THE MEDIATING EFFECT OF TEACHER SELF-EFFICACY ON TEACHING PRACTICE AND JOB SATISFACTION BY USING THE RESULTS OF TALIS 2018

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submitted by **CANSU YILDIZ** in partial fulfillment of the requirements for the degree of **Master of Science** i**n Science Education in Mathematics and Science Education, Middle East Technical University** by,

Prof. Dr. Halil Kalıpçılar
Dean, Graduate School of **Natural and Applied Sciences** _____

Prof. Dr. Erdinç Çakıroğlu
Head of the Department, **Mathematics and Science Education** _____

Prof. Dr. Ömer Geban
Supervisor, **Mathematics and Science Education, METU** _____

Prof. Dr. Eren Ceylan
Co- Supervisor, **Mathematics and Science Education, Ankara University** _____

Examining Committee Members:

Prof. Dr. Ayhan Yılmaz
Mathematics and Science Education, Hacettepe University _____

Prof. Dr. Ömer Geban
Mathematics and ScieEducationiton, METU _____

Assoc. Prof. Dr. Ömer Faruk Özdemir
Mathematics and Science Education METU _____

Date: 02.06.2022

I hereby declare that all information in this document has been obtained and presented in accordance with academic rules and ethical conduct. I also declare that, as required by these rules and conduct, I have fully cited and referenced all material and results that are not original to this work.

Name Last name: Cansu Yıldız

Signature:

ABSTRACT

THE MEDIATING EFFECT OF TEACHER SELF-EFFICACY ON TEACHING PRACTICE AND JOB SATISFACTION BY USING THE RESULTS OF TALIS 2018

Yıldız, Cansu
Master of Science, Science Education in Mathematics and Science Education
Supervisor: Prof. Dr. Ömer GEBAN
Co-Supervisor: Prof. Dr. Eren CEYLAN

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The purpose of this study is to determine the role of teacher self-efficacy as a mediator in the relationship between teaching practice and job satisfaction. To succeed in this aim, the correlational model was used in the current study. The research group of this study includes 1243 Turkish science teachers who participated in the Teaching and Learning International Survey (TALIS) 2018. ‘‘ Teaching Practice Scale ’’, ‘‘Teacher Self-efficacy Scale’’ and ‘‘Job Satisfaction Scale’’ were used to collect data. The predictive and mediating relationship between teaching practice (clarity of instruction, cognitive activation, and classroom management), teacher self-efficacy, and job satisfaction were analyzed by Structural Equation Model (SEM). The simple mediation model was used in SEM. In this study, several models were examined. The result of the study revealed that teaching practice has a positive effect on job satisfaction and teacher self-efficacy has a positive effect on job satisfaction. Furthermore, teacher self-efficacy is a mediator for teaching practice variables to explain job satisfaction. Because there has been little research on the relationship between teaching practice, job satisfaction, and teacher self-efficacy for

a Turkish sample, it is predicted that this study will throw light on future studies focused on these variables.

Keywords: Teaching Practice, Teacher Self-efficacy, Job Satisfaction, TALIS 2018

ÖZ

TALIS 2018 SONUÇLARINI KULLANARAK ÖĞRETMEN ÖZ-YETERLİLİĞİNİN ÖĞRETİM UYGULAMALARI VE İŞ MEMNUNİYETİ ÜZERİNDE ARACI ETKİSİ

Yıldız, Cansu
Yüksek Lisans, Fen Bilimleri Eğitimi, Matematik ve Fen Bilimleri Eğitimi
Tez Yöneticisi: Prof. Dr. Ömer GEBAN
Ortak Tez Yöneticisi: Prof. Dr. Eren CEYLAN

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Bu araştırmanın amacı, öğretim uygulamaları ile iş doyumu arasındaki ilişkide aracı olarak öğretmen öz-yeterliğinin rolünü belirlemektir. Bu amaca ulaşmak için mevcut çalışmada korelasyonel model kullanılmıştır. Bu çalışmanın araştırma grubunu, Uluslararası Öğretme ve Öğrenme Araştırması (The Teaching and Learning International Survey [TALIS]) 2018'e katılan 1243 Türk fen öğretmeni oluşturmaktadır. Veri toplamak için "Öğretim Uygulamaları Ölçeği", "Öğretmen Öz-yeterlik Ölçeği" ve "İş Doyum Ölçeği" kullanılmıştır. Öğretim uygulamaları (öğretimin açık ve anlaşılır olması, bilişsel etkinleştirne ve sınıf yönetimi), öğretmen öz-yeterliği ve iş doyumu arasındaki yordayıcı ve aracılık ilişkisi Yapısal Eşitlik Modeli (YEM) ile analiz edilmiştir. YEM'de basit aracılık modeli kullanılmıştır. Bu çalışmada çeşitli modeller incelenmiştir. Araştırmanın sonucu, öğretim uygulamalarının iş doyumu üzerinde olumlu bir etkisi olduğunu ve öğretmen öz-

yeterliğinin iş doyumu üzerinde olumlu bir etkisi olduğunu ortaya koymuştur. Ayrıca öğretmen öz-yeterliği, öğretim uygulamaları değişkeni için iş doyumunu açıklamaya yönelik bir aracıdır. Çalışmanın sonuçları literatüre dayalı olarak değerlendirilmiştir. Öğretim uygulamaları, iş tatmini ve öğretmen öz-yeterliliği kavramlarını, Türkiye örnekleminde içeren az sayıda araştırma olması nedeniyle, bu çalışmanın söz konusu değişkenleri ele alan gelecek araştırmalara ışık tutacağı düşünülmektedir.

Anahtar Kelimeler: Öğretim Uygulamaları, Öğretmen Öz-yeterliliği, İş Tatmini, TALIS 2018

To my grandmother

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LIST OF ABBREVIATIONS

CA: Cognitive Activation in Teaching Practice

CFA: Confirmatory Factor Analysis

CI: Clarity of Instruction in Teaching Practice

CLM: Classroom Management in Teaching Practice

CM: Self-efficacy in Classroom Management

IEA: International Association for the Evaluation of Educational Achievement

INS: Self-efficacy in Instruction

ISC: International Study Center

ISCED: UNESCO International Standard Classification of Education

ISCED LEVEL 3: Upper-secondary School

ISCED LEVEL 2: Lower-secondary School

ISCED LEVEL 1: Primary School

IQO: International Quality Observer

JS: Job Satisfaction

NPM: National Project Manager

OECD: Organization for Economic Co-operation and Development

PR: Job Satisfaction with Profession

QEG: Questionnaire Expert Group

SAQ: Survey Activities Questionnaire

STE: Self-efficacy in Student Engagement

SEM: Structural Equational Modeling

TALIS: Teaching and Learning International Survey

TSE: Teacher self-efficacy

TP: Teaching Practice

WE: Job Satisfaction with Work Environment

CHAPTER 1

INTRODUCTION

The first chapter begins with a brief introduction about the background of the study. The second part provides readers about the reasons to research teachers' self-efficacy, their teaching practice and teachers' job satisfacton especially on science teachers while highlighting the significance of the study.Lastly, detailed definitions of the study's key terms are provided.

1.1 Background of the Study

These days, education is about more than just teaching students something; it's also about assisting them in developing a reliable compass and the skills they need to confidently move in an increasingly complex and unpredictable world. We live in a world where easy to teach and measure things are often simple to make digital and automated, and where students are valued not only for what they know but also for what they can do with what they learn. Education systems and teachers tend to encounter increasing challenges. Understanding and improving educational processes requires knowledge about teachers' characteristics, beliefs, and practices. They influence students' learning environments, motivation, and achievement. Also, teachers' characteristics, beliefs and practices are linked to teachers' strategies for coping with problems in their daily professional life as well as their general wellness.

In the development of healthier communities, education directly plays a vital role. The learning process, which begins informally at early age in the family is formally continued in schools. Teachers raise community members in

classrooms, and when individuals are required to be educated, the motivational values of the teachers who lead the teaching-learning process become important (Bandura, 1997). In developing world, students are expected to be more innovative and to develop their critical thinking skills. There is consensus that teachers are the most important component in developing this information and skills. In other words, today's teachers need to assist students in developing identity, agency, and meaning by encouraging them to think for themselves and collaborate with others. Teachers Matter (OECD, 2005) emphasized the importance of recruiting, improving, and maintaining successful teachers as a prior goal for school systems around the world. Increasing the quality of teachers depends on providing the necessary support to teachers, especially in the first years of the profession and in the following period, as well as qualified pre-service teacher education because teachers are also maybe the most significant factor of changes in education reforms in enhancing education system (Villegas & Reimers, 2003). This importance of effective teachers demonstrates the increase in teacher education research and the field's tremendous expansion over the previous decades. Many factors affecting teachers are brought to the forefront to remain with advances in the field of education (Buldu, 2004). School authorities, policymakers, and employers are looking for teachers with a strong sense of self-efficacy, a strong knowledge of the subject matter, and a high level of job satisfaction. Maybe it's because such instructors are less inclined to leave their professions, have lower burnout, are creative, encourage students to learn, and provide better learning results (Skaalvik and Skaalvik 2011). Also, teachers' self-efficacy might have significant effects on student accomplishment, job satisfaction and teaching practice that result in more favorable instructional settings that better support students' educational aims and encourage accomplishment (Perera & John, 2020; Zee & Koomen, 2016). Recognizing such teachers, as well as attracting and retaining them in the profession, has become a concern for educators, policymakers, and other stakeholders.

The Teaching and Learning International Survey is one of the most recent worldwide studies to determine these effective teachers (TALIS). TALIS is a five-year cycle study that began in 2008 with 24 nations and economies and grew to 48 in 2018. First report published on 19 June 2019. In the report, the education policies implemented in various countries and the reflections of these policies in schools were examined within the scope of the data collected through questionnaires from teachers and school principals in a total of 48 countries and economies, including Turkey. International large-scale investigations allow countries to examine the strengths and weaknesses of their educational systems. International comparative studies like TALIS have aroused the countries' interest in increasing focus on determining which factors influence teachers' motivation, performance and beliefs. The findings of these studies have influenced policy in several countries, making significant contributions to recognizing, recruiting, and keeping effective teachers. Since the publication of the 2008 survey data sets, TALIS has drawn the interest of educational researchers all around the world.

1.2 Purpose of the Study

The purpose of this study was to evaluate the goodness of fit of the hypothesized model between teachers' self-efficacy, teaching practice and teachers' job satisfaction with the data from the TALIS 2018 among with a sample of 1243 science teachers using a structural equation model (SEM).

The Teaching and Learning International Survey (TALIS), conducted under the supervision of the Organization for Economic Cooperation and Development (OECD), collects fundamental information and teaching perspectives from instructors via a teacher questionnaire, which includes teacher self-efficacy, teaching practice, job satisfaction and several themes. TALIS 2018 is the third cycle of the TALIS project. TALIS 2018 makes data about teaching conditions and learning environments available, allowing researchers to investigate which factors affect

teacher job satisfaction. The research will be conducted by using upper-secondary level science teachers (ISCED 3 level) who participated in TALIS 2018 in Turkey.

1.3 Problem Statement

The current study specifically examines the following research questions for Model I and Model II:

Research Question: Does the teacher self-efficacy have a mediator role in the relationship between teaching practice and job satisfaction?

H1: Teacher self-efficacy mediates the relationship between teaching practice and job satisfaction.

H2: There is a positive relationship between teaching practice and job satisfaction.

H3: There is a positive relationship between teacher self-efficacy and job satisfaction.

H4: There is a positive relationship between teaching practice and teacher self-efficacy.

H5: There is a positive relationship between clarity of instruction and job satisfaction.

H6: There is a positive relationship between cognitive activation and job satisfaction.

H7: There is a negative relationship between classroom management and job satisfaction.

H8: The dimension of clarity of instruction of the teaching practice positively affects job satisfaction through self-efficacy.

H9: The dimension of cognitive activation of the teaching practice positively affects job satisfaction through self-efficacy.

H10: The dimension of classroom management of the teaching practice positively affects job satisfaction through self-efficacy.

1.4 Significance of the Study

Renzulli et al. (2011) confirmed that teacher job satisfaction has been a hot subject in recent decades since it has a significant influence on teachers' performance as well as their confidence in instruction. Teacher shortages and increasing rates of teacher turnover have become a widespread concern in these days, and both problems are linked to teacher job satisfaction (Henry and Redding 2020). Job satisfaction also promotes the development of factors that are thought to be required for the development of healthy communities. As a result, teachers' job satisfaction of the future teachers is extremely important when effective teaching is the question, and it is critical to investigate. Teacher job satisfaction has been linked to various factors, such as teachers' self-efficacy (Edinger and Edinger 2018), teacher motivation (Peng and Liu 2012) besides a few demographic factors such as gender, teaching qualification, years of experience and location of school (Klassen and Chiu 2010). This research may benefit the field by revealing science teachers' perceptions of their own job satisfaction.

Internal and external factors that influence teachers' job satisfaction such as demographic features and personal characteristics of the teacher and school (Sharma & Jyoti, 2006). In this research, two potential predictors will be examined to evaluate how well they might science teachers' perceived job satisfaction levels. First potential predictor is teaching practice. Evaluation of teaching practices is important from a policy viewpoint since it offers information on aspects of instructional quality (Klieme, Pauili and Reusser, 2009). In general, there are two major issues in education: accessibility and quality. Quality is an issue for both developed and

developing countries, thus countries strive to establish more qualified education systems to improve educational outcomes. According to United Nations Educational Scientific and Cultural Organization [UNESCO] (2006), quality of education is the major issue even though education is a right of every individual and is essential for human, social, and economic improvement. MoNE (2005) reports that in this technology and information age, all societies, particularly industrialized ones, are struggling to improve the quality of science education because science is vital to society's future. Primarily, we need to observe and comprehend own operating system in order to make suitable and accurate attempts to enhance the quality of science education Furthermore, information on classroom management, cognitive activation, and clarity of instruction might show unique teacher education requirements for novice teachers and in-service teachers. As stated by Hattie (2009) the most significant school variable that specifies educational success is teaching quality. This study might be beneficial in tracking the effects of high school science teachers on educational outcomes in Turkey.

Several research on teaching practices or instructional quality depend on reports of students' class activities, classroom observations, and teacher reports (Marsh et al., 2012; Wagner et al., 2016). As stated by Little, Goe and Bell (2009) the utilizing teachers' self-reports to assess instructional quality is especially difficult since these assessments usually reflect answers that the teachers think socially desirable. When participants are asked to respond on a Likert scale (from high to low agreement), this measurement problem frequently arises. TALIS utilizes frequency response scales to eliminate the issue of social desirability. Participants are requested to use a frequency scale to specify how often a certain instructional practice occurs throughout lessons in a randomly chosen target or reference class in the relevant questionnaire items. In particular, the evaluations made by the individuals themselves are also important in terms of their professional perceptions and job satisfaction.

Second predictor to be studied is teachers' self-efficacy beliefs. Self-efficacy beliefs have an impact on an individual's ideas, aims, lifestyle, efforts in the

challenging situations, and the outcomes that arise from those efforts (Bandura, 2001). If an individual is having major doubts about his or her ability, he or she may slow down or stop doing so to reduce the difficulties. In this manner, an individual's self-efficacy regarding his work will influence his behaviors, organization effectiveness, and efficiency in dealing with difficulties that arise in the workplace. Teachers who are satisfied in their profession are more able to maintain a high level of professional competence. Job satisfaction, expressed as an emotional reaction to profession, is believed to be directly connected to an individual's self-efficacy belief. Determining the self-efficacy and job satisfaction of teachers includes some clues about their ability to do the job effectively. Individuals' careers or jobs cover a significant portion of their lives, which might range from 20 to 30 years. Therefore, it is believed necessary for people of society to be in a positive mood, to be mentally well, to feel that their employment will be beneficial, and to have efficacy believes in their own abilities to establish healthy societies (Rhodes et al., 2007). Teachers are supposed to like their jobs, have a positive attitude to them, be content with the benefits they receive from them, and have strong self-efficacy beliefs in their abilities to do their professions. These teaching qualities are effective in growing society's members by gaining intended characteristics in them, resulting in the establishment of a society that meets the required standards (Buluç & Demir, 2015).

