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Research on Strategies to Enhance Kindergarten Teachers' Self-Efficacy in Implementing Project Activities: A Case Study of Selected Kindergartens in Henan, China

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Abstract

The purposes of this research were: 1) to explore the factors affecting kindergarten teachers' self-efficacy in implementing project activities, based on the context of kindergartens in China, and 2) to enhance teachers' self-efficacy in implementing project activities through an Intervention Design and Implementation (IDI) study. This study involved 203 teachers from three public kindergartens in Henan Province, China, employing an Intervention Design and Implementation (IDI) approach combined with a mixed-methods research paradigm. First, the questionnaire's reliability and validity were assessed using Item-Objective Congruence (IOC) and a pilot test, and multiple linear regression (MLR) was used to analyze relationships among variables. Subsequently, 30 teachers were selected via convenience sampling to undergo a 16-week IDI intervention; 10 of them participated in semi-structured interviews. Finally, paired-sample t-tests were conducted to compare pre- and post-intervention data and verify the intervention effect. The study found that: 1) collective focus on student learning, reflective dialogue, colleague trust, and emotional intelligence have significant effects on teachers' self-efficacy, whereas derivatized practice and teacher collaboration do not have significant effects. 2) After the IDI intervention, all independent variables in this study showed significant improvement ($p < 0.05$). Concurrently, there was a significant difference in teacher self-efficacy between the pre-IDI and post-IDI conditions, $t(29) = -5.36$, $p < .001$, with a mean difference of -0.775.

Keywords: Intervention Design and Implementation, Teacher Self-efficacy, Project Activities, Kindergarten Teachers, Professional Learning Community

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Introduction

With the continuous deepening of educational reform, kindergarten curriculum has shown an innovative and diversified development pattern, and child-centered project-based curriculum has received increasing attention. Project-based learning is guided by problems and promotes deep learning and the development of higher-order thinking skills by engaging students in real-world problem-solving activities (Zhang & Ma, 2023). Researches have shown that project-based learning, as an innovative teaching method, can significantly improve students' learning motivation and performance (Ngereja et al., 2020). Against the backdrop of China's new-era preschool education policies, project-based activities are regarded as a key direction for kindergarten curriculum reform and a crucial pathway to enhancing the quality of preschool education.

Existing research has explored the educational value of project-based learning and its significance for teacher professional development from various perspectives. Related studies indicated that project-based learning is positively correlated with teacher self-efficacy (Spencer, 2020; Choi et al., 2019). Project-based learning focused on stimulating student interest and engagement, providing more opportunities for collaboration and interaction, and strengthening trust between teachers and students (Algan et al., 2013), thereby increasing teachers' teaching confidence. In the process of implementing project activities, teachers gained practical experience and continuously strengthen their belief in their own teaching abilities (Bandura, 1997). However, due to some deviations in teachers' understanding of project activities and the lack of corresponding professional support, the implementation of project activities was poor, which affected teachers' self-efficacy (Li, 2012).

Although the aforementioned studies have confirmed the value of project-based learning and its positive association with teachers' self-efficacy, significant limitations remain. First, existing research has predominantly focused on primary/secondary or higher education settings, with relatively limited attention given to the preschool education stage. Second, studies on teacher self-efficacy have remained within general teaching contexts, rarely centering on the specific practice domain of "project activities." Third, within the Chinese context, empirical research systematically exploring kindergarten teachers' self-efficacy during project activity implementation and its underlying mechanisms was particularly scarce, with intervention studies virtually nonexistent.

Given the aforementioned research gap, this study focuses on enhancing kindergarten teachers' self-efficacy in implementing project activities. It systematically examines the relationship between six key variables—collective focus on student learning, deprivatized practices, reflective dialogue, teacher collaboration, trust in colleagues, and emotional intelligence—and teacher self-efficacy. Based on these findings, an intervention program was designed and implemented for validation. Grounded in the context of Chinese kindergartens, this study aims to address research gaps regarding the relationship between the implementation of project-based activities and teacher self-efficacy in early childhood education. It seeks to provide theoretical foundations and practical insights for teacher professional development, curriculum reform, and the establishment of teacher training systems.

Questions

1. How do six key variables influence teachers' self-efficacy in implementing project-based activities?

2. Can an Intervention Design and Implementation (IDI) program effectively enhance kindergarten teachers' self-efficacy in implementing project activities?

3. How do kindergarten teachers' self-efficacy and professional practices change after participating in an IDI intervention?

Objectives

1. To analyze the key factors influencing kindergarten teachers' self-efficacy in implementing project-based activities.

2. To design and implement an Intervention Design and Implementation (IDI) program aimed at enhancing kindergarten teachers' self-efficacy in implementing project activities.

3. To explore kindergarten teachers' perceptions of changes in their self-efficacy and professional practices following participation in the IDI intervention.

