The Effect of Teacher-Parent Collaboration

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Abstract
Numerous studies have explored the impact of collaboration on academic achievement and student learning conditions. While extensive research has highlighted the positive effects of teacher-parent collaboration on student development, there remains a lack of standardized measures for evaluating this collaboration. This study aims to analyze the development of teacher-parent collaboration in general education schools in the Inner Mongolia Autonomous Region of China and establish a reliable measurement framework.
Keywords: factor analysis, confirmatory factor analysis, teacher-parent collaboration

Introduction

Previous research has demonstrated the significant impact of teacher-parent collaboration on student academic success and overall school performance. “The relationship between school programs that ensure parental cooperation, teacher experience, and the academic achievement of urban school students has been studied, and the results of the study have shown that the joint efforts of parents and teachers have a positive effect on student achievement and school success” (Epstein J. L., 1991. pp. 289-305). Despite this, there remains a need to systematically assess and measure the relationship between teacher-parent cooperation and student outcomes. This study seeks to bridge this gap by analyzing how teacher-parent collaboration influences academic achievement and by developing a valid measurement tool for assessing this relationship.

Literature review

The role of teacher-parent collaboration in student achievement has been widely studied. Research indicates that parental involvement in a child's education positively affects learning outcomes, motivation, and overall school experience. Teachers, parents, and community members may have different opinions about effective communication, collaboration, and ways to contribute to the educational process. Several studies have shown that student achievement is improved due to teacher-parent communication and collaboration (Epstein, J. L., & Sanders, M. G., 2002. pp 407-437). However, barriers such as parental work responsibilities, time constraints, and communication gaps can hinder effective collaboration. Due to these difficulties, they do not have enough time to participate in school and teacher activities and provide necessary support (Swap, 1993). In order to improve student achievement, it is necessary to have a better understanding of the results of parental collaboration and the experiences of working with them (Berger, 2008. pp NJ: Pearson). Successful teacher-parent collaboration includes six key factors:

Successful teacher-parent collaboration includes six key factors:

1. Parenting support
2. Effective communication
3. Volunteering opportunities
4. Learning at home initiatives
5. Shared decision-making
6. Community engagement (Epstein & Sanders, 2002)

Active participation of parents and the community has a positive impact on school activities. Clark (2007; Bogdanov, N. L., Robertson, B., Đorđević-Milošević, S., & Klark, L., 2007) emphasized the importance of cooperation between parents, teachers, and community members in supporting students' academic success and developed a proposal to support teacher-parent cooperation. It is important to involve parents in the school decision-making process and create a friendly environment where their contributions are valued.

A comparison of modern forms of teacher-parent cooperation:

Table 1. Modern forms of teacher-parent cooperation

	Traditional model of teacher-parent cooperation	**New model of teacher-parent cooperation**
1	Parent-teacher conference: This is a meeting regularly organized by the school and aims to provide parents with information about the student's academic success and the latest information from the school.	Online platform or application: Many schools use special online platforms or applications to share information such as student progress, grades, and feedback in real-time. For example, WeChat mini-programs and DingTalk support school-family communication.
2	Home visits: The teacher visits the student's home to get to know the student's family environment, communicates with the parents face-to-face, and establishes closer ties.	Webinars and parent training: Through webinars or online training, the school provides parents with advice on educational methods and parenting methods.
3	Telephone: The teacher uses telephone and text messaging to regularly contact the parents to discuss the student's learning and living situation.	Social media groups: You can use social media such as WeChat and QQ to set up a parent group, which can quickly share information and establish communication.
4	Parent open day: The school opens its doors to parents and allows them to personally observe their child's learning environment and activities.	Email newsletter: The school regularly sends out emails with news, event plans, and student progress updates.

