergence of content, and aggregation of instruments”, yet in practice it still faces the challenges of “why to align goals, who to rally, what wisdom to converge, and how to aggregate instruments”[5]. Cha Shijun et al.'s study of Nujiang Prefecture shows that the integration of external resources into the teacher training system of ethnic regions suffers from “insufficient appropriateness, inadequate systematicity, weak sustainability, and limited regeneration”, with the fundamental cause lying in unsound institutions; accordingly, an “organic integration mechanism with institutions at its core” should be established[6]. Wu Xuan et al. constructed an evaluation system for the effectiveness of group-based education assistance, composed of “three first-level dimensions—reconstruction of school organizational effectiveness, accumulation of student learning capital, and appreciation of teacher professional capital—and ten second-level indicators”, thereby overcoming the previous limitation of “reliance on subjective experiential description”[7]. Wang Wei and An Yihan hold that vocational education group-based assistance reshapes the institutions, resources, and relationships of recipient schools through “institutional embedding, resource embedding, and relational embedding”, and stress a shift from one-way “embeddedness” to two-way “integration”[8]. Yang Fu proposes that the high-quality development of education assistance to Tibet requires “enhancing the promotional effect of policies, systematically advancing by category, building diversified development teams, strengthening students' sense of gain, continuously deepening teaching and research outcomes, and expanding the coverage of recipient schools”[9].

Overall, existing research is mostly conducted from the supply end or the effectiveness end, with insufficient systematic examination of the two-way supply-demand preferences of both parties. Methodologically, research relies mainly on experience summary, case narration, and policy analysis; empirical studies using dual-subject questionnaires to quantitatively measure supply-demand compatibility are rare. Moreover, systematic diagnosis of the actual misalignment between assistance supply and local demand, and in-depth analysis of its generative mechanism, remain relatively weak. The above studies provide a solid foundation for this paper, yet leave clear room for extension.

1.3 Research Questions and Academic Value

Based on the above analysis, this paper focuses on the following core questions: In Shanghai–Yunnan group-based paired education assistance, what structures do the sending party's supply preferences and the recipient party's actual demand preferences respectively present? To what extent do the two parties align, and at which levels do misalignments occur? What are the deep generative mechanisms of supply-demand misalignment? How can supply-demand compatibility be improved through mechanism optimization?

The academic value of this paper is mainly reflected in three aspects. First, in terms of research perspective, it incorporates education assistance into the analytical framework of supply-demand matching, achieving a paradigm shift from “displaying effectiveness at the supply end” to “two-way matching between the sending and recipient parties”. Second, in terms of research methods, it

combines the two-sided supply-demand importance matrix with independent-samples t-tests and qualitative content analysis, constructing a mixed-methods path for measuring supply-demand compatibility and remedying the weakness of insufficient empirical evidence in existing research. Third, in terms of practical value, it proposes an optimization path for supply-demand matching based on empirical diagnosis, which can provide an empirical reference for the precise and scientific implementation of group-based education assistance policies in Shanghai–Yunnan collaboration and similar regions.

2. Research Design

2.1 Analytical Framework: Supply-Demand Adaptation Theory

Supply-demand adaptation theory focuses on the coupling relationship between supply and demand in the public service domain, with the core argument that the degree of supply-demand adaptation of public education services directly determines service implementation effectiveness and the efficiency of public resource allocation. This study defines Shanghai–Yunnan group-based paired education assistance as a supply-demand interactive system of cross-regional public education services and, drawing on supply-demand adaptation theory, constructs the overall analytical framework of "supply preference—demand preference—supply-demand adaptation status—causes of contradiction—optimization path".

In terms of subject structure, this study distinguishes two analytical dimensions: the supply side and the demand side. The supply side is represented by the front-line Shanghai teachers dispatched to Yunnan who carry out assistance tasks, characterizing the target preferences, resource-input tendencies, implementation-effectiveness perceptions, and implementation obstacles of the assistance project's supply end. The demand side takes the local teachers of the recipient county-level general senior high schools in Yunnan as the core demand agents, characterizing the local schooling aspirations of recipient schools, practical teaching pain points, and actual acceptance preferences for assistance content. Meanwhile, the demands of management personnel and students at recipient schools serve as supplementary information sources for triangulating teachers' preferences and enriching the demand-side evidence.

In terms of matching levels, drawing on the multi-dimensional coupling analysis of supply-demand adaptation theory in the public policy field, this study decomposes the supply-demand coupling process between the two parties into three analytical dimensions. The first is the value-and-concept level, which examines whether the underlying goals and value orientation of the assistance reach consensus. The second is the practical-content level, which examines whether assistance carriers, implementation methods, and resource supply fit the local teaching scenarios of recipient schools. The third is the institutional-mechanism level, which examines whether supporting institutions such as assistance assessment and evaluation, teacher rotation, and cross-regional communication and coordination can form a linkage. Based on comprehensive judgments across these three dimensions, the supply-demand

adaptation status of the two parties is classified into three types: high alignment, partial misalignment, and significant misalignment.

