

## Examining pre-service teacher competence in inclusive education: A case study from Guizhou, China



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### ABSTRACT

This study examines the role of preschool teacher competence in autism education and parental involvement in the performance of inclusive education. A total of 415 students participated in the study, and structural equation modeling (SEM) was used to test the research hypotheses. The results show that three dimensions of teacher competence—belief in inclusive education, emotional care, and professionalism—do not have a significant effect on parental involvement. In contrast, communication and cooperation, continuous learning and development, and observation and evaluation have a significant positive influence on parental involvement. Furthermore, parental involvement partially mediates the relationship between preschool teacher competence and the performance of autistic students. These findings suggest that educators and policymakers should promote stronger collaboration between families and schools to improve educational outcomes. In addition, considering socio-economic and cultural factors can help provide more appropriate support for diverse families. The study highlights the importance of ongoing communication and professional development for teachers in creating a more inclusive and equitable educational environment. It also provides empirical support for improving pre-service teacher training programs in early childhood education and offers guidance for developing inclusive education courses in higher education institutions.

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### 1. Introduction

Inclusive education is a philosophy and educational practice centered on the principle of inclusion, which emerged in the 20th century and has become a global trend in education. Preschool children with autism face unique challenges during their early developmental years. Autism Spectrum Disorder (ASD) affects how children communicate, interact socially, and process sensory information (Li et al., 2023). During the preschool stage, children's brains are highly adaptable, meaning that with the right strategies, they can develop essential skills that support their growth during early intervention services, such as speech therapy, occupational therapy, and Applied Behavior Analysis (ABA). These

interventions frequently result in substantial enhancements in children's communication skills, emotional regulation, and social interactions (DeLong et al., 2025). Children with autism can thrive in environments that provide visual schedules, clear routines, and sensory-friendly spaces. The educators can create inclusive settings that foster the development and success of preschool children with autism by incorporating these strategies.

Integrated education is founded on the belief that children of varying abilities should learn together in a supportive and inclusive environment. This approach presents valuable opportunities for developing social, communication, and cognitive skills alongside peers. However, parents also play a crucial role in reinforcing classroom learning at home by ensuring that the strategies used at school are effectively implemented. Emotional care and support are particularly important for the development of children with autism, especially during early childhood (Hong et al., 2020). Parents who actively engage with teachers and therapists

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can help tailor the learning approach to meet their child's specific needs. Without proper emotional care, children with autism may feel overwhelmed, frustrated, or disconnected from their environment. It is essential for developing coping mechanisms, emotional awareness, and a sense of security, all of which are vital for their well-being (James et al., 2023). Therefore, parental involvement is essential in providing the emotional support that children need to feel safe, understood, and confident, alongside the critical role that teachers play in the school setting.

Teacher professionalism is essential in shaping the educational experience of children with autism at an early age. Educating autistic students requires not only expertise in effective learning strategies but also patience, empathy, and a deep understanding of each student's unique needs to create a supportive learning environment and adapt teaching methods. Therefore, parents need to exhibit patience and adaptability, acknowledging that progress takes time and appreciating even the smallest accomplishments. This collaboration strengthens the educational approach, bridging the gap between school and home and encouraging consistency in both learning and emotional support (Yang et al., 2023). This collaborative approach is particularly important, as autistic children often face challenges in verbal and nonverbal communication, social interaction, and adapting to new environments (Panganiban et al., 2022; Syrjämäki et al., 2023).

The competence of teachers in autism preschool settings plays a crucial role in the observation and evaluation of autistic students, significantly impacting their cognitive and psychological well-being (Oppenheim et al., 2025). This competence enables teachers to assess how children engage with learning materials, interact with peers, and respond to various teaching methods.

Evaluation, in turn, helps measure a child's progress over time. Unlike traditional grading systems, evaluating preschoolers with autism involves tracking growth in communication, social skills, emotional regulation, and cognitive abilities, which requires considerable effort and patience from both teachers and parents. Teachers must employ flexible and personalized assessment methods, such as play-based evaluations, behavior tracking, and developmental portfolios, to assess each child's strengths and challenges. However, observation and evaluation should not rest solely on teachers' shoulders (Wanner et al., 2024). This underscores the value of teacher competence in effectively observing and evaluating the cognitive and psychological well-being of autistic students.

A personalized approach not only facilitates tracking progress in critical areas such as communication, social skills, and emotional regulation but also necessitates significant collaboration and patience from both teachers and parents (Nguyen et al., 2026). Despite the emphasis on integrated education for autistic preschoolers, a gap persists in understanding how factors such as

emotional support, teacher professionalism, communication, continuous learning, and evaluation interact through parental involvement to enhance educational services.

While existing studies address these aspects individually, they often lack a comprehensive framework that captures their interrelationships. This study aims to bridge these gaps in the literature by providing a holistic framework that integrates various factors influencing the educational experiences of autistic students. How do the dimensions of preschool autism teachers' competence influence parental involvement? What role does parental involvement play in mediating the direct and indirect effects of teacher professionalism on the quality of services provided to autistic students?

The results of this study provide a valuable insight into the dynamics of teacher-parent collaboration, enriching existing theories related to integrated education. This holistic approach enhances theoretical discussions surrounding inclusive education, emotional support, and teacher professionalism. It also has significant implications for educators, policymakers, and practitioners working with autistic preschoolers, helping to identify effective strategies for enhancing emotional support, communication, and continuous learning among teachers and parents. Consequently, the study will provide actionable recommendations for improving educational practices in integrated settings. It will also highlight the importance of professional development initiatives aimed at enhancing preschool teachers.

## 2. Literature review

Ecological Systems Theory, developed by Bronfenbrenner (1979), explains how individual development is influenced by various social environments that interact in complex ways. It consists of five interrelated systems: microsystems, which encompass the immediate environments of family, friends, and school, and which describe the relationships between elements within microsystems (Currie et al., 2024). An ecological systems-based approach can help identify challenges to child development and design more effective interventions that consider cross-system factors (Chezan et al., 2022).

