

A study on the effectiveness of cultivating home-school communication skills of teacher candidates under the U-G-S collaborative education mechanism: An empirical analysis based on the targeted training program for rural teachers in Province S

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ABSTRACT

Objective: This study investigates the impact of the University-Government-School (U-G-S) collaborative education mechanism on developing home-school communication skills among teacher candidates, while analyzing key factors influencing skill enhancement. **Methods:** An experimental-controlled design was employed, involving 200 teacher candidates from a rural teacher training program at a normal university in Province B. The study included 100 participants in the experimental group (U-G-S mechanism training) and 100 in the control group (traditional training). Communication skills were assessed through questionnaires, interviews, and practice documentation. Multivariate regression models were used to analyze the contributions of institutional collaboration intensity, practice base support, and individual practical experience to communication competence. **Results:** The experimental group demonstrated significantly higher average home-school communication skills than the control group ($t = 4.85$, $p < 0.001$), indicating effective skill enhancement through the U-G-S mechanism. Multivariate regression analysis revealed that individual practical engagement ($\beta = 0.48$, $p < 0.001$) had the greatest impact, followed by institutional collaboration intensity ($\beta = 0.42$, $p = 0.001$) and practice base support ($\beta = 0.36$, $p = 0.002$). **Conclusion:** The U-G-S mechanism significantly improves teacher candidates' home-school communication skills through integrated approaches combining institutional training, practice base support, and individual practical experience.

KEYWORDS

U-G-S mechanism; Teacher trainees; Home-school communication; Rural education

1 Introduction

1.1 Research background and significance

In the context of revitalizing rural education, the professional development of rural teachers has become a key focus in China's educational reform and development. The advancement of rural education relies not only on enhancing teachers' instructional capabilities but also on their proficiency in home-school communication to promote student development and improve teaching quality. Traditional teacher training models have traditionally emphasized academic knowledge and teaching skills, often neglecting practical competencies such as parent engagement and collaborative family-school partnerships. Against this backdrop, the University-Government-School (U-G-S) collaborative education mechanism has emerged as a timely solution. By coordinating efforts among higher education institutions, government agencies, and schools, this framework optimizes practical training systems for teacher candidates, strengthens their real-world communication skills, and provides robust support for rural educators' professional growth.

1.2 Research objectives and problems

This study investigates the effectiveness of the U-G-S collaborative education mechanism in developing teacher candidates' home-school communication skills through empirical analysis. The research has three objectives: First, to clarify how this mechanism enhances communication competencies through multi-stakeholder collaboration; Second, to compare skill variations across different training models and assess whether the U-G-S framework significantly improves communication abilities; Third, to identify key factors influencing skill development, including institutional training approaches, government policy support, and guidance from practice bases.

2 Review of the literature

2.1 The connotation and influencing factors of home-school communication skills

Family-school communication skills constitute a vital component of teachers' professional competencies, particularly in rural educational environments where educators must demonstrate strong communication abilities to foster collaboration between parents and schools, thereby enhancing students' academic outcomes. This communication

encompasses not only verbal interactions but also written correspondence, digital platforms, and other modern methods. Key factors influencing teacher trainees' family-school communication skills include individual characteristics, training models, practical experience, and policy support systems.

Papuraj et al. (2025) highlighted that the disconnect between industry demands and academic training in education systems often hinders the development of practical competencies. They underscored the crucial role of hands-on experience in cultivating professional skills. Xu Tianpiao and Han Jing (2024), while studying the U-G-S collaborative education model, found that partnerships among schools, governments, and social organizations can significantly enhance educational quality. This finding underscores that developing effective home-school communication skills requires coordinated efforts from multiple stakeholders.

2.2 Theoretical basis of U-G-S collaborative education mechanism

The U-G-S (University-Government-School) collaborative education mechanism is a three-party cooperation model among universities, the government and schools. It aims to improve the comprehensive ability of normal students through resource integration and practice optimization, especially in the context of rural education, and effectively enhance the professional adaptability of normal students.

