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The Mediating Role of Student-Teacher Relationships in the Relationship Between Teacher Self-Efficacy and Teaching Practices in Turkey: Evidence from TALIS18

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Abstract

The study explored the mediating role of student-teacher relationships in teacher self-efficacy predicting teacher classroom practices among teachers in Turkey ISCED level 1 schools. The study involves teachers who participated in the TALIS 2018 data collected through a cross-sectional survey; 3591 teachers participated in the TALIS 18 survey. Data was analysed using SMART PLS 4, and results from the analysis reveal that teacher self-efficacy significantly predicted the dimensions of teachers' classroom teaching practices (ie.cognitive activation, clarity of instruction, classroom management). Self-efficacy has a statistically significant association with student-teacher relations. Finally, student-teacher relation partially mediates the relationship between teacher self-efficacy and the cognitive activation and clarity of instruction dimensions of teaching practices. The findings of the study imply that school administrators could provide professional development on increasing the self-efficacy of teachers to improve the effectiveness of their classroom teaching practices.

Keywords: self-efficacy, teaching practices, student-teacher relations, teachers, education, TALIS, Turkey

1. Introduction

Teachers' efficacy is an interest that spans across a range of educational issues, disciplines, and educational settings around the world. Teachers' self-efficacy is important to the success of educators and the schools they work (Martin & Mulvihill, 2019). Previous studies established that self-efficacy influences teacher behaviour, attitude, practices, and hence affects student learning and achievement (Almutairi & Altaf, 2024; Klassen et al, 2011; Tschannen-Moran et.al, 1998). According to Bandura's theory of self-efficacy, the concept of teachers' self-efficacy is teachers' belief in their abilities to achieve the desired results in terms of students' learning and achievement (Tschannen-Moran & Hoy, 2001; see also Tschannen-Moran et.al, 1998). Self-efficacy influences individuals' actions, cognitive processes, behaviour, and choice of activities (Bandura, 1991; Tschannen-Moran et.al, 1998). For example, Bleukx et.al (2024) identified teacher self-efficacy as a factor related to their instructional practices. Self-efficacy has gained considerable interest over the years in the education sector because of its association with teachers, and their efforts to succeed in classroom practice (C,oban et. al, 2023). Furthermore, there is evidence in existing literature on the impact of teacher self-efficacy on teachers' performance and student learning outcomes (Coban, et al, 2023; Martin & Mulvihill, 2019). However, investigations of the relationship between self-efficacy and teachers teaching practices have been neglected (Almutairi & Altaf, 2024). Teachers who perceive to have high efficacy may be more effective at achieving success than teachers with low self-efficacy. However, Martin and Mulvihill (2019) suggest that teacher self-efficacy need not be very high. Rather, teachers' perception that they are making improvements in their skills is more important. It is therefore essential for teachers to acquire skills in strategies proven effective in achieving outcomes important to teachers and students.This will likely change how teachers perceive their efficacy in what they do (Martin & Mulvihill, 2029).

Furthermore, research confirms the role of teacher practices in students' academic achievements (Scheerens, 2016). However, the association between teacher self-efficacy and teaching practices remains insufficiently explored (Mutairi & Altaf, 2024). For example, several studies recommended that future studies should endeavour to explore other tendencies in teacher beliefs and instructional practices (Bleukx, et al, 2024; Holzberger et al, 2024). Li (2021) noted that few studies relied on teacher reports to examine teaching practices (Li, 2021). In addition, most of the studies on self-efficacy focus on Western samples (Ho & Hau, 2004), therefore, selecting Turkey as the study country addresses that concern and fills a knowledge gap. Specifically, the current study aims to provide an understanding on the effect of teacher self-efficacy on dimensions of teachers' classroom teaching practices (Klassen et al, 2011), and whether student-teacher relationships play any role in aspects of Turkish teachers' classroom teaching practices.

2. TALIS

The Teaching and Learning International Survey (TALIS), is a survey conducted by the Organization for Economic Cooperation and Development (OECD). TALIS is the first international series of surveys with a major focus on the learning environment and the working conditions of teachers in schools (OECD, 2019). The OECD initiated and managed TALIS 2018 on behalf of the 49 participating countries and economies with the aim "of creating a coherent set of data to facilitate studies on teachers and teaching, and the impact teachers have on student learning" (OECD, 2019, p. 35). The survey included teachers and principals from primary schools (ISCED 1), lower secondary schools (ISCED 2), and high secondary schools (ISCED 3) (OECD, 2019). The OECD authorized all participating countries/economies to administer the ISCED level 2-core survey to teachers and principals for TALIS 2018 (OECD, 2019). In addition, countries had the option to participate in a TALIS-PISA link international survey.

2.1 Turkey

The educational system of Turkey is a highly centralized system of governance, implying decisions and management is by the Ministry of National Education (MoNE), particularly in state owned schools except tertiary institutions (OECD, 2013). Although, in 2010 the MoNE introduced standards for schools to self-assess and develop school improvement plans, the aim of the initiative was "to empower schools and to support the decentralization plans of MoNE" (OECD, 2013, p.11). In the TALIS 2008, teachers in Turkey "reported average levels of self-efficacy" and below average levels of job satisfaction (OECD, 2013, p.11). In Turkey, teachers begin training at specific secondary higher schools after obtaining a bachelor's degree, be under 40 years, and pass the Public Staff Selection Exam. In TALIS 2008, it was reported that "18% of teachers in Turkey were in their first two years of training, more than double the OECD average" (OECD, 2013,p.11).

