

## ORIGINAL ARTICLE

# Investigation of the Relationships Between Beliefs About Developmentally Appropriate Practices, Competencies in Inclusive Practices and Self-Efficacy Perceptions in Early Childhood Education Teacher Candidates

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## ABSTRACT

This study aims to examine early childhood education teacher candidates' beliefs about developmentally appropriate practices, their perceptions of self-efficacy and their levels of teacher self-efficacy in relation to inclusive education. Five hundred seventy-one university students participated in the study. According to the results, there were significant positive relationships between teachers' perceptions of self-efficacy and the belief scale for developmentally appropriate practices ( $r=0.294$ ). There were moderate positive relationships between teachers' perceptions of self-efficacy and teachers' self-efficacy towards inclusive education ( $r=0.601$ ), and low positive relationships between the belief scale for developmentally appropriate practices and teachers' self-efficacy towards inclusive education ( $r=0.263$ ). The mediation effect analysis showed that teachers' perception of self-efficacy can explain 42.86% of the effect of belief in developmentally appropriate practices on teacher self-efficacy towards inclusive education. These findings highlight that teachers' beliefs and self-efficacy perceptions play an important role in improving the quality of educational practices.

## 1 | Introduction

High-quality early childhood education is of great importance for the development of children and their long-term success in life (Kostelnik et al. 2011). Many components, including positive interactions, developmentally appropriate practices and qualified teachers, define quality in the educational process (Espinosa 2002). It has been found that programmes that emphasise quality in early childhood education develop children's language, literacy and numeracy skills and reduce undesirable behaviours (Yoshikawa et al. 2016). A developmentally appropriate curriculum is a key component of quality early childhood education (Koralek et al. 1995).

A clear understanding of child development makes it easier for teachers to create a safe, supportive and meaningful learning environment that considers each child's individual needs. A good teacher is not merely a figure who imparts knowledge to students; they are also a guide who facilitates their learning processes, providing direction when necessary to prevent potential problems from arising (Shonkoff and Phillips 2000). A deep understanding of how children think, feel, behave and learn makes teachers' pedagogical practices more effective; comprehensive knowledge of developmental stages directly affects the quality of learning (Berk 2018). As can be seen, teachers play a key role in supporting children's development and learning. Therefore, teacher education also has an important place in

this regard. In Turkey, where this research was conducted, the 2018 Preschool Education Program prepared by YOK is used. This programme consists of three parts: general culture, vocational knowledge and subject-specific courses. Teacher candidates' practical courses are only in their final year. However, it is considered extremely important for teacher candidates to frequently visit schools to observe teachers' planning and implementation, to establish a foundation for their own practices and to conduct practices appropriate for children's development. Indeed, NAEYC (2020) emphasises this in its Developmentally Appropriate Practices statement. Teachers who base their decisions on Developmentally Appropriate Practices (DAP), first published by NAEYC in 1986 and most recently updated in 2020 (Barnes 2022), make decisions based on three fundamental sources of information. These are as follows: (a) age appropriateness, (b) cultural appropriateness and (c) individual appropriateness (Kostelnik et al. 2011).

In developmentally appropriate early education programmes, teachers (a) build positive relationships with children and their families, (b) provide opportunities for children to choose and plan their activities, play, explore and interact with adults and peers, (c) encourage and extend children's thinking by asking questions, making comments and offering suggestions, (d) provide learning experiences for all developmental domains based on a variety of learning styles and take into account children's interests and prior learning when planning curriculum and (e) assess children's development and use assessment information to improve teaching and learning (NAEYC 2009). NAEYC reviewed the statement again in 2020 and published its fourth version. The fourth edition emphasises the importance of context, including social, cultural and historical contexts, in a more comprehensive manner than previous editions, covering definitions, key issues, principles, guidelines and recommendations. This broader perspective highlights the impact of contexts not only on each child but also on all adults involved in any area of early childhood education (educators, administrators and others). While the statement reiterates the importance of culture and context, it notes that more research has been conducted on white and middle-class children and families. The declaration also emphasises that teachers are affected by funding and different policy decisions and that teachers need to benefit from higher education and professional training programmes. However, teachers are key to supporting children's holistic development and teachers who can achieve the above goals must have an inclusive perspective. In an inclusive learning environment, all children learn together in the same classroom, despite their differences. These classrooms value diversity and the unique contributions of each child. In this context, differences in age-related developmental characteristics among children are accepted and differentiated practices are implemented to accommodate the individual and cultural characteristics of children. The relationship between inclusive education and GUE will be discussed below.

### 1.1 | Developmentally Appropriate Practices and Inclusive Education

The Division of Early Childhood (DEC) and the National Association for the Education of Young Children (NAEYC)

define inclusive education as (a) access to a wide range of learning opportunities, (b) individualised accommodations that facilitate participation with adults and peers and (c) system-level supports that support efforts in the classroom (DEC & NAEYC 2009). As noted above, teachers who use the DAP as a basis use three primary sources of information: age appropriateness and individual appropriateness. Teachers who consider these and create an inclusive classroom plan the environment, differentiate content, adapt the teaching process and assess learning outcomes (Bredenkamp 2014). One of the factors influencing teachers' creation of an inclusive learning environment in the context of developmentally appropriate practices is teachers' self-efficacy. The relationship between DAP and inclusive education and self-efficacy is discussed below.

### 1.2 | Developmentally Appropriate Practices and Self-Efficacy

Bandura (1997) defined self-efficacy as 'perceived self-efficacy is defined as people's judgments of their abilities to organise and execute courses of action required to achieve specified types of performance' (cited in Skaalvik and Skaalvik 2007, 611). Teacher self-efficacy refers to a teacher's beliefs about his or her ability to act in ways that will produce desired outcomes for the children in his or her classroom. Teacher self-efficacy is the primary personal factor that influences teachers' classroom behaviour (Cruz et al. 2020; Sawyer et al. 2022). When assessed in the context of the early years, teacher self-efficacy is considered important due to its influence on the selection of appropriate teaching practices for early childhood education and primary school children (Cobanoğlu et al. 2019; Raymond and Gabriel 2023).