2.3 Practical experience of the targeted training project for rural teachers

The Rural Teacher Targeted Training Program, a key initiative in China's recent efforts to advance rural education development, aims to cultivate teacher candidates with both the commitment and capability to serve rural communities through collaboration between government agencies, universities, and local schools. The implementation of the U-G-S mechanism within this program enables teacher trainees to enhance their professional competencies—including home-school communication skills—in authentic teaching environments.

He Chao and Liu Changjiang (2023) found that introducing the U-G-S mechanism can enhance students' practical skills and improve their adaptability to societal demands. Through government policy support, institutional curriculum development, and practical environments provided by rural schools, teacher trainees can develop communication competencies and gain hands-on experience in real-world scenarios.

3 Research design and data analysis

3.1 Investigation and experimental design

This study employed an experimental control design, assigning teacher trainees under the U-G-S collaborative education mechanism to the experimental group and those in traditional training models to the control group. Through questionnaire surveys, interviews, and documentation of practical practices, it measured differences in home-school communication skills between these groups. A multiple regression model was then used to empirically investigate key influencing factors.

3.1.1 Sample selection

The study focused on 200 teacher trainees from a provincial normal university's rural teacher training program in Province B. The participants were divided into two groups: 100 trainees in the experimental group receiving U-G-S (University-Graduate-School) integrated training, and 100 in the control group following traditional training methods. Both groups were balanced in terms of gender distribution, academic specialization, and commitment to rural education, ensuring comparable experimental conditions.

3.1.2 Measuring tools

(1) Home-school communication skills scale: Building upon existing research on teacher-parent communication and tailored to rural education contexts, this study developed a self-validated parent-teacher communication skills assessment scale using a 5-point Likert scale (1=extremely unskilled, 5=very skilled). The instrument evaluates five dimensions: verbal communication proficiency (including home visit and phone interaction skills), written communication competence (such as parent contact book usage and school-home notice drafting), digital communication capabilities (application of WeChat, QQ, and school-parent apps), conflict resolution skills (handling parental concerns and disputes), and collaborative parenting skills (organizing parent-teacher meetings and providing family education guidance). As shown in Table 1, the scale underwent expert review and demonstrated high reliability

with a Cronbach's α' coefficient of 0.86.

(2) Interview outline: To gain deeper insights into teacher trainees' home-school communication capabilities, we designed a semi-structured interview protocol for three key participants: teachers, teacher trainees, and parents. The protocol includes three sections: ① Teacher interviews: assessing challenges in home-school communication, growth experiences during training, and evaluations of the U-G-S mechanism. ② Teacher interviews: evaluating the effectiveness of home-school communication practices among experimental group teacher trainees and providing feedback on the U-G-S mechanism's impact. ③ Parent interviews: assessing parental recognition of teacher trainees' home-school communication performance and identifying areas for improvement.

(3) Project practice record and observation report: Collect cases of communication between normal students and their parents in the practice process, including home visit records, parent meeting organization, screenshots of online communication, etc., to assist quantitative research by qualitative analysis.

3.1.3 Data collection

(1) Questionnaire survey data: A total of 190 questionnaires were collected in this study, including 96 in the experimental group and 94 in the control group, with a valid return rate of 95%. Through the questionnaire survey, self-evaluation data of teacher trainees' home-school communication skills in each dimension were collected.

(2) Multiple regression data: In order to explore the key factors affecting the improvement of home-school communication skills, this study collected the total score data of home-school communication skills, and measured the independent variables such as school cooperation intensity, support of practice base, and personal practice participation.

(3) Interview situation: This study collected feedback from teacher trainees, instructors, and parents through interviews. The interviewees included teacher trainees from the experimental group and the control group, focusing on the changes in their home-school communication skills.