This theory provides a comprehensive framework for examining the dynamics at play in the education of autistic preschoolers, highlighting how various interrelated social environments impact. Moreover, Ecological Systems Theory contributes significantly to fields such as education, developmental psychology, and social policy by offering a holistic perspective on how environmental factors influence individual growth. Improved student performance correlates with higher levels of teacher competence, as children flourish in environments that meet their educational and emotional needs.

## 2.1. Belief in integrated education

The belief in inclusive education refers to the conviction that all students, regardless of their abilities or disabilities, can learn together in inclusive settings (Dignath et al., 2022). This belief is grounded in the idea that students have the right to learn alongside their peers, develop meaningful relationships, and prepare for life, emphasizing the importance of an inclusive learning environment and active parental participation in the educational journey of children with autism spectrum disorder (ASD) (Fang et al., 2022; Fernández Cerero et al., 2024). Parents' belief in the benefits of integrated education plays a crucial role in facilitating successful inclusion. Individuals who fervently support inclusive education are generally more proactive in securing adequate assistance for their children in mainstream environments (Heyder et al., 2020). Some parents encounter difficulties such as inadequate school support, a lack of specialized training for teachers, and social stigma surrounding autism in mainstream schools. Schools can set up training programs and support networks for parents that help them deal with the challenges of integrated education (Cartwright and Mount, 2022). The cultural and community perceptions significantly influence parents' beliefs and involvement in integrated education.

**H1.** Belief in integrated education has a significant effect on pre-service teachers' parental involvement.

## 2.2. Emotional care and support

Emotional care and support involve demonstrating love and concern to help individuals navigate their feelings and experiences through both verbal and nonverbal actions. For children with autism, this means creating a nurturing environment where they feel understood, accepted, and supported. Parents serve as primary caregivers and advocates, helping their children face emotional challenges while fostering resilience and social adaptability (Fong et al., 2021). The emotional care provided by teachers also plays a crucial role in enhancing parental involvement and motivation among autistic students, thereby strengthening interpersonal relationships. Parents who maintain consistent routines, provide clear communication, and employ adaptive strategies tailored to their child's needs can significantly improve their child's emotional stability (Hou et al., 2023).

The parents often experience higher levels of stress, anxiety, and emotional exhaustion due to a lack of resources and support. Limited access to mental health services and public misconceptions about autism can further exacerbate parental stress, making it difficult for them to provide the emotional support children need. This highlights the necessity of a collaborative approach among parents, educators, and healthcare professionals to enhance students' cognitive and psychological well-being

(McNair et al., 2025). Schools should implement programs that equip parents with effective strategies to support their children's emotional needs, such as parent training workshops, peer support groups, and access to counseling services. Additionally, fostering strong communication between parents and teachers will ensure that emotional support strategies are consistent across home and school environments, creating a more cohesive support system for students with autism.

**H2.** Emotional care and support have a significant positive effect on pre-service teachers' parental involvement.

## 2.3. Professionalism

Teacher professionalism is an important factor that plays an important role in supporting and improving teacher effectiveness to ensure the success of autistic students in the educational environment and parental involvement. Professionalism in teaching autistic students includes specialized knowledge, teaching skills, adaptability, and a commitment to inclusive education. Educators working with autistic students must have a profound understanding of autism spectrum disorder (ASD), use evidence-based teaching strategies, and develop inclusive classroom environments that encourage academic and social development (Wittwer et al., 2024). Parental involvement is widely recognized as a key component in improving educational outcomes for autistic students. Research shows that collaboration between teachers and parents can strengthen the learning process, as parents can provide valuable insights into children's unique needs, strengths, and challenges (Ovati et al., 2024). Teachers who work with parents gain a deeper understanding of how to adapt their teaching approach, set realistic learning goals, and implement appropriate interventions.

**H3.** Professionalism has a significant effect on pre-service teachers' parental involvement.

## 2.4. Communication and cooperation

Effective communication and cooperation between teachers and parents are essential for supporting autistic students in their academic and social development. When teachers actively involve parents, they learn about the unique needs, preferences, and challenges faced by autistic students, leading to more appropriate and effective educational strategies (Fernández Cerero et al., 2024). Parental involvement fosters a collaborative approach in which teachers and parents work together to create a consistent support system, ensuring that the learning experiences at school align with those at home. Communication between teachers and parents of autistic students can take various forms, including meetings, progress reports, digital communication platforms, and informal

check-ins. Studies show that open and frequent communication leads to better academic outcomes and improved behavior in autistic students, as it allows for the early identification and resolution of potential issues (Peng et al., 2024). Teachers who actively listen to parents' concerns and integrate their feedback into learning plans create an inclusive learning environment. Additionally, parental input aids educators in comprehending sensory sensitivities, behavioral triggers, and students' preferred learning modalities, thereby improving classroom management and educational efficacy (Tan et al., 2020). Educators can better support the holistic development of autistic students, ensuring that these students thrive both academically and socially while fostering strong communication and collaboration.

**H4.** Communication and cooperation have a positive effect on pre-service teachers' parental involvement.

## 2.5. Continuous learning and development

Continuous teacher learning and development for autistic students is essential to ensure high-quality inclusive education. Given the diverse learning and behavioral characteristics associated with autism spectrum disorder (ASD), teachers must continually enhance their knowledge, instructional strategies, and collaboration skills to meet the evolving needs of autistic students (Hugh et al., 2023).

One of the most effective ways to achieve this professional growth is through the active involvement of parents, who provide valuable insights and firsthand experiences related to their children's unique learning patterns and challenges. Ongoing collaboration with parents allows teachers to adapt their teaching methods based on real-time feedback, thereby increasing student engagement and promoting meaningful progress. Parental involvement plays a crucial role in shaping teachers' professional development by offering real-life perspectives on autism and strengthening the connection between the learning environment at school and at home (Heyder et al., 2020).