Hypothesis

H1: Collective Focus on Student Learning has a significant impact on Teacher Self-efficacy in implementing project activities.

H2: Derivatized Practice has a significant impact on Teacher Self-efficacy in the implementation of project activities.

H3: Reflective Dialogue has a significant impact on Teacher Self-efficacy in implementing project activities.

H4: Teacher Collaboration has a significant impact on Teacher Self-efficacy in implementing project activities.

H5: Trust in Colleagues has a significant impact on Teacher Self-efficacy in implementing project activities.

H6: Emotional Intelligence has a significant impact on Teacher Self-efficacy in implementing project activities.

Literature Reviews

1. Teacher Self-efficacy (TSE)

Self-efficacy is a concept derived from Bandura's social cognitive theory. Bandura (1977) noted that self-efficacy refers to an individual's assessment of their ability to perform specific tasks. In an educational context, teacher self-efficacy refers to a teacher's belief that they can effectively promote student engagement and learning, even when faced with students who lack motivation or ability. Teacher self-efficacy was a crucial factor in achieving effective teaching (Martin et al., 2008). Teacher self-efficacy was not only associated with students' academic achievement and motivation levels (Klassen et al., 2009), but also promoted teaching innovation (Caprara et al., 2006), enhanced teachers' ability to cope with work-related stress (Caprara et al., 2003), and improved job satisfaction (Caprara et al., 2006). Teachers' self-efficacy was influenced by various factors. Bandura (1997) proposed that the formation of self-efficacy primarily stems from four sources: mastery experiences, vicarious experiences, verbal persuasion, and psychological and emotional states. Self-efficacy was characterized by multidimensionality, situational specificity, and plasticity (Dellinger et al., 2008). Tschannen-Moran and Hoy (2001) developed a three-dimensional scale for Teacher Self-Efficacy, providing an important measurement tool for subsequent empirical research.

2. Collective Focus on Student Learning (CFSL)

Collective Focus on Student Learning was one of the core characteristics of Professional Learning Community (PLC). It referred to a team of teachers centering their efforts on students' academic achievements and skill development, continuously focusing on students' learning opportunities and learning outcomes (Louis, Marks et al., 1996). Many studies have shown that professional learning communities are positively correlated with teachers' self-efficacy. Keung et al. (2020) found that among the five elements of PLC, collective focus on student learning has the most significant impact on teachers' self-efficacy. In the process of paying attention to students' learning, teachers enhanced their teaching confidence and improved their professional competence by discussing teaching strategies together, sharing experiences, and paying attention to students' needs (Zheng et al., 2019). Collective Focus on Student Learning not only

directly improved teachers' self-efficacy but also significantly influenced teaching quality and confidence in equitable teaching through its mediating effect (Ahn & Bowers, 2024).

3. Derivatized Practice (DP)

Derivatized practice can also be called shared personal practices and are an integral part of professional learning communities. Louis, Kruse et al. (1996) argued that deprivatized practices involve teachers committing to openly sharing their teaching practices within professional learning communities. This open sharing helped teachers acquire new teaching methods and strategies, promoting their professional growth and teaching improvement (Zheng & Luo, 2024), thereby enhancing their self-efficacy(Zheng et al., 2019). In PLC, deprivatized practices alleviated teachers' sense of isolation, enhance team cohesion, and boost teachers' professional confidence (Liang et al., 2022).

4. Reflective Dialogue (RD)

Reflective dialogue was one of the core elements of PLC, referring to in-depth discussions among teachers on educational issues such as curriculum, teaching, and student learning and development (Valckx et al., 2020). Such exchanges helped teachers generate new perspectives and ideas, prompting them to reflect on and improve their teaching practices (Louis, Marks et al., 1996), thereby enhancing their confidence and professional competence(Zheng & Luo, 2024). As suggested by Lomos et al. (2011), reflective dialogue was an important factor in promoting teacher professional development. According to Zheng et al. (2019), reflective dialogue positively predicted teacher self-efficacy and played a significant mediating role in the relationship between instructional leadership and teacher self-efficacy. Borko (2004) emphasized that schools should create more opportunities to promote reflective dialogue among teachers, thereby enhancing teacher self-efficacy.

5. Teacher Collaboration (TC)

Teacher collaboration referred to collaborative behaviors and actions undertaken by teachers based on work objectives and centered around teaching practices (Kelchtermans, 2006). Collaboration provided teachers with opportunities to share knowledge and learn from one another (Hammad et al., 2024), thereby promoting teaching innovation and professional development (Ronfeldt et al., 2015). According to Sehgal et al. (2017), working alone could lead to negative emotions, while teacher collaboration helped educators address uncertainties and challenges in teaching practice, receive support and feedback, and thereby enhanced their sense of self-efficacy. According to Guo et al. (2011), teacher collaboration was critical to the challenging work of kindergarten teaching. Both teacher collaboration and children's participation could enhance kindergarten teachers' self-efficacy.