Even though studies on the relationships of teacher self-efficacy and teaching practices have been conducted in recent years (Buri´c & Kim, 2020; Poulou, Reddy, & Dudek, 2019), students' academic accomplishment (Caprara et al., 2003; Perera & John, 2020), and outcomes for teacher such as burnout, job satisfaction (Granziera & Perera, 2019; Klassen & Chiu, 2010; McLennan et al., 2017), these literatures largely arose independently of one another. Moreover, as Woolfolk Hoy et al. (2009) pointed out, few research have investigated how TSE beliefs drive teachers' classroom teaching practices, which in turn affect outcomes of teachers and students. Researchers have pointed for more holistic models of the concurrent roles of TSE in classroom teaching practices and teacher outcomes that better represent the

numerous levels of the classroom ecosystem to be developed and tested (Zee & Kommen, 2016).

Finally, the findings obtained from large-scale applications such as TALIS (such as TALIS, PISA, TIMSS) provide information about the relationships between variables and provide information regarding their educational qualifications. TALIS provides credible assessments of skills in an international context, as well as thorough information on the factors that influence educational results in countries. Studying teacher qualities and the impacts of these factors may be significant for observing changes in science education, and thus the results of the study were expected to be useful for future research. Only a few research have been conducted to date on the relationship between teacher self-efficacy, teaching practice, and job satisfaction and the mediator role of teacher self-efficacy simultaneously. As a result, the hypothesized integrated model created. Moreover, in studies using TALIS 2018 data, studies were generally conducted with teachers at the lower- secondary school level (ISCED 2 Level). There are not many studies on teachers at the ISCED 3 level.

1.5 Definition of the Terms

Self-efficacy: Beliefs in one's ability to plan and carry out the actions needed to achieve specific goals (Bandura,1997).

Teacher self-efficacy: Teachers' beliefs in their abilities to develop specific instructional behaviors that have an influence on pupils' educational outcomes, like performance, engagement, and motivation (Klassen et al. 2011; Skaalvik and Skaalvik 2010).

Job Satisfaction: The pleasant emotional state resulting from a positive evaluation of one's job or work experiences (Locke, 1969).

Teacher job satisfaction: Teachers' sense of fulfillment and happiness because of their work as educators (OECD 2019a).

Teaching practice: Refers to what happens in the class between teachers and students, instructional metrics, teacher–student interaction, and students' learning outcomes (Hattie, 2009).

CHAPTER 2

LITERATURE REVIEW

The first four section of this chapter discusses the concept of self-efficacy, teaching practice and teachers' job satisfaction and through overview of their relations. The following section focuses on TALIS by explaining TALIS framework and the effect on TALIS results in Turkey. In the last section, Confirmatory Factor Analysis (CFA) and Structural Equational Modelling (SEM) was defined and the significance of using SEM was discussed. To sum up, this chapter enhances background and context in order to recognize research which is related to teacher's self-efficacy, their teaching practices and emphasizes the importance of exploring job satisfaction of teachers.

2.1 Self-efficacy

Self-efficacy is based on the social cognitive theory framework, which emphasizes the evolution and exercise of human agency, implying that people have some control over their actions (Bandura, 2006a). Self-efficacy, in this approach, influences individual's aims and behaviors and is impacted by one's conditions and the surroundings (Schunck & Meece 2006). Self-efficacy has been shown to have a significant impact on human accomplishment in a variety of settings, such as education, sports, health, and employment, according to a large body of research (Bandura, 1997).

The research extensively demonstrates that self-efficacy beliefs' widespread effect on numerous dimensions of functioning and action, verifying social–cognitive theory, that places such beliefs at the basis of human agency (Bandura, 2001). Albert

Bandura was the first to introduce the concept of self-efficacy, which he described as an individual's belief about ability to perform well by coordinating the activities required to demonstrate a certain performance (Bandura,1997).Individual's motivation, emotional states, and behaviors are influenced by their beliefs rather than what is obviously true states Bandura (1997) and shows that having belief in one's ability to produce outcomes will give them the confidence to pursue that activity. Even if someone has the necessary abilities to execute a task, this does not ensure that they can do it successfully. The quality of individuals' work is determined by belief in what he/she can accomplish with his/her abilities. The conditions in which individual perform are also crucial. Pintrich (1993) similarly claim that self-efficacy belief has a greater impact on task completion than abilities.

Self-efficacy beliefs have an impact on an individual's ideas, aims, lifestyle, attempts in the face of challenges, and the outcomes that emerge from those attempts (Bandura, 2001). In other words, self-efficacy belief of person influences how individuals think, what they pursue, what goals they establish, and how much effort they put forward in certain undertakings. If a person is having major concerns about his or her ability, he or she may slow down or stop doing so to remove the difficulties. Individuals who feel confident in their talents, on the other hand, be more eager to deal with the problem and settle it in the event of challenge (Hazır Bıkmaz, 2002). In this respect, a person's self-efficacy regarding their work influences his/her behaviors, performance, and efficiency in dealing with workplace challenges. People who have strong self-efficacy beliefs do better at work in general because they are more willing to work, are more resilient, and have low stress levels (Bandura, 1997). Consequently, the higher one's self-efficacy in a context, the higher one's satisfaction in that context. Finally, self-efficacy beliefs can affect the decisions people make at critical points in their lives, potentially influencing their lives and who they become (Bandura, 2012).

2.1.1 Source of Self-efficacy

There are four sources of self-efficacy belief proposed by Bandura (1997). The first and most effective one is enactive mastery experiences. The real experiences that a person performs an ability to sustain and achieve the task are described as mastery experiences. That is, mastery experiences related to performance achievement, and They are referring to the fact that success and failure in accomplishing a task may have a significant impact on the construction of individuals' efficacy beliefs. Efficacy beliefs increase with success, while setbacks, particularly those that occur in the early phases of situations when a sense self-efficacy has yet to be developed, decrease efficacy beliefs. Being accomplished in certain activities, especially those performed under difficult conditions, improves one's belief in one's own capabilities. Positive prior experiences may help one achieve success despite difficulties, whereas past failures might turn even possible obstacles into a cause to give up. Mastery experiences offer instructors with the most accurate evidence for determining if they have acquired the abilities to accomplish the specific activity in the given situation at the expected degree of competence (Bandura, 1997; Tschannen-Moran & McMaster, 2009). Teaching practices might provide as real evidence for instructors to assess their mastery of teaching knowledge and abilities in a particular task.

The second source of self-efficacy is vicarious experiences which may be used to build a sense of personal efficacy through modeling. Because most activities lack standard measurements of performance, individuals can only evaluate their abilities by comparing themselves to others who have completed similar tasks or are in similar circumstances. Prospective teachers have low past experiences in teaching; hence these experiences are thought to be especially significant in the development of their efficacy beliefs (Labone, 2004).

Verbal persuasion is the third source of self-efficacy. It refers to feedback from others convincing one that s/he is capable of performing a given task effectively. Individuals who are verbally convinced that they can accomplish the

given tasks are more willing to put in more effort and continue with it. Unrealistic evaluations, on the other hand, may cause failures, lowering both the recipient's belief in his/her own abilities and the persuader's trust for him/her. Teachers may develop negative judgments of their own performance in the classroom. If their coworkers, administrators, or managers can provide them with verbal support, instructors are more likely to gain confidence in their abilities to execute the specific tasks and so enhance their teaching.

Stress, exhaustion and emotional reactions refers to the fourth source of self-efficacy: physiological and affective states (Bandura, 1997). Individuals become distressed when they have concerns about their performance, which causes failure. Individual's efficacy evaluations are also influenced by their mood. Whereas positive mood improves perceived self-efficacy, but negative mood lowers it (Bandura, 1997).

The sources of self-efficacy may help to clarify how these sources shape teaching practice and teachers' job satisfaction. According to Gilakjani and Sabouri (2017), efficacy beliefs are a crucial basis for teachers' teaching methods and decision-making process about curriculum. This indicates that teachers' beliefs assist them in selecting teaching strategies and developing personal classroom rules. Also, teachers who felt more self-efficacious widely accepted higher levels of job satisfaction (Edinger and Edinger 2018; Klassen and Chiu 2010).

2.1.2 Teachers' self-efficacy

Teacher self-efficacy (TSE) might be described as a teacher's belief in their own competence to plan, coordinate, and execute actions necessary to achieve certain educational objectives, according to social cognitive theory. Teacher efficacy has been highlighted as one of the key elements influencing both instructional behavior and student results. Teachers' beliefs which are critical to comprehend and analyze their actions as well as how they develop and comprehend instruction have

been studied for over couple decades (Ashton et al., 1984; Gibson and Dembo, 1984; Soodak & Podell, 1997; Woolfolk & Hoy, 1990). There were several definitions regarding teacher self-efficacy such as ‘‘teachers’ belief or conviction that they can influence how well students learn, even those that may be difficult or unmotivated ’’ (Guskey & Passaro, 1994); ‘‘the extent to which teachers believe they can affect students learning ’’ (Dembo & Gibson, 1985); ‘‘individual teachers’ beliefs in their own ability to plan, organize and carry out activities that are required to attain given educational goals’’ based on social cognitive theory (Skaalvik & Skaalvik, 2010).

According to Bandura (2012) self-efficacy beliefs are domain-specific, with varying expressions relying on the task domain and context. In the teaching domain, teachers’ self-efficacy can be described as ‘‘a teacher’s efficacy belief is a judgement of his or her capabilities to bring about desired outcomes of student engagement and learning, even among those students who may be difficult or unmotivated’’ (Tschannen-Moran & Woolfolk Hoy, 2001). Teachers who have a high sense of efficacy spend more time in organizing, are more structured, are more willing to open new approaches, have more passion for teaching, and are more persistent when dealing with problematic pupils (Tschannen-Moran & Woolfolk Hoy, 2001). Moreover, several cross-sectional research have shown relationship of TSE and several outcomes, including students’ progess, such as achievement and motivation (Ashton & Webb 1986; Caprara, Barbaranelli, Steca, & Malone, 2006; Klassen & Tze, 2014) teachers’ well-being (Brouwers & Tomic, 2000; Skaalvik & Skaalvik, 2007) teachers’ instructional behaviours (Tschannen- Moran et al., 1998) and teachers’job satisfaction (Caprara, Barbaranelli, Borgogni, & Steca, 2003).

Different educational environments and teaching practices might result in different self-efficacy beliefs (Klassen et al., 2011; Malinen et al., 2013). As a result, it was stated that teacher self-efficacy in teaching is not a one-dimensional construct. To accurately analyze teachers' self-efficacy, a multidimensional framework was presented that contains three self-efficacy core factors: self-efficacy in instruction, self-efficacy in student engagement, and self-efficacy in classroom management

(Klassen et al., 2011). This framework was utilized with three dimensions in TALIS 2018 (self-efficacy in classroom management, instruction, and student engagement) (OECD,2019a).

2.2 Teaching Practice

Geo (2007) stated the quality of teaching is established by what teachers do in their classes. As a result, the term "teaching practices" refers to the overall effectiveness of instructional practices or instructional quality (Ainley & Carstens, 2018). In the area of education, teaching quality is described in several ways, but researchers accept that the concept is multidimensional (Kunter & Voss, 2013; Wagner et al., 2013). Teacher support, classroom management, clarity of instruction, and cognitive activation are all dimensions of teaching practices (Ainley & Carstens, 2018). The two aspects of instruction clarity and teacher support might be tightly related. Hence, in TALIS 2018, teacher support dimension is evaluated using a scale that measures instruction clarity.

Classroom management is defined as the efforts that teachers do to create a harmonious atmosphere and efficient use of time by avoiding or successfully dealing with disciplinary issues and interruptions throughout the lesson (Van Tartwijk and Hammerness, 2011). According to the study, the most significant characteristics of efficient classroom management are clarified mandatory rules and procedures, well-structured teaching, and effective organization (Praetorius et al., 2014). The consequences of large-scale international evaluations of student success have discovered a positive relation between a safe and orderly environment (as assessed by teachers) and student accomplishment in various nations (Martin et al., 2013; Wang and Degol, 2016). In TALIS 2018, a healthy disciplinary atmosphere in the target class will as an indicator of classroom management.

Teaching activities that need students to assess, integrate, and utilize knowledge in the context of solving problems are known as cognitive activation (Lipowsky et al., 2009). Teacher support in student participation in higher-level thinking was highlighted in cognitive activation (Klieme et al.,2009). Activating cognitive thinking processes may be done by giving students complex tasks in their proximal zones, utilizing prior knowledge, elaborating on students' opinions and experiences, and asking engaging questions (Praetorius et al., 2014). In terms of operationalization, it is likely the most demanding and difficult of the four dimensions, presumably because it is more directly linked to the subject domain than the other two dimensions (Baumert et al., 2010; Klieme, Pauli and Reusser, 2009). It might possibly be due to its dependence on instructional quality variations across lessons (Praetorius et al., 2014).

Clarity of instruction refers enhancing students with a review end of the lesson and connecting new and old topics and providing comprehensive instruction and learning objectives (Kane and Cantrell, 2010). Clarity and coherence of goals impacted students' perceptions of learning environments positively (Seidel et al., 2005). Clarity of instruction has also been highlighted by researchers as a significant effect on student learning (Seidel, Rimmele and Prenzel, 2005).

These three dimensions of teaching practice have been associated with pupils' cognitive and noncognitive learning results in studies (Kunter et al., 2013). Teaching practices are at the core of any study of teaching and learning since what teachers perform has the most direct impact on learning outcomes of students at the school level (Hattie, 2009). TALIS refers to instructional practices, while the related measure is based on research on instructional quality.

2.3 Job satisfaction

Job satisfaction may be described as people's favorable or negative assessments of their jobs (Weiss, 2002). Locke (1976), on the other hand, defined

job satisfaction as a pleasing or positive state that a person reaches when he or she evaluates his job or work-related life. As a result, job satisfaction may be defined as an emotive reaction to individual's work.

People obtain a variety of pleasant and negative experiences throughout their professional life, as well as experiences based on their observations indirectly. Individual's attitudes toward their profession are influenced by the attitudes of those around them, and they form attitudes about their job based on whether they possess the emotional competence demanded by their profession. Thus, job satisfaction can be described as one's attitude toward one's job (Greenberg & Baron, 2000).

One of the most fundamental requirements for individuals to be pleased, successful, and creative is job satisfaction (Günbayı & Tokel, 2012). According to findings of Türk (2007), a high degree of job satisfaction has a favorable impact on employees' physical health and wellbeing, whereas a poor level of job satisfaction can result in a variety of physical problems and psychological difficulties. It is well established that job satisfaction has an influence not only on the person but also on the organization. People who have high job satisfaction contributes to desired organizational outcomes such as lower absenteeism, commitment to the organization, and greater productivity because of enhanced citizenship behavior (Verquer, Beehr, & Wagner, 2003). However, a lack of job satisfaction might result in undesirable consequences such as absenteeism, leaving the profession, or poor performance (Feldman & Arnold, 1983). Job satisfaction is critical in educational institutions, as it is in other companies. As a result, understanding the factors that influence work satisfaction may explain what should be done to improve job satisfaction.