Engaging parents in the educational process enables teachers to modify their instructional approaches based on immediate feedback, which can lead to enhanced student engagement and improved outcomes (Hayes et al., 2023; Pesonen et al., 2025). Moreover, teachers' professional development significantly influences parental involvement by equipping educators with the knowledge and skills necessary to inform instructional practices and interventions.

This collaboration deepens teachers' understanding of autism and fosters a more cohesive support system for autistic students, bridging the gap between home and school.

**H5.** Continuous learning and development have a significant effect on pre-service teachers' parental involvement.

## 2.6. Observation and evaluation

Teachers' observations and evaluations of autistic students play a crucial role in identifying strengths, challenges, and progress within the educational environment (McDougal et al., 2020). These tests give teachers useful information by letting them watch students in a structured way, which helps them learn more about how each student learns, acts, and interacts with others. This understanding is essential for developing tailored educational strategies that meet individual needs. Teachers can facilitate a more effective learning experience by recognizing specific areas where students excel and where they require additional support. However, the role of parental involvement is indispensable, as parents offer invaluable insights into their children's behavior, preferences, and developmental history. This information can significantly enhance the accuracy and relevance of teacher observations (Cosso et al., 2022). The parental input provides a broader understanding of the child's abilities and needs, allowing for a more holistic approach to education (Darling-Hammond et al., 2020). The teachers and parents collaborate in evaluating autistic students to create more comprehensive and personalized intervention plans to address the specific challenges faced by the child (Cherewick et al., 2023; Panganiban et al., 2022). This collaborative effort improves educational outcomes and fosters a supportive environment that promotes the overall development of autistic students. and ensure that each child receives the support necessary to thrive academically and socially.

**H6.** Observation and evaluation have a positive effect on pre-service teachers' parental involvement.

## 2.7. Parental involvement

Parental involvement plays a crucial role in the education and development of autistic students. When parents actively engage in their child's learning process, academic, social, and emotional outcomes significantly improve (Fernández Cerero et al., 2024). Parents are important partners in helping teachers because they can give teachers important information about their child's specific needs, wants, and problems. This makes the learning experience more personalized and effective. One of the primary benefits of parental involvement is the creation of a consistent and structured learning environment across both school and home settings. Autistic students tend to perform better when there is alignment between school-based interventions and home-based reinforcement, leading to greater stability and enhanced learning progress (Azad et al., 2021). Despite its numerous benefits, parental involvement in the education of autistic students often faces challenges. Communication barriers between parents and teachers, limited school resources, and a lack of autism-specific training for

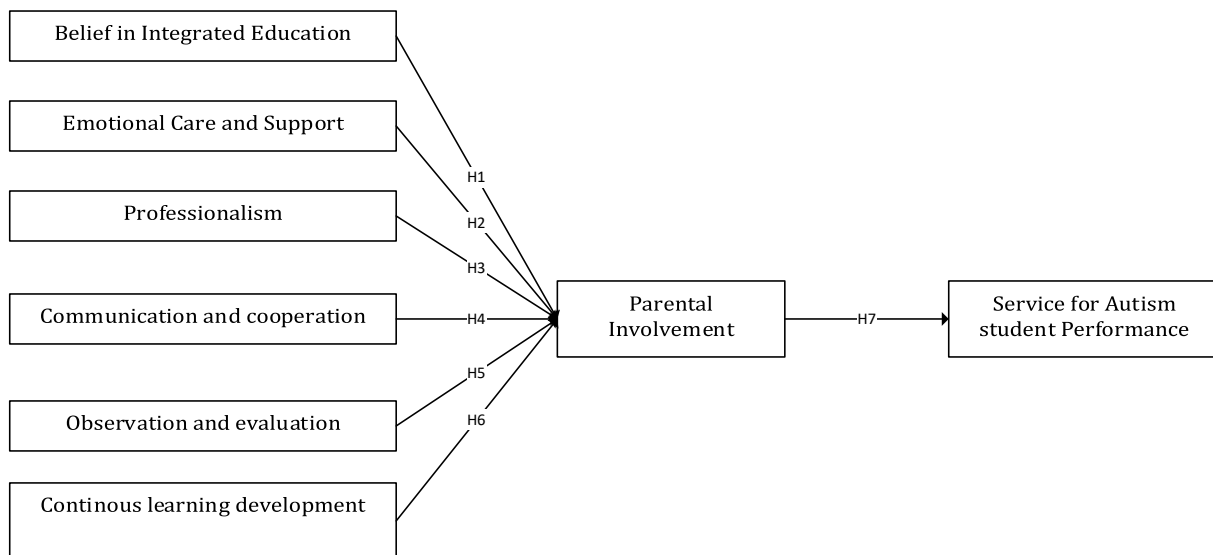
educators can hinder effective collaboration. Furthermore, parents may struggle to balance work responsibilities, financial constraints, and personal stress, which can impact their ability to participate in school activities or provide additional support at home. Addressing these challenges is necessary to create a more collaborative and supportive educational environment for autistic students, ultimately enhancing their learning experiences and outcomes.

Services for autism students encompass a comprehensive array of educational, therapeutic, and support services tailored to meet the unique needs of students with autism spectrum disorder (ASD) (Helkkula et al., 2020). These services aim to enhance cognitive, social, emotional, and behavioral development, facilitating effective learning and integration into educational settings. Providing specialized services for autistic students is essential for ensuring their academic, social, and emotional development. Autism services encompass a range of

support mechanisms, including IEPs, behavioral interventions, speech and occupational therapy, and inclusive classroom strategies. These services are designed to address the unique needs of autistic students, promoting independence and enhancing their overall quality of life. Effective service provision requires a collaborative effort among educators, therapists, parents, and policymakers to create a supportive and accommodating learning environment. Students who receive individualized and structured interventions are more likely to achieve academic success and develop essential life skills (Peng et al., 2024).

**H7.** Parental involvement has a significant positive effect on pre-service teachers' service quality for students with autism.

Based on the literature review and hypotheses development, the conceptual research framework proposed in this study is presented in Fig. 1.