6. Trust in Colleagues (TIC)

Trust was a psychological state characterized by an individual's willingness to assume vulnerability based on positive expectations of others' intentions or behaviors (Rousseau et al., 1998). Research indicated that trust is a cornerstone of school effectiveness, influencing members' willingness to collaborate and fostering collective strength within the teaching community (Leithwood et al., 2010). In a trusting school environment, teachers were more willing to offer constructive opinions and take risks in innovation, thereby driving school reform (Tschannen-Moran, 2014). Colleague trust can enhance teaching confidence by promoting open communication and resource sharing, enabling teachers to access teaching support and feedback (Huang et al., 2019).

7. Emotional Intelligence (EI)

Emotional intelligence was a subset of social intelligence, referring to an individual's ability to recognize and understand their own and others' emotions, and to use this information to effectively guide their thoughts and behaviors (Salovey & Mayer, 1990). Education was an emotional endeavor that requires teachers with emotional competence (Valente et al., 2020). Many studies have shown that emotional intelligence significantly affects teachers' self-efficacy through both direct and indirect mechanisms. Emotional intelligence played a critical

role in the teaching process, not only promoting students' academic performance (Curci et al., 2014), but also being closely related to teachers' self-confidence, creativity, and classroom management skills (Dolev & Leshem, 2017). In early childhood education settings, due to their high complexity and multifaceted nature, maintaining a positive emotional state is particularly important for teachers (Ye et al., 2024). Kindergarten teachers with high emotional intelligence were better able to regulate their own emotions, understand students' emotional needs, and stimulate students' interest in learning, thereby enhancing their teaching confidence (Wu et al., 2019).

Methodology

1. Research Conceptual Framework

Based on a review of existing literature and three fundamental theories: self-efficacy theory (Bandura, 1997), professional learning community theory (Hord, 1997), and emotional intelligence theory (Salovey & Mayer, 1990), researcher constructed the conceptual framework for this study, and proposed six research hypotheses. As shown in Figure 1.

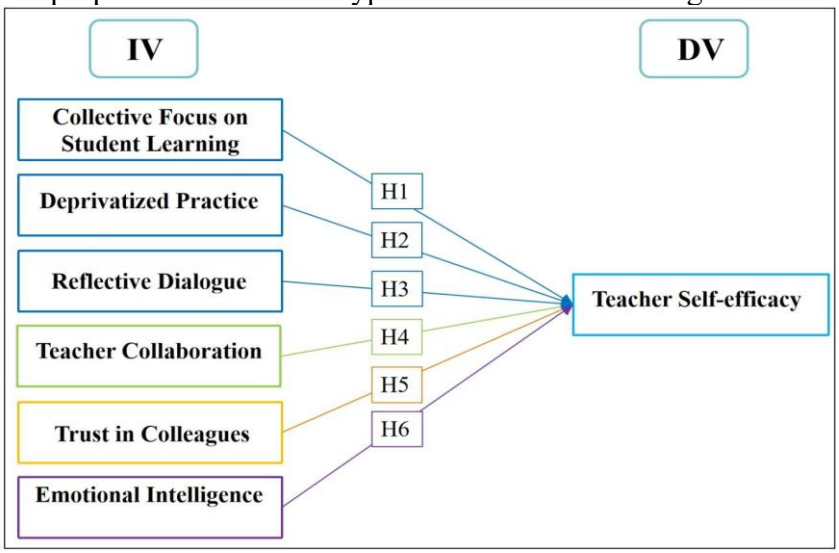

Figure 1 Conceptual Framework

2. Research Methodology

This study employed a mixed-methods approach, combining quantitative and qualitative research. Quantitative data was used to analyze variable relationships and intervention effects, while qualitative data provided supplementary interpretation and validation of quantitative findings. The research process was divided into the following four stages:

Stage 1: Questionnaire design. The Item-Content Consistency Index (IOC) and pilot testing (N=30) were used to ensure the reliability and validity of the project.

Stage 2: Intervention model construction. Multiple linear regression (N=90) was used to validate the hypotheses. Pre-intervention questionnaire testing (N=30) and interviews (N=10) were conducted with participants.

Stage 3: Intervention implementation. A 16-week IDI was conducted with 30 participants.

Stage 4: Effect evaluation. Post-intervention questionnaire testing (N=30) and interviews (N=10) were conducted with participants. Analysis was performed using a paired samples t-test.

3. Research Population, Sample Size and Sampling Procedures

3.1 Research Population

The target population for this study was teachers at three public kindergartens in Henan Province, China. All three kindergartens are provincial model kindergartens with sufficient and

stable teaching staff. Researcher selected a total of 203 teachers from these three kindergartens who were interested in participating in this study.