2.2 Research Methods

2.1.1 Two-sided Supply-demand Importance Matrix

Drawing on the four-quadrant matrix logic of Importance-Performance Analysis (IPA), this study constructs a two-sided supply-demand importance matrix: the X-axis represents the mean importance scores that Shanghai teachers dispatched to Yunnan assign to each assistance dimension, characterizing supply-side preferences; the Y-axis represents the mean importance scores that local teachers of the recipient county-level general senior high schools in Yunnan assign to each assistance dimension, characterizing demand-side preferences. The overall mean importance of all samples is taken as the dividing baseline for both the horizontal and vertical axes, yielding four adaptation statuses: the Alignment Zone, the Supply Surplus Zone, the Supply Gap Zone, and the Low-Priority Zone. The matrix borrows the quadrant-division logic of IPA, but the Y-axis is no longer the performance perception of the same subject but the demand importance of another group; it therefore differs from the classic IPA model. The framework is shown in Figure 1.



Figure 1. Framework of the Two-sided Supply-demand Importance Matrix Based on the IPA Approach

The rationale for choosing this matrix is as follows. First, its observational object is “importance” evaluation, which is highly consistent with this paper's research question of “supply-demand preferences”. Second, it imposes relaxed constraints on sample size, fitting the medium sample scale of this study. Third, this method has mature application paradigms in the evaluation of education services

and public service supply, lending it strong methodological defensibility.

Independent-samples t-test. This is used to test whether statistically significant between-group differences exist between the Shanghai dispatched-teacher group and the Yunnan local-teacher group in perceived importance of assistance goals, perceived assistance effectiveness, and perceived policy-implementation resistance, thereby elevating supply-demand misalignment from “an intuitive judgment of score levels” to “a scientific judgment of statistical significance”. Operationally, Levene's test for equality of variances is conducted first:

When pLevene > 0.05, the t-test results under the assumption of equal variances are read; when pLevene < 0.05, the t-test results after correction for unequal variances are read. The significance criteria are: $p < 0.05$ indicates a statistically significant difference, $p < 0.01$ indicates a highly significant difference, and $p > 0.05$ indicates no significant between-group difference.

Qualitative content analysis (NVivo coding). Systematic qualitative coding analysis is conducted on policy texts such as the Implementation Plan for “Group-Based” Assistance of Education Personnel in Xuanwei City (Xuanfa [2022] No. 39), transcripts of symposiums with front-line teachers of recipient schools, and the typical practice case of arts-education assistance at Xuanwei No. 10 Senior High School. Coding follows the standardized procedure of “open coding—axial coding—selective coding”, extracting from the raw materials the recipient party's genuine demand categories, practical obstacles during assistance implementation, and effective experiences in typical cases. In this study, the themes coded from original interview statements and case materials are used to provide contextualized explanations of the statistical output, achieving triangulation between quantitative statistics and qualitative evidence. The questionnaire data from recipient students serve as supplementary evidence from the student perspective and do not participate in statistical inference.

The internal logic of the method combination is as follows: supply-demand matching theory builds the analytical framework for the whole paper and defines the two subjects of supply and demand and the three matching levels of value, practice, and institution; the two-sided supply-demand importance matrix locates and identifies the quadrant positions of supply-demand matching across the five assistance dimensions; the independent-samples t-test statistically verifies whether cognitive misalignment truly exists between the two groups; and qualitative coding explains in depth the real-world causes behind the statistical results. These four components are interlinked and mutually corroborative, constituting a complete mixed-methods research design.

2.3 Variable Measurement and Data Processing

The questionnaire converts the original ranking items of assistance priorities into a 5-point Likert importance scale: 1 = not at all important, 2 = not very important, 3 = moderately important, 4 = relatively important, 5 = extremely important. Five assistance dimensions are observed: A, teacher training and professional competence enhancement; B, curriculum development and teaching resource development; C, school management system and institutional export; D, hardware facilities and teaching equipment support; and E, students' comprehensive quality and development support. A

perceived-assistance-effectiveness scale (1 = no improvement, 5 = significant improvement) and a perceived-policy-resistance scale (1 = no resistance, 5 = great resistance) are also set.

Data processing follows a standardized procedure, with all quantitative analysis completed using SPSS 26.0.

Step 1: Data cleaning. Invalid questionnaires with patterned responses or extensive missing data are removed, yielding the valid samples: Shanghai dispatched assistance teachers, N1 = 40; local teachers of recipient county-level general senior high schools in Yunnan, N2 = 52. The survey adopts convenience sampling and covers multiple recipient county-level general senior high schools involved in Shanghai–Yunnan group-based assistance. The respondents are Shanghai teachers dispatched to Yunnan who participate in the assistance and in-service general senior high school teachers at recipient schools. Constrained by practical survey conditions, this study cannot achieve strict random sampling; the analytical results mainly reflect the perceptions of the survey sample, and the extrapolation of conclusions should be treated with caution.

Step 2: Reliability test. Cronbach's alpha coefficients are calculated for the assistance-importance, effectiveness-perception, and resistance-perception scales in each of the two sample groups to test internal consistency, with $\alpha > 0.7$ considered to indicate acceptable scale reliability.

Step 3: Descriptive statistics. The mean (M) and standard deviation (SD) of each observed dimension in the two groups are calculated to depict the original preference distribution of the two parties.