(4) Data analysis methods: This study comprehensively evaluated the role of U-G-S mechanism in teacher trainees' home-school communication skills using multilevel data analysis methods. Descriptive statistical analysis, independent sample t-test and multiple regression analysis were used for data processing, and the specific methods are as follows.

3.2 Descriptive statistical analysis

The mean (Mean, M) and standard deviation (Standard Deviation, SD) of each dimension of home-school communication skills of normal students in the experimental group (U-G-S mechanism cultivation) and the control group (traditional mode cultivation) were statistically compared to compare their basic distribution.

3.3 Independent samples t-test

In order to test whether there was a significant difference in the mean of home-school communication skills between the experimental group and the control group, the hypothesis test was carried out by independent sample t-test (Independent Samples t-Test). The mathematical formula of t-test is as follows.

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$$

Official explanation: t: t-statistic (t-value $\bar{X}_1, \bar{X}_2, s_1^2, s_2^2, n_1, n_2$), mean of the experimental group and the control group, variance of the experimental group and the control group, sample size of the experimental group and the control group.

Hypothesis Setting: null hypothesis (H0): The mean values of the $\bar{X}_1, \bar{X}_2, \bar{X}_1, \bar{X}_2$ experimental group and control group are equal, i.e., $=$. Alternative hypothesis (H1): The mean values of the experimental group and control group are unequal, i.e., $\neq$. Significance Test: A two-tailed test was employed with a significance level $\alpha = 0.05$ ($p < 0.05$). If the p-value is less than 0.05, the null hypothesis is rejected, indicating a significant difference in home-school communication skills between the experimental group and control group.

The scores of teacher trainees in the experimental group on verbal communication, written communication, information-based communication, conflict resolution, and home-school collaboration skills were significantly higher than those of the control group ($p < 0.05$), demonstrating that the U-G-S mechanism plays a significant role in enhancing home-school communication skills. To further examine the impact of the U-G-S mechanism on teacher trainees' home-school communication skills, this study compared the score differences across various dimensions of home-school communication skills between the experimental group and control group using an independent samples t-test. The teacher trainees in the experimental group showed significant differences from the control group across multiple dimensions. Table 2 presents the means, t-values, and p-values for each dimension to clarify the differences between the

two groups.

Table 2 Questionnaire survey data

dimension	Mean (M) of experimental group	Mean (M) of control group	t price	p price
Oral communication skills	4.21	3.65	3.82	0.002
Written communication skills	4.05	3.49	3.27	0.004
Information communication skills	4.34	3.92	2.98	0.007
Conflict resolution skills	3.89	3.31	4.1	0.001
Home-school collaboration ability	4.12	3.44	3.75	0.002

As can be seen from the data, the scores of the experimental group were significantly higher than that of the control group in all dimensions ($p < 0.05$), indicating that U-G-S mechanism had a positive effect on the improvement of teachers' home-school communication skills.

3.4 Interview circumstances

In addition to quantitative data analysis, we collected qualitative feedback through interviews to further validate the impact of the U-G-S mechanism on enhancing home-school communication skills. The interview results indicated that most teacher trainees reported significant improvements in their communication abilities after undergoing U-G-S training. For instance, a trainee from the experimental group shared: "At the beginning of my internship, I was quite nervous about communicating with parents. However, through several home visits and school training sessions, I now feel confident in interacting with parents and have even helped them resolve academic challenges their children faced."

Teacher interviews also showed that teacher trainees in the experimental group performed better than the control group in home-school communication. A rural school instructor said, "Teacher trainees who participated in U-G-S training were more active in attending parent-teacher conferences and were able to effectively respond to parents' questions and offer reasonable suggestions."

In interviews with parents, 70% of respondents reported that teacher trainees in the experimental group proactively shared their children's academic progress, compared to 45% in the control group. This difference further demonstrates the positive impact of the U-G-S mechanism on developing teacher trainees' home-school communication skills.