5	School-family communication notebook: This model records students' daily activities and allows teachers and parents to communicate in writing.	Online parent-teacher conference: Using video conferencing tools such as Zoom and Tencent Meeting, online parent-teacher conferences are organized to facilitate parental involvement.
6	School-parent coordination committee: A committee consisting of parent representatives and teacher representatives that participates in school decision-making and planning.	Learning management system (LMS): The school uses a learning management system to provide parents with access to class schedules, learning materials, homework, and test scores.
7		Immerse experience day: Using virtual reality (VR) or augmented reality (AR) technology, parents can virtually tour the school or experience lessons.
8		Family education lectures and parenting schools: The school regularly organizes family education lectures, opens "parenting schools," invites experts, and provides advice on family education and mental health.
9		Student-led parenting conferences: Students present to their parents what they have learned and reflect on their growth, and the teacher provides additional suggestions and advice.
10		Parent-child joint reading and homework cooperation: Parents are encouraged to read books with their children or participate in homework such as crafts and small science experiments.
11		School-family joint programs: Parents are involved in the process of developing school programs and teaching lessons. For example, parents share their professional experiences and interesting skills.

Research Methodology

We developed a 28-item questionnaire from teachers and parents to determine the structure of the relationship between student academic achievement and teacher-parent collaboration. The data were collected within the framework of the questionnaire, and each item was measured on a Likert scale (1=not necessary, 2=not important, 3=average, 4=important, 5=very important). The questionnaire consisted of 2 parts. In this part, the questionnaire was asked to teachers and parents to define the scope. The instructions section explained how to fill out the survey questionnaire. The next section asked for general information about the respondents, such as age and profession. The last section had 28 items for two factors to assess the importance of teacher-parent cooperation in the two countries. (Table 2) SPSS and AMOS programs were used to develop the survey. The questionnaires from teachers were coded from T1 to T28, and the questionnaires from parents were coded from P1 to P28.

Table 1. Factors that determine the scope of teacher-parent collaboration

Code		Item	Latent variable
T1	P1	I communicate openly with my students' parents.	Teacher and Parents
T2	P2	My school provides regular information to parents through its website, platform, and handouts.	
T3	P3	I look for ways to collaborate with my students' parents.	
T4	P4	I meet and talk with my student's parents in person.	
T5	P5	I have a common understanding with my students' parents about their children's learning and upbringing.	
T6	P6	The collaboration between teachers and parents at our school positively impacts students' academic success.	
T7	P7	Teachers and parents at our school respect each other's opinions.	
T8	P8	It is pleasant for parents to exchange their opinions with me about their problems.	
T9	P9	I work with parents to support the learning and development of students.	
T10	P10	Parents at our school participate in parent councils and other activities.	

T11	P11	I regularly exchange information about students' learning with parents and guardians.	
T12	P12	I respect the differences and perspectives of my students' parents.	
T13	P13	Teachers and parents at our school work together to achieve the school's mission, vision, and strategic plan.	
T14	P14	Teachers at our school value the cooperation of parents who support their children's learning and development.	
T15	P15	Teachers and parents at our school are continuous and regular.	
T16	P16	Teachers at our school consider parents valuable partners in learning.	
T17	P17	Teachers and parents at our school collaborate clearly and effectively.	
T18	P18	I communicate with my students' parents via email and the Internet.	
T19	P19	I receive questions, suggestions, and requests from my students' parents in many ways, including phone calls, online and face-to-face meetings.	
T20	P20	Parents in my class actively participate in parent-teacher conferences.	
T21	P21	The cooperation between teachers and parents in our school positively impacts improving the school environment.	
T22	P22	Parents in my class support their children's learning in every way.	
T23	P23	There is good trust between teachers and parents in our school.	
T24	P24	Our school uses handouts, the Internet, and social media to develop relationships and communication between teachers and parents.	
T25	P25	I incorporate parents' suggestions when developing class work plans	
T26	P26	Our school encourages parents to participate voluntarily in its activities.	
T27	P27	Parents are openly involved in the decision-making process related to school policy.	
T28	P28	Our school's teacher-parent partnership is stable throughout the school year	

Internationally, research on teacher-parent partnership in student development has expanded and has been conducted in several regions (America, Asia, Europe) at all levels of education (primary, secondary, high school, university). The current state of teacher-parent partnership and a need for data have been identified as needed; we developed a 28-item questionnaire to measure teacher-parent partnership and conducted a factor analysis and confirmatory analysis to check its validity and reliability. A total of 800 teachers participated in this questionnaire.