Step 4: Independent-samples t-test. Levene's test for equality of variances is conducted; if pLevene > 0.05, the t-test results under equal variances are read; if pLevene < 0.05, the corrected t-test results are read. The statistical significance criteria are: $p < 0.05$ indicates a statistically significant difference, $p < 0.01$ indicates a highly significant difference, and $p > 0.05$ indicates no significant between-group difference.

Step 5: Construction of the two-sided supply-demand importance matrix. The dispatched teachers' importance means serve as the X-axis (supply preference) and the local teachers' importance means as the Y-axis (demand preference); the overall mean importance of all 92 samples is calculated as the cross-division threshold to divide the four quadrants of Alignment Zone, Supply Surplus Zone, Supply Gap Zone, and Low-Priority Zone.

Step 6: Triangulation. The statistical output is cross-referenced with the interview, policy, and case materials obtained through NVivo coding to explain the real-world mechanisms underlying the statistical differences.

2.4 Research Hypotheses

Based on supply-demand adaptation theory and the practical realities of Shanghai–Yunnan group-based assistance, the following testable hypotheses are proposed:

H1: The dispatched teachers and local teachers differ between groups in their perceived importance of the assistance goals across dimensions.

H1-1: In the school management system and institutional export dimension, the dispatched teachers'

perceived importance is significantly higher than that of local teachers, falling into the Supply Surplus Zone.

H1-2: In the hardware facilities and teaching equipment support dimension, local teachers' perceived demand importance is significantly higher than that of dispatched teachers, falling into the Supply Gap Zone.

H2: The dispatched teachers and local teachers show statistically significant differences in their perceptions of assistance implementation effectiveness.

H3: The dispatched teachers and local teachers show significant differences in their perceptions of resistance to some assistance policy implementation; in the dimensions of policy–local learning condition compatibility and assessment and evaluation, local teachers perceive greater resistance.

2.5 Data Sources

This study uses multi-source mixed data to achieve cross-validation of the evidence chain. First, questionnaire survey data: questionnaires for Shanghai teachers dispatched to Yunnan and for local teachers of recipient county-level general senior high schools in Yunnan, covering the three major dimensions of assistance-goal importance, assistance-effectiveness perception, and policy-implementation resistance; a questionnaire for students of recipient general senior high schools provides qualitative support from the student perspective. Second, policy texts: the national overall plan for “group-based” assistance of education personnel, Shanghai's implementation plan for paired assistance, and Yunnan's supporting documents for Shanghai–Yunnan collaboration in education assistance, including implementation plans at all levels, annual deployments, and staged task lists. Third, qualitative interview data: transcripts of symposiums with front-line teachers of recipient schools, providing first-hand feedback from local teachers in subjects such as English, politics, and music on topics including assisted classroom models, mentoring, teaching and research institutions, and personnel rotation. Fourth, typical cases: the music and arts education assistance practice at Xuanwei No. 10 Senior High School, involving the reconstruction of the music teaching and research group, the construction of arts clubs, and the development of school-based curricula, reflecting both the opportunities and practical obstacles in the implementation of external advanced curriculum resources in county-level senior high schools.

3. Analysis of Empirical Results

3.1 Scale Reliability Test

Table 1. Results of the Scale Reliability Test

Sample group	Assistance-importance scale α	Effectiveness-perception scale α	Resistance-perception scale α

Sample group	Assistance-importance scale α	Effectiveness-perception scale α	Resistance-perception scale α
Shanghai dispatched assistance teachers (N1 = 40)	0.826	0.791	0.743
Yunnan local teachers (N2 = 52)	0.841	0.803	0.765

As shown in Table 1, the Cronbach's alpha coefficients of both the Shanghai dispatched-teacher questionnaire and the Yunnan local-teacher questionnaire on the three scales of assistance importance, effectiveness perception, and resistance perception are all greater than 0.7, ranging from 0.743 to 0.841. This indicates good internal consistency of the questionnaire scales and reliable measurement results, providing a validity basis for subsequent statistical analysis.

3.2 Importance of Assistance Goals and Between-Group Difference Tests of the Two Parties

Table 2. Importance of Assistance Goals and between-group Difference Tests of Dispatched and Local Teachers

Dimension	Dispatched teachers N1 = 40 M ± SD	Local teachers N2 = 52 M ± SD	Levene's test p	t	p	Matrix quadrant
A.Teacher training and professional competence enhancement	4.12 ± 0.61	4.53 ± 0.54	0.417	-3.812	<0.001	Alignment Zone
B.Curriculum development and teaching resource development	3.74 ± 0.70	4.01 ± 0.63	0.534	-1.765	0.080	Alignment Zone
C.School management system and institutional	3.58 ± 0.76	2.86 ± 0.82	0.286	4.274	<0.001	Supply Surplus Zone

Dimension	Dispatched teachers N1 = 40 M ± SD	Local teachers N2 = 52 M ± SD	Levene's test p	t	p	Matrix quadrant
export						
D.Hardware facilities and teaching equipment support	3.11 ± 0.83	4.22 ± 0.67	0.091	-6.733	<0.001	Supply Gap Zone
E.Students' comprehensive quality and development support	2.43 ± 0.87	2.61 ± 0.84	0.722	-0.926	0.356	Low-Priority Zone

Note: $p < 0.05$ indicates a statistically significant between-group difference. The overall mean importance of all samples is 3.40, serving as the cross-division line of the matrix.