3. Theoretical Framework

There are several factors in education-influencing students' learning outcomes. Among these factors are teachers' self-efficacy, quality of student-teacher relationships, and teachers' classroom practices. These selected constructs represent key areas that influence both students' academic development and the quality of the learning environment. This theoretical framework aims to explain how teacher efficacy influences the dimensions of teachers' teaching practices, and how student-teacher relationships may affect the interplay between teacher efficacy and dimensions of teachers'classroom teaching practices. The constructs in the present study are underpinned by a combination of the following theories: Social Cognitive Theory, Vygotsky's Social Development Theory (1978), Self-Determination Theory (Deci & Ryan, 2000), and Skinner's Behaviorism (Diller, 2021). These theories together provide a framework to predict human behaviour and motivation in relation to human characteristics and beliefs (Bleukx, Denis, Van Keer, & Aesaert, 2024).

According to Bandura's 1986 social cognitive theory, self-efficacy is the individuals' beliefs about their abilities to successfully perform tasks or achieve goals (Bandura, 1991). Self-efficacy plays a central role in shaping behaviours, emotions, and actions. Self-efficacy is posited to have a direct impact on teachers' classroom practices, and consequently on student academic engagement, motivation, and outcomes. Individuals'congitive and behavior results from personal, behavioural, and environmental factors, according to the Social Cognitive Theory (SCT).

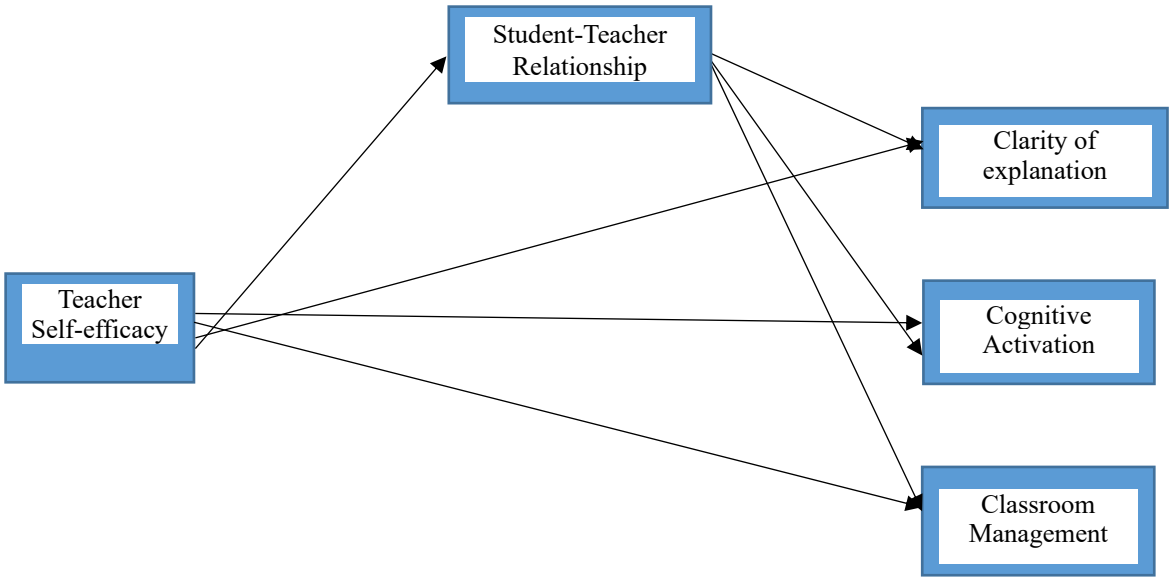

Figure 1. Proposed Model

Study objectives:

1. To determine the effect of teacher self-efficacy on dimensions of classroom teaching practices (clarity of instruction, cognitive activation, and classroom management).
2. To determine the effect of teacher self-efficacy on student-teacher relationship
3. To determine the mediating role of student-teacher relations in the relationship between teacher self-efficacy and the dimensions of classroom teaching practices.

3. 1 Literature Review

3.1.1 Self-efficacy

Self-efficacy is a personal appraisal of how well one can accomplish required courses of action (Bandura, 1997). It is one owns appraisal of the ease or not associated with the individual performing a particular behavior successfully (Bleukx, et.al, 2024, p. 3). Bandura (1997) noted the effects of self-efficacy on cognitive, health, clinical, athletic, and organizational functioning. Bandura (1986, 1997) argued and identified mastered experiences, physiological and emotional states, somewhat related experiences, and social persuasion as sources of self-efficacy. Teachers with a positive mindset about their ability to provide quality teaching, turn to influence students' motivation and achievement positively (Adu et.al, 2012; Mojavezi & Tamiz, 2012). It is the reason for teachers attending seminars and training to improve upon their skills in order to provide effective teaching in the teaching-learning process (Suer & Oral, 2012). Self-efficacy is not just a psychological concept but it is the very essence of what teachers attempt to do whenever they enter the classroom (Martin & Mulvihill, 2019). According to Klassen et al (2011), self-efficacy is a motivational factor that influences teachers' behaviours and teaching practices.