**Fig. 1:** Research framework

### 3. Methodology

#### 3.1. Questionnaire design

Before distributing the questionnaire for data collection, two experts, one from the field of education and a professional English-Chinese translator, were invited to validate it. The control was anonymous, and random sampling was carried out to avoid bias and increase validity. A pretest and pilot test were conducted to validate the wording of the measurement items and minimize potential instrument bias (Table 1). The purpose of the trial is to ensure that participants understand each question and to revise the wording to avoid single-source bias (Podsakoff et al., 2003).

#### 3.2. Sample and data collection

This study uses two colleges and universities, Zunyi Teachers College and Zunyi Vocational and

Technical College in Zunyi City, Guizhou Province, China. Guizhou students in China who are majoring in preschool education and are preparing for a future career as pre-service teachers. Data was collected by administering an offline survey via direct contact with the school, which initially corresponded with a formal letter between 1 February and 28 February 2025. The survey was anonymous, and control questions and randomly generated filters were used to avoid bias and achieve data validity.

#### 3.3. Data analysis

The data were analyzed using two statistical programs, namely SPSS 22 and AMOS 22 software. Furthermore, hypothesis testing was conducted using a structural equation model (SEM). The main advantage of using SEM is that it facilitates the use of factor analysis and regression separately to test the model. In addition, it is simultaneously used to estimate all path coefficients. Pearson's correlation

coefficient was also used. to determine the relationship between the predictors. Thirdly, the common method variance (CMV) was adopted as a

prevention and post-detection technique. Finally, this study applied mediation procedures from Hayes (2018).

**Table 1: Variables’ definition**

Variables	Definition	Source
Belief in integrated education	The students’ abilities, backgrounds, and needs are learned together, including a value of diversity and inclusion, promoting equal opportunities.	Haegele et al. (2021)
Emotional care and support	Providing understanding, empathy, encouragement, and reassurance to someone in order to help them cope with their feelings, stress, or challenges, including listening, validating emotions, and offering comfort.	Hillier et al. (2018)
Professionalism	The conduct, behavior, and attitude expected of someone in a work or professional environment, including competence, reliability, and respect.	Noordegraaf (2020)
Communication and cooperation	The processes of effectively sharing information, ideas, and working together.	Thornhill-Miller et al. (2023)
Continuous learning and development	The ongoing process of acquiring new knowledge, skills, and insights to improve personal or professional abilities.	Beausaert et al. (2011)
Observation and evaluation	The systematic processes used to assess people, situations, or outcomes. Observation involves carefully watching and recording behaviors, events, or conditions in a structured way to gather relevant information.	Pesonen et al. (2025)
Parental involvement	The active participation and engagement of parents or guardians in their child’s education and development.	Zucker et al. (2021)
Service for autism students’ performance	The specialized support, resources, and interventions are provided to help students with autism spectrum disorder (ASD) succeed in educational settings.	Accardo et al. (2019)

**3.4. Results and discussion**

The data were analyzed using structural equation modelling (SEM) with AMOS version 22 and SPSS version 22 software, which allows for testing of complex relationships between latent variables in the research model. SEM was chosen for its ability to analyze multiple interrelated factors simultaneously, offering a structured framework for integrating empirical data. The measurement items for all constructs were adapted from prior studies and are presented within the manuscript. The questionnaire employed a seven-point Likert scale ranging from 1 (“strongly disagree”) to 7 (“strongly agree”) for all items. The respondents’ demographic characteristics included age, education level, and gender. Although 500 participants were initially targeted, a total of 415 valid responses were obtained, resulting in an effective response rate of 83.0% (Table 2). The measurement items for each construct are as follows.

Belief in Integrated Education (BIE) was measured using five items: inclusive education benefits students with autism; autistic students can thrive better in an inclusive educational environment; inclusive schools have appropriate methods to support children with autism; inclusive education improves social interaction among autistic students; and the school provides a good program for inclusive education. Emotional Care and Support (ECS) was measured using five items: autistic children receive adequate emotional support; emotional support is important in educating autistic children; the school provides programs to support emotional well-being; I am adequately trained to provide emotional support; and autistic students feel emotionally comfortable while learning. Professionalism (PM) was measured using three items: I have received professional training related to autism education; I understand effective teaching strategies for autistic students; and the school provides regular training on autism education.

Communication and Cooperation (CC) was measured using three items: I communicate effectively with parents of autistic students; the school has an effective communication system with parents; and I collaborate well with colleagues in supporting autistic students.

Continuous Learning and Development (CLD) was measured using four items: I regularly seek updated knowledge on autism education; the school supports professional development; I consider continuous improvement in working with autistic students important; and I attend training or seminars related to autism education.

Observation and Evaluation (OE) was measured using five items: I observe autistic students’ development regularly; I record students’ learning progress periodically; the school has an effective evaluation system; I use observation results to adjust teaching strategies; and I believe regular evaluation is essential in autism education.

Parental Involvement (PI) was measured using five items: parents are actively involved in their child’s education; parental involvement is important in planning education; the school provides programs involving parents; I invite parents to discuss student development; and parents support learning at home.

Services for Autism Students (SAS) was measured using five items: the school provides specialized services for autistic students; services are tailored to students’ needs; the school has experts (e.g., psychologists and therapists); the school provides adequate facilities; and teachers collaborate with autism specialists in designing learning strategies.

**3.5. Pearson correlation**

The correlation between these constructs shows a fairly close relationship between belief in integrated education, emotional care and support, professionalism, communication and cooperation, continuous learning and development, observation and evaluation, parental involvement, and service for

students with autism (Table 3). The diagonal shows the square root of the Average Variance Extracted (AVE) for each construct.

**3.6. Measurement results**

The confirmatory factor analysis (CFA) results ( $\chi^2/df = 3.378$ , GFI = 0.951, NFI = 0.954, CFI = 0.950, IFI = 0.951, and RMSEA = 0.045) show that the data fit well with the model. The values of Cronbach's alpha, composite reliability, and average variance extracted (AVE) are significantly above the threshold value, indicating that inter-item reliability exists among the items of each variable in this study (Table 4).