In terms of the distribution of importance means, the dispatched teachers place teacher training and professional competence enhancement (4.12), curriculum development and teaching resource development (3.74), and school management system and institutional export (3.58) at higher priority, presenting a supply structure of “emphasizing the team, the curriculum, and the institutions”. The local teachers, by contrast, place teacher training and professional competence enhancement (4.53) and hardware facilities and teaching equipment support (4.22) at high demand, exhibiting a demand structure of “emphasizing competence and hardware”.

The independent-samples t-tests reveal more fine-grained cognitive differences. First, in the two dimensions of teacher training and hardware facilities, local teachers' demand importance is significantly higher than that of dispatched teachers ($p < 0.001$). Enhancing the professional competence of the teacher team is a strong consensus between the two parties, but local teachers' demand is more urgent, reflecting the recipient schools' intense desire to build a “teacher team that will not leave”. The improvement of hardware conditions, as a fundamental schooling weakness of recipient schools, is a prominent demand of local teachers, whereas dispatched teachers rank it relatively lower. Second, the school management system and institutional export dimension shows a reversed significant difference ($p < 0.001$): the dispatched teachers' importance score (3.58) is significantly higher than that of local teachers (2.86). This is the only dimension among the five to display a directional reversal, quantitatively confirming a significant cognitive misalignment between the two parties on this dimension. Combined with the qualitative interview coding, the punch-card attendance management and the “Know and Act Classroom” open-class system introduced by the dispatched teams encountered

practical frictions during implementation; some local teachers more urgently need directly implementable classroom teaching guidance than mere reconstruction of institutional texts. A structural supply-demand misalignment thus emerges between the supply preference and the genuine needs of front-line teachers. Third, in the curriculum development and teaching resource development dimension, the between-group difference is marginally significant ($p = 0.080$), and the two parties' perceptions are generally close; in the students' comprehensive quality and development support dimension, there is no statistical difference between the two groups ($p = 0.356$), with both scoring at relatively low levels, reflecting the convergence of the two parties' priority perceptions of students' comprehensive development under the constraint of the college-entrance pressure in county-level senior high schools.

Based on the supply-side and demand-side importance means, with the overall mean of all samples (3.40) as the dividing baseline, a four-quadrant scatter diagram of the two-sided supply-demand importance matrix is plotted (see Figure 2). The five assistance dimensions comprise eight observed sub-items, whose quadrant distributions are as follows:

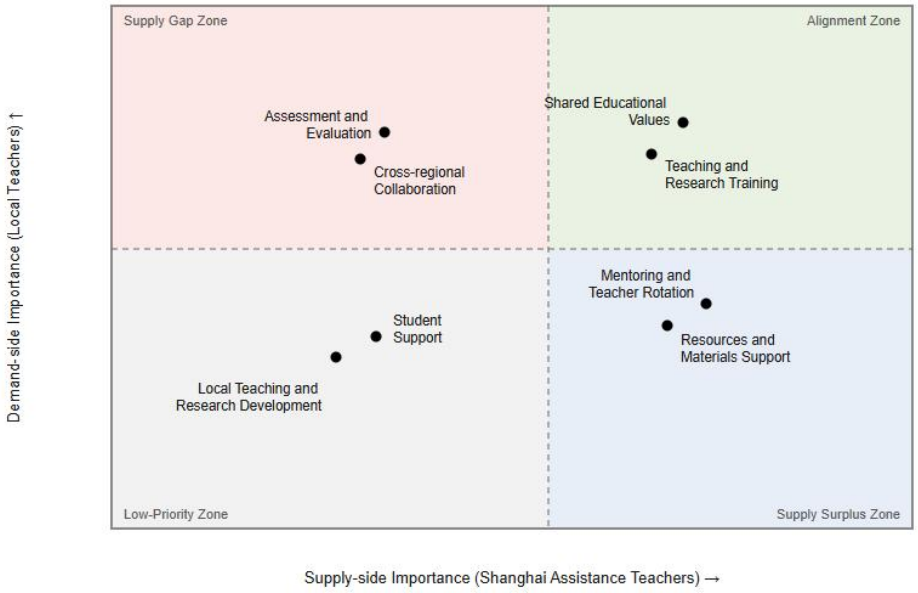


Figure 2. Scatter Diagram of the Distribution of the Two-sided Supply-demand Importance Matrix across Dimensions of Shanghai–Yunnan Group-based Education Assistance

First, the Alignment Zone (high X—high Y): teacher training and professional competence enhancement, and curriculum development and teaching resource development. Both parties assign high importance to these dimensions and the between-group differences are small; they constitute the dimension with the highest current supply-demand compatibility. This corresponds to the practical cases at Xuanwei No. 10 Senior High School of rebuilding the music teaching and research group, mentoring pairings, and cross-regional joint teaching and research, and is also the dimension with the

most prominent assistance effectiveness.

Second, the Supply Surplus Zone (high X—low Y): school management system and institutional export. The supply end attaches high importance, but front-line local teachers have limited actual demand; the supply preference clearly exceeds local practical demand, representing a typical supply-demand misalignment. This suggests that imported management institutions need to be adapted in light of local learning conditions and should not be simply copied or transplanted.