As mentioned in the introduction, teachers who take DAP as a basis act appropriately according to age, individual and culture. Studies show that teachers based on DAP have higher self-efficacy (Abroampa and Simpson 2020; Cobanoğlu et al. (2019); Cruz et al. 2020; Sawyer et al. 2022). Some of these studies have focused on all developmentally appropriate practices (Abroampa and Simpson 2020; Cobanoğlu et al. (2019)), while others have focused on individual and cultural appropriateness (Cruz et al. 2020; Sawyer et al. 2022). Therefore, it is possible to discuss a relationship between teachers' self-efficacy and the components of DAP. The relationship between self-efficacy and inclusive teaching based on individual and cultural appropriateness, which is one of these components, is discussed below.

### 1.3 | Self-Efficacy and Inclusion

The National Association for the Education of Young Children (NAEYC) and the Early Childhood Section of the Council for Special Needs Children issued a joint statement in 2009 supporting inclusive early childhood education. The definition of early childhood inclusion in this statement is as follows:

Early childhood inclusion embodies the values, policies, and practices that support the right of every infant and young child and their family, regardless of ability, to participate in a wide range of activities and

contexts as full members of families, communities, and society. The desired outcomes of inclusive experiences for children with and without disabilities and their families include a sense of belonging and membership, positive social relationships and friendships, and development and learning to reach their full potential. The defining characteristics of inclusion that can be used to identify high quality early childhood programmes and services are access, participation and support

(DEC-NEAYC, 2009).

As can be seen, inclusive education has many stakeholders. One of the factors that is important in achieving these denominators is teacher self-efficacy. In a study conducted by Woodcock et al. (2022), it was found that all teachers had a similar conceptual understanding of inclusive education. However, it was found that there were differences in practice between teachers with high and low self-efficacy. This shows that teacher self-efficacy is an important factor in inclusive education. Studies conducted with early childhood education teachers and teacher candidates show that there is a relationship between their perspective on inclusive education and their self-efficacy (Chow 2024; Ismailos et al. 2022; Woodcock et al. 2022; Wray et al. 2022; Yada et al. 2022).

## 2 | Purpose of the Study

As mentioned above, in early childhood education, GUU supports children's holistic development by considering their individual differences and the socio-cultural context in which they live (Copple and Bredekamp 2009). This approach enables teachers to develop strategies that are sensitive to children's needs, flexible and supportive of learning. Examining the extent to which DAP is included in preschool teacher education programmes in Turkey is critical for understanding the relationships between teacher candidates' beliefs about developmentally appropriate practices, their competencies in integration practices and their perceptions of self-efficacy. This is because teachers' self-efficacy influences both their perspectives on GUU and inclusive education. Teacher education is one of the important factors in teachers' self-efficacy, beliefs about GUU and beliefs about inclusive education (Chow 2024; Jumiaan et al. 2020; Taye et al. 2024; Tumkaya and Miller 2020; Wray et al. 2022). For this reason, it is essential to determine the level of teacher candidates and take the necessary measures in teacher education. A literature review reveals many studies on teachers' and teacher candidates' self-efficacy, beliefs about GUU and beliefs about inclusive education, as well as many studies on binary variables. When examining these studies conducted in different countries, it is evident that preschool teachers have positive attitudes towards DAP but do not follow its principles in their practices (Chan 2016; Mengstie 2023). Bjorklund (2022) suggests that teachers follow developmentally appropriate practices to increase children's learning opportunities. It is essential to identify the influencing factors and their relationships from the undergraduate level onwards in order for teachers to adopt and use developmentally appropriate practices. While preparing

age-appropriate educational programmes for children is important, individual and cultural appropriateness are also important components of GUU. A meta-synthesis study by Chow and colleagues (2023) revealed that teachers have educational needs related to inclusive education. In light of all these studies, understanding the relationship between preschool teachers' beliefs about developmentally appropriate practices from the beginning of their studies, their competence in integration practices and their perceptions of self-efficacy is an important step in improving the quality of preschool education practices. Clarifying this relationship is valuable in guiding the development of teacher education programmes and preschool education policies. This study will contribute to the field by revealing the relationship between these structures, thereby facilitating the development of strategies to improve practices in early childhood education. In this context, this research seeks to answer the following questions:

1. What are the levels of teacher self-efficacy, belief in developmentally appropriate practices and teacher self-efficacy towards inclusive education among preservice teachers?
2. Is there a relationship between the perception of teacher self-efficacy, the belief in developmentally appropriate practices and the teacher self-efficacy towards inclusive education of preservice teachers?
3. Is there a relationship between preservice teachers' perceptions of teacher self-efficacy, belief in developmentally appropriate practices and teacher self-efficacy towards inclusive education?

## 3 | Method

### 3.1 | Research Design

Structural equation modelling (SEM) analysis was used to examine the structures discussed in this study. SEM is a powerful multivariate analysis method that can be used to test complex theories from empirical data (Thakkar 2020). The reason why SEM was preferred in this study is that this type of analysis allows the examination of cause-effect relationships in a complex structure consisting of manifest or latent variables (Endres 2018). This method is beneficial in the special education study, where it can be used to link the latent variables with the observed variables (Moore 1995). This study is concerned with the relationship between early childhood education teachers' beliefs about developmentally appropriate practices, their competencies for inclusive practices and their perceptions of self-efficacy. Therefore, structural equation modelling was preferred.

### 3.2 | Study Group

In this study, the sample was selected using an appropriate sampling method. Although the study was designed as a stratified sample, the desired number could not be reached. For this reason, appropriate sampling was preferred. Data from teacher candidates were collected through an online form, and efforts

were made to prevent bias in the data in this way. This method was applied to minimise the potential social desirability effect in participant responses and data collection bias. Five hundred and seventy-one university students enrolled in early childhood education programmes participated in the study. This group, composed of students studying in different geographical regions of Turkey, has the potential to represent the general characteristics of preschool teacher candidates; however, caution should be exercised when generalising the findings to all teacher candidates. The characteristics of the participants are presented in Table 1.

### 3.3 | Data Collection Tools

#### 3.3.1 | Developmentally Appropriate Practice Belief Scale

The belief subscale of the teacher beliefs and practices scale, developed by Kim and Buchanan (2009), was adapted to Turkish by Şahin Sak and Sak (2017). The scale, which consists of a total of 29 items, one of which is open-ended and five-point Likert type, consists of three subdimensions as: developmentally appropriate (GU), developmentally unapproachable (GUO) and family, culture and inclusion as a result of exploratory factor analysis. The total reliability coefficient calculated for all items of the scale in the adaptation study was found to be 0.85. In this study, the reliability coefficient of the scale was found to be 0.91.