3.2 Sample Size and Sampling Procedures

During the questionnaire design phase, the researcher selected 30 kindergarten teachers to conduct a pilot test and ensure the questionnaire's reliability. A multiple linear regression analysis was conducted on 90 teachers to validate the hypothesis. During the intervention phase, 30 teachers were selected as intervention subjects based on the requirements emphasized by (Cohen, 2013) regarding statistical power, sample size recommendations, and resource constraints. Before and after the intervention, the 30 participating teachers were administered the questionnaire, and 10 of them were interviewed.

3.3 Sampling Procedures

The researcher employed stratified multistage sampling, which was as follows:

Sampling 1: Pilot test. Purposeful sampling was used to select 30 teachers from among 203 teachers at three kindergartens for a preliminary survey.

Sampling 2: Multiple regression analysis. Stratified sampling was used to select 90 teachers from the three kindergartens for the survey. All were full-time teachers who had previously conducted project activities.

Sampling 3: Intervention implementation. Convenience sampling was used to select 30 of the 90 teachers for the intervention. These 30 teachers were from the same kindergarten and had a strong interest in this study, which facilitated the implementation of the intervention activities.

3.4 Research Instruments

3.4.1 Questionnaire

The researcher identified the source of the questionnaire from five previously published articles. The items were adjusted for Chinese kindergarten teachers. The questionnaire consisted of two parts. The first part collected demographic information, including gender, age, educational background, and years of teaching experience. The second part measured six independent variables and one dependent variable.

Three experts with extensive research experience in education evaluated the questionnaire's content validity using the IOC method. One item with an IOC value below 0.67 was removed, resulting in a final instrument with 52 items.

Subsequently, the researcher randomly distributed the questionnaire to 30 participants for a pilot test. The results showed that all questionnaire items exceeded 0.7, indicating good reliability across all dimensions. The test results and correlation strengths are shown in Table 1:

Table 1 Pilot Test Result

Variable	Number of Items	Sources	Cronbach's Alpha	Strength of Association
Collective Focus on Student Learning	4	Yin et al. (2019)	0.734	Acceptable
Derivatized Practice	4	Yin et al. (2019)	0.898	Good
Reflective Dialogue	4	Yin et al. (2019)	0.956	Excellent
Teacher Collaboration	8	Liu et al. (2021)	0.959	Excellent
Trust in Colleagues	4	Yin et al. (2013)	0.897	Good
Emotional Intelligence	16	Wong and Law (2002)	0.946	Excellent
Teacher Self-efficacy	12	Moran and Hoy (2001)	0.967	Excellent

3.4.2 Semi-Structured Interviews

This study employed semi-structured interviews as a supplementary tool to quantitative questionnaires to gain deeper insights into changes in teachers' self-efficacy and their professional experiences during project implementation. The interview guide was designed around core issues including teachers' understanding of project activities, self-efficacy levels, challenges encountered during implementation, and perceptions of intervention effectiveness.

It underwent review by two experts in preschool education, with minor adjustments made to specific questions based on feedback to ensure clarity and relevance.

Ten teachers were selected from the 30 participants in the intervention. Each teacher was interviewed before and after the intervention to compare changes in their self-efficacy and teaching beliefs. The same interview guide was used for both rounds to ensure data comparability. Each interview lasted approximately 30–45 minutes and was audio-recorded with participant consent, followed by transcription into text.

Interview data were processed using thematic analysis, with core themes emerging through coding, categorization, and cross-textual comparison. To enhance credibility and reliability, two researchers independently coded portions of the transcripts, reached consensus, and documented the theme generation process.

Result

1. Demographic Profile

Researcher presented an overview of the entire study population (n=90) and the specific circumstances of the 30 kindergarten teachers who voluntarily participated in the intervention, as shown in Table 2:

Table 2 Demographic Profile

Entire Research Population (n=90)		**Frequency**	**Percent**
Gender	Male	1	1.1%
	Female	89	98.9%
Age	20-25 years old	6	6.7%
	26-30 years old	28	31.1%
	31-40 years old	43	47.8%
	41-50 years old	12	13.3%
	51years old and above	1	1.1%
Total		90	100%
IDI Participants (n=30)		Frequency	Percent
Gender	Male	0	0
	Female	30	100%
Age	20-25 years old	0	0
	26-30 years old	5	16.67%
	31-40 years old	12	40%
	41-50 years old	12	40%
	51years old and above	1	3.33%
Total		30	100%

2. Results of Multiple Linear Regression

This study proposed six hypotheses, and the researcher used multiple regression analysis (n=90) to verify the relationship between the independent variables and the dependent variable. As shown in Table 3, through variance inflation factor (VIF) analysis, it was found that the VIF values of all five variables were below 5, indicating that the correlation between variables was minor and would not significantly affect the robustness of the regression model (O'brien, 2007). It is worth noting that the VIF value for teacher collaboration reached 5.76, indicating that this variable may have a certain degree of correlation with other independent variables and should be given attention in further analysis. Four independent variables—collective focus on student learning, reflective dialogue, colleague trust, and emotional intelligence—significantly influenced the dependent variable of teacher self-efficacy ($p < 0.05$), with $-1.98 >$ t-value > 1.98. However, derivatized practices and teacher collaboration did not

significantly influence teacher self-efficacy ($p > 0.05$). Among the significant variables, emotional intelligence ($\beta = 0.6527$) had a relatively high impact on teachers' self-efficacy.