Third, the Supply Gap Zone (low X—high Y): hardware facilities and teaching equipment support. Recipient schools have a strong demand for improving hardware and smart-teaching conditions, but dispatched teachers rank this relatively lower in their subjective goal priorities, creating an evident assistance shortfall that needs to be remedied by strengthening resource allocation.

Fourth, the Low-Priority Zone (low X—low Y): students' comprehensive quality and development support. Both groups score below the division threshold. Constrained by the reality of college-entrance advancement in county-level senior high schools, club activities and study tours and other comprehensive developmental content are extended tasks and should not be set as core assessment indicators.

In sum, the empirical results support research hypotheses H1, H1-1, and H1-2.

3.3 Between-Group t-Tests of Perceived Assistance Effectiveness

Table 3. Perceived Assistance Effectiveness and between-group Difference Tests of Dispatched and Local Teachers

Evaluation dimension	Dispatched teachers N1 = 40 M ± SD	Local teachers N2 = 52 M ± SD	Levene's test p	t	p
Advancement-rate improvement	4.31 ± 0.58	4.04 ± 0.66	0.243	2.013	0.046
Teacher professional competence enhancement	4.25 ± 0.60	3.92 ± 0.71	0.167	2.380	0.019
Curriculum resource construction effectiveness	3.87 ± 0.72	3.51 ± 0.77	0.475	2.236	0.027
School management institution implementation effectiveness	3.66 ± 0.75	2.94 ± 0.84	0.132	4.425	<0.001

Evaluation dimension	Dispatched teachers N1 = 40 M ± SD	Local teachers N2 = 52 M ± SD	Levene's test p	t	p
Hardware condition improvement	3.72 ± 0.78	4.16 ± 0.65	0.306	-2.971	0.003

Table 3 shows that the dispatched teachers' perceived scores on advancement-rate improvement, teacher professional competence enhancement, curriculum resource construction effectiveness, and school management institution implementation effectiveness are all significantly higher than those of local teachers ($p < 0.05$), with the between-group difference in school management institution implementation effectiveness being highly significant ($p < 0.001$). By contrast, in the hardware condition improvement dimension, local teachers' evaluation is significantly higher than that of dispatched teachers ($p = 0.003$). This result further corroborates the findings on the importance of assistance goals in subsection (II), supports research hypothesis H2, and reveals the specific patterns of supply-demand misalignment: in the dimension of institutional export, the sending party more readily perceives the establishment of institutional documents and regulatory texts, tending to evaluate assistance effectiveness from the perspective of “whether an institutional system has been built”; local teachers, by contrast, focus more on the actual effect of institutions in classroom teaching scenarios. This cognitive gap—“the supply side sees institutional architecture while the demand side sees practical implementation”—constitutes direct evidence of supply-demand misalignment in the institutional dimension. In the four dimensions of teacher-training effectiveness, curriculum-resource effectiveness, hardware-improvement effectiveness, and student-development effectiveness, the between-group perceptual differences do not reach statistical significance, but local teachers score slightly higher on hardware-improvement effectiveness, indicating that the “visualizable” effects of hardware investment are readily perceived by both parties.

3.4 Between-Group t-Tests of Perceived Policy-Implementation Resistance

Table 4. Between-group Difference Tests of Perceived Policy-implementation Resistance

Resistance dimension	Dispatched teachers N1 = 40 M ± SD	Local teachers N2 = 52 M ± SD	Levene's test p	t	p
Compatibility between policy and local learning conditions	2.84 ± 0.81	3.62 ± 0.74	0.441	-4.721	<0.001

Resistance dimension	Dispatched teachers N1 = 40 M ± SD	Local teachers N2 = 52 M ± SD	Levene's test p	t	p
Cross-actor communication efficiency between the two regions	2.31 ± 0.73	2.47 ± 0.80	0.388	-0.974	0.331
Timeliness of resource allocation	2.26 ± 0.70	2.51 ± 0.76	0.463	-1.592	0.113
Rationality of the assessment and evaluation mechanism	2.33 ± 0.75	3.18 ± 0.83	0.217	-4.783	<0.001

Table 4 shows that in the two dimensions of compatibility between policy and local learning conditions and rationality of the assessment and evaluation mechanism, local teachers perceive significantly higher resistance than dispatched teachers ($p < 0.001$). Local teachers rate the resistance of policy–local learning condition compatibility at 3.62, significantly higher than the dispatched teachers' 2.84, indicating that the direct transplantation of mature eastern classroom models results in “maladjustment to local conditions”. The resistance of the assessment and evaluation mechanism is rated at 3.18, significantly higher than the dispatched teachers' 2.33, indicating that the dispatch assessment favors explicit outputs such as open classes, institutional documents, and teaching and research activities, while local educational assessment is closely tied to college-entrance advancement quality. The two evaluation logics are in conflict and constitute an important real-world source of supply-demand misalignment. No statistically significant differences exist between the two groups in cross-region communication or timeliness of resource allocation.

The above test results support research hypothesis H3.