#### 3.3.2 | Teacher Self-Efficacy Perception Scale

Developed by Tschannen-Moran et al. (1998) and adapted to Turkish by Köse and Çıkrıkçı (2007), the Teacher Self-Efficacy Perception Scale is a 24-item, five-point Likert-type scale. The scale includes student motivation, instructional strategies and classroom management dimensions. The total reliability coefficient calculated for all items in the adaptation study of the scale was found to be 0.92. In this study, the reliability coefficient of the scale was found to be 0.97.

**TABLE 1** | Characteristics of the participants.

		<i>n</i>	%
Gender	Woman	479	83.89
	Man	92	16.11
Age	18–20	150	26.27
	21–23	355	62.17
	24–26	36	6.30
	27+	30	5.25
Class	1	28	4.90
	2	117	20.49
	3	161	28.20
	4	265	46.41

#### 3.3.3 | Teacher Efficacy for Inclusive Education Scale

The Teacher Efficacy for Inclusive Practices (TEIP) scale, developed by Sharma et al. (2015), was adapted into Turkish by Tanriverdi and Özokçu (2018). The scale, which is prepared as a six-point Likert type, consists of 18 items. The scale is composed of three subscales: teaching effectiveness in an inclusive environment, behaviour management effectiveness and collaboration effectiveness. The total reliability coefficient calculated for all items in the adaptation study of the scale was found to be 0.89. In this study, the reliability coefficient of the scale was found to be 0.97.

### 3.4 | Data Analysis

Before the start of the study analysis, the data set was checked for data entry errors and missing data by means of frequency analysis. As a result of the examination, it was determined that there were correct data entries and no missing data in the data set. To determine the participants' level of agreement with the scale scores, they were grouped into classes using k-means cluster analysis and the classes obtained according to the class means were named low-medium-high. In order to decide on the appropriate method for difference analyses, the normal distribution of the scale scores at the independent variable levels was examined. The skewness and kurtosis values were examined for the assumption of normal distribution. It was assumed that the scale scores with skewness-kurtosis values between  $-1$  and  $+1$  provided the assumption of normal distribution. While it was found that the scores on the Developmental Appropriate Practices Belief Scale showed a normal distribution, it was found that the other scale scores did not show a normal distribution.

For this reason, Spearman correlation analysis was used to examine the relationships between the scale scores. In addition, the coefficients of determination obtained as a function of the correlation coefficients between the scale scores were calculated. The coefficient of determination is equal to the square of the correlation coefficient and indicates how much of the change in one variable is explained by another variable (Çakan et al. 2020). Structural equation modelling analysis was used to examine the mediator model established in the study. When the analysis of the mediator model was carried out, the estimates were made using the bootstrap method. The analyses of the mediator variables were carried out with the program Jamovi 2.3.28.

## 4 | Findings

A cluster analysis was used to classify each scale to determine the levels of teacher self-efficacy, belief in developmentally appropriate practices and teacher self-efficacy for inclusive education of early childhood education teaching students. The results are presented in Table 2.

In Table 2, it can be seen that the cluster analysis results for all scale scores are statistically significant ( $p < 0.05$ ). According to the results of the cluster analysis carried out for the scores of the Teacher Self-Efficacy Perception Scale, 7.18% ( $n = 41$ ) of the students of the Department of early childhood education have a low level of teacher self-efficacy, 56.57% ( $n = 323$ ) have a medium level

of teacher self-efficacy and 36.25% ( $n=207$ ) have a high level of teacher self-efficacy. According to the results of the cluster analysis carried out for the scores on the scale of developmentally appropriate practices beliefs, 22.07% ( $n=126$ ) of the early childhood education teaching department students have a low belief level in developmentally appropriate practices. 26.97% ( $n=153$ ) have a medium level of developmentally appropriate practices beliefs and 59.96% ( $n=291$ ) have a high level of belief in developmentally appropriate practices. According to the cluster analysis results for the scores of the Teacher Self-Efficacy Perception Scale for Inclusive Education, 5.78% ( $n=33$ ) of the preservice teachers have a low level of teacher self-efficacy for inclusive education, 39.75% ( $n=227$ ) have a medium level of teacher self-efficacy for inclusive education and 54.47% ( $n=311$ ) have a high level of teacher self-efficacy for inclusive education. In general, most of the preservice teacher education students who participated in the study have a moderate perception of teacher self-efficacy, a high level of developmentally appropriate practices beliefs and a high level of teacher self-efficacy for inclusive education.

In order to determine the relationship between teacher self-efficacy perceptions, belief in developmentally appropriate practices and teacher self-efficacy for inclusive education among the students of the Early Childhood Education Teaching Department, a Spearman correlation analysis was conducted. The results are shown in Table 3.

Looking at Table 3, it can be seen that there is a positive, low ( $r=0.294$ ) and statistically significant ( $p<0.05$ ) relationship between the scores on the Teacher Self-Efficacy Perception Scale

and the scores on the Belief in Developmentally Appropriate Practices Scale. Accordingly, it can be said that as the participants' belief in developmentally appropriate practices increases, so does their perception of teacher self-efficacy. It was found that there was a positive, moderate ( $r=0.601$ ) and statistically significant ( $p<0.05$ ) relationship between the scores on the Teacher Self-Efficacy Perception Scale and the scores on the Teacher Self-Efficacy Scale for Inclusive Education. Accordingly, it can be interpreted that as participants' perceptions of teacher self-efficacy increase, so does their teacher self-efficacy for inclusive education. It was found that there was a positive, low level ( $r=0.263$ ) and statistically significant ( $p<0.05$ ) relationship between scores on the Developmentally Appropriate Practices Belief Scale and scores on the Teacher Self-Efficacy Scale for Inclusive Education. In other words, as participants' levels of belief in developmentally appropriate practices increased, so did their levels of teacher self-efficacy for inclusive education.