Data processing and analysis

A factor analysis was conducted using a questionnaire assessing teacher-parent collaboration. The results of this questionnaire involving teachers are explained. The questionnaire consisted of primary data. A factor analysis was first conducted, followed by a factor confirmation analysis. Factor analysis was performed by combining 28 variables from this questionnaire into a small number of factors in a way that they were interrelated, and the data were tested for consistency or appropriateness using the Kaiser-Meyer-Olkin (KMO) measure; the correlation for each group of variables was tested using the "Bartlett's test of sphericity" test, and the factor analysis method was used to sort the factors from large to slight variance (Principal Component Analysis/PCA).

A principal component analysis (PCA) was performed on the 28 questionnaires with Varimax. The KMO measure was 0.971 ($p<.000$), indicating strong factor structure. The Bartlett's test $\chi^2(325) = 18669.297$, $p<.000$ was significant, confirming the suitability of the data for factor analysis (PCA). (Table 1).

Table 2. KMO and Bartlett's Test for the questionnaires completed by teachers

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.971
Bartlett's Test of Sphericity	Approx. Chi-Square	18669.297
	Df	325
	Sig.	.000

The reliability of the questionnaire we developed was 0.973, indicating that the internal consistency of the questions as variables. It was also found that no variables needed to be removed. (Table 2).

Table 3. Reliability of the questionnaire completed by teachers

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.973	.973	28

Table 4. Item-Total Statistics

Item-Total Statistics					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
T1	111.11	231.151	.586	.	.973
T2	111.24	229.604	.604	.	.973
T3	111.11	230.148	.677	.	.972
T4	111.04	231.093	.664	.	.972
T5	111.07	231.106	.653	.	.972
T6	111.15	229.444	.724	.	.972
T7	111.18	228.631	.761	.	.972
T8	111.08	229.934	.733	.	.972
T9	111.04	228.972	.759	.	.972
T10	111.20	226.863	.777	.	.972
T11	111.08	228.877	.768	.	.972
T12	111.06	229.203	.722	.	.972
T13	111.28	227.292	.751	.	.972
T14	111.20	227.196	.813	.	.971
T15	111.23	226.745	.767	.	.972
T16	111.13	227.090	.819	.	.971
T17	111.17	227.142	.823	.	.971
T18	111.10	229.027	.712	.	.972
T19	111.03	229.297	.742	.	.972
T20	111.16	227.683	.741	.	.972
T21	111.13	227.634	.814	.	.971
T22	111.09	228.177	.814	.	.972
T23	111.21	227.040	.820	.	.971
T24	111.13	228.601	.791	.	.972
T25	111.27	228.998	.677	.	.972
T26	111.19	228.880	.737	.	.972
T27	111.29	227.980	.712	.	.972
T28	111.23	226.988	.803	.	.972

Table 5. Results of Factor Analysis of the Questionnaires Taken by Teachers

Total Variance Explained									
	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	15.471	59.503	59.503	15.471	59.503	59.503	9.541	36.696	36.696
2	1.552	5.969	65.472	1.552	5.969	65.472	7.482	28.775	65.472
3	.928	3.571	69.043						
4	.736	2.832	71.875						
5	.678	2.606	74.480						
6	.616	2.371	76.851						
7	.569	2.188	79.039						
8	.510	1.960	80.999						
9	.480	1.848	82.846						
10	.427	1.643	84.489						
11	.380	1.463	85.952						
12	.347	1.335	87.287						
13	.342	1.316	88.603						
14	.330	1.269	89.871						
15	.319	1.227	91.099						
16	.286	1.102	92.200						
17	.258	.994	93.194						
18	.249	.959	94.154						
19	.247	.952	95.106						
20	.216	.832	95.938						
21	.209	.804	96.742						
22	.197	.757	97.498						
23	.184	.708	98.206						
24	.173	.664	98.870						
25	.157	.603	99.474						
26	.137	.526	100.000						
Extraction Method: Principal Component Analysis.									