2.3.1 Teacher Job Satisfaction

There is no generally accepted description of teachers' job satisfaction (Zembylas & Papanastasiou, 2004). It is described by Locke (1969) as a pleasant

emotional state resulting from an evaluation of individual's job or job experiences The TALIS 2018 project also embraced Locke's description of teacher job satisfaction, which mean the sense of accomplishment and enjoyment that teachers derive from their profession as teachers (OECD 2019a). It was comprised of three dimensions: work environment satisfaction, professional satisfaction and autonomy. As stated in the TALIS 2018 report, although only the first two dimensions were used for the "combined job satisfaction scale", all three of these dimensions were examined in terms of measurement invariance, since it was not aimed to get a total score on job satisfaction in this study.

For teachers, job satisfaction is stated as their affective reactions to their profession or teaching role (Skaalvik & Skaalvik, 2010). It is an unclear concept that has been investigated both as a general construct and as instructors' satisfaction with various settings (Evans, 1997). One issue with evaluating teachers' satisfaction with various conditions and allowing those results to suggest overall job satisfaction is that different conditions may be meaningful to different teachers. As a result, the difficulty with such measurements is that they ignore the fact that the influence of several conditions on total job satisfaction is determined by how important each situation is to the teacher individually. As a result, satisfaction with concrete circumstances may not be used as a measure for total job satisfaction among instructors. In TALIS 2018, teachers' overall job satisfaction was evaluated according to this idea.

Teachers' job satisfaction is significant because it has a considerable impact on teacher retention, absenteeism, exhaustion, dedication to educational objectives, teachers' enthusiasm, job performance, and, by extension, students' academic accomplishment (Chen, 2007; Klassen et al., 2009; Ingersoll, 2001; Price and Collett, 2012; Renzulli, Macpherson Parrott and Beattie, 2011;).

2.4 Overview of TALIS

Teaching and Learning International Survey (TALIS) is a worldwide study that focuses on the working conditions of teachers and school principals and explores the learning and teaching environments in schools. The main purpose of TALIS is to provide strong international indicators and policy analysis to help countries review and develop their policies in the focus of effective learning and teaching. TALIS implemented by the OECD every five years; it was implemented in 2018, following the 2008 and 2013 cycles. About the fact that TALIS 2018 is based on ISCED level 2 (lower secondary school level), the new cycle includes international alternatives for ISCED level 1 (primary schools) and ISCED level 3 (upper secondary schools), which is influencing the survey's conceptual framework and instruments. While the themes of TALIS 2018 were consistent across ISCED levels, questionnaire items were adjusted to ISCED levels 1 and 3 where appropriate. All of the 48 countries and economies participating in TALIS 2018 participated in the lower secondary school level (ISCED 2), while TALIS 2018 was applied within the scope of the primary school level (ISCED 1) in 15 and within the scope of the high school level (ISCED 3) in 11 of them.

TALIS main objective is to create globally comparable data that can be used to formulate and execute strategies aimed at school administrators, students, and teaching, with a focus on factors that influence student learning. In other words, it offers teachers and school leaders a voice, encouraging them to contribute to the study and advancement of educational policies in key fields. The scope of academic and policy analysis in education made possible by TALIS data is broad. Also, it allows for the investigation of relationships and interrelationships between elements in those themes. TALIS provides the advantages of offering insights based on significant numbers of respondents.

Finally, the aim of the TALIS survey is to enhance comprehensive international indicators and policy-relevant research on teachers and teaching in a

timely and affordable approach to facilitate countries in reviewing and developing policies that develop an environment for effective education (TEDMEM, 2019).

2.4.1 TALIS 2018 Conceptual Framework

The TALIS 2018 conceptual framework is based on the framework which was used in TALIS 2013. TALIS 2018 is the third cycle of the TALIS programme. It has a greater number of participants than before, but it maintains the same fundamental emphasis on lower secondary education (ISCED 2) and the same range of alternatives as TALIS 2013. As a result, TALIS 2018 emphasizes the collection of valuable and relevant information regarding teaching conditions, instructors and learning environments. TALIS 2018 has also broadened the TALIS-PISA link, which began in 2013 when several countries conducted the TALIS 2013 survey in PISA 2012 schools.

TALIS 2018 research was conducted through questionnaires prepared for teachers and school principals based on this conceptual framework. In the conceptual framework of TALIS 2018, the themes and priorities related to professional qualifications and pedagogical practices at institutional and teacher level are generally discussed. The themes of TALIS 2018 can be divided into two dimensions: focus and level. The first of these dimensions (focus) depends on the degree to which a theme is primarily associated with professional qualifications or pedagogical practice of schools or teachers. The second dimension (level) indicates at what level (institutions or teacher) that theme is addressed. Figure 1 represents the TALIS 2018 themes in comparison to the two focus and level axes.

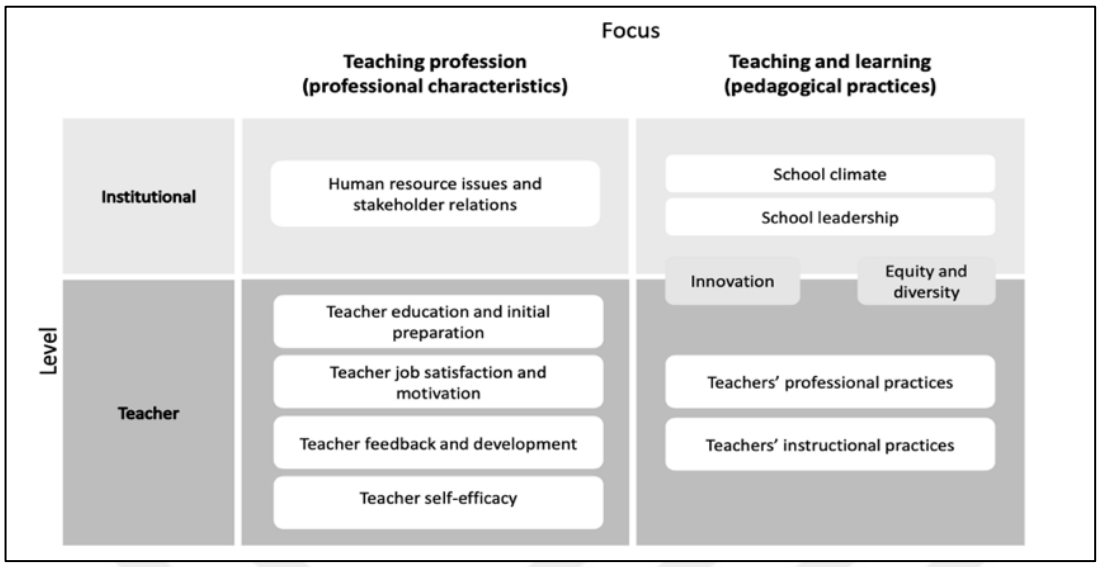


Figure 1 Conceptual mapping of themes in TALIS 2018

TALIS provides a conceptual map showing under what dimension it is studied, depending on its relationship to institution or teacher level (including classroom work), as well as professional qualifications and pedagogical practices. Each theme in the conceptual framework may be related to other dimensions. However, the most important links and interactions are shown under two dimensions to define the basic structure of the conceptual framework.

Themes are determined by the completion of priority rating exercise with the participation of OECD member countries, partner countries and European Commission. This priority rating exercise took place between February and April 2015 and included 20 OECD countries and 5 partner countries and economies. Three phases were included in the priority ranking process. Countries were asked to assign 100 ranking points to 20 proposed themes in the first phase, with higher points indicating higher priority. The ratings were calculated by adding the points that each country assigned to each theme. Within the conclusion, nine themes were concurred to, in spite of the fact that the relative significance agreed to each of them varied across the participating countries. These themes are; teachers' instructional practice, school leadership, teachers' professional practices, teacher education and initial

preparation, teacher feedback and development, school climate, job satisfaction, teacher human resource issues and stakeholder relations teacher self-efficacy.

TALIS focuses on five main policy areas: school policies that encourage effectiveness; professional development for teachers; effective instructors and teaching; engaging teachers to the profession; and keeping teachers in the profession. Figure 2 illustrates the four parts of the conceptual map, which shows the link between the themes and five TALIS policy areas. Teachers' instructional practices and teacher professional practices, the two themes in the lower-right part that relate to the policy area concerned with effective teaching. Teacher education and initial preparation, teacher self-efficacy, teacher feedback and teacher job satisfaction and motivation which are in the lower-left part are all related to development of teacher attributes. While the two themes which are school climate and school leadership in the upper-right part are both related to school effectiveness, human resource issues and stakeholder relations theme in the upper-left part is associated with the two policy areas- retaining teachers and attracting teachers.

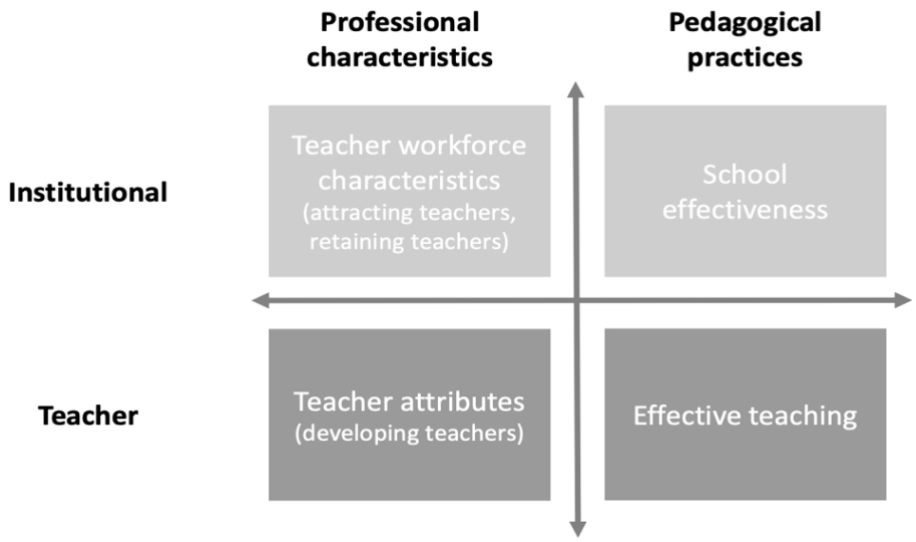


Figure 2. Relationships between themes and policy areas in TALIS 2018

2.5 Studies about Self-efficacy, Teaching Practice and Job Satisfaction

Teachers are supposed to like their jobs, have a good attitude toward their work, to be pleased with the benefits they receive from job, and have high self-efficacy beliefs in their ability to accomplish their responsibilities. These characteristics of teachers are efficient in producing society members by attaining desirable characteristics and hence building a society that meets the necessary requirements (Buluç & Demir, 2015). Teachers' self-efficacy is considered to influence teachers' perceptions about teaching and instructional activities (Skaalvik & Skaalvik, 2007; Tschannen-Moran & Woolfolk Hoy, 2001). According to previous study a teacher's self-efficacy beliefs have a considerable influence on teachers' performance and motivation (Bandura, 1997; Ross, 1998; Woolfolk Hoy & Davis, 2006). Betoret (2006) stated that teachers who have low sense of self-efficacy belief have more difficulty teaching, lower job satisfaction, and high level of job stress.

Teachers are more likely to be satisfied with their job when they are confident in accomplishing important work-related activities and goals (Skaalvik and Skaalvik, 2007). In other words, if instructors think they are incapable of handling obstacles, they are likely to be dissatisfied with their profession. Moreover, teachers with low levels of self-efficacy are more likely to be dissatisfied with their professions and therefore they are more likely to leave their profession (Evans, 2001) The relationship between TSE and TJS is particularly significant since job satisfaction has been demonstrated to be strongly related to job performance in a variety of work environments and more significantly, it is seen as a key factor influencing teachers' attitudes and efforts in their everyday work with pupils (Caprara et al., 2003; Judge, Thoresen, Bono, & Patton, 200).

In the literature, it is widely known that teacher self-efficacy has a favorable influence on job satisfaction. (Klassen & Chiu, 2010; Soto & Rojas, 2019) However, several research has found that self-efficacy has no effect on job satisfaction (Reilley

et al., 2017). According to recent results, teachers' self-efficacy beliefs have a critical role in influencing and maintaining their commitment to profession and job satisfaction (Caprara, Barbaranelli, Borgogni, & Steca & Malone, 2006).

Kasalak and Dagyar (2020) conducted a meta-analysis in order to determine the relationship between TSE and JS using TALIS. 102 independent data belonging to 50 nations included in the TALIS 2008, 2013, 2018 were merged. The findings revealed that there is a relationship between TSE and JS.

A study was conducted with 122 primary school teachers in rural parts of the United States and discovered a significant relationship between teacher self-efficacy and job satisfaction. (Edinger and Edinger, 2018). Several additional studies, including those done in Italy (Moe, Pazzaglia, and Ronconi 2010) and Norway (Avanzi et al. 2013), achieved similar outcomes.

Liu, Keeley, and Sui (2020) studied how variables which are teacher motivation, teacher self-efficacy and school climate (both teacher level and school level) impact Chinese teachers' job satisfaction at the same time using the data from TALIS 2018. According to the HLM findings, both school and teacher level variables were strongly associated to teacher job satisfaction.

The quality of teaching is shaped by teachers' evaluations of their own abilities. There is a significant relation among teacher self-efficacy and teaching practice, according to studies on teachers' actual teaching practice. Teachers' self-efficacy, especially, is linked to their teaching practice and quality (Holzberger et al.2013). Teachers who have a high level of self-efficacy are more prepared to give instruction, perform better in the classroom, and are more open to new opinions and eager to attempt new strategies to better satisfy the needs of their students (Saraçoğlu, Aldan, Karademir, Dinçer & Dedebali, 2017). Moreover, more efficacious teachers are often better at handling the classroom via the use of effective methods and approaches. Teachers with strong self-efficacy beliefs have been shown to be more productive in the classroom, using more new teaching methods to establish higher

academic goals for their students and encouraging student autonomy (Woolfolk et al., 1990; Guskey, 1988; Ross, 1998; Wolters & Daugherty, 2007).

Based on previous research, it is reasonable to predict a reciprocal relationship between teaching practice and self-efficacy. Effective instructional practice, in fact, may be a determinant of a teacher's self-efficacy. Generally, this is consistent with studies on self-efficacy and its origins for example, Sun (2001) examined the relationship between TSE and TP of 415 Taiwan elementary school teachers. The findings of the SEM statistical analyses revealed that X^2 = 227.6, which has a significant level of 0.05, and the other CFI, NFI, NNFI, GFI, and RFI are all less than 0.90. He found that there appears to be no meaningful relationship between teacher self-efficacy and teaching performance since the overall model fit is poor.

According to Holzberger et al. (2013), there is a relationship between instructors' self-efficacy and teaching quality. 155 German middle school mathematics instructors participated in the study. Rather than cognitive activation (β = 0.14, p< 0.05) or classroom management (β = 0.1, p= 0.11), it was discovered that instruction efficacy can positively predict teacher-reported instructional practices relating to student support β = 0.1, p= 0.14). Teaching practice, on the other hand, can better explain the instruction efficacy.