The mediating effect of perceived teacher self-efficacy on the effect of developmentally appropriate practices and beliefs on teacher self-efficacy for inclusive education was examined using structural equation modelling. First, a model without a mediating effect variable was constructed. In the model without the mediating variable, a path was drawn from scores on the developmentally appropriate practices beliefs scale to scores on the teacher self-efficacy scale for inclusive education. The Teacher Self-Efficacy Perception Scale scores were then included in the model as a mediating variable. The results are presented in Table 4. In addition, the path diagrams for the models are presented in Figure 1.

**TABLE 2** | Participants' teacher self-efficacy, developmentally appropriate practices beliefs, and teacher self-efficacy for inclusive education.

		<i>n</i>	%	Min.	Max.	<i>X</i>	Statistics
Teacher self-efficacy	Low	41	7.18%	24.00	79.00	65.76	F (2.568) = 1273.657 $p=0.000$
	Medium	323	56.57%	80.00	102.00	93.30	
	High	207	36.25%	103.00	120.00	111.79	
Developmentally appropriate practices beliefs	Low	126	22.07%	64.00	97.00	87.86	F (2.568) = 1904.344 $p=0.000$
	Medium	154	26.97%	98.00	116.00	107.86	
	High	291	50.96%	117.00	140.00	126.11	
Teacher self-efficacy for inclusive education	Low	33	5.78%	18.00	52.00	29.67	F (2.568) = 1509.638 $p=0.000$
	Medium	227	39.75%	54.00	85.00	76.93	
	High	311	54.47%	86.00	108.00	94.27	

**TABLE 3** | Results of correlation analysis.

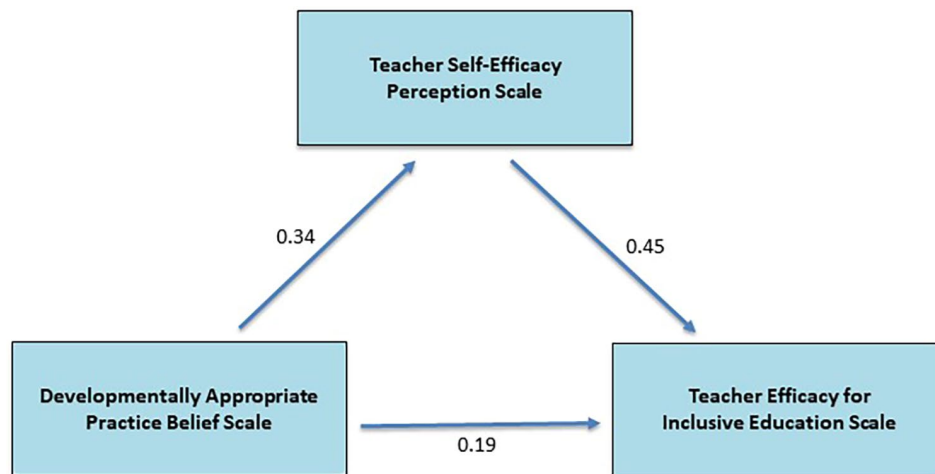
	Teacher self-efficacy	Developmentally appropriate practices beliefs	Teacher self-efficacy for inclusive education
Teacher self-efficacy	1000		
Developmentally appropriate practices beliefs	294**	1000	
Teacher self-efficacy for inclusive education	601**	263**	1000

\*\* $p<0.01$ .

**TABLE 4** | Mediator Effect Analysis Results.

	Paths	Path coefficient ( <i>B</i> )	Std. Path coefficient ( $\beta$ )	<i>p</i>
No mediating variables	DAPB $\Rightarrow$ TSEFIE	0.36	0.35	<0.001
Model 1	DAPB $\Rightarrow$ TSE (Direct effect)	0.28	0.34	<0.001
	TSE $\Rightarrow$ TSEFIE (Direct effect)	0.56	0.45	<0.001
	DAPB $\Rightarrow$ TSEFIE (Direct effect)	0.20	0.19	<0.001
	DAPB $\Rightarrow$ TSE $\Rightarrow$ KEYÖÖ (Indirect effect)	0.16	0.15	<0.001

Abbreviations: DAPB, Developmentally Appropriate Practices Beliefs; TSE, Teacher Self-Efficacy; TSEFIE, Teacher Self-Efficacy for Inclusive Education.

**FIGURE 1** | Path diagram for mediating variable.

Looking at Table 4, we see that the standardised path coefficient from the Developmentally Appropriate Practices Belief Scale scores to the Teacher Self-Efficacy for Inclusive Education scores is 0.35 when there is no mediator variable, and this effect is statistically significant ( $p < 0.05$ ). In other words, a one standard unit increase in scores on the belief in developmentally appropriate practices scale results in a 0.35 standard unit increase in scores on the Teacher Self-Efficacy Scale for Inclusive Education. In Model 1, where teacher self-efficacy perception was included in the model as a mediator variable, the standardised path coefficient from developmentally appropriate practices belief scale scores to teacher self-efficacy perception scale scores ( $\beta = 0.34$ ) and the standardised path coefficient from teacher self-efficacy perception scale scores to teacher self-efficacy scale scores for inclusive education ( $\beta = 0.45$ ) were found to be statistically significant ( $p < 0.05$ ). When the teacher self-efficacy perception variable was included in the model, the standardised path coefficient from the Developmentally Appropriate Practices Belief Scale scores to the Teacher Self-Efficacy Scale for Inclusive Education scores was 0.15 and statistically significant ( $p < 0.05$ ). After the mediator variable was included in the model, it was observed that the significant effect from the Developmentally Appropriate Practices Belief Scale scores to the Teacher Self-Efficacy Scale for Inclusive Education scores continued. When Table 4 is examined, it is seen that the standardised path coefficient from the Developmentally Appropriate Practices Belief Scale scores to the Teacher Self-Efficacy Scale for Inclusive Education scores is 0.35 when there is no mediator variable, and

this effect is statistically significant ( $p < 0.05$ ). In other words, a one-standard-unit increase in the developmentally appropriate practices belief scale scores causes a 0.35-standard-unit increase in the teacher self-efficacy scale scores for inclusive education. In Model 1, where Teacher Self-Efficacy Perception was included in the model as a mediator variable, the standardised path coefficient from the Developmentally Appropriate Practices Belief Scale scores to the Teacher Self-Efficacy Perception Scale scores ( $\beta = 0.34$ ) and the standardised path coefficient from the Teacher Self-Efficacy Perception Scale scores to the Teacher Self-Efficacy Scale for Inclusive Education scores ( $\beta = 0.45$ ) were determined to be statistically significant ( $p < 0.05$ ). When the teacher self-efficacy perception variable was included in the model, the standardised path coefficient from the Developmentally Appropriate Practices Belief Scale scores to the Teacher Self-Efficacy Scale for Inclusive Education scores was 0.15 and statistically significant ( $p < 0.05$ ). After the mediator variable was included in the model, it was observed that the significant effect from the Developmentally Appropriate Practices Belief Scale scores to the Teacher Self-Efficacy Scale for Inclusive Education scores continued.