4. Discussion

The empirical results show that the two parties in Shanghai–Yunnan group-based education assistance are highly aligned at the macro-value-goal level but exhibit partial supply-demand misalignment at the levels of teaching practice implementation, resource transformation, and long-term institutional operation. This misalignment is not a simple work error or subjective bias but an objective product of the superimposition of multiple real-world factors, including the developmental gap in education between eastern and western China, the inertia of project-based supply, the absence of two-way communication mechanisms, and periodic personnel rotation. This is consistent with the judgment that “appreciation of teacher professional capital” is a key indicator of the sustainability of assistance [7].

4.1 The Value Consensus and Foundation for Supply-Demand Alignment

The research confirms that the two parties have a high degree of consensus on the top-level goals of teacher team building and teaching quality improvement, which constitutes an important foundation for the continued deepening of group-based assistance. The sending party takes “building a team, cultivating talent, and shifting from blood transfusion to blood making” as its primary supply goal, while recipient schools take “strengthening the faculty and improving schooling quality” as their core demand; the two parties are highly aligned at the value-and-concept level. The music and arts education assistance practice at Xuanwei No. 10 Senior High School is a typical case: the dispatched teachers started by rebuilding the music teaching and research group, implementing normalized teaching and research activities and mentoring mechanisms, while simultaneously developing school-based arts curricula and building student clubs, thereby driving the transformation of external arts-education resources into endogenous local capacity and achieving an effective articulation from value consensus to practical implementation.

4.2 The Specific Patterns and Manifestations of Supply-Demand Misalignment

At the levels of practical content and institutional mechanism, supply-demand misalignment is concentrated in four dimensions.

First, the misalignment between the supply of teaching models and local learning conditions. The mature Shanghai classroom paradigms brought by the sending party are built on an educational foundation of excellent student foundations, relatively relaxed class-hour structures, and deep teaching and research accumulation; by contrast, recipient schools face prominent differentiation in students' academic foundations, heavy weekly teaching loads for teachers, and weak teaching and research foundations. Directly copying eastern classroom models readily produces the adaptation contradiction of “impressive in concept but difficult to implement on the ground”. Teachers acquire new concepts, yet classroom transformation is insufficient, giving rise to short-term fluctuations in teaching. Local English teachers reported in interviews that students were unaccustomed to the directly transplanted Shanghai reading classes and thematic-inquiry models; local students have weak vocabulary foundations and more urgently need practical strategies adapted to local learning conditions, such as vocabulary consolidation and differentiated instruction. This corroborates the problem of “insufficient appropriateness” of external resources[6].

Second, the misalignment between supply-side preferences and front-line demands. The sending party prefers explicit projects such as curriculum-institution building, school-based curriculum development, and the export of school management institutions, whereas front-line local teachers more urgently need practical teaching techniques for local learning conditions, such as differentiated instruction, exercise design, and consolidation of basic knowledge. The directional difference in “preferences” for the content of assistance supply is the core manifestation of supply-demand misalignment. The insufficient “convergence of content” in assistance scenarios precisely corresponds to this preference misalignment[5].

Third, the misalignment in the allocation of hardware resources and software resources. Improvements in hardware materials and teaching equipment are relatively easy to deliver with visible effects, yet the urgent demand of recipient schools for hardware ranks relatively low in the sending party's goal priorities and thus falls into the Supply Gap Zone. Meanwhile, the software outcomes the sending party strives to export—teaching and research institutions, school-based curricula, distinctive clubs—are constrained by the recipient's insufficient capacity for local digestion and absorption, and some outcomes face pressure on sustainable operation after the dispatched teachers rotate out.

Fourth, the misalignment at the institutional mechanism level. This is mainly manifested in the inheritance risk caused by periodic personnel rotation, the inconsistency of the two-way assessment orientations, and the insufficiency of the assistance demand diagnosis mechanism. The questionnaire data show that 40% of the dispatched teachers believe the current institutional weakness lies in the lack of a long-term follow-up mechanism and insufficient assessment incentives.

4.3 The Generative Mechanisms of Supply-Demand Misalignment

First, the objective gap in the developmental stages of education between eastern and western China. Shanghai and county-level senior high schools in northeastern Yunnan are at different stages of educational development, with significant differences in educational concepts, teacher structures, student foundations, class-hour burdens, and teaching and research accumulation. The same set of management institutions or classroom models runs smoothly in the east but produces adaptation contradictions when directly transplanted to recipient schools; this is the most fundamental objective cause of supply-demand misalignment. Imported advanced educational concepts are not “ready to use as they are”; they must undergo localized adaptation before they can truly take root.

Second, the path inertia of “supply-driven” project-based assistance. Group-based assistance is advanced from the top down in a project-based manner, with personnel and resources allocated in a coordinated manner by the eastern dispatching units, readily forming an inertia in which the supplier dominates project design. Although policy documents require dispatch according to needs, the front-end joint demand diagnosis process is easily simplified, resulting in the one-way supply of “whatever I provide, you receive” rather than a precise configuration of supply after systematically identifying the real pain points of the disciplines, classrooms, and teachers in recipient schools. This is a typical manifestation of “insufficient supply-demand docking” in assistance practice[2].