**3.7. Structural model**

The fit of the data to the proposed model is adequate (Hair Jr et al., 2019):  $\chi^2/df = 3.378$ , GFI = 0.887, NFI = 0.884, CFI = 0.880, IFI = 0.881, and RMSEA = 0.050. The results showed that Belief in Integrated Education did not have a positive effect on parental involvement ( $\gamma_{11}=0.084$ ,  $p > 0.05$ ); therefore, H1 was not supported (Table 5). Similarly, Emotional Care and Support had no significant effect on Parental Involvement ( $\gamma_{12}=0.013$ ,  $p > 0.05$ ), hence H2 was also unsupported. Furthermore, although Professionalism has a positive relationship with Parental Involvement ( $\gamma_{13}=0.225$ ,  $p > 0.05$ ), hence H3 is unsupported. However, Communication and Cooperation have a positive and significant effect on Parental Involvement ( $\gamma_{14}=0.401$ ,  $p < 0.001$ ), supporting H4. Furthermore, continuous learning and development also show a significant relationship with parental involvement ( $\gamma_{15}=0.226$ ,  $p < 0.001$ ), supporting H5. In addition, Observation and Evaluation play an important role in increasing parental involvement ( $\gamma_{16}=0.612$ ,  $p < 0.001$ ). Furthermore, parental involvement has a significant effect on service autism student ( $\beta_{21}=0.529$ ,  $p < 0.001$ ) to support H6 and H7.

**3.8. Mediation effect**

Table 6 shows how trust in integrated education, emotional care and support, professionalism, communication and cooperation, continuous learning and development, and direct and indirect observation and evaluation directly affect autism service students through parental involvement. The results show that three variables have a significant direct effect on autism students' services. Teachers who have a stronger belief in integrated education have no direct influence on autistic students ( $\beta = 0.107$ ,  $T = 2.380$ ,  $p < 0.001$ ). Similarly, the emotional support provided by teachers has no direct effect on autistic students ( $\beta = 0.130$ ,  $T = 3.010$ ,  $p < 0.001$ ). Teacher professionalism also has no direct effect on services for autistic students ( $\beta = 0.112$ ,  $T = 2.208$ ,  $p < 0.001$ ). Meanwhile, teachers who have good communication and cooperation tend to provide

more optimal services for autistic students ( $\beta = 0.406$ ,  $T = 8.808$ ,  $p < 0.001$ ). Continuous learning and development also contribute significantly to improving services for autistic students ( $\beta = 0.153$ ,  $T = 3.251$ ,  $p < 0.001$ ).

**Table 2: Respondent demographics**

Demographic items	Frequency	Percentage (%)
<b>Gender</b>		
Male	166	40.0%
Female	249	60.0%
<b>Age group</b>		
≤ 20 years	80	19.3%
21 - 25 years	250	60.2%
26 - 30 years	70	16.9%
≥ 31 years	15	3.6%
<b>Year of study</b>		
First-year (freshman)	100	24.1%
Second-year (sophomore)	120	28.9%
Third-year (junior)	110	26.5%
Fourth-year (senior)	85	20.5%
<b>Intended career path in tourism</b>		
Inclusive preschool teacher	200	48.2%
General preschool teacher	120	28.9%
Special education teacher	75	18.1%
Other	20	4.8%
<b>Previous experience with autism students</b>		
Yes	280	67.5%
No	135	32.5%

Observation and evaluation also play an important role in improving the quality of services for autistic students ( $\beta = 0.247$ ,  $T = 4.271$ ,  $p < 0.001$ ). Belief in integrated education increases parental involvement, which ultimately contributes to improved services for students with autism ( $\beta = 0.154$ ,  $SE = 0.035$ , 95% CI: 0.086-0.225). Emotional support also increases parental involvement and plays a role in improving services for students with autism ( $\beta = 0.154$ ,  $SE = 0.031$ , 95% CI: 0.092-0.215). Teacher professionalism, communication and cooperation, and continuous learning have a greater mediating effect through parental involvement in autistic student services, with coefficients of ( $\beta = 0.223$ ,  $SE = 0.036$ , 95% CI: 0.153-0.296), ( $\beta = 0.236$ ,  $SE = 0.037$ , 95% CI: 0.168-0.313), and ( $\beta = 0.204$ ,  $SE = 0.039$ , 95% CI: 0.129-0.283). Meanwhile, observation and evaluation have the highest mediating effect, where increased parental involvement due to teacher evaluation and observation contributes significantly to improved services for students with autism ( $\beta = 0.345$ ,  $SE = 0.049$ , 95% CI: 0.255-0.446).

**4. Discussion**

**4.1. Key findings**

Although belief in inclusive education is widely regarded as a positive attitude, it supports the idea of providing equal educational opportunities for all students in Guizhou, China. Some parents may feel unprepared or lack the necessary knowledge about how to engage effectively with inclusive education practices, especially if they are unfamiliar with the specific needs of their children or the school's support systems. Cultural and social factors, such as language barriers or previous negative experiences

with educational institutions, can further hinder involvement. Therefore, while belief in inclusive education is important, it must be accompanied by supportive structures, practical resources, and proactive outreach from schools to truly enhance parental involvement. This discrepancy suggests that while teachers may hold positive views about inclusive education. One possible reason is that teachers' belief in inclusive education does not necessarily lead to concrete actions that facilitate

parental involvement (Chezan et al., 2022). Furthermore, parents may have a limited understanding of what inclusive education entails or may even perceive that this approach does not align with the child's specific needs (Fang et al., 2022). If schools do not actively communicate the principles and benefits of inclusive education in an accessible and engaging manner, parents may remain passive participants rather than active contributors to the learning environment.