## 5 | Discussion

This study examined the relationships between preschool teacher candidates' beliefs about developmentally appropriate practices, their competence in integration practices and their

perceptions of self-efficacy. Teacher candidates' beliefs about developmentally appropriate practices, their self-efficacy in inclusive education and teacher training play an important role in their self-efficacy. Although teachers have positive beliefs about developmentally appropriate practices, inconsistencies are observed in their practices (McMullen 1999). It is seen that one of the important factors in these beliefs and practices is their education (Taye et al. 2024). When teachers' views on inclusive education are examined, it is seen that teachers are not prepared to teach children with special needs and do not have sufficient knowledge about it (Chhabra et al. 2010; Zukani 2018). A study by Xue et al. (2022) found a significant difference between attitudes towards inclusive education and the duration of training in inclusive education. Teacher training is a key factor here. The education and feedback teachers receive during their undergraduate studies are extremely important for both their self-efficacy and their self-efficacy in inclusive education. Bandura (1997) noted that one of the factors influencing teachers' high self-efficacy is external support—teachers' ability to demonstrate a behaviour successfully. Bandura (1997) stated that one of the factors affecting teachers' high self-efficacy is external support. Teachers' successful performance of a behaviour and praise from others increase their self-efficacy. The research results from different countries given in the examples above show that teacher education is an effective factor on these variables. Therefore, it is essential to determine the relationship between these components.

As a result of the study, it was found that most of the preservice teachers' perceptions of teacher self-efficacy were at a moderate level, and their beliefs in developmentally appropriate practices and teacher self-efficacy for inclusive education were high. The majority of the group from which the data were collected had received online training for 1 year. It is thought that this may be the reason why the preservice teachers have a moderate level of self-efficacy. In a study conducted by Akman and Yazıcı (2021), it was found that preservice early childhood education teachers did not see themselves as competent due to online education and were worried about their teaching experience. In a study by Ashraf et al. (2021), teachers were provided with blended education for their students. The study found that students and teachers were concerned about their lack of pedagogical skills. In a study conducted by Ma et al. (2021), it was determined that a lack of experience in online teaching significantly impacted teachers' self-efficacy perceptions. Therefore, it can be assumed that teachers and candidates share similar concerns. It is expected that first and second-grade students also have moderate levels of self-efficacy. A review of relevant literature shows that teacher candidates have moderate and high levels of self-efficacy perceptions (Billheimer 2006; Clark and Newberry 2019; Ismailov et al. 2022; Pendergast et al. 2011). Teacher candidates' beliefs in developmentally appropriate practices and self-efficacy for inclusive education are higher than teachers' self-efficacy because most teacher candidates were in practice when the scales were completed and were enrolled in the Special Education and Inclusion course. Considering that the three sources of information of the DAP are age appropriateness, individual appropriateness and socio-cultural appropriateness, it is expected that the two variables will be similarly high. A review of the literature revealed that teacher candidates have high levels of belief in developmentally appropriate practices (Betawi and Jabbar 2019;

Kim 2011; Rentzou and Sakellariou 2011) and moderate and high levels of self-efficacy for inclusive education (Sharma et al. 2015).

According to the results of the correlation analysis, there were significant positive and low-level relationships between teachers' perceptions of self-efficacy and the belief scale for developmentally appropriate practices. There were moderate positive relationships between teachers' perceptions of self-efficacy and teachers' self-efficacy for inclusive education and low-level relationships between the belief scale for developmentally appropriate practices and teachers' self-efficacy for inclusive education. It was observed that as participants' beliefs in developmentally appropriate practices increased, their perceptions of teacher self-efficacy and teacher self-efficacy for inclusive education increased; as their perceptions of teacher self-efficacy increased, their teacher self-efficacy for inclusive education increased.

A review of the literature suggests that there is a relationship between teachers' and preservice teachers' perceptions of self-efficacy and their beliefs about practices that are developmentally appropriate. A literature review suggests that teachers with high self-efficacy try different teaching strategies for children and make appropriate arrangements in the classroom environment (Bruce et al. 2010; Tschannen-Moran et al. 1998; 2007). Teachers based on DAP are also expected to make the necessary environmental and instructional arrangements (Bredenkamp 2014). A study conducted by Cobanoglu et al. (2019) revealed that there is a relationship between teachers' general efficacy and developmentally appropriate practices. Similarly, a study conducted by Abroampa and Simpson (2020) determined that there is a low-level positive relationship between teachers' belief in developmentally appropriate practices and their self-efficacy. Therefore, it can be said that there is a relationship between teachers' and preservice teachers' beliefs in developmentally appropriate practices and their self-efficacy.

Another finding of the research is that there is a positive moderate relationship between preservice teachers' self-efficacy and their self-efficacy for inclusive education. A review of the literature shows that there is a relationship between the self-efficacy of early childhood education teachers and teacher candidates and their self-efficacy for inclusive education, similar to this research (Ahsan et al. 2012; Aiello and Sharma 2018; Chow 2024; Ismailov et al. 2022; Savolainen et al. 2020; Woodcock et al. 2022).