Hypothesis 1: Self-efficacy is statistically significantly associated with all three dimensions (T3CLAIN, T3COGAC, and T3CLASM) of teaching practices

3.1.2 Teaching Practices

Teaching practice is generally teachers' instructional practices, and according to Ainley and Carstens (2018), effective instructional practices traditionally means clarity of instruction, teacher support, cognitive activation, and classroom management. However, in the TALIS-PISA link survey, three of the four dimensions, namely clarity of instruction, cognitive activation, and classroom management was used to measure teaching practices (OECD, 2019). Therefore, the present study used the same three subscales (clarity of instruction, cognitive activation, and classroom management). It is also the authors' view that clarity of instruction may encompass teacher efforts in clarifying instructions. Clarity of instruction, according to Seidel and Shavelson (2007) refers to clarifying teaching goals, teaching in a clear and structured manner, providing direct student experiences, activating students' prior knowledge, and facilitating the basic processing of information. Cognitive activation, according to socio-constructivist theory is the independent construction of knowledge by the learner and the learner's interaction with others in the zone of proximal development (ZPD)

(Vygostky, 1978; Pakpahan & Saragih; Babakr, Mohamedamin, & Kakamad, 2019). Cognitive activation encompasses efforts directed at stimulating students' higher-order thinking processes and collaborative engagement in a subject (Künsting et.al, 2016). For example, providing students with challenging tasks and questions, which require students to problem solve, and building on students'experiences and ideas to activate their cognitive processes (Künsting et. al, 2016; Praetorius, et. al, 2014; Lipowsky et. al, 2009; Klieme et. al, 2009). Classroom management refers to all the actions taken by teachers in the classroom to ensure that the environment is conducive for teaching and learning to occur. Teachers' actions can include a code of conduct, ensure discipline, manage and prevent disruptive behaviour at all times during the lesson time (van Tartwijk & Hammerness, 2011).

3.1.3 Student-Teacher Relationship

The student - teacher relationships is among several critical factors influencing students' academic achievement and motivation (Choi & Han, 2023).The nature of the relationship between teachers and students greatly influences the overall classroom climate. In this relationship, teachers are responsible for regulating classroom environment, discipline, implementation of approaches and methods to learning, and interacting with the students in the class (Mojavezi & Tamiz, 2012). Quality student-teacher relationship is characterized by warmth, support, communication, and mutual respect (Pianta, 1999). Therefore, the quality of the relationship between students and teachers can influence students' academic motivation and outcomes. Vygotsky (1978) strongly argued that interaction and cooperation with others, such as the one between teachers and peers, could stimulate learners' cognitive development. Several studies have demonstrated that positive student-teacher relationships enhances students' academic motivation, self-esteem, and learning outcomes. According to the elf-determination theory (SDT), when students' basic psychological needs such as autonomy, competence, and relatedness are met, they are more likely to engage positively in classroom learning activities (Deci & Ryan, 2000). Therefore, students value the relationship with their teachers, and they respond with greater engagement and effort when they believe that their teachers care about them and are supportive (Mojavezi & Tamiz, 2012). Holzberger et al (2024) recommended that future studies should identify reliable proximal outcomes of self-efficacy beliefs and distinguish mediator variables in order to provide the practical relevance of self-efficacy to teachers. Therefore, the present study proposes that student-teacher relationships mediates the relationship between self-efficacy and the dimensions of teaching practices.

Hypothesis 2: Self-efficacy statistically significantly relates to the student-teacher relationship

Hypothesis 3: Student-teacher relationships mediates the relationship between teacher self-efficacy and the dimensions of teacher classroom practices (T3COGAC, T3CLASM, and T3CLAIN).

3.1.4 Self-efficacy and Teacher Practices

Teacher self-efficacy can influence teacher well-being, teacher-student relationships, classroom management, student achievements, as well as teacher professional development (Mutairi & Altaf, 2024). The self-efficacy of teachers influences their instructional practices, their efforts, and their persistence within the profession (Martin & Mulvihill, 2019). According to Bleukx, et.al (2024), the powerful interdependence between teacher beliefs and their classroom practices should be explored (p.15). A number of studies have demonstrated the impact of teacher self-efficacy on teachers' performance and student learning outcomes (Coban, et al, 2023). For example, in a study to explore the association between teacher beliefs, instructional practices, and students' reading achievement using PIRLS 2021, self-efficacy was identified as a factor associated with students' achievement (Bleukx, et.al, 2024). Teacher self-efficacy may influence how students perceive and engage with their teacher, with higher self-efficacy of teachers potentially leading to positive relationships with students. Such a positive relationship can foster a supportive classroom environment, leading to better cognitive activation and classroom management practices. Moreover, Wilson et.al (2020) noted that teacher self-efficacy influences their classroom teaching practices. Thus, evidence from previous studies suggest that teacher self-efficacy relates to teachers' behaviour in the classroom (Künsting et.al, 2016). The concept of self-efficacy consist of efficacy in instruction, efficacy in student engagement, and efficacy in classroom management according to the TALIS 2018 technical report (OECD, 2019). While some studies used the subscales (see Mutairi & Altaf, 2024; Li, 2021), others used the composite self-efficacy (see Saragena, et al,2024; Holzberger, et al, 2013) scale depending on study objectives. In the present study, the TALIS 2018 composite scale of teacher self-efficacy is the independent variable, and student-teacher relationship as a mediator in the relationship between teacher self-efficacy and dimensions of classroom teaching practices.