3.5 Analysis of key factors affecting home-school communication skills

In order to further explore the key factors affecting home-school communication skills, this study adopted multiple regression analysis (Multiple Regression Analysis), took the total score of home-school communication skills (Y) as the dependent variable, and took the intensity of school cooperation (X_1), support degree of practice base (X_2), and individual participation in practice (X_3) as independent variables, and established the following regression model.

$$Y = \beta_0 + X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon$$

Official Notes: Y : Total Score of Home-School Communication Skills (dependent variable). β_0 : Constant term (intercept). β_1 : Intensity of School-University Collaboration. β_2 : Support Level of Practice Base. β_3 : Individual Participation in Practice. ε : Regression coefficients of each variable, indicating the impact degree of each factor on home-school communication skills. ε : Error term. Specific regression analysis results are shown in Table 3.

Table 3 Multiple regression analysis results of the influence of U-G-S mechanism on home-school communication skills

variable	regression coefficient (β)	t price	p price
Intensification of institutional cooperation	0.42	4.15	0.001
Practice base support	0.36	3.72	0.002
Individual practice engagement	0.48	4.85	0

As shown in Table 3, regression analysis results indicate that individual practice engagement has the greatest impact on enhancing home-school communication skills ($\beta = 0.48$, $p < 0.001$), followed by the intensity of school-enterprise collaboration ($\beta = 0.42$, $p = 0.001$). Although support from practice bases ($\beta = 0.36$, $p = 0.002$) has a smaller effect, it still plays a positive role. The model's coefficient of determination (R^2) reaches 0.59, indicating that the model can explain 59% of the variability in home-school communication skills. The F-statistic calculation formula is as follows.

$$F = \frac{SSR/k}{SSE/(n-k-1)}$$

Among them, SSR (sum of regression squares), SSE (sum of error squares), k (number of independent variables) and n (total number of samples) were calculated to obtain $F = 23.41$, $p < 0.001$, indicating that the overall regression model is significant.

Personal practical engagement (X3) demonstrated the most significant impact on home-school communication skills ($\beta=0.48$, $p<0.001$), indicating that teacher trainees' practical communication experience is the key factor influencing their skill development. The second most influential factor was institutional collaboration intensity (X1) ($\beta=0.42$, $p=0.001$), highlighting the crucial role of university training programs and teaching support in enhancing communication competencies. While practice base support (X2) had a relatively smaller effect ($\beta=0.36$, $p=0.002$), it still played a positive role, suggesting that practical opportunities and guidance from rural schools contribute to the growth of teacher trainees' communication skills.

3.6 Summary

This study comprehensively evaluated the effectiveness of the U-G-S mechanism in enhancing home-school communication skills among teacher trainees through quantitative and qualitative analyses. The questionnaire results demonstrated that the experimental group scored significantly higher than the control group across dimensions including verbal communication, written communication, digital communication, conflict resolution, and home-school collaboration capabilities, indicating the positive impact of the U-G-S mechanism on improving family-school communication skills. Interview findings further validated this conclusion, revealing that teacher trainees in the experimental group exhibited greater initiative and effectiveness when communicating with parents. Multivariate regression analysis revealed that individual practical engagement had the greatest influence on skill enhancement, followed by institutional collaboration intensity and support from practice bases. This research provides data-driven insights and practical evidence for optimizing rural teacher training models.

4 Conclusion

This study systematically evaluated the effectiveness of the U-G-S collaborative education mechanism in developing teacher trainees' home-school communication skills through a combination of experimental controls and multivariate data analysis. The research findings demonstrate that the U-G-S mechanism significantly enhanced teacher trainees' performance across all dimensions of home-school communication. Trainees in the experimental group scored notably higher than the control group in verbal communication, written communication, digital communication, conflict resolution, and collaborative home-school capabilities. These results further confirm the positive impact of multi-party cooperation among educational institutions, government agencies, and rural schools on improving teacher trainees' communication competencies.

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