The final finding regarding the second subproblem is that there is a low positive relationship between preservice teachers' beliefs about developmentally appropriate practices and their self-efficacy towards inclusive education. As mentioned in the introduction, the three dimensions of DAP are age appropriateness, individual appropriateness and socio-cultural appropriateness. The low relationship between these two variables among preservice teachers may be due to a lack of experience. According to Specht et al. (2016), preservice teachers who have had positive experiences with inclusive education tend to have positive beliefs and self-efficacy regarding inclusion. In parallel to this situation, a systematic review study conducted by Tumkaya and Miller (2020) determined that field experiences and interactions with children with special needs are important for teachers' and

preservice teachers' self-efficacy towards inclusive education. A study conducted by Friesen and Cuning (2020) found that preservice teachers' self-efficacy towards inclusive education increases with practice. Similarly, a study conducted by Chow et al. (2024) found that one of the factors influencing teachers' self-efficacy towards inclusive education was previous experience. As a result of the research conducted by Tuncay and Kizilaslan (2022), it was found that teacher candidates need more practice in the context of inclusive education.

Considering the last finding of the study, according to the mediation analysis, the variable perceived teacher self-efficacy partially mediates the effect of believing in developmentally appropriate practices on teacher self-efficacy towards inclusive education. Furthermore, through the effect of teacher self-efficacy perception, an increase in the level of belief in developmentally appropriate practices increases teacher self-efficacy towards inclusive education. The mediating effect accounts for 42.86% of the total effect. Accordingly, the variable teacher self-efficacy perception can explain 42.86% of the effect of belief in developmentally appropriate practices on teacher self-efficacy towards inclusive education. These results show that teachers' beliefs in developmentally appropriate practices and their self-efficacy perceptions significantly affect their self-efficacy towards inclusive education.

## 6 | Conclusion

Early childhood is one of the periods when children develop most rapidly. For this reason, early childhood educators need to be aware of children's developmental processes. Suppose teachers are aware of children's development. In that case, they can communicate effectively with them, plan curricula according to their development, identify and observe children with special needs, understand and welcome differences and contribute to shaping public policy from a multicultural perspective (Akman 2014). In order for them to be able to do these things, it is believed that it is important that they are supported from the beginning of teacher education. Research has shown that teacher education (Almalky and Alwahbi 2023; Tuncay and Kizilaslan (2022); Friesen and Cuning 2020) and self-efficacy perceptions (Abroampa and Simpson 2020; Ismailos et al. 2022; Wray et al. 2022) are important factors in teachers' implementation of developmentally appropriate practices and formation of self-efficacy for inclusive education. For this reason, this study aimed to examine the relationships between beliefs about developmentally appropriate practices, inclusive practice competencies and perceptions of self-efficacy among preservice teacher candidates. As a result of the research,

- When there is no mediating variable, the standardised path coefficient from the Developmentally Appropriate Practices Belief Scale scores to the Teacher Self-Efficacy Scale scores for Inclusive Education is 0.35, and this effect is statistically significant ( $p < 0.05$ ).
- When Teacher Self-Efficacy Perception is included in the model as a mediator variable, the standardised path coefficient from Developmentally Appropriate Practices Belief Scale scores to Teacher Self-Efficacy Perception Scale scores

is ( $\beta = 0.34$ ) and the standardised path coefficient from Teacher Self-Efficacy Scale scores to Inclusive Education Teacher Self-Efficacy Scale scores ( $\beta = 0.45$ ) is statistically significant ( $p < 0.05$ ).

- When the teacher self-efficacy perception variable was included in the model, the standardised path coefficient from the Developmentally Appropriate Practices Belief Scale scores to the Inclusive Education Teacher Self-Efficacy Scale scores was 0.15 and statistically significant ( $p < 0.05$ ).

## 7 | Recommendations and Future Research

In this study, the teacher self-efficacy of preservice teachers was found to be lower than their belief in developmentally appropriate practices and their belief in inclusive education. Given that teacher self-efficacy is an important factor in teacher practice, it is believed that research can be conducted to increase teacher candidates' self-efficacy. It is thought that one of the reasons for the moderate level of teacher self-efficacy may be the lack of practice of the participants. In Turkey, higher education institutions changed the programmes of education faculties in 2018 and reduced the number of practices. Accordingly, teacher candidates go to practice for 1 day in the first and second semesters of the fourth year. Therefore, most teachers who participated in the study did not have the opportunity to practice. As mentioned above, teacher self-efficacy is the most important personal factor that influences teachers' classroom actions. Therefore, teacher candidates can increase their self-efficacy and believe in what they can do through more practice. This research was conducted with a Turkish sample. A cross-cultural study can be conducted with a larger sample in future studies. In addition, the findings can be supported with qualitative data by observing teacher candidates' practice and conducting interviews.

### Conflicts of Interest

The authors declare no conflicts of interest.

### Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

### References

- Abroampa, W. K., and S. N. Simpson. 2020. "Correlates of Public Kindergarten Teachers' Self-Efficacy and Their Developmentally Appropriate Practice Beliefs in Selected Districts in the Central Region, Ghana." *Journal of Education and Practice* 11, no. 14: 49–57.
- Ahsan, M. T., U. Sharma, and J. M. Deppeler. 2012. "Exploring Pre-Service Teachers' Perceived Teaching-Efficacy, Attitudes and Concerns About Inclusive Education in Bangladesh." *International Journal of Whole Schooling* 8, no. 2: 1–20.
- Aiello, P., and U. Sharma. 2018. "Improving Intentions to Teach in Inclusive Classrooms: The Impact of Teacher Education Courses on Future Learning Support Teachers." *Form@ Re-Open Journal per La Formazione In Rete* 18, no. 1: 207–219.
- Akman, B. 2014. *Early Childhood Development: A Multicultural Perspective*. Nobel.