Table 3 The MLR Results on Teacher Self-efficacy (n=90)

Variables	t-value	p-value	Stand. Estimate (β)	VIF	R^2
Collective Focus on Student Learning	2.478	0.015	0.1539	1.11	0.710
Derivatized Practice	0.586	0.560	0.0643	3.46	
Reflective Dialogue	3.506	< .001	0.4172	4.06	
Teacher Collaboration	0.359	0.721	0.0509	5.76	
Trust in Colleagues	-2.723	0.008	-0.2722	2.86	
Emotional Intelligence	6.998	< .001	0.6527	2.49	

The R-squared value of the regression model is 0.710, indicating that the independent variables can explain 71.0% of the variation in teachers' self-efficacy. In summary, H1, H3, H5, and H6 are supported, but H2 and H4 are not supported. Based on the results of the multiple linear regression analysis, an intervention design and implementation model was constructed for this study, and the following hypotheses were verified through the intervention.

H7: There is a significant difference in Collective Focus on Student Learning Pre-IDI and Post-IDI.

H8: There is a significant difference in Derivatized Practice Pre-IDI and Post-IDI.

H9: There is a significant difference in Reflective Dialogue Pre-IDI and Post-IDI.

H10: There is a significant difference in Teacher Collaboration Pre-IDI and Post-IDI.

H11: There is a significant difference in Trust in Colleagues Pre-IDI and Post-IDI.

H12: There is a significant difference in Emotional Intelligence Pre-IDI and Post-IDI.

H13: There is a significant difference in Teacher Self-efficacy Pre-IDI and Post-IDI.

3. IDI Intervention Stage

The intervention was designed based on self-efficacy theory. Drawing on Bandura's (1997) four major sources of self-efficacy, the correspondence between the six independent variables in this study and these sources was analyzed to provide a theoretical rationale for constructing the intervention model. This study employed project activities as the vehicle for a 16-week IDI intervention involving 30 teachers, centered around six core variables. The specific implementation process is as follows:

Stage 1: Pre-intervention Preparation (Week 1, 2 sessions, 1 hour each)

This stage included an introduction to the project, ethical briefing, pre-test questionnaires and interviews, and group discussions on teachers' difficulties and needs in implementing project activities. Teachers jointly formulated learning goals and participation commitments.

Stage 2: Establishing Professional Learning Community (Weeks 2–3, 3 sessions, 1 hour each)

Activities focused on ice-breaking, experience sharing, case discussions, and the development of collaborative norms, with an emphasis on strengthening colleague trust and teacher collaboration.

Stage 3: Project Activity Preparation (Weeks 4–6, 5 sessions, 1 hour each)

This stage included lectures on project-based learning, video observations of teaching cases, group-based project design, training in reflective dialogue, and emotional regulation exercises, targeting collective focus on student learning, reflective dialogue, and emotional intelligence.

Stage 4: Project Implementation and Ongoing Support (Weeks 7–13, 8 sessions, 1 hour each, plus classroom practice)

Teachers implemented project activities in their classrooms, supported by video-based reflection, peer feedback, teaching log sharing, problem diagnosis, and instructional adjustment. This stage promoted derivatized practice, reflective dialogue, and emotional intelligence.

Stage 5: Outcomes Presentation and Reflective Summarization (Weeks 14–15, 5 sessions, 1 hour each)

This stage involved project showcases, teaching case reports, peer evaluation, and researcher feedback, as well as the formulation of follow-up action plans.

Stage 6: Post-intervention Evaluation (Week 16, 1 session, 1 hour)

Post-test questionnaires and interviews were conducted, followed by a satisfaction survey and a summary of intervention effects.

The intervention was primarily implemented by the researcher (Doctoral candidate), with support from the kindergarten-based teaching and research coordinator (senior teacher). To ensure implementation fidelity and participant engagement, attendance was recorded for all sessions. Project plans, teaching logs, classroom observation records, and reflective reports were collected. Interviews were audio-recorded and transcribed verbatim. During the classroom implementation phase, teacher participation was further monitored through video review and peer feedback to verify actual engagement.