Chen, Lin, and Hsieh explored the relationship between TSE and TP in junior high school in Taiwan using TALIS 2018 data. 3106 teachers were examined in this study. Research models were created assuming classroom management efficacy and instruction efficacy constructs in teacher self-efficacy and clarity of instruction practice, cognitive activation practice, and classroom management practice in teacher teaching practice based on a literature review and exploratory factor analysis (EFA). The major conclusions from the examination of SEM are as follows. (1) Teaching efficacy has a higher positive impact on clarity of instruction practice than classroom management efficacy. (2) In terms of classroom management practice,

classroom management efficacy is more influential than teaching efficacy. (3) Teaching efficacy influence on cognitive activation practice positively, whereas classroom management efficacy influence negatively.

Depaepe and König (2018) studied German pre-service teachers' (N=342) teaching practice. professional knowledge, instructional efficacy using path analysis in order to determine how TSE influences TP. They showed that teacher self-efficacy has a significant influence on teaching practice.

Wang, Hall, and Rahimi (2015) discovered that Canadian instructors who were more confident in their ability to involve their students in the learning process, handle students' disobedience, and regulate activities in the classroom indicated lower burnout and better job satisfaction.

CHAPTER 3

METHODOLOGY

In this chapter, design of the study, data source, population and sampling, instruments, validity and reliability, data analysis in addition to assumptions and limitations of the present study were explained.

This study identified the relationship teacher sense of self-efficacy, teaching practice and teachers' job satisfaction of science teachers in Turkey. Path analysis was used due to the nested data structure of TALIS 2018. LISREL Program was used in analyzing the data

3.1 Design of the Study

Mertler (2016) stated that the purpose of correlational research is to investigate at the relationship between two or more variables. The current study was non-experimental quantitative research. Confirmatory Factor Analysis (CFA) and Structural Equation Modeling (SEM) was used to identify correlations among variables of teachers' self-efficacy, teaching practice and teachers' job satisfaction. This was cross-sectional research considering the nature of the TALIS 2018 data. The present study used a basically regression analyses strategy with two purposes: (1) to determine the postulated models' goodness of fit with the data and (2) to establish mediator role of teacher self-efficacy on the relationship between teaching practice and teacher job satisfaction.

3.2 Conceptual Model

TSE is thought to have a lot of implications for a variety of classroom activities, including teaching actions, affective classroom dynamics and behavioral expectations at both the teacher and student levels. (Woolfolk Hoy et al. 2009) These sorts of outcomes are like Pianta and colleagues' theoretically motivated and empirically validated classroom quality framework (CLASS; Pianta & Hamre, 2009; Pianta et al., 2008). Today, the CLASS is a significant framework for studies on the effectiveness of classroom processes, owing to its focus on instructor supports and practices connected to the well-established key areas of teaching support, emotional support, and classroom organization. Because the CLASS framework's three domains notably include instructor practices, they might be useful in recognizing and further structuring the different classroom processes in the relationship between TSE and teacher outcomes. Considering this framework, model was offered for presenting the findings of review research.

Different studies have experimentally examined the theoretical relationships between teaching practice, teacher self-efficacy, and work satisfaction, likewise apply variables are rarely combined in literature. In other words, all constructions that analyzed have already been validated in the literature through the previous years of investigation. However, there analyses generally bilateral relations without mediation effect. Teacher self-efficacy might have direct or indirect effects for job satisfaction of teachers, according to Bandura's concept of triadic reciprocal causation.

TALIS 2018 ISCED 3 level of national data were utilized to investigate the hypothesized model. Figure 3 shows the indirect relationship between teaching practice and job satisfaction with the presence of teacher self-efficacy as a mediator. SEM was used to investigate the hypothesized structural relationship between variables related to teacher self-efficacy, teaching practices, and teacher job satisfaction.

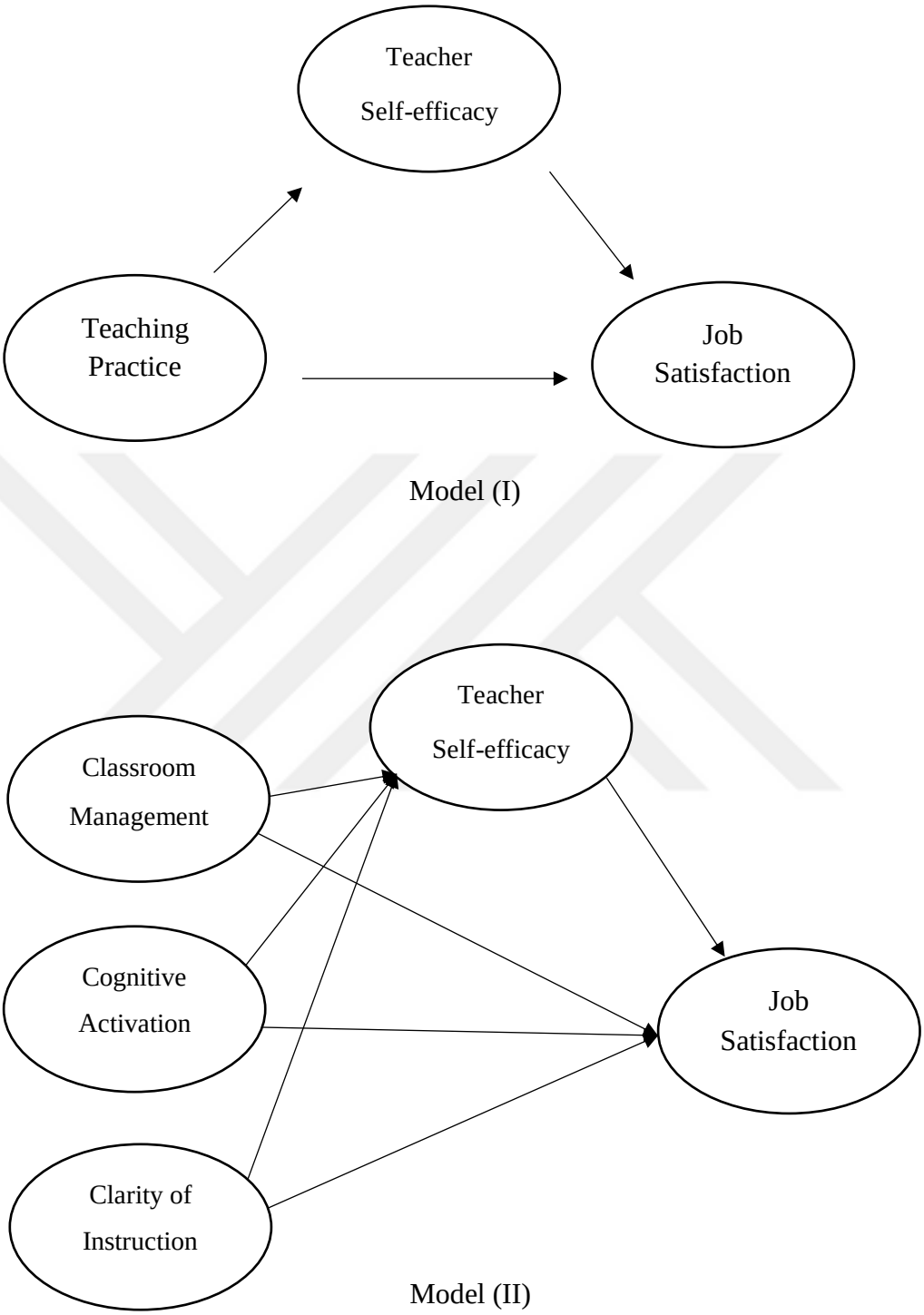


Figure 3.Hypothesized structural models: Mediation between teaching practice and job satisfaction

3.2.1 Mediation Effect Model

The main concern in the mediation model is that it stipulates the existence of another variable while investigating the relationship between two variables. The model given in figure 4 is a simple effect model, where the effect of X on Y is indicated by a'. This effect is also often referred to as the total effect.

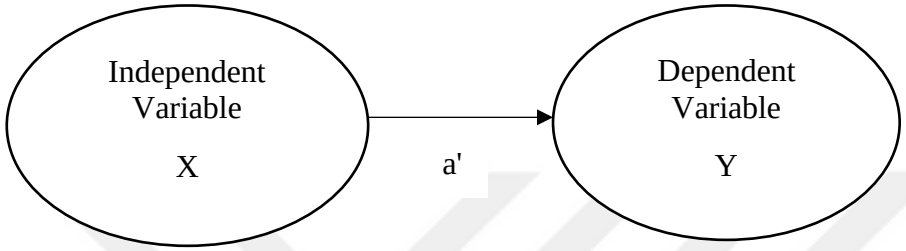


Figure 4. Simple effect model

The model in Figure 5 is showing the mediation effect. The effect of X on Y is provided by a third variable, M (intermediate variable). In the mediating effect model, the effect of X on M is symbolized through a and the effect of M on Y is symbolized by b. When the mediating variables M and X are included in the model at the same time, the effect of X on Y is shown by the c path.

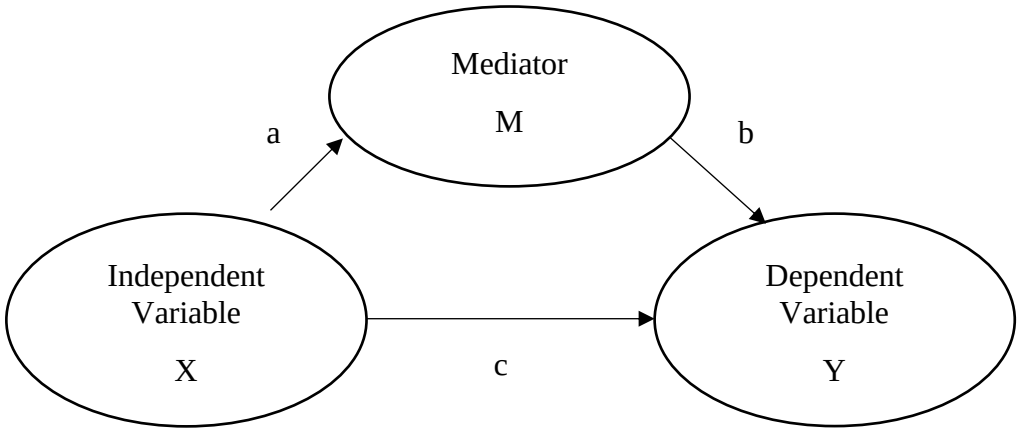


Figure 5. Mediation effect model

According to Baron and Kenny (1986), a variable that is claimed to be a mediating variable (M) is defined as a mediating variable if it meets four assumptions:

1. In the mediator model, there should be a significant relationship between dependent and independent variable. If there is no relationship between the dependent and independent variable, there is nothing to mediate.
2. There should be a significant relationship between independent variable and mediator variable. To be a mediator variable, it must be predictable by the independent variable.
3. Mediator variable should significantly predict dependent variable while controlling independent variable.
4. The influence of the mediator variable is controlled to show the mediating role in the model, and the effect of the DV and IV relationship should be decreased.

In addition, in Baron and Kenny's method, it is suggested that the results of the Sobel test (Sobel, 1982) should also be considered in order to test whether the indirect effect is statistically significant. It is discussed in the result part in details.

3.3 Data Source

Teaching and Learning International Survey (TALIS) 2018, high school science teachers' data of Turkey was the primary data source for this study. TALIS is one of the large-scale studies of the OECD. TALIS is the first international survey of teachers and school administrators to focus on working conditions and learning environments in schools. It also offers the opportunity to compare countries internationally. A total of 48 countries, 31 of which are OECD countries, participated in TALIS 2018 at secondary school (ISCED 2) level. In addition, 15 countries took part in this study at primary level (ISCED 1) and 11 countries at high school level (ISCED 3).

Thanks to TALIS 2018 representative sample data collection procedures, the results of this research may be extrapolated to the participating countries' teachers. One of the most important purposes of the TALIS study is to provide an opportunity to examine good practices and deficiencies in different education systems around the world. TALIS aims to provide the opportunity to make analyzes on the determined main themes (OECD,2018). Because of the aim of the present study, teacher level characteristics were in the focus in this dissertation.

3.4 Population and Sampling

TALIS focuses into the learning environment and teacher working conditions in schools. The representatives main survey sample was composed of around 200 schools per nation, with 20 teachers within each school. The number of schools sampled was proportionate according to their size. The sample size for the national sample is set at 4 000 teachers. Full-time or part-time classroom teachers and special education teachers were included in the scope of the TALIS 2018 study.

TALIS 2018 have been applied in primary, middle, and high school levels in Turkey. In Turkey, approximately 16000 teachers and 815 school principals from 825 schools participated to the TALIS 2018 survey. Table 1 shows the number of schools, teachers and school principals participating in TALIS 2018 application at all ISCED levels in Turkey. The current study was conducted based on the upper -secondary level (ISCED 3) science teachers in Turkey. The total number of the teachers who were participated in TALIS 2018 is 8342. 1243 science teachers from high school teachers in Turkey were included in this study.

Table 1. Numbers of School, Principal and Teacher participating from Turkey in TALIS 2018

	School	Principal	Teacher
Primary school (ISCED 1)	172	171	3024
Middle school (ISCED 2)	196	196	3952
High school (ISCED 3)	457	448	8342
Total	825	815	15498

Stratified cluster sampling was used to implement TALIS. The schools were divided into groups based on their financial sources, geographic locations, and school types. In the first step, schools were chosen at random in each nation, and in the second stage, teachers were chosen at random from the schools chosen in the first stage. This sampling process, as well as the corresponding sample sizes for teachers, was conducted for each involved country. Both school and teacher response rates were estimated to be at least 75% which resulted in an overall reply rate of 56.25% to take into account the population-representative sample size of each nation (OECD 2019b).

3.5 Instruments

TALIS 2018 gathered information on the aforementioned themes and indicator areas from teachers and school principals working at ISCED 2 level (same as in TALIS 2008 and 2013). Furthermore, as in TALIS 2013, nations were offered the option of surveying their ISCED level 1 and ISCED level 3 teacher and school principal populations in addition teachers and principals in schools chosen for involvement in PISA 2018. As in TALIS 2008 and 2013, the instruments used to

collect this information comprised of two questionnaires, one for teachers and one for principals.

The TALIS Questionnaire Expert Group (QEG), created and led by the TALIS International Research Consortium, oversaw developing the teacher and principal questionnaires. At crucial stages of the survey the QEG's work encompassed numerous phases, including virtual and face-to-face meeting. (Before the pilot study, field trial and the main study) The creation of questionnaires began with the idea of universal template questionnaires. For the core TALIS population and all alternative populations, adjustments have been made to the local and level-specific circumstances. Themes and indicators in the 2018 surveys overlapped across the core and optional populations, as they did in TALIS 2013, allowing for cross-level analysis.

TALIS 2018 contained three important stages which were the pilot study stage, the field trial stage, and the main survey stage of large scale-international survey. OECD designed and implemented all data collection processes. The testing of new, modified, and trend questions in the survey was an essential part of the questionnaire development process. As a result, some of the TALIS member nations conducted a test of new material (pilot phase). Following the pilot study, all survey materials were tested in all countries (field trial phase).

3.5.1 Pilot Study

The survey instruments were examined by experts throughout the pilot study, which was the first phase. In May 2016, a pilot study was performed with a small sample of teachers and principals from 11 TALIS involved nations and economies to assess the content of questionnaires (OECD,2019). To acquire principal and teacher cooperation, convenience techniques were used, such as assistance from the ministry of education and current relations with teachers'

networks developed during prior research studies. In general, participating nations and economies attempted to strike a balance between sex, (i.e., male and female), school characteristics (i.e., state and private schools), and school location (OECD, 2019). The pilot study conducted in March 2017 Turkey, the main application was carried out between the months of March and May 2018.