- Akman, B., and D. Yazıcı. 2021. "Examining the Opinions of Prospective Teachers Regarding the Effect of Online Teaching Application on Their Teaching Experience." In *7th International Early Childhood Education Congress*, 22–25.
- Almalky, H. A., and A. A. Alwahbi. 2023. "Teachers' Perceptions of Their Experience With Inclusive Education Practices in Saudi Arabia." *Research in Developmental Disabilities* 140: 104584.
- Ashraf, M. A., S. M. Tsegay, and Y. Mejjia. 2021. "Blended Learning for Diverse Classrooms: Qualitative Experimental Study With In-Service Teachers." *SAGE Open* 11, no. 3: 21582440211030623.
- Bandura, A. 1997. "Self-Efficacy in Changing Societies." In *Exercise of Personal and Collective Efficacy in Changing Societies*, 1–45. Cambridge University Press.
- Barnes, G. F. 2022. "Early Childhood National Board Certified Teachers' Perspectives on Developmentally Appropriate Practice." PhD diss. Walden University.
- Berk, L. 2018. *Infants and Children: Prenatal Through the Middle Childhood*. Pearson.
- Betawi, A., and S. Jabbar. 2019. "Developmentally Appropriate or Developmentally Inappropriate, That's the Question: Perception of Early Childhood Pre-Service Teachers at the University of Jordan." *International Journal of Adolescence and Youth* 24, no. 1: 40–50.
- Billheimer, B. C. 2006. *Perceived Teacher Self-Efficacy in Early Childhood Settings: Differences Between Early Childhood and Elementary Education Candidates*. Master's Thesis. East Tennessee State University.
- Bjorklund, D. F. 2022. *Children's Thinking: Cognitive Development and Individual Differences*. Sage Publications.
- Bredekamp, S., and Division for Early Childhood and The National Association for the Education of Young Children. 2014. *Effective Practices in Early Childhood Education*. Prentice Hall.
- Bruce, C. D., I. Esmonde, J. Ross, L. Dookie, and R. Beatty. 2010. "The Effects of Sustained Classroom-Embedded Teacher Professional Learning on Teacher Efficacy and Related Student Achievement." *Teaching and Teacher Education* 26, no. 8: 1598–1608.
- Çakan, M., S. Çelikten, and T. Gündüz. 2020. "Nicel Veri Analizi ve Yorumlanması." In *Kuramdan Uygulamaya Eğitimde Bilimsel Araştırma Yöntemleri*, edited by B. Oral and A. Çoban, 161–203. PEGEM.
- Chan, W. L. 2016. "The Discrepancy Between Teachers' Beliefs and Practices: A Study of Kindergarten Teachers in Hong Kong." *Teacher Development* 20, no. 3: 417–433.
- Chhabra, S., R. Srivastava, and I. Srivastava. 2010. "Inclusive Education in Botswana: The Perceptions of School Teachers." *Journal of Disability of Policy Studies* 20, no. 4: 219–228 Retrieved From Wiley Online Library.
- Chow, W. S. E. 2024. "Exploring In-Service Teachers' Attitudes, Teacher Self-Efficacy, and Influential Factors for Implementing Inclusive Practices in Hong Kong Classroom." *Educational Psychology* 44: 1–19.
- Chow, W. S. E., K. de Bruin, and U. Sharma. 2024. "A Scoping Review of Perceived Support Needs of Teachers for Implementing Inclusive Education." *International Journal of Inclusive Education* 28, no. 13: 3321–3340.
- Clark, S., and M. Newberry. 2019. "Are we Building Preservice Teacher Self-Efficacy? A Large-Scale Study Examining Teacher Education Experiences." *Asia-Pacific Journal of Teacher Education* 47, no. 1: 32–47.
- Cobanoglu, R., Y. Capa-Aydin, and A. Yildirim. 2019. "Sources of Teacher Beliefs About Developmentally Appropriate Practice: A Structural Equation Model of the Role of Teacher Efficacy Beliefs." *European Early Childhood Education Research Journal* 27, no. 2: 195–207.
- Copple, C., and S. Bredekamp, eds. 2009. *Developmentally Appropriate Practice in Early Childhood Programs Serving Children From Birth Through Age 8*. 3rd ed. NAEYC.
- Cruz, R. A., S. Manchanda, A. R. Firestone, and J. E. Rodl. 2020. "An Examination of Teachers' Culturally Responsive Teaching Self-Efficacy." *Teacher Education and Special Education* 43, no. 3: 197–214.
- Endres, H. 2018. "Methodical Foundations and Operationalization." In *Adaptability Through Dynamic Capabilities: How Management Can Recognize Opportunities and Threats*, 85–96. Springer Fachmedien Wiesbaden.
- Espinosa, L. M. 2002. "High-Quality Preschool: Why We Need It and What It Looks Like." <https://search.ebscohost.com/login.aspx?direct=true&db=eric&AN=ED480816&site=eds-live>. NIEER Preschool Policy Matters.
- Friesen, D. C., and D. Cuning. 2020. "Making Explicit Pre-Service Teachers' Implicit Beliefs About Inclusive Education." *International Journal of Inclusive Education* 24, no. 14: 1494–1508.
- Ismailos, L., T. Gallagher, S. Bennett, and X. Li. 2022. "Pre-Service and In-Service Teachers' Attitudes and Self-Efficacy Beliefs With Regards to Inclusive Education." *International Journal of Inclusive Education* 26, no. 2: 175–191.
- Jumiaan, I., A. Alelaimat, and Fathi Ihmeideh. 2020. "Kindergarten Teachers' Knowledge Level of Developmentally Appropriate Practice in Jordan." *Education 3-13* 48, no. 8: 1000–1011.
- Kim, H. K. 2011. "Developmentally Appropriate Practice (DAP) as Defined and Interpreted by Early Childhood Preservice Teachers: Beliefs About DAP and Influences of Teacher Education and Field Experience." *SRATE Journal* 20, no. 2: 12–22.
- Kim, K. R., and T. K. Buchanan. 2009. "Teacher Beliefs and Practices Survey: Operationalising the 1997 NAEYC Guidelines." *Early Child Development and Care* 179, no. 8: 1113–1124. <https://doi.org/10.1080/03004430701830381>.
- Koralek, D. G., L. J. Colker, and D. T. Dodge. 1995. *The What, Why, and How of High-Quality Early Childhood Education: A Guide for On-Site Supervision*, 20036–21426. National Association for the Education of Young Children.
- Köse, İ. A., and N. D. Çıkrıkçı. 2007. "Öğretmen Öz-Yeterlik Algısı Ölçeğinin Farklı Gruplarda Yapı Geçerliğinin Sınanması." In *XVI. Ulusal Eğitim Bilimleri Kongresi*, 5–7. congress.
- Kostelnik, M. J., A. K. Soderman, A. P. Whiren, and M. Rupiper. 2011. *Developmentally Appropriate Curriculum: Best Practices in Early Childhood Education*. Pearson Education.
- Ma, K., M. Chutiyami, Y. Zhang, and S. Nicoll. 2021. "Online Teaching Self-Efficacy During COVID-19: Changes, Its Associated Factors and Moderators." *Education and Information Technologies* 26, no. 6: 6675–6697.
- McMullen, M. B. 1999. "Characteristics of Teachers Who Talk the DAP Talk and Walk the DAP Walk." *Journal of Research in Childhood Education* 13, no. 2: 216–230.
- Mengstie, M. M. 2023. "Preschool Teachers' Beliefs and Practices of Developmentally Appropriate Practice (DAP)." *Journal of Early Childhood Research* 21, no. 2: 121–132.
- Moore, A. D. 1995. "Structural Equation Modeling in Special Education Research." *Remedial and Special Education* 16, no. 3: 178–183.
- NAEYC. 2009. "Developmentally Appropriate Practice in Early Childhood Programs Serving Children From Birth Through Age 8." <http://www.naeyc.org/files/naeyc/file/positions/PSDAP.pdf>.
- NAEYC. 2020. "Position Statement on Developmentally Appropriate Practice in Programs for 4- and 5-Year Olds." *Young Children* 41, no. 6: 20–29.