4. Methodology

The present study used existing data from the International Teaching and Learning Survey (TALIS 2018) database for secondary data analysis. The study design is a cross-sectional survey design. Review of the related formed the basis fort the selection of the study sample and variables. In the current study, teachers' teaching practices were determined as the dependent (predicted) variables, while teacher self-efficacy and student teacher relations were determined as the independent (predictor) and mediating variables, respectively.

4.1 Data and Participants

The data for the present study is from the Organization for Economic Cooperation and Development's (OECD) third cycle of the TALIS 2018 database. More than one hundred thousand school principals and teachers from 48 countries participated in the third cycle of TALIS 2018. The study used a two-stage stratified probability sampling procedure. In the first stage, 200 schools randomly selected from each participating country, followed by a random selection of 20 teachers from the schools. These teachers provide instruction at the ISCED 2 level (International Standard of Classification of Education). All participating countries/economies are reqiured by the TALIS 2018 to administer the ISCED 2 core survey to teachers and their principals (OECD, 2019, p.112). In addition, a TALIS-PISA link option was provided for interested countries. Among the participating countries, nine participated in the TALIS-PISA link international option, and Turkey is the only GCC country among the nine countries that participated in this option. In the case of Turkey, a sample of 150 schools was selected from the 211 TALIS-PISA link schools; however, 142 schools participated. In the TALIS-PISA link option, the sample consisted of all teachers of the 15-year-old students in each sampled PISA school. The procedure enabled the investigation into teaching practices and learning environments of PISA 2018 teachers. Thus, the present study used the TALIS-PISA 2018 population from the Turkey data set by the use of the IDB analyzer. Three thousand five hundred and thirty one (3591) teachers from Turkey participated in the Teaching and Learning Survey (TALIS-PISA 2018) with an overall participation rate of about 98% (OECD, 2019). The participants responded to questions related to teachers' beliefs and practices, teachers' work, feedback and recognition, and school leadership, school climate, and job satisfaction. Date quality is assured by runing standardized checks at the country level to detect inconsistencies, duplicat records or erroneous data entry (OCED, 2019).

4.2 Measures

4.2.1 A Dependent Variable: Teaching Practices (T3TPRA)

According to Ainley and Carstens (2018), teaching practices refers to the instructional quality. The measure is from the PISA survey, and since the study country participated in the TALIS-PISA survey option, we were able to obtain the data for the measure using the IDB analyzer software. As outlined in the TALIS 2018 Technical report, the teaching practices measure consists of three subscales: *T3CLAIN: Clarity of instruction (subscale), T3CLASM: Classroom management (subscale)*, and *T3COGAC: Cognitive activation (subscale)*. Each subscale consists of 4 items, and teachers were asked to think about their teaching, and select from 4 response options, how often they do certain practices in their teaching? The following response options were provided; 1 = "Never or almost never", 2 = "Occasionally", 3 = "Frequently", 4 ="Always" (OECD, 2019). In the present study, the subscales are used as the dependent variables to measure the different dimensions of teachers' instructional practices/teaching practices. The items were related to instruction, student tasks, and engaging students in the lesson.

4.2.2 An Independent Variable: Teacher Self-Efficacy (T3SELF)

Teacher self-efficacy is the independent variable. The measure consist of three subscales, namely T3SECLS: Self-efficacy in classroom management (T3SECLS), Self-efficacy in instruction (T3SEINS), and Self-efficacy in student engagement (T3SEENG*)*. Each of the subscales consist of 4 items, and teachers were asked; "In your teaching, to what extent can you do the following?" The response options were; 1 = Not at all, 2 = To some extent, 3 = Quite a bit, 4 = A lot. The composite scale of Teacher self-efficacy (T3SELF) consisting of 12 items was used as the independent variable in the study.

4.2.3 A Mediating Variable: Teacher-Student Relation (T3STUD)

Teacher-student relation is considered a mediating variable. The measure consists of four items. Teachers responded to questions related to the measure. For example, the teachers were asked how strongly they agreed or disagreed with the statements about what happens in their school. (OECD, 2019). The teachers responded on a four-point Likert scale; 1- "Strongly Disagree", 2 -"Disagree", 3- "Agree", 4-"Strongly Agree".