In each national study center might utilize the instruments in their original English or French form or make a full translation into their language. External verifiers did not review national modifications and translations since the pilot study were only used to obtain qualitative data and feedback rather than quantitative, internationally comparable data. However, the pilot study contributed questionnaire development in terms of many aspects such as, terminology, relevancy and acceptability of questions, ambiguity, clarity of questions and completion time of the survey (OECD, 2019).

3.5.2 Field Trial Phase

The field trial was the second important phase, respectively. The national surveys were subjected to rigorous independent modification, translation, and layout verification processes throughout this phase. The field trial began in February and March of 2017 to assess the question formats, survey processes, and data collecting techniques from the 46 TALIS participating countries. National adaption forms were used by each national research center to document their changes to their national survey instruments. All reported adjustments were approved by the TALIS 2018 international study center (ISC). Members of the Questionnaire Expert Group (QEG) edited and shortened the questionnaire materials to clarify the language used and to improve the specificity of the questions between the pilot study and the field trial. Field trial data containing evaluation of scale and item, cross-population and cross-cycle were examined by The International Association for the Evaluation of Educational Achievement (IEA) Hamburg's Research and Analysis Unit (OECD,2019).

3.5.3 Main Survey

The major data gathering in Southern Hemisphere countries occurred in 2017, from September to December, whereas the Northern Hemisphere data collection took place from March to May in 2018. The TALIS 2018 main data collection included 48 countries (OECD,2019).

While preparing field trial and main survey, decentralized translation was done. In other words, each country had to develop and translate its own national instruments based on one of the two original versions which were English or French. The ISC supplied countries with Word documents including translated questions from the field trial that may be utilized in the main survey in their original form.

Apart from the two countries, all the others used the online delivery system in order to gather data. Login actions, navigation, and answers throughout the fulfillment of an online questionnaire were recorded anonymously. Personal information such as IP addresses about respondents was never stored.

3.5.4 Quality Control

During the main data gathering process for TALIS 2018, quality control measures were carried out. For accurate comparisons of teacher and principal survey findings among countries/economies, quality control in questionnaire administration was critical. First of all, the International Association for the Evaluation of Educational Achievement (IEA) created and operated a standardized international quality control program to verify data collection operations in the involved countries and economies. For each involved nation and economy was assigned an international quality observer (IQO) to perform international quality control outside the national research center as part of the program. Secondly, following the application of the main survey, the Survey Activities Questionnaire (SAQ) was managed and implemented online to gather information regarding the NPM's feedback on all areas of the questionnaire administration. For TALIS 2018, SAQ increased the quality

control operations (OECD, 2019). Lastly, throughout the field trial phase and the main survey, the TALIS International Consortium mandated that NPMs perform national data collecting quality observations.

3.5.5 Teacher Questionnaire

In teacher questionnaire, there are 58 questions which were related to teachers' profiles such as gender, the highest level of formal education, teaching experience, first teaching qualification and subjects that they teach.

Moreover, related to initial preparation; teachers' professional development, instructional and professional practices; self-efficacy and job satisfaction; and school leadership, feedback, and school climate were taking part in the survey. More specifically, teachers responded about their professional experience and qualifications and diversity, as well as how often they cooperate with other teachers or how much they participate in school decision-making processes, include school climate issues in the teacher questionnaire. It took approximately 45 minutes to fill out the questionnaires, which were prepared electronically or in print. The current study examined data acquired using teacher questionnaires on upper secondary science teachers' self-efficacy in teaching, teaching practice, teachers 'job satisfaction (see Appendix A, Appendix B and Appendix C).

3.6 Validity and Reliability

The external validity of a study is determined by how generalizable its findings are (Fraenkel & Wallen, 1996). In other words, the population sample chosen ought to be representative in order to make generalizations. In this research, stratified cluster sampling was used to identify the representative sample for the population. The outcomes of the study may be generalized because it was done by tremendous number of teachers in different nations.

The development of the TALIS 2018 scale started with a theoretical identification of items that appeared to be indicative of the required latent constructs. These identifications were obtained from previous TALIS cycles, research studied from relevant domains, and professional understanding of item and scale construction. These procedures served as a preliminary validity test for the scales (Messick, 1995). Detailed quality testing was performed on the data used to describe constructs and calculate scale scores.

The latent constructs were assessed using field trial data, and then modified for the main questionnaire. The outcomes of these field trial studies were subsequently used by the TALIS International Consortium, the Questionnaire Expert Group (QEG), and the OECD to make choices concerning item and scale adjustments.

The extent to which an instrument's measurements are consistent is known as reliability. Although reliability is essential for accurate measurement, it is insufficient when the test is not valid (Martin & Mullis, 2008). Cronbach Alpha values were determined for each scale to determine its internal validity. Cronbach alpha must be at least 0.7 to obtain an adequately reliable scale. The omega coefficients for the subscales and stratified Cronbach alpha value are greater than 0.7.in the most of the TALIS 2018 scales. Table 2 provides information about the reliability values of variables used in this research.

Table 2. Reliability Values of Scale Variable

Variable	Omega* Coefficient	Stratified* Cronbach's Alpha
Teacher self-efficacy		
Classroom Management	.869	
Student Engagement	.799	
Instruction	.826	
Self-efficacy in overall		.928
Teaching Practices		
Clarity of Instruction	.933	
Classroom Management	.874	
Cognitive Activation	.787	
Teaching Practice in overall		.906
Teacher Job Satisfaction		
Work Environment	.859	
Profession	.850	
Job Satisfaction in overall		.894

Note. *Omega/Cronbach's Alpha, Retrieved from TALIS 2018 Technical Report
Source: OECD, TALIS 2018 database.

3.7 Data Analysis

TALIS 2018 data were acquired as an SPSS data file from the OECD official website. TALIS dataset is available for everyone in the form of separate SPSS files for each country and each ISCED levels. The first report, TALIS 2018 Results (Volume I), in which the findings of the research are shared, was published by the OECD in June 2019. In current study, ISCED 3 level data of Turkey were used. The extracted data was used to create two data sets. The first data set featured the extracted raw data provided by the TALIS 2018 team, whereas the second data set had changed data recoded to new data.

Statistical analyses were performed in many stages. The analyses proceeded by evaluating measurement models of the self-efficacy, teaching practice and job satisfaction scale for ISCED 3 level science teachers in Turkey. The data were examined by using Confirmatory Factor Analysis (CFA) consisting of second order confirmatory factor analysis and structural equation modelling (SEM) with the software of LISREL 8.7 which is a special computer program developed for covariance structure analysis. Data adjusted before starting the analysis process so that it can be imported into the LISREL program. The data preparation process was completed with SPSS 28.

Firstly, descriptive statistics utilized by using SPSS. Secondly, Confirmatory factor analysis is used to analyze. CFA is selected since the theoretical conceptual model may be verified and the relationship between the variables can be shown. To acquire the greatest results, a researcher must make critical judgments on which approach to use. The present study's aim is to validate rather than create a new instrument. The main reason for choosing confirmatory factor analysis instead of exploratory factor analysis (EFA) is that in confirmatory factor analysis, each observed variable is defined only under its own latent variable. That is, an observed variable defined under latent variable is not allowed to be represented by another latent variable (Kline, 2005). According to Şencan (2005) confirmatory factor analysis is more effective analysis than exploratory factor analysis because it theoretically provides much more reliable information about the validity of the model and factor structure. Final step is the application SEM which is a statistical technique that analyzes data in a confirmatory approach (Byrne, 2001). In this method, a hypothesized model of variable relationships and simple mediation effect are statistically tested to verify its consistency with the data, which is also known as the goodness of fit.

3.7.1 Structural Equation Modelling and Confirmatory Factor Analysis

The structural equation model (SEM) is a general concept that includes many statistical techniques, rather than being a statistical technique. Confirmatory factor Analysis (CFA), path analysis and multiple regression are the most common statistical analyzes of these techniques. That is, SEM is a statistical technique used to test models with causal relationships and correlation relationships among variables, and it is a multivariate method that combines many analyzes to predict relationships. It also known as covariance structure analysis in the literature (Kline, 2005). Jöreskog and Sörbom (1993) defined SEM as the general name given to the techniques that allow examining the latent variables of the structural equation model through the observed variables. The concept of causality in structural equation modeling is the testing of direct effects and indirect effects between variables in the context of a model constructed by researchers.

The most common method used in the structural equation modeling literature is evaluating whether the data support the model is the two-stage method (Anderson & Gerbing, 1988). As the first step in the analysis, the measurement model is tested, and it is checked whether the measurements of the structures in the model measure the relevant structures correctly, and in the second stage, the structural models are examined.

The Confirmatory Factor Analysis (CFA) is a one of the structural equational modellings that focuses on especially measurement models; that is relationship between observed and latent variables. Observed variable is the variable whose effect is examined about a feature belonging to the individual. Latent variable is an unobservable variable that affects more than one observed variable and tries to explain the relationship between these observed variables. In CFA, previously determined hypothesis, theory, or model regarding the relationship between variables were tested, and it is one of the main methods used in examining construct validity (Tabachnick & Fidell, 2001). Namely, in confirmatory analyses, a model is created for assumptions based on knowledge or experience obtained from previous

extensive research within the framework of observations. Based on these assumptions, the accuracy of the previously established model is tested for some parameters (Jöreskog & Sörbom,1993). Similarly, Gorsuch (1983) states that confirmatory factor analysis is a very powerful analysis that allows testing of previously determined assumptions.

Kline (2005) stated each observed variable is defined only under its own latent variable in confirmatory factor analysis. An observed variable defined under one latent variable is not allowed to relate to another latent variable. Figure 4 shows an example of a simple measurement model.

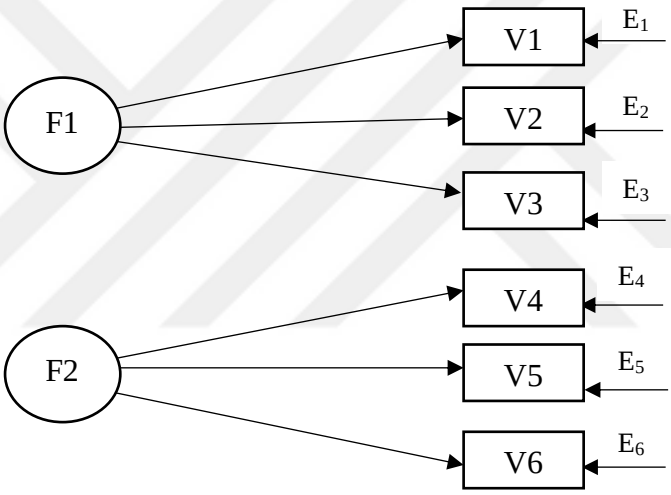


Figure 6. Sample Measurement Model

In Figure 6, it is seen that F1 and F2 are latent variables and each of them is represented by 3 observed variables. When it is concluded that the latent variables in the model can be represented by observed variables according to the measurement model results, the testing of the structural model can be started. In the figure 6, V1-V6 represents the observed variables and E1-E6 represents error variance.

3.7.1.1 Second Order/Higher Order Confirmatory Factor Analysis

The Second Order Confirmatory Factor Analysis is a statistical technique used to verify that postulated construct in a research load into a specific number of underlying components. Figure 7 is an example of second order CFA for a single construct. The main construct (A1) is linked to the sub-constructs (B1, B2 and B3) using one sided arrow to display the causal effect. Each sub-constructs have its own sets of observed variables. (C1-C9)

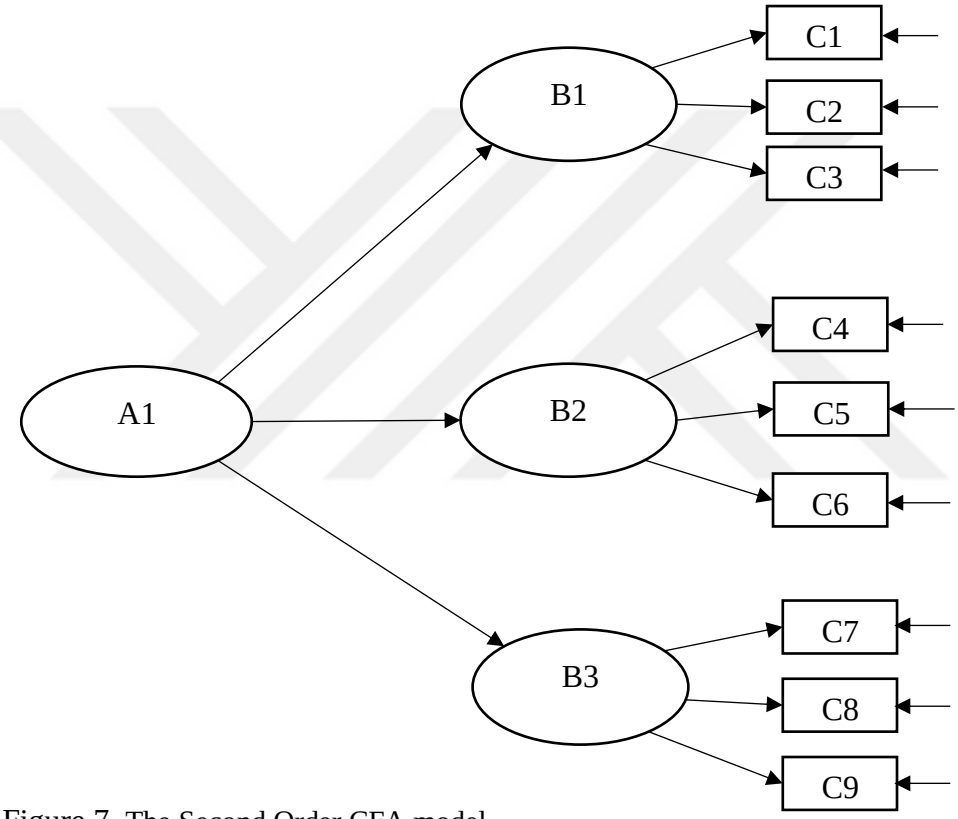


Figure 7. The Second Order CFA model

As can be seen in the figure 7, each of the first-order constructs (B1, B2 and B3) has a direct influence on the second-order construct. In this analysis, unlike a standard confirmatory factor analysis model, the relationships between the factors are not analyzed. In such a case, the first-order constructs are defined as the endogenous variable and the second-order construct as the exogenous variable.

In second-order confirmatory factor analysis models, at least three first-order factors are required to define the second level. Otherwise, the direct impact from the second level to the first level may be poorly defined. In addition, there must be at least two indicators of each first-order factor (Kline, 2005).

3.7.2 Model Specification

According to Jöreskog (1973) structural equation models consist of two parts. The first part is the measurement model applied by relating the observed variables to latent variables with confirmatory factor analysis. The second part is the structural model, which is applied by relating latent variables to each other with simultaneous equation systems.

3.7.2.1 Measurement Model

The first step in structural equational modeling is to construct the model for measuring latent variables (Lei & Wu, 2007). Latent variables, alternatively known as endogenous variables, are unobserved variables. Observed variables, also referred as measurable variables or exogenous variables, are used to indicate latent variables that are postulated based on theory (Kline,2016; Tabachnik & Fidell, 2019).

CFA was used to analyze the measurement model, allowing the researchers to test the hypothesis regarding latent variables and their relation to the observed variables (Hox & Bechger, 1998). Theories and empirical findings are used to hypothesize both latent and observable variables (Kline, 2016).