**Table 3:** Correlation matrix for measurement scales

Constructs	Mean	SD	BIE	ECS	PM	CC	CLD	OE	PI	SAS
BIE	5.43	0.747	<b>0.706**</b>							
ECS	5.45	0.780	0.504**	<b>0.737**</b>						
PM	5.62	0.680	0.568**	0.546**	<b>0.756</b>					
CC	5.66	0.751	0.270**	0.287**	0.417**	<b>0.760</b>				
CLD	5.95	0.729	0.308**	0.291**	0.371**	0.513**	<b>0.769</b>			
OE	5.61	0.754	0.298**	0.292**	0.306**	0.434**	0.517**	<b>0.717</b>		
PI	5.64	0.691	0.233**	0.248**	0.310**	0.489**	0.312**	0.674**	<b>0.767</b>	
SAS	5.54	0.842	0.232**	0.263**	0.270**	0.573**	0.309**	0.530**	0.608**	<b>0.775</b>

BIE: Belief in integrate education; ECS: Emotional care and support; PM: Professionalism; CC: Communication and cooperation; CLD: Continuous learning and development; OE: Observation and evaluation; PI: Parental involvement; SAS: Service autism student; Diagonal elements are the square roots of the AVE for each construct; Pearson correlations are shown below the diagonal; \*: p < 0.05; \*\*: p < 0.01; \*\*\*: p < 0.001

**Table 4:** Measurement results

Constructs	MLE estimates factor loading/measurement error	Squared multiple correlation (SMC)	Composite reliability (CR)	Average variance extracted (AVE)	Cronbach's α
<b>Belief in integrated education</b>			0.818	0.698	0.874
BIE1	0.806	0.350	0.650		
BIE2	0.878	0.229	0.771		
BIE3	0.837	0.299	0.701		
BIE4	0.625	0.724	0.276		
BIE5	0.709	0.905	0.095		
<b>Emotional care and support</b>			0.851	0.543	0.838
ECS1	0.645	0.798	0.203		
ECS2	0.759	0.424	0.576		
ECS3	0.870	0.243	0.757		
ECS4	0.749	0.439	0.561		
ECS5	0.786	0.382	0.618		
<b>Professionalism</b>			0.754	0.631	0.786
PM1	0.801	0.358	0.642		
PM2	0.776	0.398	0.602		
PM3	0.621	0.951	0.049		
PM4	0.645	0.584	0.416		
<b>Communication and cooperation</b>			0.804	0.578	0.822
CC1	0.796	0.366	0.634		
CC2	0.768	0.410	0.590		
CC3	0.714	0.490	0.510		
<b>Continuous learning and development</b>			0.852	0.591	0.854
CLD1	0.675	0.544	0.456		
CLD2	0.816	0.334	0.666		
CLD3	0.767	0.412	0.588		
CLD4	0.808	0.347	0.653		
<b>Observation and evaluation</b>			0.746	0.581	0.761
OE1	0.566	0.866	0.134		
OE2	0.741	0.708	0.292		
OE3	0.686	0.529	0.471		
OE4	0.745	0.445	0.555		
OE5	0.674	0.546	0.454		
<b>Parental involvement</b>			0.799	0.644	0.798
PI1	0.689	0.525	0.475		
PI2	0.694	0.518	0.482		
PI3	0.778	0.666	0.334		
PI4	0.733	0.463	0.537		
PI5	0.628	0.606	0.394		
<b>Service autism student</b>			0.808	0.559	0.807
SAS1	0.662	0.562	0.438		
SAS2	0.764	0.416	0.584		
SAS3	0.686	0.529	0.471		
SAS4	0.672	0.548	0.452		
SAS5	0.792	0.650	0.350		

The attention and emotional support do not have a significant effect on parental involvement. This contradicts the assumption that emotional support from teachers can help create a closer relationship between school and family, which in turn increases

parental involvement. This is because parental involvement is often influenced by a broader range of factors, such as parents' availability, socio-economic status, knowledge of educational processes, and the school's efforts to engage families.

In addition, some parents may view their primary role as providing emotional stability and encouragement at home, rather than participating in school-based activities. Cultural attitudes towards education and parental roles can also play a part, as some cultures place less emphasis on visible involvement in schools. There are several possible reasons why this relationship is insignificant. One is that parents prioritize children’s academic aspects

over the emotional aspects provided by teachers. In many cases, parents feel that their primary responsibility is to ensure children succeed academically, while the emotional aspects are considered part of the teacher's job at school. Some parents feel they lack the skills or time to provide additional emotional support at home, which leads them to remain passive even if the child receives emotional attention from the teacher at school.

**Table 5: Proposed model results**

Hypotheses	Symbol	Path		Coefficients	Test results	
H1	Y <sub>11</sub>	Belief in integrated education	→	Parental Involvement	0.084	Unsupported
H2	Y <sub>12</sub>	Emotional care and support	→	Parental Involvement	0.013	Unsupported
H3	Y <sub>13</sub>	Professionalism	→	Parental Involvement	0.225	Unsupported
H4	Y <sub>14</sub>	Communication and cooperation	→	Parental Involvement	0.401***	Supported
H5	Y <sub>15</sub>	Continuous learning and development	→	Parental Involvement	0.226***	Supported
H6	Y <sub>16</sub>	Observation and evaluation	→	Parental Involvement	0.612***	Supported
H7	β <sub>21</sub>	Parental involvement	→	Service Autism Student	0.529***	Supported

\*\*\*: p < 0.001

**Table 6: Mediation result**

Direct effect				b	t	95% CI	
Belief in integrated education	→	Service autism student		0.107	2.380	(0.186, 0.195)	
Emotional care and support	→	Service autism student		0.130	3.010	(0.045, 0.214)	
Professionalism	→	Service autism student		0.112	2.208	(0.032, 0.211)	
Communication and cooperation	→	Service autism student		0.406	8.808***	(0.315, 0.497)	
Continuous learning and development	→	Service autism student		0.406	8.808***	(0.315, 0.497)	
Observation and evaluation	→	Service autism student		0.247	4.271***	(0.133, 0.361)	
Indirect effect				b	SE	95% CI	
Belief in integrated education	→	Parental involvement	→	Service autism student	0.154	0.035	(0.086, 0.225)
Emotional care and support	→	Parental involvement	→	Service autism student	0.154	0.031	(0.092, 0.215)
Professionalism	→	Parental involvement	→	Service autism student	0.223	0.036	(0.153, 0.296)
Communication and cooperation	→	Parental involvement	→	Service autism student	0.236	0.037	(0.168, 0.313)
Continuous learning and development	→	Parental involvement	→	Service autism student	0.204	0.039	(0.129, 0.283)
Observation and evaluation	→	Parental involvement	→	Service autism student	0.345	0.049	(0.255, 0.446)

