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RESEARCH ARTICLE

The Impact of Teacher-Parent Collaboration on Student Academic Achievement

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ABSTRACT

Many factors influence student academic achievement and development, including individual characteristics, school environment, and family environment. Among these, teacher-parent collaboration is one of the key factors determining educational outcomes and creative development. Effective teacher-parent collaboration increases academic achievement by supporting students' learning abilities, social skills, and psychological well-being. The relationship between student academic achievement and teacher-parent collaboration is considered by considering students' upbringing, parents' educational level, national exam subjects, and teacher-parent collaboration questionnaires. A theoretical model is established and validated by identifying and quantifying variables. This model can be validated using mathematical-statistical methods.

INTRODUCTION

For children of all ages, collaboration with parents and teachers can have a huge impact on learning outcomes. It is crucial not to leave this responsibility solely to kindergartens (Gill Kirk & Jenny Jay, 2018), schools, and teachers. When parents actively engage in their children's education, academic success becomes an achievable goal.

However, in rural areas of the Inner Mongolia Autonomous Region, the collaboration between schools, teachers, and parents is lacking, leading to potential negative outcomes.

2. Background

The level of understanding, completeness, and in-depth mastery of the knowledge, skills, and practices set out in the curriculum is considered academic success. Academic success is when a student has mastered the knowledge and skills included in the curriculum. Evaluating students' academic success during and at the end of the course is common. Inner Mongolia commonly tests students' knowledge, skills, and practices orally, in writing, and through their independent work during the semester, which significantly impacts the student's academic success. In-process assessment is the most critical; the success and quality of education largely depend on many factors (Brookhart.S.M, 2010).

The research process to identify factors influencing academic success is a comprehensive and inclusive one. It involves surveying students, parents, teachers, school principals, and examining the family environment, the care given to the student, the integration of teaching and learning activities, and the efforts of teachers and students (Bardon, 2024). Each examinee, along with their parents,

class leaders or teachers, and school principals, are interviewed to determine how the school teacher, family and psychological environment, and the student's interests, needs, and activities affect academic success. This thorough process ensures that all potential factors are considered (Batbold, 2017).

Our study found that teacher-parent collaboration and parenting significantly impact student academic achievement (Figure 1). This suggests that teacher-parent collaboration is related to student academic achievement (Kade, 2022). Developing a theoretical model can confirm this relationship. (Hill, N. R., & Tyson, D. F., 2009) .

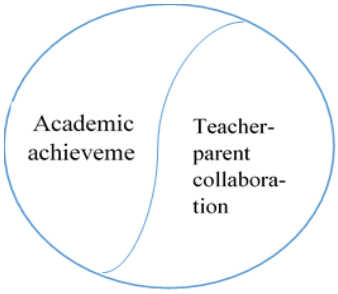

Figure 1. Relationship between student academic achievements

Student development is positively affected by student academic achievement and teacher-parent collaboration. However, the following adverse effects are evident when student academic achievement declines.

Therefore, teacher-parent collaboration is essential to reverse the above adverse effects. Improved teacher-parent collaboration will positively affect student education, improve academic achievement, and provide student development opportunities (Davies, 1996).

Factor analysis can be used to determine the relationship between student academic achievement and teacher-parent collaboration. Therefore, the relationship between student academic achievement and teacher-parent cooperation is as follows:

1. Student upbringing

2. Parental education level

3. National examination subject

3. METHODOLOGY

We surveyed teachers about whether student education, teacher-parent cooperation, and parental education level depend on them. Data were collected and analyzed from 600 students in grades 1-12 in the Inner Mongolia Autonomous Region. The teacher-parent cooperation questionnaire survey and the variables expressed numerically are extracted, and a theoretical model is established and validated (Ekornes & Irene Velsvik Bele, 2020).

Our theoretical model measures the relationship between student academic achievement and teacher-parent cooperation. Therefore, we will extract the variables and validate the theoretical model. When removing the variables,

1. The variable that expresses student upbringing numerically is the results of the questionnaire survey taken by the teacher about student upbringing (Q1)

2. The variable that expresses student achievement numerically in the national examination is the subject grades, including:

Mathematics subject grades (Q2)

Mongolian language subject grades (Q3)

Science subject grades (Q4).