5. Data Analysis and Results

5.1 Brief Introduction of the Technique and SEM

Structural equation modelling (SEM), a quantitative data analysis procedure, was used in the current study. SEM is a multivariate analysis technique used to study the relationship between constructs. The Smart PLS-SEM 4.0 software was used for secondary data analysis (Ringle, Wendi, & Becker, 2024). PLS-SEM is a quantitative data analysis method that examines the relationship hypothesis (Chua, 2023; Latif, et.al, 2020). In SEM, two types of data analysis are conducted, the measurement model analysis, and structural model analysis. In measurement model analysis, the quality of the criteria of the study constructs are examined. The criteria assessed in the measurement model commonly includes factor loadings, reliability, and validity of the measures. Commonly used tools to examine the measurement model include Cronbach's alpha, average variance extracted, and composite reliability. In addition, the structural model

examines the level of significance and the relationship between hypotheses using path coefficients (Henseler, Ringle, & Sarstedt, 2015). The study extracted country data for Turkey from the OECED TALIS 2018 data. However, dataset was screened, and variables with no reponses deleted before the analysis was conducted.

5.2 Measurement Model Assessment

The common method bias was examined, followed by the measurement model assessment. It was assessed through outer loadings, composite reliability, bootstrap confidence interval, convergent reliability, and discriminant validity (Sarstedt et al. 2019). Measurement model is used to examine the appropriateness between theory and data, and thus, test the relationship between observed and unobserved variables (Latif, et.al, 2020. p. 7).

5.2.1 Convergent Validity and Reliability

After an initiation assessment of the measurement model, indicators with outer loadings less than 0.7 were removed as recommended by Hair et al. (2019) to improve the average variance extracted (AVE). The following factors were removed; TT3G42E, TT3G42L, TT3G34C, TT3G34D, TT3G34H, TT3G34I, and TT3G34K. As shown in Table 1, after a re-run of the Consistent PSL-bootstrapping, all the indicator loadings of the current study exceeded the established threshold of 0.7, at $p < 0.5$, explaining at least 49% of the variance of each factor. The results shows that all five latent variables achieved convergent validity of loading (Hair et al, 2009; Cheung, et al, 2024). Cronbach's alpha and composite reliability are used to examine the construct reliability. The Cronbach's alpha and composite reliability for all constructs were greater than the recommended 7.0 in the current study (See Table 1). Therefore, all the constructs achieved internal consistency and reliability.

The convergent validity of the construct was assessed using Hair et al (2019) recommended average variance extracted criteria. A construct is acceptable, if it can explain at least 50% of the variance of its parts and an AVE of 0.50 or above (Hair et al., 2019). Every AVE in Table 1 was higher than 0.50. The study sample achieved strong internal consistency.

Table 1. Factor loadings, reliability, and convergent validity

Constructs	Items	Factor Loadings	Cronbach's Alpha	Composite Reliability (rho_a)	Composite Reliability (rho-c)	Average Variance Extracted
Teacher Self-efficacy – T3SELF	TT3G34A	0.746	0.870	0.872	0.900	0.562
	TT3G34B	0.750				
	TT3G34E	0.781				
	TT3G34F	0.729				
	TT3G34G	0.749				
	TT3G34J	0.727				
	TT3G34L	0.764				
Student-Teacher Relationship (T3STUD)	TT3G49A	0.800	0.854	0.857	0.902	0.698
	TT3G49B	0.889				
	TT3G49C	0.871				
	TT3G49D	0.775				
Teacher Clarity of Instruction (T3CLAIN)	TT3G42A	0.732	0.789	0.795	0.863	0.613
	TT3G42B	0.811				
	TT3G42C	0.814				
	TT3G42D	0.773				
Cognitive Activation (T3COGAC)	TT3G42F	0.837	0.791	0.793	0.878	0.705
	TT3G42G	0.840				
	TT3G42H	0.842				
Classroom Management (T3CLASM)	TT3G42I	0.824	0.834	0.934	0.895	0.74
	TT3G42J	0.858				
	TT3G42K	0.897				

Discriminant validity measures how much a construct is empirically different from other elements in the structural model. The study applied two ways in examing the discriminant validity. According to the Fornell and Larcker (1981) criteria, that each construct's AVE must be contrasted with each other's square inter-construct correlation and all other reflectively assessed constructs in the structural model. They also recommended having any models' constructs shared variance exceed its AVE. To evaluate the discriminant validity, Henseler et al. (2015) developed a second criterion, known as Heterotrait-Monotrait (HTMT). According to Henseler et al. (2015), the geometric mean of average correlations for items measuring the same construct is divided by the average correlation value for various constructs to determine the HTMT. Henseler et al. (2015) recommended a threshold value of 0.90 for structural models with highly comparable structures; a value of 0.85 for structural models with fundamentally distinct constructs. Consequently, when HTMT levels are above 0.85 or 0.90, issues with discriminant validity appear. The evaluation results for the HTMT and Fornell-Larcker criteria show that the current study has attained appropriate discriminant validity, as shown in Table 2 and Table 3.