3.7.2.2 Structural Model

The structural model is based on a suitable measurement model. As the TALIS 2018 Technical Report previously supplied the measurement model's valid psychometric characteristics and appropriate model fit indices (see table 3),

structural equations were developed for the hypothesized structural models. The one of latent variables is teacher self-efficacy that is a composite score derived from classroom management, instruction, and student engagement. Other latent variable is teaching practice that is a composite score derived from classroom management, cognitive activation, and clarity of instruction. Last latent variable is the job satisfaction that is a composite score derived from work environment and profession. They each have a scale composite score for their items.

3.7.3 Model Evaluation

SEM research can be considered the best ways to check model fit for over two decades but there is no strict statistical framework for researchers to retain or reject hypotheses in structural equational modeling (Kline, 2016). For model to be acceptable, some goodness-of-fit criteria that try to predict how consistent the relationships in the model are with the data must be within acceptable limits.

As stated by Kline (2016), Chi-Square Goodness of Fit, Comparative Fit Index (CFI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR) needed to check for model fit as in shown table 3. The fit indices shows how plausible the model that estimated. Because the chi-square value is sensitive to the sample size, it is not appropriate to use it to control the fit of the model (Brown, 2014). However, Jöroskog and Sörbom (2001) states that chi -square value can be used in the comparison of models, if not as a criterion of goodness of fit. As a result, when the chi-square value decreases, the model fit increases. In this research, RMSEA, CFI, TLI and SRMR were reported as a fit indices. According to Kelloway (1998) , RMSEA which is developed later is important in terms of both ease of interpretation and confidence interval, as well as providing estimates independent of sample size. Another test that considers the sample size and the degree of freedom in the model is CFI in the evaluation of the model fit. NFI is another important test which a sample size desensitized version of CFI. Another major criterion that is frequently mentioned in the literature is

RMR and standardized RMR. Hu and Bentler (1998) argued that RMR and SRMR fit criterion gives very good results after their studies.

Table 3. Model fit indices for CFA and SEM

Fit Indices	Name	Good Fit	Acceptable Fit
X^2	Chi-squared	p>0.05	
[1]X^2/sd		$0 \leq X^2/sd \leq 2$	$2 \leq X^2/sd \leq 3$
[2]CFI	Comparative Fit Index	$.95 \leq CFI \leq 1$	$.90 \leq CFI \leq .95$
[2]NFI	Normed Fit Index	$.95 \leq NFI \leq 1$	$.90 \leq NFI \leq .95$
[3]RMSEA	Root Mean Square Error of Approximation	$.00 \leq RMSEA \leq .05$	$.05 \leq RMSEA \leq .08$
[3]SRMR	Standardized Root Mean. Square Residual	$.00 \leq SRMR \leq .05$	$.05 \leq SRMR \leq .10$

[1](Kline, 2016), [2](Baumgartner & Homburg, 1996; Bentler, 1980; Marsh, Hau, Artelt, Baumert & Peschar, 2006), [3](Browne & Cudeck, 1993)

3.7.4 Model Modification

In the confirmatory factor analysis model, when the fit indices do not meet the acceptance levels, it can be quite difficult to redefine the model. In this case, it may be beneficial to examine the modification suggestions made as a result of the analysis. The modification indices suggest detailed modifications to the model by looking at the covariance between the indicator and latent variables. These modifications are usually built on the basis of error matrices. When these modifications are added or removed, it represents the X^2 value that will be obtained in the model. In particular, if a change suggested by the modification indices

corresponds to a very large decrease in the X^2 value of the model, it indicates that the proposed modification is a critical change for the model (Sümer, 2000).

The problems encountered in the organization of confirmatory factor analysis models are categorized in two dimensions. The first dimension is related to indicators. In some cases, indicators that are theoretically defined under a certain structure may not sufficiently explain this structure. In this situation, the indicator can be defined under a different factor. As a result of the modifications, indicators whose factor loadings do not increase at a reasonable may be measuring a characteristic that other indicators do not measure. The second problem in model modification is related to factors. Incorrect determination of the number of latent variables can be an example of this.

3.8 Variables of the Study

The Teaching and Learning International Survey (TALIS 2018) examines a wide range of items including teachers' perspectives and attitudes. The TALIS 2018 database covers items as variables, and it includes scale scores and index scores of the latent variables (see table 2). The OECD reports go into detail about how these index and scale scores were calculated (OECD, 2019b). All these variables were derived from the original TALIS 2018 database.

3.8.1 Mediator Variable

Teacher self-efficacy was used as a mediator variable in this study. The concept of teacher self-efficacy is well-suited to explaining the relationship between teaching practice and job satisfaction. Teacher self-efficacy is considered as one of the most important motivational beliefs influencing instructors' professional behaviors and instructional methods (Klassen et al., 2011). TSE is measured using twelve items in the TALIS 2018 teacher questionnaire. Teacher self-efficacy is offered to be three dimensions in the present study and defined like self-efficacy in

classroom management (CM), self-efficacy in instruction (INS) and self-efficacy in student engagement (STE). The items for each subscale are shown in table 4. These questions' response options were designed as 4-point Likert-type response with 1 for "Not at all", 2 for ''To some extent'', 3 for ''Quite a bit'' and 4 for "A lot".

Table 4. Teachers' self-efficacy scale

''In your teaching, to what extent can you do the following?''
Self-efficacy in classroom management (CM)
34D. Control disruptive behavior in the classroom
34F. Make my expectations about students' behavior clear
34H. Get students to follow classroom rules
34I. Calm a student who is disruptive or noisy
Self- efficacy in instruction (INS)
34C. Craft good questions for students
34J. Use a variety of assessment strategies
34K. Provide an alternative explanation, for example when students are confused
34L. Vary instructional strategies in my classroom
Self- efficacy in student engagement (STE)
34A. Get students to believe they can do well in schoolwork
34B. Help students value learning
34E. Motivate students who show low interest in schoolwork
34G. Help students think critically

3.8.2 Independent Variable

Teaching practice was used as an independent variable. TP is measured using twelve items in the TALIS 2018 teacher questionnaire. Teaching practice is offered

to be three subscales in the present study and defined like classroom management (CLM), clarity of instruction (CI) and cognitive activation (CA). The items for each subscale are shown in table 4. These questions' response options were designed as 1 for “Never or almost never”, 2 for ‘‘Occasionally’’, 3 for ‘‘Frequently’’ and 4 for “Always”.

Table 5. Teaching practice scale

‘‘Thinking about your teaching in the <target class>, how often do you do the following?”
Teaching practice in clarity of instruction (CI)
42A. I present a summary of recently learned content
42B. I set goals at the beginning of instruction
42C. I explain what I expect the students to learn
42D. I explain how new and old topics are related
Teaching practice in cognitive activation (CA)
42E. I present tasks for which there is no obvious solution
42F. I give tasks that require students to think critically
42G. I have students work in small groups to come up with a joint solution to a problem or task
42H. I ask students to decide on their own procedures for solving complex tasks
Teaching Practice in classroom management (CLM)
42I: I tell students to follow classroom rules
42J: I tell students to listen to what I say
42K: I calm students who are disruptive
42L: When the lesson begins, I tell students to quieten down quickly

3.8.3 Dependent variable

Job satisfaction was used as a dependent variable in this study. JS is measured using eight items in the TALIS 2018 teacher questionnaire. Teachers' job satisfaction was defined as a multidimensional construct with two sub-scales: work environment satisfaction and professional satisfaction (OECD 2019b). Respondents answered on a four-point Likert scale ranging 1 for "Strongly disagree", 2 for ''Disagree'', 3 for ''Agree'' and 4 for "Strongly Agree".

Table 6. Job satisfaction scales

''We would like to know how you generally feel about your job. How strongly do you agree or disagree with the following statements?''
Job satisfaction with work environment (WE)
53C.* I would like to change to another school if that were possible
53E. I enjoy working at this school
53G. I would recommend this school as a good place to work, and
53J. All in all, I am satisfied with my job.
Job satisfaction with profession (PRO)
53A. The advantages of being a teacher clearly outweigh the disadvantages,
53B. If I could decide again, I would still choose to work as a teacher,
53D*. I regret that I decided to become a teacher, and
53F.* I wonder whether it would have been better to choose another profession.

Note: * represents reverse-coded items

3.9 Data Preparation

3.9.1 Recoding Variables

When the items are examined in teacher job satisfaction part, it is determined that some items should be reverse coded. Negative covariance between items TT3G53C, TT3G53D and TT3G53F was eliminated after recoding these items. Throughout scale constructions and validations, the TALIS technical report discussed the problem of reverse-coding. Nevertheless, empirical evidence show that this reverse-coding was not included in the data that was released. While dealing with these data, researchers must be aware of the deficiency of reverse coding. A 4-point Likert scale was used for all three dimensions as an answer option. (1 = strongly disagree, 4= strongly agree) Items coded TT3G53C, TT3G53D and TT3G53F has been recoded as follows 1→4, 2→3, 3→2 and 4→1. In self-efficacy and teaching practice scale are not recoded.

3.9.2 Handling Missing Values

Missingness might occur for several reasons. In long questionnaires, for example, volunteers may inadvertently leave certain items unanswered. Mechanical problems in experimental methods or procedures may result in unrecorded data, or the research may be related to sensitive matter, in which case participants may exercise their right not to answer these types of questions. Traditional techniques presume that if missing values account for less than 5% of the entire dataset, it is acceptable (Tabachnick & Fidell, 2019). The statistical analysis will be biased; if missing values account for more than 10% of the entire dataset (Bennett, 2001).

Missing data analysis showed 7,4 % of missing values for the summated variables. MCAR test is used to try and determine if data which is missing from the dataset in randomly or in a systematic way. Little's MCAR test $x^2 = 1286.722$, df=1070, $p < .05$ showed that responses were not missing completely random.

Depending on the data mechanism, standard techniques (e.g., pairwise deletion, listwise deletion, mean imputation,) can be applied since missing value may generate significant bias (Wothke, 2000). The expectation-maximization method was applied to impute missing values in SPSS 28.0.

Table 7.Number missing values

Variable	**N**	**Mean**	**Std. Dev**	**Missing**	
				N	**%**
TP_A	1038	3,17	,711	205	16.5
TP_B	1038	3,33	,627	205	16,5
TP_C	1036	3,26	,681	207	16,7
TP_D	1036	3,42	,621	207	16,7
TP_E	1033	1,84	,817	210	16,9
TP_F	1034	2,53	,774	209	16,8
TP_G	1037	2,25	,806	206	16,6
TP_H	1036	2,51	,773	207	16,7
TP_I	1036	2,90	,846	207	16,7
TP_J	1035	3,04	,845	208	16.7
TP_K	1036	2,79	,848	207	16,7
TP_L	1035	2,52	,922	208	16,7
TSE_A	1224	3,19	,707	19	1,5
TSE_B	1224	3,24	,721	19	1,5
TSE_C	1223	3,28	,663	20	1,6
TSE_D	1220	3,29	,689	23	1,9
TSE_E	1222	3,11	,712	21	1,7
TSE_F	1220	3,21	,662	23	1,9
TSE_G	1222	3,19	,708	21	1,7
TSE_H	1221	3,31	,675	22	1,8
TSE_I	1222	3,20	,712	21	1,7
TSE_J	1220	3,06	,709	23	1,9
TSE_K	1217	3,37	,630	26	2,1
TSE_L	1218	3,05	,726	25	2,0
TJS_A	1220	2,86	,817	23	1,9
TJS_B	1219	2,92	,940	24	1,9
TJS_C	1219	2,78	,960	24	1,9
TJS_D	1219	3,25	,815	24	1,9

TJS_E	1218	3,03	,810	25	2,0
TJS_F	1216	2,66	,950	27	2,2
TSJ_G	1217	2,91	,852	26	2,1
TSJ_F	1221	3,18	,684	22	1,8

3.10 Assumptions of the Study

The generalizability of the data to be obtained in this study was made within the framework of the following limitations. The following are the assumptions of this study:

1. This research considered that the TALIS 2018 sample of Turkey was representative of national population.
2. The current study assumed that all TALIS 2018 participants provided accurate information about themselves and clearly expressed their thoughts and situations in the questionnaires.
3. Questionnaires for teachers and school principals, as well as cognitive items, were prepared in English and French first and then translated into Turkish. The translations from English to Turkish were assumed to be correct in this study.

3.11 Limitations of the Study

First of all, an important point to be underlined is that the questionnaires provided to teachers and administrators in the TALIS study are filled on a statement basis. It should not be ignored that the data obtained in the TALIS study contains subjective, personal, and cultural biases due to its nature. Social desirability bias means that self-report items in such a manner that participants may inadvertently or consciously portray themselves in a positive way. In other words, Teachers may give survey replies that they think are more socially acceptable than an actual response; as a result, teachers' replies can differ from their real teaching practices.

Consequently, while evaluating the results of the current study, response bias should be considered.

Second, as the literature study revealed that latent variables are correlated to teacher characteristics such as gender, degree of education, teaching experience, and subject taught. Because of current study focused on the relationships between teacher self-efficacy, teaching practice, and job satisfaction rather than the influence of teacher characteristics on the latent variables, teacher characteristics were not included in the predicted models.

Lastly, all the scales included in this study's psychometric properties were obtained straight from the TALIS 2018 Technical Report. Validity and reliability scales used in this study were directly from TALIS 2018 Report.

CHAPTER 4

RESULTS

The primary goal of this study was to examine the relationship between teachers' self-efficacy,teaching practice and job satisfaction of teachers. The study's participants were high school science teachers in Turkey. They were provided a instrument containing several parts, one of which asked for demographic information. We examined nation cases that the OECD regarded as valid (OECD, 2019b) and that included TSE ,TP and JS data.

In this chapter, the analyses and the findings of these analyses were reported. Firstly, descriptive analysis and demographic characteristics were represented about sample. Secondly, measurement model of the teacher self- efficacy, teaching practice and job satisfaction levels of science teachers were examined using confirmatory factor analysis (CFA). Later, two research model was teste using structural equation modelling (SEM).

4.1 Descriptive Statistics

The sample of the study includes 1243 science teachers from Turkey (611 females and 632 male). Table 1 shows the percentages of science teachers based on gender and experience. The percentages of upper-secondary female and male science teachers are 49.2% and 50.8 % in Turkey. As in shown in the table, teachers ranged according to their years of experience *(M*=15.51, *SD*=8.75) which were subsequently categorized into career stages based on Gu and Day (2007). In other words, early-career (≤8 years of teaching experience; 28.9%), mid-career teachers

(9-23 years of teaching experience; 52%), late-career teachers (≥24 years of teaching experience; 18.8%) and some were missing (0.3%). Educational attainment split into four categories. According to the UNESCO Institute for Statistics (2011), short-cycle tertiary education, or ISCED 2011 level 5, programs are frequently designed to provide learners with professional knowledge, abilities, and competences. A total ISCED 2011 level 6 is equal to bachelor's degree. ISCED 2011 level 7 means that master's degree. Finally, ISCED 2011 level 8 refers to doctoral degree. A total of 916 (73.7%) teachers held degrees at the bachelor or below bachelor, and 326 (26.2%) teachers possessed master's or doctoral degree. Demographic characteristics of participants and descriptive statistics of variables were represented in table 8 and table 9.