3. The variables that quantify teacher-parent collaboration are the results of the questionnaire survey, including:

Collaboration of Teachers, Parents, and Counselors in Overcoming Non-Academic Problems of Elementary School Students (Q5)

The variables that quantify parent education level are the questionnaire survey results (Q6) taken from teachers and parents. (Figure 2)

The significance of the results lies in the fact that the relationship between student academic achievement and teacher-parent collaboration is confirmed by the measure that can be measured in this way. Q1-Q7 codes the variables, with student academic achievement coded as F1 and teacher-parent collaboration coded as F2, respectively.

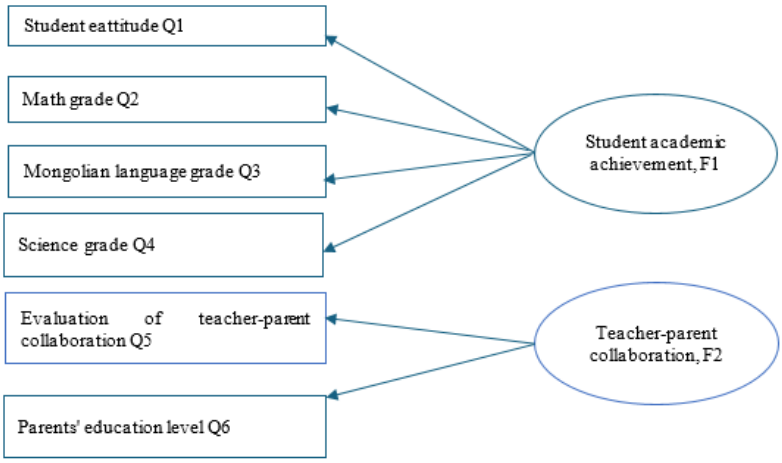

Figure 2. The measure of the relationship between student academic achievement and teacher-parent collaboration

Ovals represent latent variables, and rectangles represent explicit variables.

National examination of Mathematics, Natural sciences, and Mongolian language grades measured student academic achievement. Student academic achievement and teacher-parent cooperation can be measured by assigning numerical values to specific measurements and then finding their numerical and semantic relationships. This is the essence of measuring student academic achievement and teacher-parent cooperation. Therefore, the methodology was carried out in the following steps. These include:

Step One: Identifying the main variables of student development and teacher-parent collaboration.

Variables have different meanings for each study. Factors that are not observed in reality are called latent variables. Latent variables can be identified by measuring and recording.

Student academic achievement and teacher-parent collaboration are the latent variables of the study. Student academic achievement and teacher-parent collaboration are closely related, and student academic achievement, student upbringing, teacher-parent collaboration, and parent education level are also latent variables.

Step Two: Assign numerical values to and measure the main variables. The numerical variable that measures academic achievement is the results of state exams, which is a directly measured variable.

Quantitative measurement of teacher-parent cooperation and student development requires designing a questionnaire and then mathematical and statistical processing of the survey results. Therefore, it is realistic to measure teacher-parent cooperation and student academic achievement in this way and calculate the relationship.

As part of our research, we conducted a factor analysis of the main factors that measured student academic achievement and teacher-parent cooperation according to the questionnaire developed a quantitative correlation model.

For academic achievement, we considered the results of 3 subjects: mathematics, natural sciences, and Mongolian language. The evaluation of teacher-parent cooperation was evaluated by the class teacher on a scale of 1-5. The educational level of the student's parents was coded as 1- primary, 2- essential, 3- secondary, and 4- higher, and the results were obtained from the survey of the class teacher. The class teacher evaluated the students' upbringing on a scale of 1-5 (1- inferior, 2- poor, 3- average, 4- sound, 5-very good). (Table 1)

Table 1. Evaluation form for evaluating students' academic achievement and teacher-parent collaboration

№	Students	Student academic achievement				Teacher-parent collaboration	
		Math grade	Science grade	Mongolian language grade	Student attitude	Evaluation of teacher-parent collaboration	Parents' education level
1	Student 1						
2	Student 2						

Table 2. Descriptive Statistics

Descriptive Statistics					
	N	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
Math grade	600	7	100	73.39	24.256
Science grade	600	10	100	76.71	18.147
Mongolian language grade	600	4	100	74.40	21.570
Student attitude	600	2	5	4.41	.673
Evaluation of teacher-parent collaboration	600	2	5	4.25	.723
Valid N (listwise)	600				

The results of discrete statistics show that the mean score in mathematics was 73.39, with a standard deviation of 24.256; the mean score in natural sciences was 76.71, with a standard deviation of 18.147; the mean score in Mongolian was 74.40, with a standard deviation of 21.570; the mean score in student discipline was 4.41, with a standard deviation of .673; and the mean score in teacher-parent cooperation was 4.25, with a standard deviation of .723 (Table 2).