Teacher professionalism has no significant effect on parental involvement. This result is surprising, given that teacher professionalism is often associated with improved teaching quality and classroom management, which should attract more involvement from parents (Azad et al., 2021). It means that a teacher with a high level of professionalism, without strong communication between the school and parents, will still not be able to significantly encourage parental involvement. Parents who rarely interact with teachers may not be aware of professionalism, and as a result, do not feel encouraged to be more active in their children’s education. Therefore, although teacher professionalism is an important element in a quality education system, the results of this study show that this factor is not enough to directly increase parental involvement.

Teacher professionalism, which encompasses qualities such as competence, ethical conduct, reliability, and effective communication, is crucial for maintaining high standards in education and fostering positive learning environments. However, it may not have a significant effect on parental

involvement for several reasons. Parents' own circumstances, including available time, socioeconomic status, and past school experiences, often shape parental involvement more than anything else. While professional teachers may communicate effectively and create welcoming atmospheres, parents might still face barriers like work commitments, language differences, or limited understanding of school systems. Parental involvement also often depends on proactive outreach, flexible participation opportunities, and supportive policies that address parents’ diverse needs. This finding underscores the fact that parental involvement is highly dependent on the extent to which schools and teachers are able to establish open, transparent, and effective communication. When schools actively provide clear and structured channels of communication toward regular parent-teacher meetings, timely and transparent student progress reports, and open opportunities for parents to share input, the level of parental engagement tends to increase significantly. Therefore, fostering strong communication and cooperation between teachers and parents should be

regarded as one of the key strategies to enhance parental involvement in children's educational journey.

The continuous learning and development for teachers has a substantial impact on parental involvement. It occurred due to equipping educators with up-to-date knowledge, effective strategies, and improved communication skills that directly enhance family engagement. When teachers regularly participate in professional development, they become more adept at understanding diverse family backgrounds, addressing students' individual needs, and creating inclusive classroom environments. Furthermore, teachers who are committed to continuous learning are often more proactive in seeking innovative ways to involve parents, such as organizing workshops, sharing resources, or utilizing technology to keep families informed and engaged. These efforts make parents feel valued and empowered to participate more actively in their child's education. In addition, teachers who consistently invest in the development of skills and knowledge tend to be more adept at building positive relationships with parents and fostering a more inclusive and supportive learning environment (Hayes et al., 2023; Hugh et al., 2023). Continuous professional development programs for teachers can cover various critical aspects, including advanced communication techniques, the effective use of technology to facilitate parental engagement, and a deeper understanding of the indispensable role that parents play in supporting children's education to ensure that educators are well-prepared to interact with parents in meaningful and constructive ways (Hayes et al., 2023). Hence, strengthening teachers' capacities to engage with parents can serve as a highly effective approach for increasing parental involvement.

This study also reveals that systematic observation and evaluation have a particularly strong impact on parental involvement. This finding suggests that parents are more inclined to become actively engaged in children's educational development when they receive clear, detailed, and structured information regarding academic progress. A well-structured evaluation system enables parents to comprehend their children's strengths and pinpoint the precise areas necessitating enhancement (Yang et al., 2023). It fosters a sense of shared responsibility between educators and families (Pesonen et al., 2025). This collaborative approach leads to increased parental involvement, which is essential in creating a supportive learning environment that benefits students both at school and at home (Panganiban et al., 2022). Hence, the higher the level of parental involvement, the better the educational and support services received by children with autism. Parents who are actively involved in their children's education tend to have a better understanding of their specific needs and can give schools more useful and relevant feedback on how to improve service quality. The parental involvement leads to a more holistic approach to

supporting children with autism, ensuring that they receive continuous and well-coordinated assistance both within the school setting and at home.

This study highlights an intriguing finding regarding the role of teachers' beliefs in inclusive education. Specifically, teachers' belief in the significance of inclusive education does not directly influence the quality of services offered to autistic students; however, it does have an indirect effect by fostering greater parental involvement (Cartwright and Mount, 2022). This suggests that even when teachers strongly support the concept of inclusive education, beliefs alone are not sufficient to bring about tangible improvements in services for autistic students. Instead, the impact of these beliefs is more pronounced when they lead to enhanced parental engagement, which subsequently contributes to better educational services for children with autism. It proves that an inclusive education system is not solely dependent on teachers' attitudes but also on the extent to which parents understand, embrace, and actively support the implementation of inclusive practices in schools (Helkkula et al., 2020). Therefore, while fostering a strong belief in inclusive education among teachers is undoubtedly important, its effectiveness in improving services for autistic students is significantly mediated by the level of parental involvement (Gonzalez-DeHass et al., 2022). Therefore, a comprehensive approach is needed that not only promotes inclusive education within the school environment but also actively engages parents to ensure meaningful and sustainable improvements in the services provided to children with special needs.