Despite the challenge of measuring the relationship between variables in terms of factor loadings, the factor analysis was thorough. The variables were meticulously classified by factor rotation (Varimax orthogonal Rotation), and the 27 indicators were divided into 2 groups of factors that met the criteria. Factor 1 explains 36.696%, and factor 2 explains 28.775%, or 65.472% of the total teacher-parent relationship (Table 2.3)

The higher the load of the factor, the stronger the positive correlation between the factor size and the factor loading is greater than 0.4, and the factor loading is considered significant if it is greater than 0.5. Therefore, for the first factor, the variables T27, T28, T23, T17, T26, T24, T16, T21, T15, T22, T14, T28, T13, T7, T10, T20 are significant. For the second factor, the variables T9, T3, T4, T5, T8, T11, T1, T12, T5, T19, T6 are significant. (Table 4)

Table 6. Varimax rotation matrix of the factor of the questionnaire in which teachers participated

Rotated Component Matrix[a]		
	Component	
	1	2
T27	.823	
T28	.804	
T23	.797	
T17	.791	
T26	.771	
T24	.767	
T16	.745	
T21	.727	
T15	.705	
T22	.699	
T14	.674	
T25	.648	
T13	.637	
T7	.611	
T10	.611	
T20	.573	
T9		.814
T3		.744
T4		.731
T8		.721
T11		.692
T1		.683
T12		.667
T5		.651

T19		.617
T6		.590
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.		
a. Rotation converged in 3 iterations.		

The factor loading values , a key indicator of the strength of the relationship between factors, ranged from 0.573 to 0.823 in our study on teacher-parent collaboration. This range signifies a robust positive correlation with the factor size. Following the factor search analysis, a factor confirmation analysis was conducted to ensure the accurate classification of teacher-parent collaboration into factors. The results of this analysis guided the structuring of relationships between factors and variables using Structural Equation Modeling (SEM) analysis.

The main fit indices of the factor confirmation analysis are χ^2/df(CMIN/DF), RMSEA (root mean square error of approximation), TLI (Tucker-Lewis index), CFI (comparative fit index), and IFI.

Structural modeling analysis demonstrates the model's ability to accurately represent the data. Here, the positive hypothesis that the data fit the model and the negative hypothesis that the model does not fit the data were tested. The model results showed that CMIN/DF was 7.425, which means that the data exceeded the appropriate range and was too large. RMSEA .090 does not meet the framework and is too high. TLI .898 is too low. IFI .907, CFI .907 or met. (Table 6) This result confirms that our model is appropriate to the data and can represent it. However, the model's ability to represent the data is not perfect, as indicated by the discrepancies in the fit indices. Hence, the appropriate framework is not fully met. The negative hypothesis that the model we built is not entirely appropriate to the data is confirmed.

Table 7. Model table /teacher/

Model fit					
Classification	CMIN/DF	TLI	IFI	CFI	RMSEA
Level	Less than 5	greater than .9	greater than .9	greater than .9	08 less than
Default model	7.425	.898	.907	.907	.090

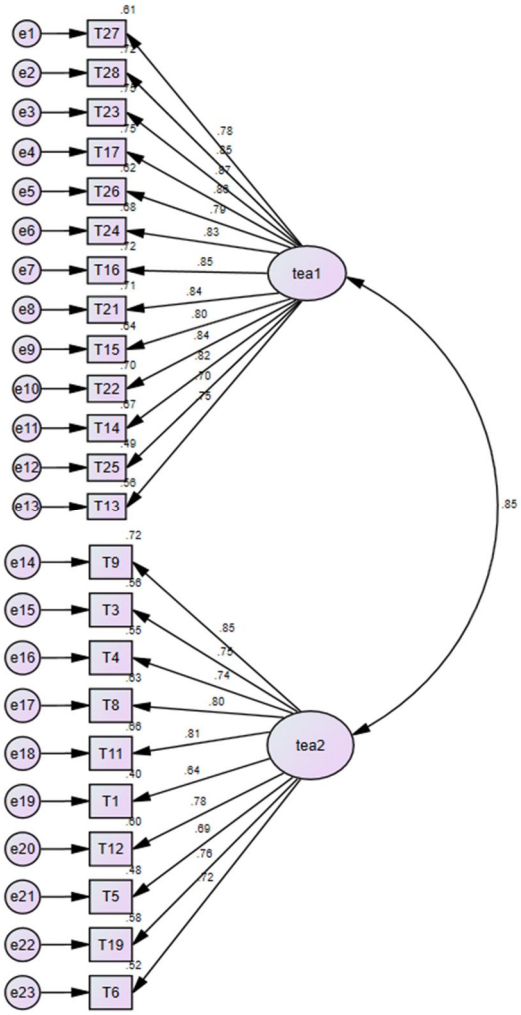

Figure 1. Modeling indicators for studying teacher-parent collaboration /Teacher/

Notably, the correlation between the factors is 0.85 (Figure 1).