Table 8. Summary of demographic characteristics of sample

	N	%
Gender		
Female	611	49.2
Male	632	50.8
Teaching Years		
Early career (≤ 8 years)	360	28.9
Mid-career (9-23 years)	646	52
Late career (≥ 24 years)	233	18.8
Educational Background		
High school and below	3	0.2
Bachelor's degree	913	73.5
Master's degree	307	24.7
Doctoral degree	19	1.5

Table 9. Descriptive statistics for the variables

	N	M	Std. Deviation	Min.	Max
Teacher self-efficacy					
Classroom Management	1243	13.010	2.248	4	16
Student Engagement	1243	12.718	2.3314	4	16
Instruction	1243	12.758	2.1543	4	16
Teaching Practices					
Clarity of Instruction	1243	13.160	1.97278	4	16.08
Classroom Management	1243	11.275	2.66377	4	16
Cognitive Activation	1243	9.155	2.30027	3.94	16
Teacher Job Satisfaction					
Work Environment	1243	11.901	2.57318	4	16
Profession	1243	11.698	2.81167	4	16

Table 10 represents the scale reliability and confirmatory factor analysis (CFA) model fit indices of teacher self-efficacy, teaching practice and teacher job satisfaction. Cut-offs requirements for CFA model evaluation for TALIS 2018 (OECD,2019): omega coefficient $\geq$ .700 (good); CFI $\geq$ .900 (acceptable); TLI $\geq$ .900 (acceptable); RMSEA $\leq$ .080 (acceptable); SRMR $\leq$ .060 (acceptable). Each of show high reliabilities therefore, they are acceptable.

Table 10. Scale Reliability coefficients and CFA Model Fit Indices for Teacher Self-efficacy, Teaching Practice and Teacher Job Satisfaction calculated by OECD

Scale	Omega coefficient	CFI	TLI	RMSEA	SRMR
Teacher self-efficacy					
Classroom Management	.86	.993	.959.	.049	.012
Student Engagement	.799	.999	.995	.019	.004
Instruction	.826	.996	.989	.025	.011
Teaching Practices					
Clarity of Instruction	.933	1.000	1.000	.000	.004
Classroom Management	.874	.999	.996	.016	.004
Cognitive Activation	.787	1.000	1.002	.000	.000
Teacher Job Satisfaction					
Work Environment	.859	.992	.976	.036	.016
Profession	.850	.985	.962	.040	.018

Note. Adapted from TALIS 2018 Technical Report by OECD, 2019, Paris, TALIS, OECD Publishing.

4.2 Assumptions of SEM

Before conducting SEM analysis, the statistical assumptions behind SEM were investigated and addressed. It is important to supply the assumption of multivariate normality which indicating the observations in the sample are distributed normally to utilize multivariate statistical methods. In addition, each variable must fulfill the univariate normality assumption for multivariate normality. For determining univariate normality skewness and kurtosis coefficients were utilized. Skewness and kurtosis coefficients of measurement vary between -.261 and .866. The findings are within the literature's accepted bounds (George & Mallery, 2010) and it implies that the data are normally distributed.

Even though multivariate outliers were identified using Mahalanobis distance using SPSS. $p < .05$ was used as the level of statistical significance. those values were not removed from the sample since they were believed to be acceptable response patterns shown in figure 8. It is common for a few outliers to arise when considering the sample size (N=1243).

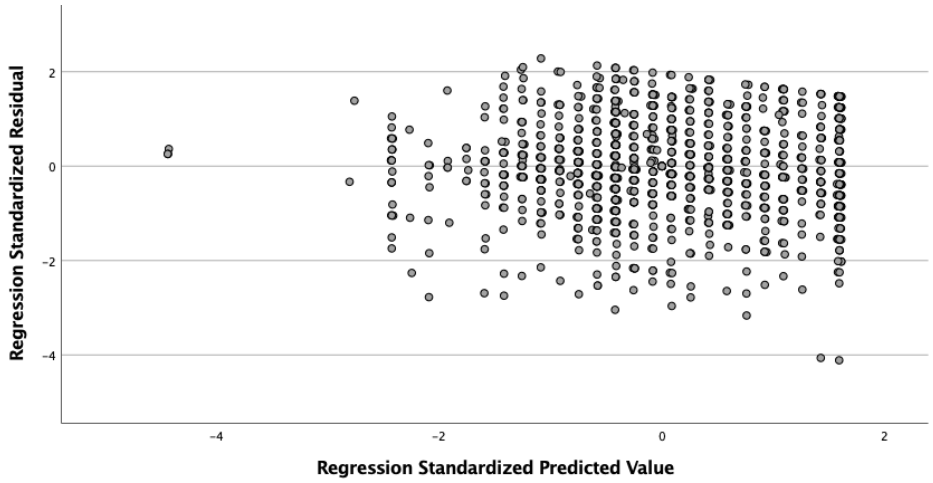


Figure 8. Scatterplot of dependent and independent variable

For the SEM findings to be reliable, the correlational analysis is required to effectively verify the assumption of multicollinearity. The independent variable has a significant relationship with mediator and independent variables; and the mediator variable has a significant relationship with the dependent variable in mediator model. These relations should not be too high to prevent multicollinearity. For this study, variation inflation factor (VIF) was used to check assumption. VIF value should be less than 10, so there is no multicollinearity. High relationships above 10 cause multicollinearity problem (O'Brien, 2007).

Table 11. Variation inflation factor values between variables

	TP	TSE	JS
TP		1.000	1.359
TSE			1.359

When table 11 is evaluated, VIF values of the variables were below than 10. Hence, there is no multicollinearity problem. After analyses of normality and multicollinearity the structural model was tested. The Maximum Likelihood Estimation Method was used to examine both the measurement and structural models. The most widely utilized adaptive function in SEM is the Maximum Likelihood Estimation Method (Çelik & Yılmaz, 2003).

4.3 Measurement Models with Variables

During TALIS analyses, confirmatory factor analysis (CFA) was used to see how well the actual empirical data fit the latent construct by TALIS team. CFA permits inference on the scale from the scale items by determining the relation between the two. The theoretical model of each scale is evaluated with regard to its alignment to the empirical data using the model fit indices as assessment criteria (see table 3).

4.3.1 Teacher Self-Efficacy Measurement Model

The dimensions of self-efficacy scale in the TALIS 2018 report were analyzed whether the defined structure is provided or not by using confirmatory factor analysis (CFA). Figure 9. represents second order confirmatory factor measurement model of teacher self-efficacy scale, with three large oval shapes labelled STE, CM and INS representing the latent constructs of self-efficacy in

student engagement, self-efficacy in classroom management and self-efficacy in instruction respectively. The twelve square boxes at the end of pointed arrows from STE, CM and INS display the observed variables that expose the latent variables.

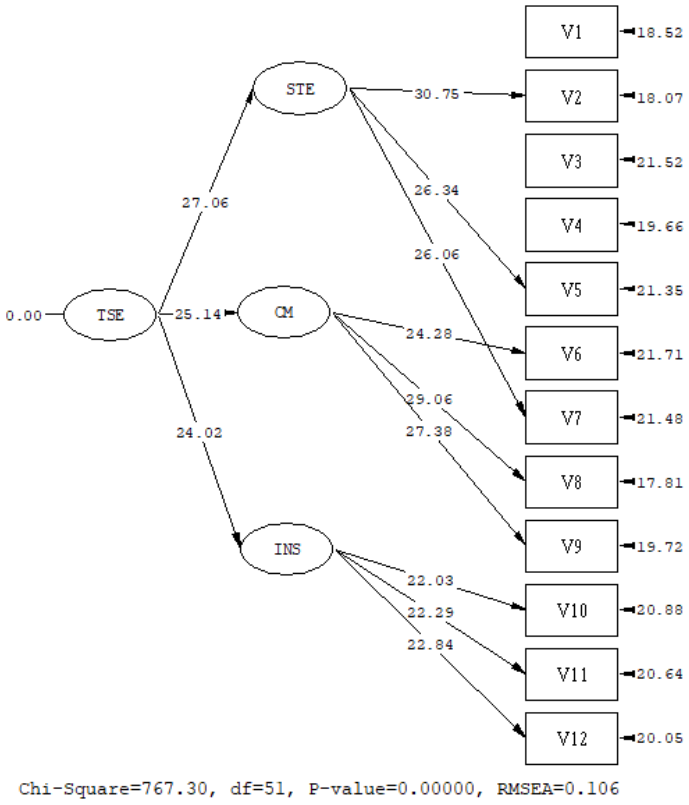


Figure 9. T-values for the measurement model designed for self-efficacy scale

Short arrows pointing towards the observed variables represent the related measurement errors for these items. For the model whose accuracy is checked in SEM to be legitimate, the path coefficients must be significant. T- value is checked for the significance of the path coefficients. Critical t-value should be between 1.96-2.56 at .05 level to be considered as a significant. If above 2.56 t-values are significant at .01 level (Çokluk, Şekercioğlu & Büyüköztürk, 2016). When the measurement model is determined, t-values of scale items are significant at .01 level. If there is a t value below than this value, the relationship or item corresponding to

this parameter should be removed from the model. As can be seen in the figure 9, all t-values are significant for the measurement model.

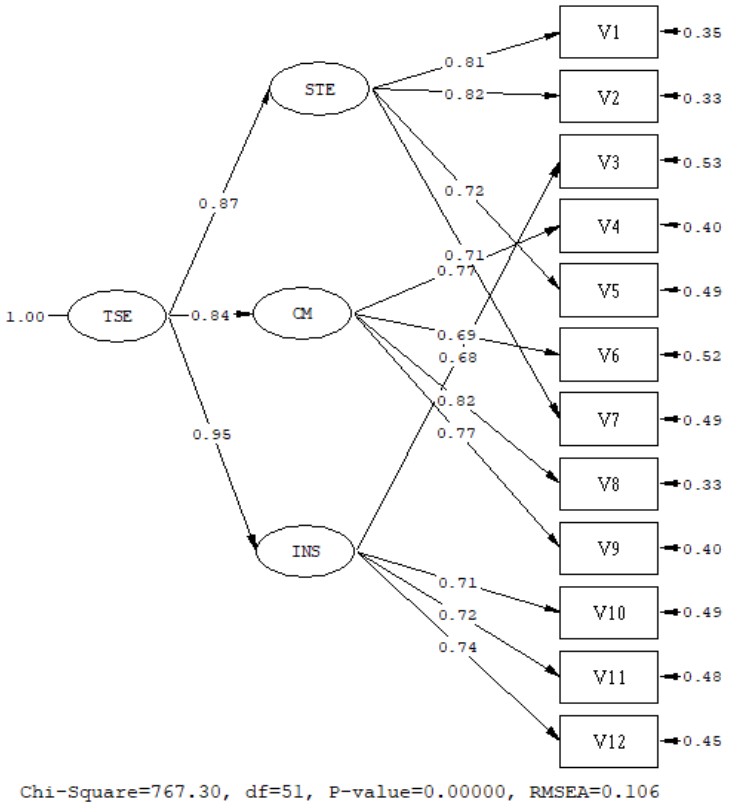


Figure 10. Standardized solution for the measurement model for self-efficacy scale

Standardized solution value for items and all values are significant for the measurement model ($\geq .30$). Fit indices values are critical values for how well a model is supported by the data. Cut-offs results for CFA model evaluation for teacher self-efficacy Chi-square = 767.30, NFI = .96, RMSEA =.11, SRMR=.058, CFI =.97. Although the findings clearly showed to a good fit to the data, some modifications were applied by adding correlations recommended by TALIS.

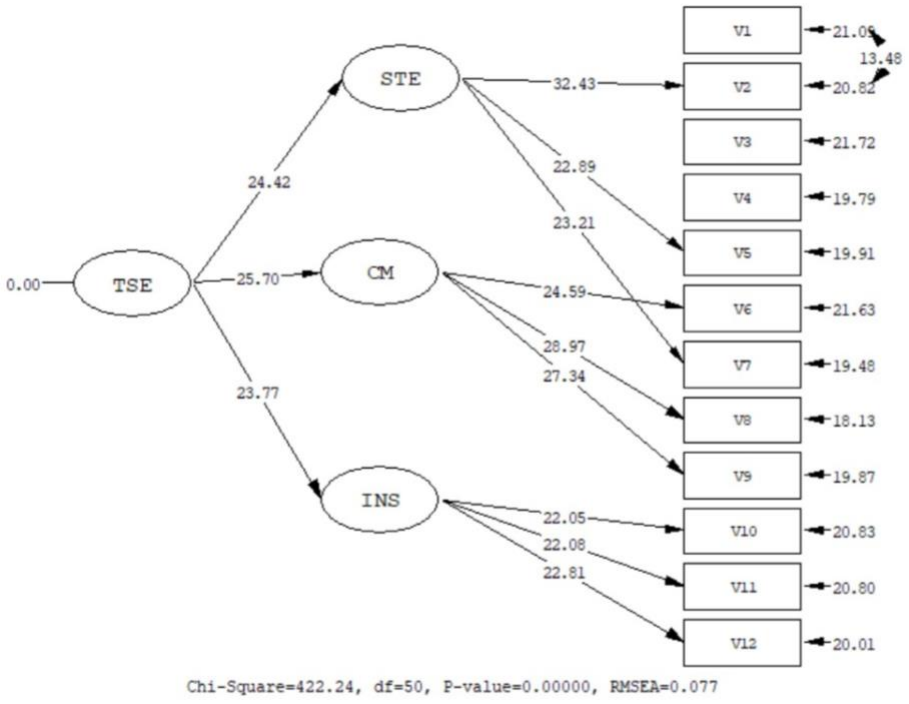


Figure 11. T-values for the measurement model for self-efficacy scale after modification.

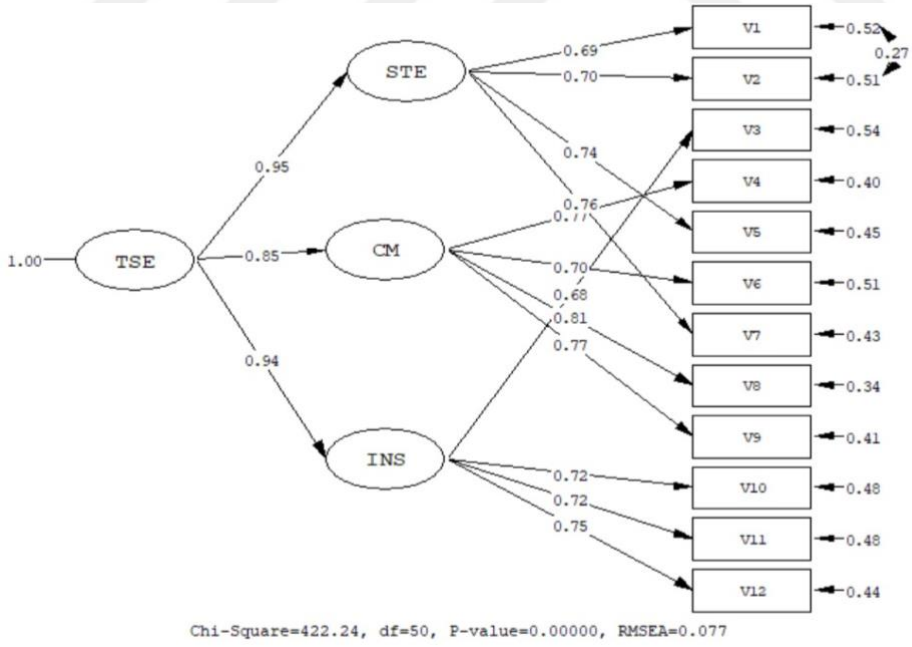


Figure 12. Standardized solution values for the measurement model of self-efficacy scale after modification.