Attention and emotional support also have no direct influence on services for students with autism, but have an indirect influence through parental involvement. The attention and emotional support from teachers can help improve student welfare; this does not necessarily directly improve the quality of services for students with autism (Darling-Hammond et al., 2020). A good educational service for autistic students often involves a combination of appropriate learning strategies, adequate academic support, and access to special resources. Emotional support alone is not enough to increase the effectiveness of services without the involvement of parents in understanding the child's needs and working with teachers in optimizing learning strategies. The attention and emotional support from teachers will only have a positive impact on services for autism students if parents are also involved in following up on children's needs at home and in the school environment. Teacher professionalism also has no direct influence on services for autistic students, but it has an indirect influence through parental involvement. It indicates a correlation between teacher professionalism and improved teaching quality and effective classroom management (Syrjämäki et al., 2023). Parents can provide more accurate information about children's needs, assist in the implementation of learning strategies at home, and strengthen communication

between school and family. Thus, although teacher professionalism is a key element in a quality education system, its impact on services for autistic students can only be realized if parents participate in supporting children's education. The role of belief in integrated education, attention, and emotional support, and teacher professionalism can only contribute to improving services for students with autism if parents participate in the education process of their children (Hugh et al., 2023). On the other hand, communication and cooperation, continuous learning and development, and observation and evaluation have a direct influence on services for autistic students, showing that effective interaction between teachers and parents and increased teacher competence are the main keys to creating better educational services.

#### 4.2. Theoretical implications

The findings of this study provide significant theoretical contributions to the field of inclusive education, particularly concerning the role of parental involvement in supporting children with autism spectrum disorder (ASD). Grounded in Ecological Systems Theory, the study underscores the interconnected influence of various environmental systems on a child's educational experience. The parental involvement acts as a key moderating factor in bridging the gap between inclusive education policies and effective implementation in practice. Ecological Systems Theory emphasizes the importance of microsystem interactions, such as teacher-student and parent-child relationships, in shaping developmental outcomes. However, this study suggests that the mesosystem, specifically the collaboration between teachers and parents, plays an even more critical role in ensuring the success of inclusive education. The absence of a significant direct effect between teacher professionalism and parental involvement challenges previous assumptions that teacher expertise alone is sufficient to foster an inclusive environment. Instead, it highlights the need for structured communication channels that actively engage parents in the learning process.

#### 4.3. Practical implications

The practical implications of this study emphasize the importance of targeted interventions for educators, policymakers, and support organizations in fostering inclusive education for children with ASD. The parental involvement requires structured communication strategies and professional development initiatives for teachers. First, educational institutions should establish systematic communication frameworks, such as regular parent-teacher meetings, digital communication platforms, and workshops, to enhance collaboration between schools and families. Hence, schools should provide training for teachers on effective communication techniques tailored to

parents of children with ASD. Second, professional development programs should be designed to equip teachers with the skills necessary to engage parents effectively. This includes training on cultural competence, individualized education planning (IEP) processes, and evidence-based inclusive teaching strategies. Hence, schools should implement observational and evaluative measures to track the progress of students with ASD. By maintaining transparent evaluation reports and involving parents in the assessment process, educators can foster a sense of shared responsibility in supporting student development. Schools should also provide accessible resources and guidance for parents to reinforce learning strategies at home. Finally, policymakers should consider implementing national guidelines that encourage parental involvement in inclusive education.

#### 5. Conclusion

This study highlights the multifaceted relationship between inclusive education, teacher professionalism, parental involvement, and student outcomes for children with ASD. While teacher professionalism alone does not directly enhance parental involvement, structured communication and continuous professional development play a pivotal role in fostering collaboration. The results show that inclusive education works best when teachers and parents work together, which is made easier by clear communication, shared learning experiences, and regular observation. Recognizing the moderating role of parental involvement, this research contributes to the ongoing discourse on inclusive education, emphasizing that successful integration requires a holistic approach that encompasses teacher training, policy support, and active family engagement.

While this study offers valuable insights, several limitations must be acknowledged. First, the study focuses on a specific population—undergraduate students majoring in preschool education in Zunyi City, China—limiting its generalizability to other socio-cultural contexts. Future research should consider cross-cultural analyses to determine whether similar patterns exist in different educational systems and cultural environments. Second, the reliance on self-reported survey data introduces the possibility of response bias. Participants may have provided socially desirable answers rather than accurately reflecting experiences. Future studies should incorporate mixed-method approaches, such as qualitative interviews and longitudinal studies, to gain deeper insights into the evolving nature of parental involvement in inclusive education. Third, while this study establishes the significance of communication and continuous learning in enhancing parental involvement, it does not explore potential moderating variables, such as socio-economic status, policy frameworks, or parental education levels. Future research should examine these factors to

develop more comprehensive models of inclusive education. Finally, experimental or intervention-based studies could be conducted to evaluate the effectiveness of specific parental engagement programs and professional development initiatives. Testing structured interventions, researchers can identify best practices for fostering collaboration between educators and parents in inclusive educational settings.

### List of abbreviations

ABA	Applied behavior analysis
AMOS	Analysis of moment structures
ASD	Autism spectrum disorder
AVE	Average variance extracted
BIE	Belief in integrated education
CC	Communication and cooperation
CFA	Confirmatory factor analysis
CFI	Comparative fit index
CI	Confidence interval
CLD	Continuous learning and development
CMV	Common method variance
CR	Composite reliability
df	Degrees of freedom
ECS	Emotional care and support
GFI	Goodness-of-fit index
IEPs	Individualized education programs
IFI	Incremental fit index
MLE	Maximum likelihood estimation
NFI	Normed fit index
OE	Observation and evaluation
p	Probability value/significance level
PI	Parental involvement
PM	Professionalism
PM1-PM4	Measurement items for professionalism
RMSEA	Root mean square error of approximation
SAS	Services for autism students
SD	Standard deviation
SE	Standard error
SEM	Structural equation modeling
SMC	Squared multiple correlation
SPSS	Statistical package for the social sciences
t	t-statistic
$\alpha$	Cronbach's alpha
$\beta$	Standardized regression coefficient
$\gamma$	Gamma coefficient/path coefficient
$\chi^2$	Chi-square statistic

### Compliance with ethical standards

#### Ethical considerations

All participants provided informed consent prior to enrollment in the study. Written informed consent was obtained from all individuals included in the research. The study protocol was reviewed and approved by the Ethics Committee of Mahachulalongkornrajavidyalaya University.

#### Conflict of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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