- Pendergast, D., S. Garvis, and J. Keogh. 2011. "Pre-Service Student-Teacher Self-Efficacy Beliefs: An Insight Into the Making of Teachers." *Australian Journal of Teacher Education* 36, no. 12: 46–58.
- Raymond, S., and F. Gabriel. 2023. "An Ecological Framework for Early Years Teacher Self-Efficacy Development." *Teaching and Teacher Education* 132: 1–13.
- Rentzou, K., and M. Sakellariou. 2011. "Greek Pre-Service Kindergarten Teachers' Beliefs About and Practices of Developmentally Appropriate Practices in Early Childhood Education." *Early Child Development and Care* 181, no. 8: 1047–1061.
- Şahin Sak, İ. T., and R. Sak. 2017. "Gelişime Uygun Uygulamalar İnanc Ölçeğinin Türkçeye Uyarlanması." *Mehmet Akif Ersoy University Journal of Education Faculty* 41: 346–362. <https://doi.org/10.21764/efd.17842>.
- Savolainen, H., O. Malinen, and S. Schwab. 2020. "Teacher Efficacy Predicts Teachers' Attitudes Towards Inclusion – A Longitudinal Cross-Lagged Analysis." *International Journal of Inclusive Education* 26: 958–972.
- Sawyer, B. E., A. O'Connell, N. Bhaktha, L. M. Justice, J. R. Santoro, and A. R. Drogalis. 2022. "Does Teachers' Self-Efficacy Vary for Different Children? A Study of Early Childhood Special Educators." *Topics in Early Childhood Special Education* 42, no. 1: 50–63.
- Sharma, U., S. Shaukat, and B. Furlonger. 2015. "Attitudes and Self-Efficacy of Pre-Service Teachers Towards Inclusion in Pakistan." *Journal of Research in Special Educational Needs* 15, no. 2: 97–105. <https://doi.org/10.1111/1471-3802.12071>.
- Shonkoff, J. P., and D. A. Phillips, eds. 2000. *From Neurons to Neighborhoods: The Science of Early Childhood Development*. National Academy Press.
- Skaalvik, E. M., and S. Skaalvik. 2007. "Dimensions of Teacher Self-Efficacy and Relations With Strain Factors, Perceived Collective Teacher Efficacy, and Teacher Burnout." *Journal of Educational Psychology* 99, no. 3: 611–625.
- Specht, J., D. McGhie-Richmond, T. Loreman, et al. 2016. "Teaching in Inclusive Classrooms: Efficacy and Beliefs of Canadian Preservice Teachers." *International Journal of Inclusive Education* 20, no. 1: 1–15.
- Tanriverdi, A., and O. Özokçu. 2018. "The Psychometric Properties of the Turkish Version of the Teacher Efficacy for Inclusive Practices (TEIP) Scale." *Educational Research Review* 13, no. 18: 654–663.
- Taye, M. S., F. Y. Kana, and T. R. Jekil. 2024. "Preschool Teachers' Role and Beliefs About Developmentally Appropriate Practice: A Systematic Literature Review." *Center for Educational Policy Studies Journal*: 1–21. <https://doi.org/10.26529/cepsj.1693>.
- Thakkar, J. J. 2020. *Structural Equation Modelling: Application for Research and Practice*. Springer.
- Tschannen-Moran, M., A. W. Hoy, and W. Hoy. 1998. "Teacher Efficacy: Its Meaning and Measure." *Review of Educational Research* 68, no. 2: 202–248.
- Tumkaya, G. S., and S. Miller. 2020. "The Perceptions of Pre and In-Service Teachers' Self-Efficacy Regarding Inclusive Practices: A Systematised Review." *Elementary Education Online* 19, no. 2: 1061–1077.
- Tuncay, A. A., and A. Kizilaslan. 2022. "Pre-Service Teachers' Sentiments, Attitudes and Concerns About Inclusive Education in Turkey." *European Journal of Special Needs Education* 37, no. 2: 309–322.
- Woodcock, S., U. Sharma, P. Subban, and E. Hitches. 2022. "Teacher Self-Efficacy and Inclusive Education Practices: Rethinking Teachers' Engagement With Inclusive Practices." *Teaching and Teacher Education* 117: 103802.
- Wray, E., U. Sharma, and P. Subban. 2022. "Factors Influencing Teacher Self-Efficacy for Inclusive Education: A Systematic Literature Review." *Teaching and Teacher Education* 11: 103800.
- Xue, R., H. Chai, D. Zhu, L. Yao, W. Yan, and W. Fu. 2022. "Analysis of the Factors Influencing Inclusive Education Competency of Primary and Secondary Physical Education Teachers in China." *Sustainability* 15, no. 1: 308–318.
- Yada, A., M. Leskinen, H. Savolainen, and S. Schwab. 2022. "Meta-Analysis of the Relationship Between Teachers' Self-Efficacy and Attitudes Toward Inclusive Education." *Teaching and Teacher Education* 109: 103521.
- Yoshikawa, H., C. Weiland, and J. Brooks-Gunn. 2016. "When Does Preschool Matter?" *Future of Children* 26, no. 2: 21–35. <https://doi.org/10.1353/foc.2016.0010>.
- Zukani, N. M. 2018. "Factors Affecting Teachers' Attitude Towards the Implementation of Inclusive Education." Doctoral dissertation, University of Fort Hare.