Modification indices were provided in the model and increased the level of fit; Modifying to the results of the model, CMIN/DF 4.922 or a low value was obtained. IFI .953, CFI .953, or a high value was obtained, which is satisfactory. RMSEA .070 met the range. TLI .937, or a high value, was obtained. From this, all the results met the appropriate range. As seen from Table 7, these indicators are appropriate to the data, can express the data, and all the results meet the appropriate range, which confirms that the results of the analysis are valid. Therefore, the positive hypothesis is confirmed that the model's ability to represent the data is not perfect, as indicated by the discrepancies in the fit indices.

Table 7. Model table with increased level of appropriateness /teacher/

Model fit					
Classification	CMIN/DF	TLI	IFI	CFI	RMSEA
Level	Less than 5	greater than .9	greater than .9	greater than .9	08 less than
Default model	4.922	.937	.953	.953	.070

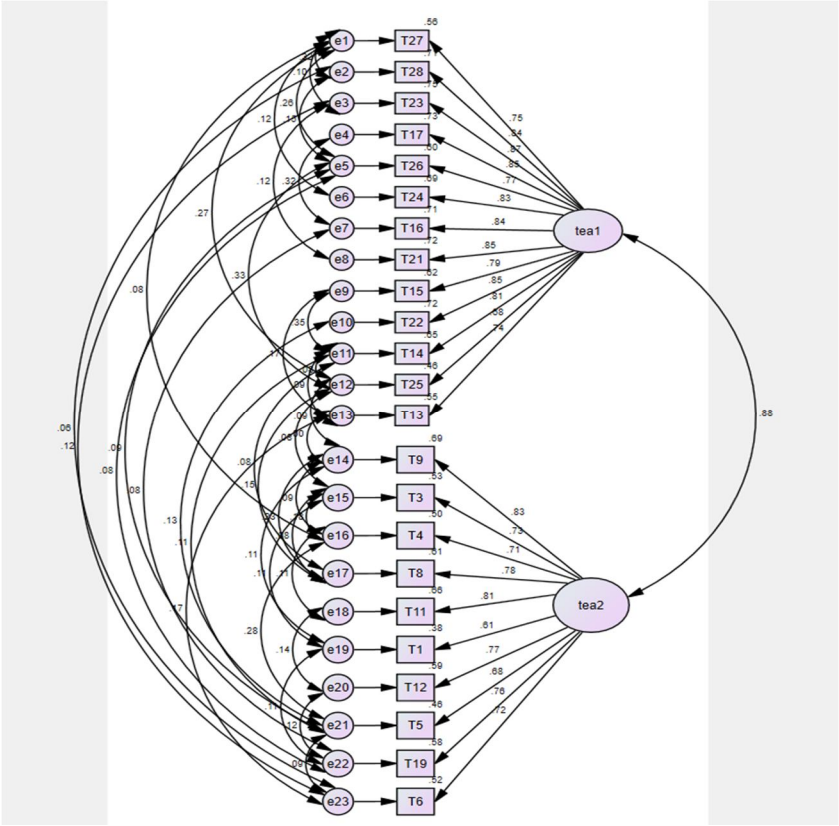

Figure 2. Factor correlation analysis /teacher/

Discussion

The findings confirm that teacher-parent collaboration significantly contributes to student academic success in case of the secondary schools in the Inner Mongolia Autonomous Region of China. Effective communication, parental involvement, and shared decision-making were found to be the strongest predictors of positive student outcomes.

Key contributions of this study include:

- Development of a standardized questionnaire to measure teacher-parent collaboration.
- Empirical validation of the impact of teacher-parent collaboration on student achievement.
- Identification of critical factors influencing collaboration effectiveness.

These findings underscore the importance of fostering strong teacher-parent partnerships through structured programs and technological advancements.

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