Table 2. Discriminant validity -Heterotrait-monotrait ratio (HTMT) - Matrix

	Overall Sample				
	1	2	3	4	5
1. Cognitive Activation (T3COGAC)					
2. Classroom Management (T3CLASM)	0.284				
3. Student-Teacher Relationship (T3STUD)	0.233	0.056			
4. Teacher Self-efficacy (T3SELF)	0.523	0.223	0.323		
5. Teacher Clarity of Instruction (T3CLAIN)	0.518	0.334	0.266	0.525	

Table 3. Discriminant validity - Fornell-Larcker criterion

	Overall Sample				
	1	2	3	4	5
1. Cognitive Activation (T3COGAC)	**(0.840)**				
2. Classroom Management (T3CLASM)	0.241	**(0.860)**			
3. Student-Teacher Relationship (TSELF)	0.191	0.045	**(0.835)**		
4. Teacher Self-efficacy (T3SELF)	0.440	0.207	0.278	**(0.750)**	
5. Teacher Clarity of instruction (T3CLAIN)	0.412	0.280	0.218	0.439	**(0.783)**

5.2.2 Structural Model Assessment

First, as part of the assessment of the structural model, the Variance Inflation Factor (VIF) scores was used to examine the structural model. The multi-collinearity issue among the exogenous constructs in the structural model was examined (Table 4). Hair et al. (2022) states that when VIF levels are less than 5, multi-collinearity issues are not severe. As shown in Table 4, the VIF values, are less than five (5), which suggests that issues of multicollinearity was not present in the study.

Table 4. Collinearity statistics (VIF)

Outer model – List	VIF
TT3G34A	2.317
TT3G34B	2.385
TT3G34E	1.931
TT3G34F	1.715
TT3G34G	1.765
TT3G34J	1.748
TT3G34L	1.903
TT3G42A	1.455
TT3G42B	1.671
TT3G42C	1.713
TT3G42D	1.549
TT3G42F	1.580
TT3G42G	1.741
TT3G42H	1.707
TT3G42I	2.127
TT3G42J	2.302
TT3G42K	1.682
TT3G49A	1.746
TT3G49B	2.881
TT3G49C	2.651
TT3G49D	1.625

Second, the structural model (path coefficients and coefficients of determination, R^2), (Hair et al., 2022) described the predictive relationships between self-efficacy and teaching practices (clarity in instruction, cognitive activation, and classroom management) and with the student-teacher relationship as a mediating variable. Bootstrap sampling technique with 5000 samples was used to examine the significance of the path coefficients (Hair et al., 2022). As shown in Table 5, the path coefficients of the proposed model indicate that teacher self-efficacy have a statistically significant impact on all three dimensions of teaching practices. Specifically, the relationship between teacher self-efficacy and cognitive activation dimension (β = 0.419, p < .000), and t-value (28.687 > 1.645, significant level = 5%), teacher clarity in instruction (β= 0.410, p < .000), and t-value (27.775 > 1.645, significant level = 5%), classroom management (β= 0.211, p < .000), and t-value (13.140 > 1.645, significant level = 5%) were statistically significant. In addition, the association between teacher self-efficacy and student teacher relation was statistically significant (β= 0.278, p < .000), and t-value (14.769 > 1.645, significance level = 5%).

The effect sizes of the paths (f^2) were evaluated using f^2 values of 0.35, 0.15, and 0.02, indicating large, medium, and small effects, respectively (Sarstedt et al., 2022). According to Table 5, teacher self-efficacy had a medium effect (.202) on cognitive activation and teacher clarity in instruction (0.195). However, teacher self-efficacy had a small effect (0.043) on classroom management and student-teacher relationship (0.084), respectively. The remaining paths had no impact.

Table 5. Results of the structural model

Path	Path coefficient	*t-value*	f^2- effect size	Decision
Hypothesis 1				
T3SELF -> T3COGAC	0.419	28.687***	0.202	Supported
T3SELF -> T3CLAIN	0.410	27.775***	0.195	Supported
T3SELF -> T3CLASM	0.211	13.140***	0.043	Supported
Hypothesis 2				
T3SELF -> T3STUD	0.278	14.769***	0.084	Supported
Hypothesis 3				
T3STUD -> T3COGAC	0.074	4.376***	0.006	Supported
T3STUD -> T3CLASM	-0.014	0.773^{ns}	0.000	Not supported
T3STUD -> T3CLAIN	0.104	6.612***	0.013	Supported

The coefficient of determination (R^2) was used to evaluate the model's explanatory power. According to Hair et al. (2011), R^2 values of 0.25, 0.50, and 0.75 correspond to weak, moderate, and strong categories, respectively. As Table 6 displays, the results demonstrate that 20.3% of the variances in teacher clarity in instruction was explained by teacher self-efficacy, 19.9% of the variances in cognitive activation was explained by teacher self-efficacy, and finally 4.3% of the variances in classroom management was explained by teacher self-efficacy.

With an R^2 of.203 (20.3% variance explained), it was revealed that teacher self-efficacy could predict teacher clarity in the instruction component of teaching practices. Similarly, with an R^2 of .199 (19.9% of variance explained), the results demonstrate that teacher self-efficacy could also predict the cognitive activation component of teaching practices.

The $PLS_{predict}$ technique was used to examine the predictive power ($Q^2_{predict}$) of the endogenous variables as recommended by Sarstedt et al. (2019), and the results are presented in Table 6. According to Sarstedt et al. (2019), Q^2 is used to evaluate a model's (out-of-sample) prediction power and comprehend the predictive relevance of the suggested path model. When Q^2 is positive, it indicates that the PLS-SEM model's predictive error is less than the naïve benchmark's (i.e., the linear regression model LM) prediction error (Hair et al., 2022). According to Cheah et al. (2023), Table 6 shows that every endogenous latent variable has a Q^2 value greater than zero, meaning all the data sets have acceptable predictive accuracy.