Third, the absence of two-way communication and dynamic adaptation mechanisms. A demand survey is often conducted once at the start of the assistance, but mid-course dynamic evaluation during the assistance process and supply-demand iterative adjustment mechanisms are lacking. Learning conditions change and teacher competence evolves during the assistance, yet once an assistance plan is determined it is seldom revised dynamically; the routine demand feedback channels among the dispatched team, local management, and front-line ordinary teachers are not smooth enough, making it difficult for front-line teachers' real teaching difficulties to be transmitted upward to the assistance project design stage.

Fourth, the constraints of the rotation cycle and insufficient motivation for long-term institutional building. Assistance personnel have explicit service periods, and dispatched teachers' individual performance is strongly tied to explicit outputs within their terms, making them more inclined to complete visible institutional, curricular, and activity outcomes during their tenure; for capacity cultivation that requires long-term accumulation and is not easily demonstrated in the short term, the motivation to invest is readily weakened. After personnel rotate out, a stable succession mechanism is lacking, and some outcomes are difficult to sustain. This is a typical manifestation of the risk of "disembedding" and the limitation of "one-way embeddedness" in the assistance process[4].

4.4 Dialogue with Existing Research

This study engages in dialogue with and advances existing research in two respects. On the one hand, existing studies on group-based assistance mostly affirm it from the perspective of assistance effectiveness; this paper uses dual-subject questionnaires to quantitatively identify structural supply-demand misalignment, empirically corroborating the phenomenon of "maladjustment of transplanted external institutions" identified in previous qualitative research. On the other hand, this study introduces the public management theory of supply-demand matching into group-based education assistance, constructs a two-sided supply-demand matrix to measure compatibility, and remedies the weakness of past research in this field, which was dominated by qualitative narration with relatively weak quantitative evidence, thereby providing a replicable analytical path for subsequent research on similar paired education assistance.

5. Practical Paths for Optimizing Supply-Demand Matching in Group-Based Assistance

Based on the assistance positioning of "blood transfusion as the foundation and blood making as the goal", this section seeks to break the inertia of supply-driven practice and construct a complete operating chain of front-end demand diagnosis—two-way dynamic adaptation—localized transformation and implementation—closed-loop evaluation and feedback, so as to systematically bridge the supply-demand misalignment between the two parties.

5.1 Conducting Multi-Party Joint Demand Diagnosis at the Front End and Shifting from Supply Orientation to Demand Orientation

Before the assistance team is stationed, a joint diagnosis working group should be established, involving the dispatch preparatory group, recipient school management, front-line backbone teachers of each discipline, and student representatives. Through symposiums, questionnaires, classroom observations, and other means, a real, school-level, classified demand list should be formed. The demand list should distinguish three categories: first, rigid hard needs, such as teaching quality improvement, remedying learning-condition shortcomings, and hardware condition improvement; second, institutional construction needs, such as the operation of teaching and research groups and teacher cultivation systems; and third, distinctive development needs, such as club construction, school-based curricula, and study-tour exchanges. The disciplinary composition of the group and the

assistance task list should be precisely matched to the demand list, avoiding the output of projects based solely on the advantages of the dispatching school and breaking the path inertia of supply-driven practice at its source. This is precisely the localized implementation of “enhancing the promotional effect of policies” and “systematically advancing by category” in the context of county-level senior high school assistance[9].

5.2 Establishing a Two-Way Dynamic Adaptation Mechanism to Promote the Localized Transformation of Imported Experience

The simple copy-and-transplant model should be abandoned, and the basic principle established that imported advanced educational concepts must undergo transformation in light of local learning conditions. On the one hand, a mid-semester review symposium system between the sending and recipient parties should be established, collecting front-line teachers' classroom practice feedback regularly, and dynamically optimizing and adjusting the already-introduced classroom models and teaching and research institutions, refusing the one-size-fits-all copying of the eastern model. On the other hand, a distinction should be drawn between “concept input” and “supply of practical instruments”: while conveying advanced educational concepts, greater supply of practical teaching strategies adapted to local learning conditions—such as differentiated instruction, consolidation of basic knowledge, and exercise design—should be provided to respond to local teachers' most urgent needs for classroom implementation. At the same time, school-based curricula and club projects should have local succession plans designed at the outset, specifying which local teachers will take over after the dispatched teachers leave. Drawing on the experience of the music club construction at Xuanwei No. 10 Senior High School, local backbone teachers should be cultivated concurrently with club construction, so that imported outcomes are sedimented into school institutional texts and school-based teaching materials, achieving “people leave, projects continue, and outcomes remain”. The above review and succession system is precisely the operable implementation path of the “organic integration mechanism”[6].

5.3 Reconstructing a Multi-Party Collaborative Assessment and Evaluation System to Dissolve the Conflict between the Two Parties' Assessment Logics

The single-indicator assessment should be reformed in favor of two-way multi-dimensional evaluation involving both the sending and recipient parties. The weight of explicit outputs such as the number of open classes and lectures in the assessment should be appropriately reduced; the weight of long-term indicators such as the growth increment of local teachers, the sustainable operation of institutions, and the effectiveness of localized transformation of teaching methods should be increased. Both the hard indicator of local advancement quality and the soft indicator of long-term teacher team growth should be considered, as should short-term effectiveness and effectiveness sustained over three to five years. “The continuation and inheritance of assistance outcomes” should be incorporated as an assessment

observation point, compelling the dispatched team to value the incubation of local backbone forces during its tenure and to weaken the orientation toward “showcase projects” within the tenure, thereby fundamentally dissolving the inherent tension between the two parties' assessment logics. The evaluation approach centered on “appreciation of teacher professional capital” can serve as a reference for the reconstruction of assessment indicators[7].