4. Results Comparison between Pre-IDI and Post- IDI

Researcher used paired sample t-tests to compare the changes in kindergarten teachers' self-efficacy before and after participating in the IDI. Table 4 shows the specific changes in the seven variables before and after the intervention:

Table 4 Paired Samples T-Test

	Variables	Mean	SD	t-value	df	p-value	Effect Size	95% Confidence Interval	
								Lower	upper
Pair 1	Pre-CFSL	4.03	0.518	-2.86	29.0	0.008	-0.522	-0.900	-0.1360
	Post-CFSL	4.40	0.544						
Pair 2	Pre-DP	3.19	0.703	-5.47	29.0	< .001	-0.999	-1.433	-0.5530
	Post-DP	4.17	0.569						
Pair 3	Pre-RD	3.65	0.503	-4.65	29.0	< .001	-0.848	-1.262	-0.4244
	Post-RD	4.29	0.633						
Pair 4	Pre-TC	3.44	0.600	-5.36	29.0	< .001	-0.979	-1.410	-0.5359
	Post-TC	4.25	0.531						
Pair 5	Pre-TIC	3.96	0.602	-2.50	29.0	0.018	-0.456	-0.829	-0.0759
	Post-TIC	4.36	0.669						
Pair 6	Pre-EI	3.79	0.451	-4.26	29.0	< .001	-0.777	-1.181	-0.3623
	Post-EI	4.33	0.438						
Pair 7	Pre-TSE	3.43	0.476	-5.36	29.0	< .001	-0.979	-1.410	-0.5361
	Post-TSE	4.20	0.546						

Table 4 presents the results of paired-samples t-tests comparing pre- and post-IDI intervention. Findings indicated that all seven variables were significantly higher post-intervention than pre-intervention ($p < 0.05$), with effect sizes ranging from moderate to large ($|d| = 0.46–1.00$). The 95% confidence intervals for all variables did not cross zero, suggesting stable intervention effects. Therefore, H7, H8, H9, H10, H11, H12, and H13 were all supported, indicating significant differences in collective focus on student learning, derivatized practices, reflective dialogue, teacher collaboration, trust in colleagues, emotional intelligence, and teacher self-efficacy before and after the intervention. Notably, the mean score for the dependent variable Teacher Self-Efficacy (TSE) increased from 3.43 (SD=0.476) to 4.20 (SD=0.546), with a t-value of -5.36 ($p<0.001$). This clearly demonstrated the positive effect of IDI on enhancing teacher self-efficacy. Meanwhile, interview findings corroborate this, with

teachers consistently reporting heightened confidence in designing, implementing, and addressing challenges within project activities. They attribute this increased confidence to sustained curriculum practice, collaborative reflection, and peer feedback.

Given the multiple paired comparisons of relevant variables in this study, a conservative significance threshold was applied to control for the risk of error. Under these conditions, the findings for each variable remained statistically significant, enhancing the robustness of the conclusions. Overall, quantitative and qualitative results demonstrated consistency in both direction and substance, collectively indicating that IDI significantly enhances teachers' self-efficacy in implementing project activities by activating professional practice, collaborative mechanisms, and emotional resources.

Discussion

This study primarily explored the key factors influencing kindergarten teachers' self-efficacy in implementing project activities and used the IDI to examine changes in these factors before and after the intervention. The results confirmed some hypotheses while also revealing findings that differ from existing research, reflecting the unique educational context and intervention design of this study.

The results of this study indicated that collective focus on student learning has a significant positive impact on teachers' self-efficacy in implementing project activities. This is consistent with the research on Zheng and Luo (2024). They suggested that collective learning within PLCs, where teachers share responsibility for student learning, can enhance their motivation and confidence. During the intervention, teachers reached a consensus on children's learning needs and goals through collective lesson planning, collaborative project design, and case studies, significantly boosting their confidence in project-based teaching.

The direct effect of derivatized practice on self-efficacy was not significant. This contradicted Heaton's (2013) research, possibly due to the fact that open teaching in Chinese kindergartens is not yet normalized, and teachers face pressure during observation and peer evaluation. However, this variable significantly improved after the intervention. Interviews revealed that teachers were willing to share their practical experiences due to non-evaluative observation and peer support.

Reflective dialogue was a key factor in improving teachers' self-efficacy. This finding aligned with the results of Cai et al. (2022). In these studies, group reflection, case analysis, and workshops helped teachers analyze problems more effectively and optimize their teaching, significantly boosting their confidence. A paired-samples t-test also confirmed the significant improvement in this variable, further demonstrating the effectiveness of the reflective mechanism.

The direct impact of teacher collaboration on self-efficacy was not significant. This differs from studies (Sehgal et al., 2017). This might be because teacher collaboration currently remains superficial, lacking in-depth co-design and reflection. However, the level of teacher collaboration significantly improved after the intervention, suggesting that fostering an atmosphere of trust and collective demonstration activities can indirectly enhance teachers' self-efficacy through vicarious experience and verbal persuasion (Bandura, 1997).