Table 6. Evaluation of the Structural Model

Data Set	Constructs	R-square	Q²predict	RMSE	MAE
Complete (ALL)	Cognitive Activation	0.199	0.193	0.899	0.701
	Classroom Management	0.043	0.042	0.979	0.741
	Student-Teacher Relationship	0.077	0.076	0.962	0.693
	Teacher Clarity of Instruction	0.203	0.192	0.900	0.715

RMSE = root mean square error, MAE = mean absolute error

The hypotheses of the results of the current study are reported in Table 5.

Hypothesis 1: Self-efficacy is statistically significantly associated with all three dimensions of teaching practices (T3COGAC, T3CLASM, and T3CLAIN)

Hypothesis 2: Self-efficacy is statistically significantly related to student-teacher relationship

Hypothesis 3: Student-teacher relationships mediates the relationship between self-efficacy and the dimensions of teaching practices (T3COGAC, T3CLASM, and T3CLAIN)

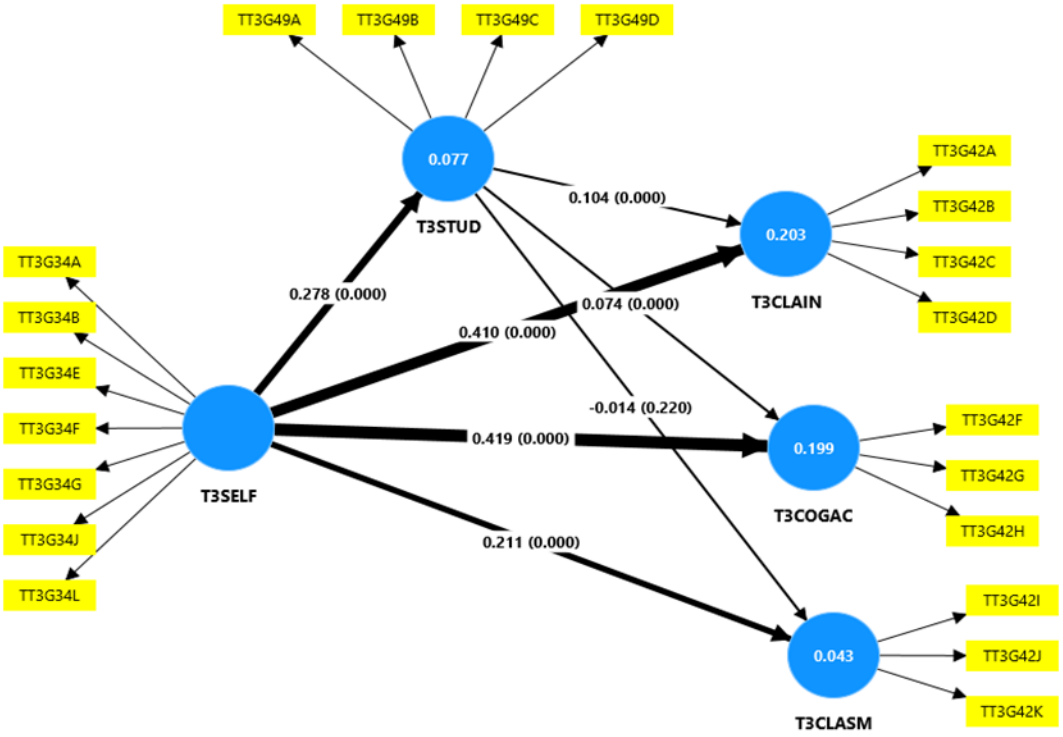

Figure 2. Structural Model

5.2.3 Mediation – Indirect Effects

Mediation analysis was conducted to determine whether student-teacher relationship mediates the relationship between teacher self-efficacy and the dimensions of teachers classroom teaching practices among teachers in Turkey.

Hypothesis 3: The mediating effect of student-teacher relation on the relationship between teacher self-efficacy and the dimensions of classroom teaching practices (clarity of instruction, cognitive activation, and classroom management).

The results in Table 7 revealed positive significant mediating role of student-teacher relationship in the cognitive (β= 0.021, p < .000), and teacher clarity in instruction (β = 0.029, p < 0.000) dimensions of teaching practices. However, student relationship has insignificant mediating role in the classroom management dimension of teaching practices.

Table 7. Mediation analysis

Path	Indirect effect	*t* - statistics	P values	Decision
T3SELF -> T3STUD -> T3COGAC	0.021	4.171	0.000	Supported
T3SELF -> T3STUD -> T3CLASM	-0.004	0.767	0.221	Not supported
T3SELF -> T3STUD -> T3CLAIN	0.029	6.069	0.000	Supported

Partial or complementary mediation is achieved when the indirect and direct effects are both significant and point in the same direction (Zhao, Lynch, & Chen, 2010; Baron & Kenny, 1986). Therefore, since the indirect and direct paths (See figure 1) from self-efficacy to the cognitive and clarity of instructions dimensions of teaching practices are statistically significant, student-teacher relationships significantly and partially mediated the relationship between teacher self-efficay and cognitive activation (β = 0.021, t = 4.171, p <0.000), and clarity of instruction (β = 0.029, t = 6.069, p < 0.000) dimensions.