5.4 Building a Long-Term Collaborative Community Combining on-Site Stations and Online Platforms to Address the Risk of Discontinuity Caused by Personnel Rotation

The limitation of the on-site service period should be broken by building an online Shanghai–Yunnan disciplinary teaching and research community. After their terms end, dispatched teachers should retain the channels of online mentoring and joint teaching and research; a resource pool of Shanghai subject experts should be established to achieve “personnel rotate while collaboration continues”. Relying on digital platforms, the guide-learning plans, school-based cases, and teaching and research resources already formed should be stored in a cloud resource library to achieve the long-term retention and reuse of assistance resources, thereby constructing a new model combining “on-site group-based assistance + long-term cross-time-space collaboration”. This both responds to the realistic constraint of “limited assistance cycles”[2] and aligns with the optimization path of “continuously deepening teaching and research outcomes”[9].

5.5 Clarifying the Boundary of Assistance and Reinforcing the Recipient Schools' Primary Responsibility

Group-based assistance is external empowerment and cannot replace the recipient schools' primary responsibility for schooling. The dispatched team mainly undertakes demonstration, guidance, and training tasks, while recipient schools should actively assume the primary work of localized transformation and the digestion and absorption of resources. After imported institutions and curricula are introduced, the local teaching and research groups should iteratively revise them in light of their own school learning conditions, forming an endogenous development chain of “dispatched input—local digestion—iterative regeneration”, and truly building a “teacher team that will not leave”, so as to achieve the fundamental shift of assistance effectiveness from external input to endogenous development. The concepts of “cohesion of subjects" and "alignment of goals”[5] are here transformed into institutional arrangements for the boundary of rights and responsibilities between the sending and recipient parties.

6. Conclusions and Research Limitations

6.1 Main Conclusions

Based on supply-demand adaptation theory, this study systematically examines the supply-demand preferences and compatibility between the sending and recipient parties in Shanghai–Yunnan

"group-based" paired education assistance, using a mixed-methods design combining questionnaire statistics, a two-sided supply-demand importance matrix, independent-samples t-tests, and qualitative content analysis. The main conclusions are as follows.

First, the two parties in Shanghai–Yunnan group-based education assistance are highly aligned at the macro-value-goal level; teacher team building and curriculum resource development are the assistance fields with the highest consensus between the two parties, constituting the value foundation for the continued deepening of assistance.

Second, three types of structural supply-demand misalignment exist at the level of assistance practice: the school management system and institutional export dimension exhibits a directional cognitive misalignment and falls into the Supply Surplus Zone; hardware facilities and teaching equipment support fall into the Supply Gap Zone, with the recipient's demands not being fully responded to; and students' comprehensive quality development is a secondary extension field on which both parties converge.

Third, the compatibility between policy and local learning conditions and the rationality of the assessment and evaluation mechanism are the two links with the greatest practical resistance in the current assistance, with local teachers perceiving significantly higher resistance than dispatched teachers.

Fourth, the supply-demand misalignment is rooted in the superimposition of multiple factors: the developmental gap in education between eastern and western China, the inertia of project-based supply, the absence of a two-way demand identification mechanism, and the inheritance discontinuity caused by periodic personnel rotation.

Fifth, the core of improving assistance quality lies in establishing an equal two-way supply-demand dialogue mechanism, adapting and transforming imported high-quality resources for local conditions, and moving from "simple transplantation and copying" toward "two-way integration and symbiosis", so as to genuinely convert external resources into the endogenous development capacity of education in the recipient counties.

6.2 Research Limitations and Future Directions

This study has several limitations. First, the questionnaire uses convenience sampling, obtaining 40 valid questionnaires from Shanghai dispatched assistance teachers and 52 valid questionnaires from local teachers of recipient county-level general senior high schools in Yunnan. The sample covers only part of the recipient county-level senior high schools in the Shanghai–Yunnan collaboration and does not achieve strict random sampling, so sample representativeness is constrained; the conclusions mainly reflect the perceptions of the survey sample and should not be simply and directly generalized to all group-based assistance scenarios nationwide. Second, the student questionnaire is used only for qualitative support and is not included in statistical inference, so quantitative analysis from the student perspective is lacking. Third, this is a cross-sectional static study: the two-sided supply-demand matrix captures only the cognitive preferences at a particular point in time and cannot depict the dynamic

evolution of supply-demand compatibility as assistance progresses. Fourth, this study borrows the IPA approach to construct a two-sided supply-demand importance matrix, adapting the classic model to the research context, and this analytical paradigm has inherent limitations. Future research could further expand the sample size, conduct multi-time-point longitudinal studies, introduce student-subject questionnaire-based quantitative analysis, and examine the evolutionary mechanism of supply-demand matching in depth in conjunction with specific recipient schools, thereby providing more solid empirical support for similar Shanghai–Yunnan assistance practices.

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