While colleague trust significantly impacted self-efficacy, the coefficient was negative, suggesting that over-reliance on peers may undermine teachers' ability to independently address challenges. This is inconsistent with the findings of Huang et al. (2019) and Yin et al. (2017). However, this variable remained significantly improved after the intervention, indicating that team support and mutual assistance mechanisms can enhance teachers' confidence in their teaching. Future training should strike a balance between trust and autonomy to prevent trust from degenerating into dependence.

Emotional intelligence had the greatest impact on teachers' self-efficacy. This finding is highly consistent with Pan et al. (2022), who confirmed that teachers with high emotional intelligence are adept at regulating emotions, are more confident, and thus maintain a high level of self-efficacy. The emotional intelligence workshops and peer support activities in this study significantly improved teachers' emotion regulation abilities.

Conclusions

This study found that emotional intelligence, reflective dialogue, and collective focus on student learning were core factors in enhancing teacher self-efficacy, while derivatized practices and teacher collaboration had no significant impact. Notably, colleague trust showed a negative effect, suggesting that over-reliance on peers may undermine teacher autonomy. The intervention design and implementation significantly improved teachers' scores on six independent variables and self-efficacy. Teachers expressed greater confidence in implementing project activities after the intervention. This suggested that comprehensive, contextualized, and collaborative intervention strategies can effectively enhance teacher self-efficacy. Furthermore, the study demonstrated that project activities are not only an important avenue for promoting curriculum innovation among kindergarten teachers but also an effective vehicle for promoting professional development and enhancing self-efficacy. Through systematic interventions and support mechanisms, teachers' professional qualities can be significantly improved, providing theoretical and practical insights to establish a sustainable support system for teacher development.

Originality Contribution

This study employed a mixed-methods approach to systematically investigate the factors influencing kindergarten teachers' self-efficacy in implementing project activities in the Chinese context, as well as intervention pathways. It yielded the following innovative research findings, as illustrated in Figure 2.

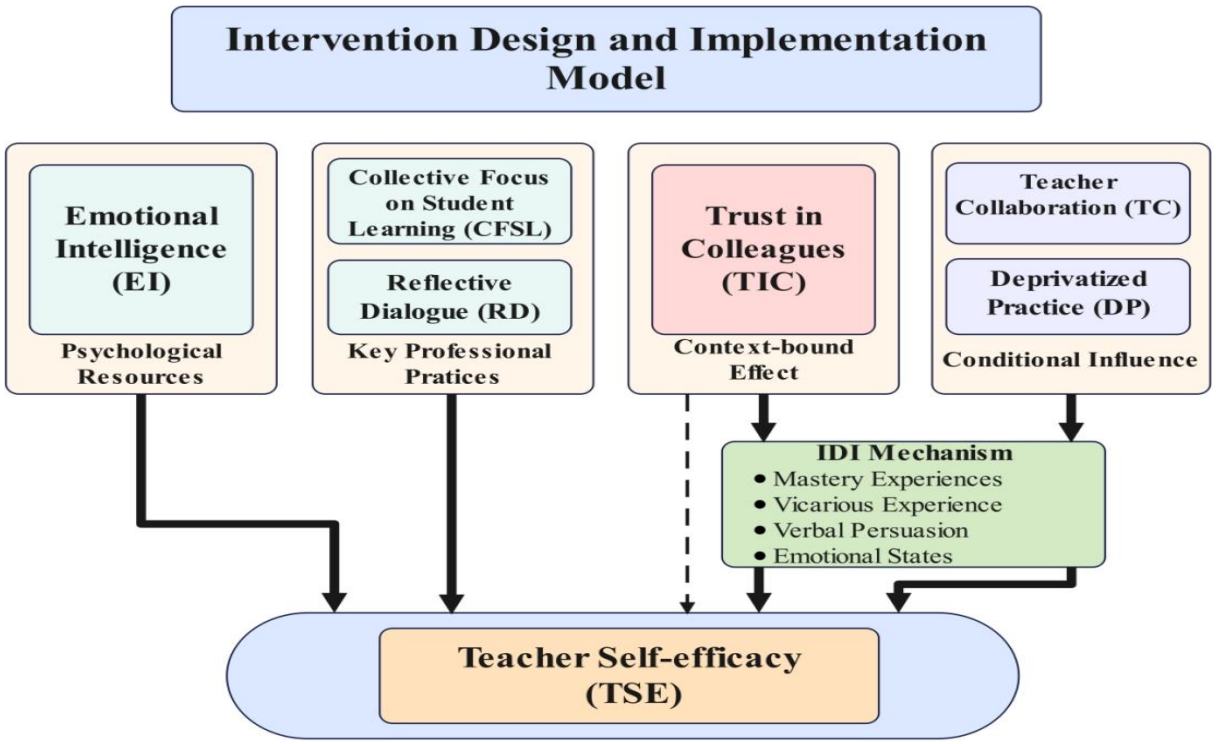

Figure 2: An Integrated Model for Generating and Intervening in Teachers' Self-Efficacy in Project Activities