6. Discussion

It has long been established that teacher self-efficacy beliefs is a function of teacher competency, and play an important role in the educational process (Holzberger et al, 2024). First, the present study examined whether self-efficacy can predict the three dimensions (Clarity of instruction, Cognitive activation, and Classroom management) of teaching practices, and whether student-teacher relations mediates the relationship between self-efficacy and the dimensions of teaching practices. The present study found that teacher self-efficacy statistically significantly predicted all three

dimensions of teaching practices. The findings align with previous studies (see; Li, 2021;Almutaire & Altaf, 2024; Holzberger, 2024; Künsting, 2016). The findings suggest that teachers with strong beliefs in their ability are more likely to be effective at teaching than teachers with low self-efficacy. Consequently, effective teaching can lead to students' achievement. Specifically, the study found a statistically significant association between teacher self-efficacy and cognitive activation of students. The results suggest that teachers with increased self-efficacy will likely engage in practices that will lead to a corresponding increase in cognitive activity among learners. Second, the results show that teacher self-efficacy is statistically significantly associated with clarity of instruction. Providing clear instructions will ensure that students understand the material, know the expectations, and consequently able to engage effectively in the learning process (Hattie, 2009). Similarly, Saragena, Maravilas, Bual, and Ramales (2024), found that significant positive association between teachers' instructional practices and their self-efficacy. Teachers with high self-efficacy are more likely able to provide clarity of instruction in teaching and consequently reduce students extraneous cognitive load, and increase the propensity to deeply process classroom information (Bolkan, 2016). Although evidence on the influence of teacher clarity in helping students remains elusive (Titsworth, Mazer, Goodboy, Bolkan, & Myers, 2015). Compared to previous studies, self-efficacy has the highest impact on cognitive activation, and then clarity in the instructions of teacher's teaching practices. However, Almutairi and Altaf (2024) found self-efficacy to have the highest impact on teacher clarity of instruction and the cognitive activation of teaching practices. Third, teacher self-efficacy was found to have a statistically significant association with classroom management. The results suggest that teachers with a high level of self-efficacy may show more support and provide a more positive classroom environment than teachers with lower self-efficacy (Guo et. al, 2012).

In addition, the present study found a statistically significant association between teacher self-efficacy and the student-teacher relationship. The results suggest that teachers with increased self-efficacy will more likely establish a stronger relationship with their students. The study further examined the possible mediation role of student-teacher relations in teacher self-efficacy and teaching practices relationship. The results revealed that student-teacher relationships partially mediates the effect of teacher self-efficacy on cognitive activation and teacher clarity of instruction dimensions of classroom teaching practices. The results suggest that student-teacher relationships positively influence cognitive activation and clarity of instruction, thus playing a more supportive role. For instance, positive student-teacher relations may enhance communication and trust, which may increase the probability that teachers can clearly and effectively convey content to learners within a supportive learning environment. Moreover, positive student-teacher relationships may reduce students' disruptive behavior and foster student engagement. According to Social cognitive theory (SCT), individuals' cognitive abilities and behaviors are shaped by the interplay of personal, behavioral, and environmental factors.

6.1 Conclusion

The study examined the influence of student-teacher relations on teachers' classroom teaching practices among teachers who participated in the TALIS-PISA 2018 survey. The current study concludes that teachers' self-efficacy has a strong impact on teachers' ability to provide instructions with clarity, promote cognitive activation, and manage the learning environment through their classroom teaching practices. In addition, student-teacher relations mediate the relationship between teacher self-efficacy and cognitive activation, and clarity of instruction dimensions of teaching practices. Therefore, the student-teacher relationship plays a supporting role and fosters the creation of a learning environment for effective learning. When students' basic psychological needs, such as autonomy, competence, and relatedness are met, they are more likely to engage positively in classroom learning activities (Deci & Ryan, 2000)

6.2 Implications

The theoretical implication of the findings in the present study on the relationships between teacher self-efficacy and the dimesnions of classroom teaching practices is that school leadership can advance teachers' professional knowledge and practice through professional development (Li, 2024). In addition, professional development training for teachers should include the sources of teacher self-efficacy such as mastery experiences, physiological and affective states, vicarious experiences, as well as social persuasion (Tschannen-Moran & McMaster, 2009) into teacher training.

6.3 Limitations

There are several limitations of the study that must be discussed. The first limitation of the present study is that the TALIS-PISA 2018 data were self-reported and therefore the relationships examined among the concepts reflected teachers' perceptions rather than objective indicators. Future studies should combine teacher self-reported measures with student ratings (Holzberger et al. 2013). Secondly, the cross-sectional design adopted in the current study implies there is no evidence of causality among the study variables (teacher efficacy, student-teacher relationship, and teaching practices dimensions). As such, future studies should consider research designs that allow for exploration of causality (Liu et al, 2018). Third, future studies should examine the probable influence of teacher profiles on the interrelations

between teacher self-efficacy, student-teacher relations, and teacher classroom teaching practices. Despite these limitations, the present study contributes to the understanding of the effect of teacher self-efficacy and dimensions of teacher classroom teaching practices.

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Data sharing statement

No additional data are available.

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