Table 3. Results of correlation analysis

		Math grade	Science grade	Mongolian language grade	Student attitude	Evaluation of teacher-parent collaboration
Math grade	Pearson Correlation	1	.532**	.483**	.597**	.592**
	Sig. (2-tailed)		.000	.000	.000	.000
	N	600	600	600	600	600
Science grade	Pearson Correlation		1	.847**	.588**	.403**
	Sig. (2-tailed)			.000	.000	.000
	N		600	600	600	600
Mongolian language grade	Pearson Correlation			1	.501**	.340**
	Sig. (2-tailed)				.000	.000
	N			600	600	600
Student attitude	Pearson Correlation				1	.462**
	Sig. (2-tailed)					.000
	N				600	600
Evaluation of teacher-parent collaboration	Pearson Correlation					1
	Sig. (2-tailed)					.000
	N					600

The results of the correlation analysis showed that the results of the mathematics course were 0.532 with the results of the Natural Sciences course, 0.597 with the evaluation of students' upbringing, 0.592 with the evaluation of teacher-parent cooperation, and 0.483 with the results of the Mongolian language course. The results of the Natural Sciences course were 0.847 or strongly correlated with the results of the Mongolian language course, 0.588 with the evaluation of students' upbringing, and 0.403 with the evaluation of teacher-parent cooperation. The results of the Mongolian language course were 0.501 or positively correlated with the assessment of students' upbringing and 0.340 with the review of teacher-parent collaboration. The evaluation of students' upbringing was 0.462 or positively correlated with the assessment of teacher-parent cooperation.

The correlation between the latent and the variables was considered using the factor correlation analysis method, and the theoretical model was validated.

According to the model results, CMIN/DF is 2.855 or low. IFI is .998, and CFI is .998 or higher, which is satisfactory. RMSEA is .056 or higher. TLI is .986 or higher. All the results meet the appropriate range (Table 4). These indicators are relevant to the data, can express the data, and all the results meet the appropriate range, which confirms that the analysis results are valid. Therefore, the positive hypothesis is confirmed.

Table 4. Model table with increased level of fit

Model fit					
Category	**CMIN/DF**	**TLI**	**IFI**	**CFI**	**RMSEA**
Level	Above of 5	.9 more	.9 up	.9 up	.08 below
Default model	2.855	.986	.998	.998	.056

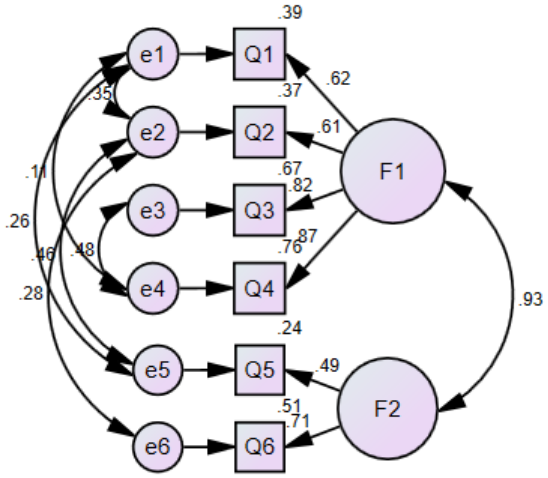

Figure 3. Path model of the relationship between student academic achievement and teacher-parent collaboration

DISCUSSION

The correlation between the questions was sufficient for (PCA) by the Kaiser Meyer Olkin and Bartlett tests.

The internal consistency of all the questions as variables was perfect by Cronbach's Alpha coefficient.

The results of the questionnaire model that the teachers participated in show that the CMIN/DF value was 2.855 or low. IFI .998, CFI .998 or higher, which is satisfactory. RMSEA .056 met the range. TLI .986 or high. From here, all the results met the appropriate range. These indicators are relevant to the data, can express the data, and all the results meet the appropriate range, which confirms that the analysis results are valid. Therefore, the positive hypothesis is confirmed.

The measure of student academic achievement and teacher-parent cooperation depends on two factors. The first factor is the results of the national exam for academic achievement and the evaluation of student discipline by the class teacher. The second factor is the results of a questionnaire survey asking the educational level of students' parents and the assessment of parent cooperation by the class teacher, respectively, and the model was validated.

The positive and negative correlations of all variables were considered when validating the measure of the relationship between student academic achievement and teacher-parent cooperation (Yang Yang, 2021). According to the above model, the relationship between student development and parent cooperation is (0.93), indicating a correlation.

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