Figure 2 presents the "Integrated Model for Generating and Intervening in Teachers' Self-Efficacy in Project Activities." This model systematically integrates six variables into a unified framework, which is further consolidated through the Intervention Design and Implementation (IDI) mechanism. Unlike previous studies that primarily explain teacher self-efficacy through single psychological factors or PLC elements, this research is the first in the Chinese context to model the linkage between emotional resources and PLC practice processes. It reveals the stable positive effects of emotional intelligence and key professional practices (reflective dialogue, collective focus on student learning) on self-efficacy. It also uncovers the contextual "double-edged sword effect" of colleague trust and demonstrates that depersonalization practices and teacher collaboration require structured interventions to be effective. Through mixed-methods research and intervention validation, this study expands the applicability boundaries of teacher self-efficacy theory within preschool education and Chinese cultural contexts. It proposes a localized intervention pathway integrating psychological resources with PLC professional practices, thereby advancing early childhood teacher professional development and curriculum reform research from "elementary explanations" toward "mechanism integration."

Recommendations

Recommendations for Applying the Research Findings

1. Creating a Positive Preschool Environment

Kindergartens should actively engage in team-building and sharing activities to foster an atmosphere of trust and mutual support. By clarifying the vision, focusing on teachers' needs, and encouraging innovation, they can foster a supportive culture and inspire teachers' enthusiasm and professional confidence. Furthermore, kindergartens should establish a diversified decision-making mechanism, fully empower teachers, and increase their participation in decision-making.

2. Establish and Actively Develop Professional Learning Communities

Kindergartens should promote teachers' professional growth through regular project activity case sharing, peer observation and results display. Within the professional learning community, a positive professional organizational culture should be fostered (Morrissey, 2000), providing opportunities for teachers to engage in reflective dialogue and fostering innovative thinking and teaching improvement (Schaap & De Bruijn, 2018). Furthermore, kindergartens should establish standardized teaching and research systems, provide strong administrative support, and ensure the regular operation of the professional learning community.

3. Enhancing Teachers' Professional Competence in Project Activities

Through systematic project-based training, teachers can acquire the necessary expertise and skills to carry out project-based activities. On-site guidance should be provided, and timely reflective dialogue should be organized to enable teachers to continuously accumulate successful experiences through "learning by doing" (Morris et al., 2017). Regular peer review and evaluation sessions should be organized to help teachers build confidence in project-based teaching through vicarious experience (Bandura, 1997). Furthermore, a sustainable resource support system should be established to ensure that teachers have constant access to reference and support throughout the teaching process, thereby reducing anxiety and boosting confidence.

4. Emphasizing the Cultivation of Teachers' Emotional Intelligence

Emotional awareness and self-regulation training should be integrated into kindergarten-based teaching and research to strengthen emotional connections among colleagues (Bradberry & Greaves, 2009). Breathing relaxation and mindfulness meditation activities can also be organized to help teachers quickly calm down in stressful situations (Jennings & Greenberg, 2009). Teachers should be encouraged to identify emotional support partners and provide psychological support during peak work pressures. Furthermore,

emotional observation and response should be incorporated into the reflection process of project activities to help teachers hone their emotional regulation skills in real-world teaching situations.

5. Establish a Supportive Teacher Development Mechanism

Kindergartens should establish a comprehensive incentive mechanism for teachers' professional growth, which should not only include material rewards but also spiritual motivation and career development opportunities. They should provide teachers with platforms for showcasing their achievements and peer support, allowing them to continuously accumulate successful experiences through gradual challenges. In addition, kindergartens can organize achievement sharing activities regularly. By strengthening teachers' sense of accomplishment and professional identity, their professional happiness and self-efficacy can be enhanced (Erozkan et al., 2016).

Recommendations for Future Research

First, expand the sample size. Future research could be conducted on a larger scale, encompassing diverse regions and multiple types of kindergartens to validate the applicability of findings across different educational contexts and cultural backgrounds. Second, extend the intervention duration. Appropriately lengthen the intervention cycle to examine the sustained effects of teachers' self-efficacy and key influencing factors through medium-to-long-term follow-up studies. Finally, refine the conceptual framework. Optimize variable selection based on the existing framework while introducing mediating and moderating variables to elucidate underlying mechanisms and pathways. Additionally, further explore the interactive effects between program activities and teacher characteristics (e.g., years of experience, educational background, professional role) to develop more targeted and actionable training and support strategies.

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