Standardized solution value is equivalent to the beta (β) value in classical regression analysis. β coefficient value for self-efficacy in instruction (.94), in student engagement (.95) and in classroom management (.85) explained the teacher self-efficacy factor. Figure 12 represents standardized solution value for items and all values are significant for the measurement model ($\geq .30$). The double arrow between residuals of items V1 (34A) -V2 (34B) represents the error covariance between these items. Items having a high correlation between error variances were found and their error covariances were combined to confirm the model's goodness of fit. Covariance suggestion for the errors of items V2 and V1 leads to the highest chi-square reduction. After modification, the chi-square value decreased by 345.06 and this difference was statistically significant (P = 0.0) The decrease in the chi-square value always contributes to the fit of the model. However, using chi-square indices to assess the model fit cannot be appropriate in studies with large sample due to the sensitiveness of samples size. After modifications, cut-offs result for CFA model evaluation for teacher self-efficacy Chi-square = 422.24, NFI = .98, RMSEA =.077, SRMR=.043, CFI =.98 show that the model was acceptable. These values are sufficient for the model to be acceptable (Hu & Bentler, 1999; Karagöz, 2016).

4.4 Teaching Practice Measurement Model

With the help of confirmatory factor analysis (CFA), the dimensions of teaching practice in the TALIS 2018 report were analyzed whether the defined structure is provided or not Figure 12. represent second order confirmatory factor measurement model of teacher teaching practice scale, with three large oval shapes labelled CI, CA and CLM representing the latent constructs of teaching practice related to clarity in instruction, teaching practice related to cognitive activation and teaching practice related to classroom management respectively. The twelve square boxes at the end of pointed arrows from CI, CA and CLM display the observed

variables that expose the latent variables. Short arrows pointing towards the observed variables represent the related measurement errors for these items.

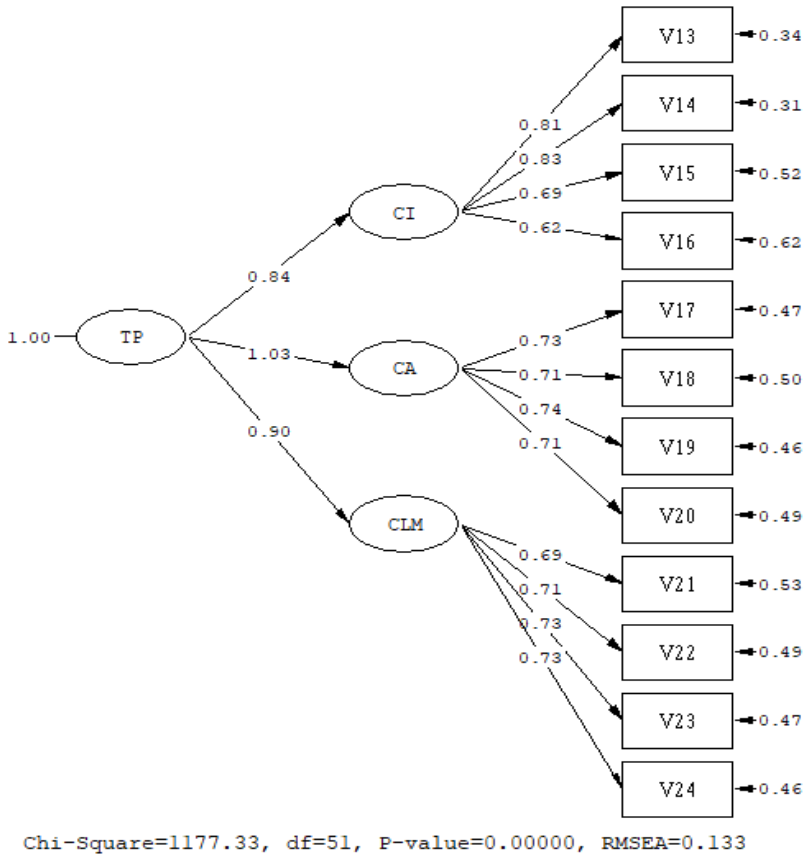


Figure 13. T-values for the measurement model for teaching practice scale

T- value was checked for the significance of the path coefficients. When the measurement model is determined, t-values of scale items are significant at .01 level. As can be seen in the figure 13, all t-values are significant for the measurement model.

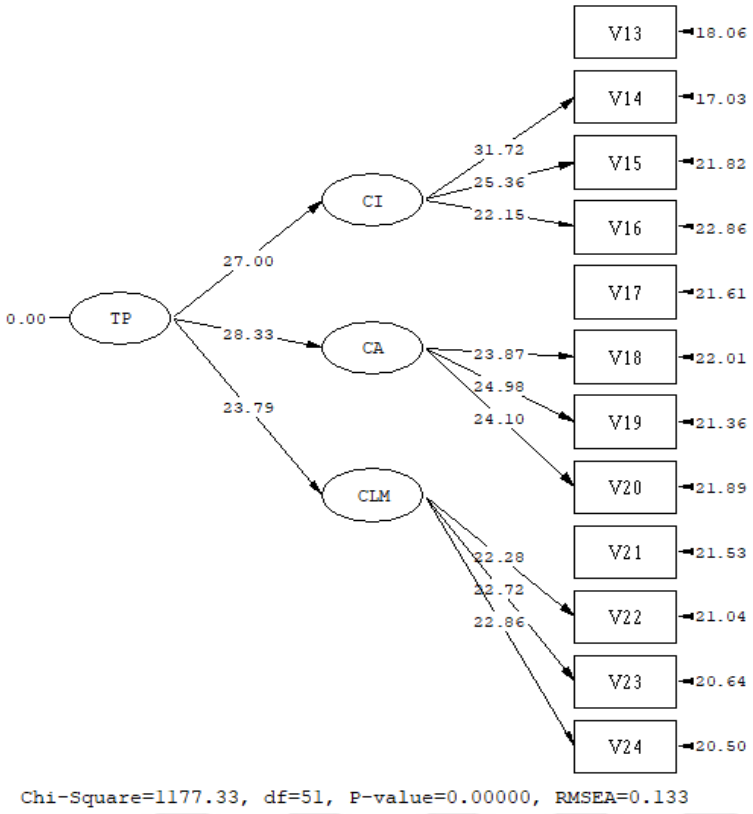


Figure 14. Standardized solution values for the measurement model for teaching practice scale

Figure 14. represents standardized solution value for items and all values are significant for the measurement model. (≥ .30) Cut-offs results for CFA model evaluation for teaching practice Chi-square = 1177.33 (P = 0.0) NFI = .95, RMSEA =.13, SRMR=.070, CFI =.95. Some modifications were applied by adding correlations recommended by the TALIS.

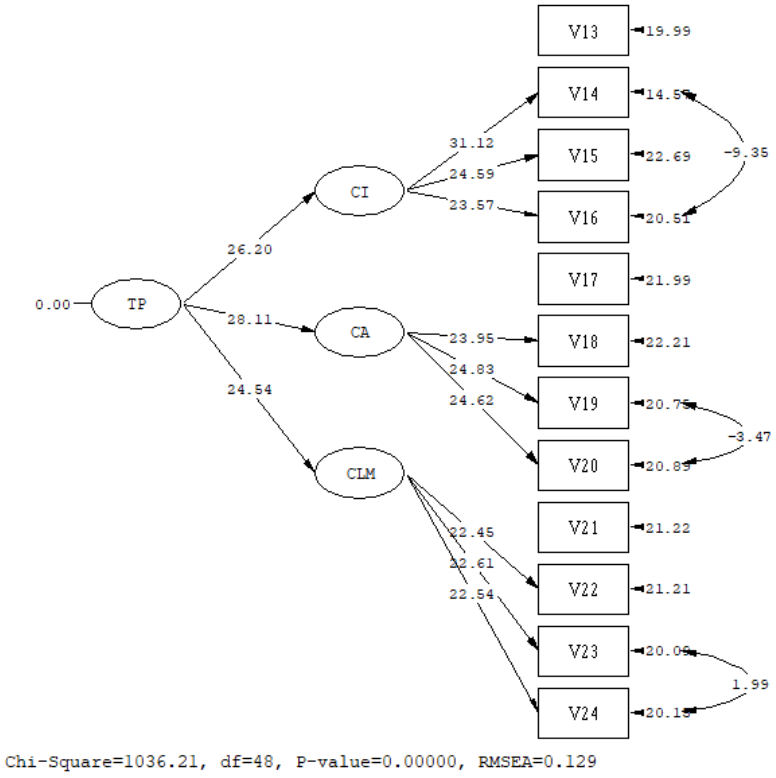


Figure 15 . T-values for the measurement model for teaching practice scale after modification

As can be seen in the figure 15, all t-values are significant for the measurement model. Items having a high correlation between error variances were found and their error covariances were combined to confirm the model's goodness of fit. The double arrow between residuals of items V14 (42B)- V16 (42D), V19 (42G) - V20 (42H) and V23 (42K) – V24 (42L) represents the error covariance between these items. After modification, the chi-square value decreased by 141.12 and this difference was statistically significant (P= 0.0). Figure 16. represents standardized solution value for items and all values are significant for the measurement model. ($\geq .30$) After modifications, cut-offs result for CFA model evaluation for teaching practice Chi-square = 1036.21 (P= 0.0), NFI = .95, RMSEA =.10, SRMR=.061, CFI =.96. These values are sufficient for the model to be acceptable (Hu & Bentler, 1999; Karagöz, 2016).

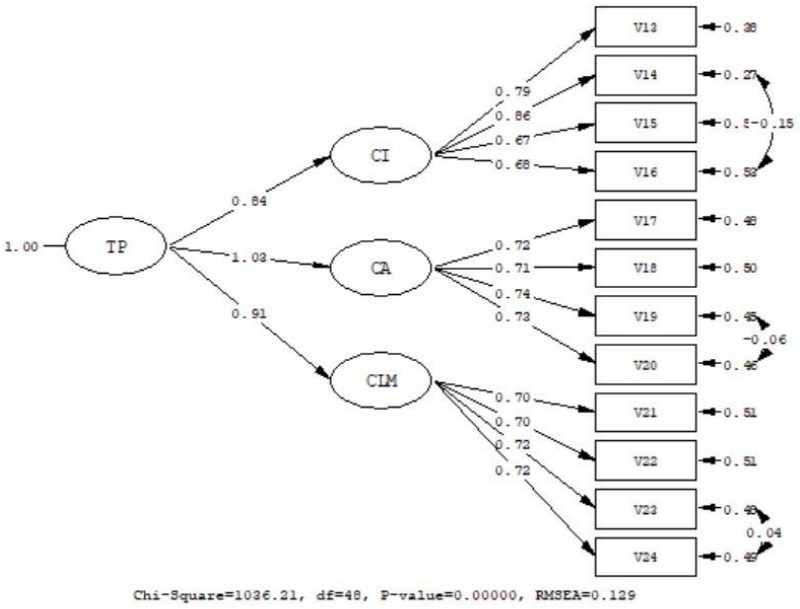


Figure 16. Standardized solution values for the measurement for teaching practice scale after modification

4.5 Job Satisfaction Measurement Model

The dimensions of job satisfaction in the TALIS 2018 report were analyzed whether the defined structure is provided or not with the help of confirmatory factor analysis. Figure 17. represent confirmatory factor measurement model of teacher teaching practice scale, with three large oval shapes labelled PR, WE representing the latent constructs of satisfaction with profession, and job satisfaction with work environment respectively. The eight square boxes at the end of pointed arrows from PR and WE display the observed variables that expose the latent variables. Short arrows pointing towards the observed variables represent the related measurement errors for these items.

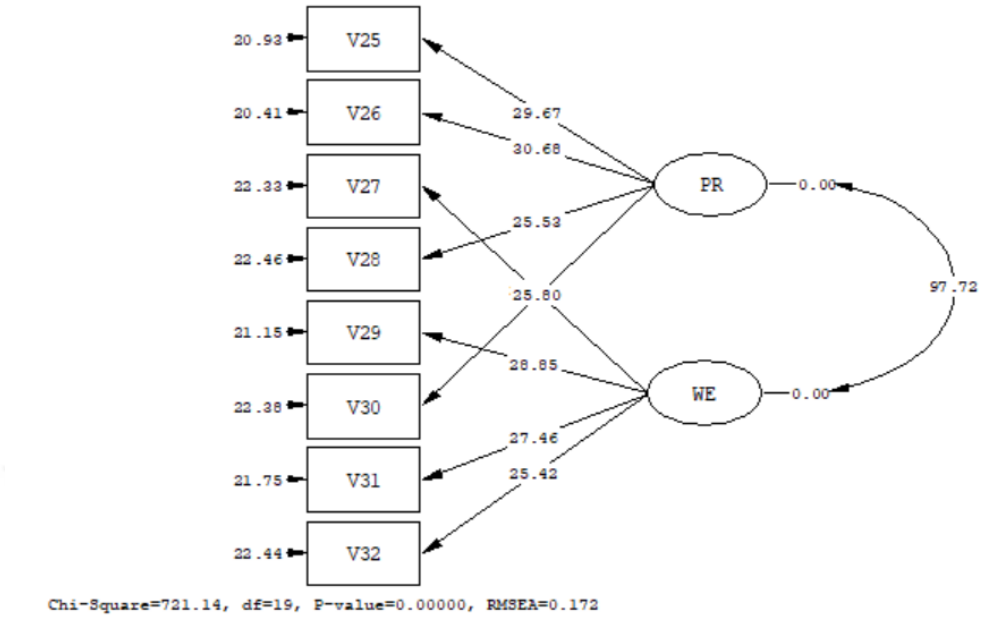


Figure 17. T-values for the measurement model for job satisfaction scale

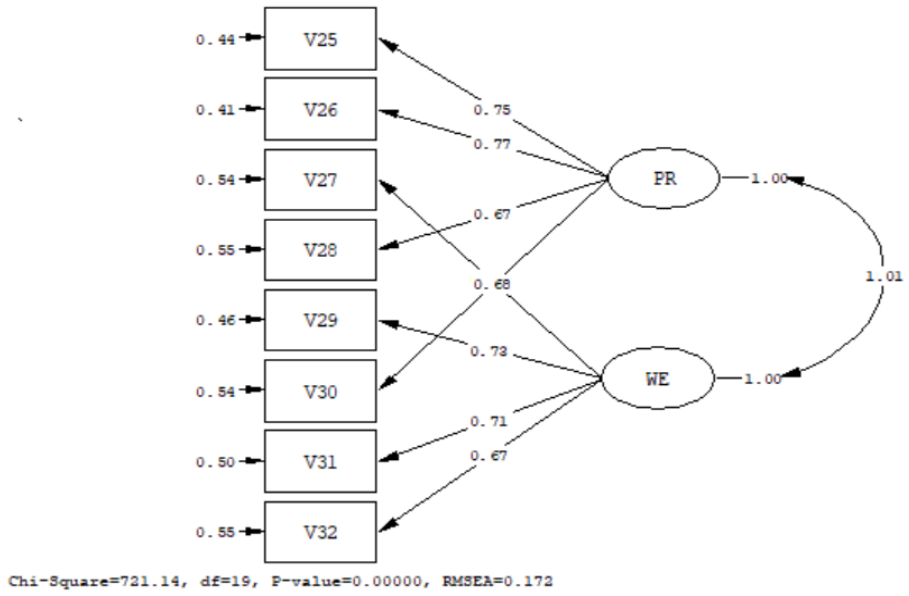


Figure 18. Standardized solution for the measurement model for job satisfaction scale

As can be seen in the figure 17, all t-values are significant for the measurement model. Figure 18. shows standardized solution value for items and all values are significant for the measurement model ($\geq$ .30). Cut-offs results for CFA model evaluation for job satisfaction Chi-square = 721.14 (P = 0.0), NFI = .93, RMSEA =.17, SRMR=.062, CFI =.93. Although the findings clearly showed to a good fit to the data, some modifications were applied by adding correlations recommended by the TALIS. Some modifications were applied between V28 (53D) and V30 (53F) by adding correlations recommended by TALIS 2018 report.

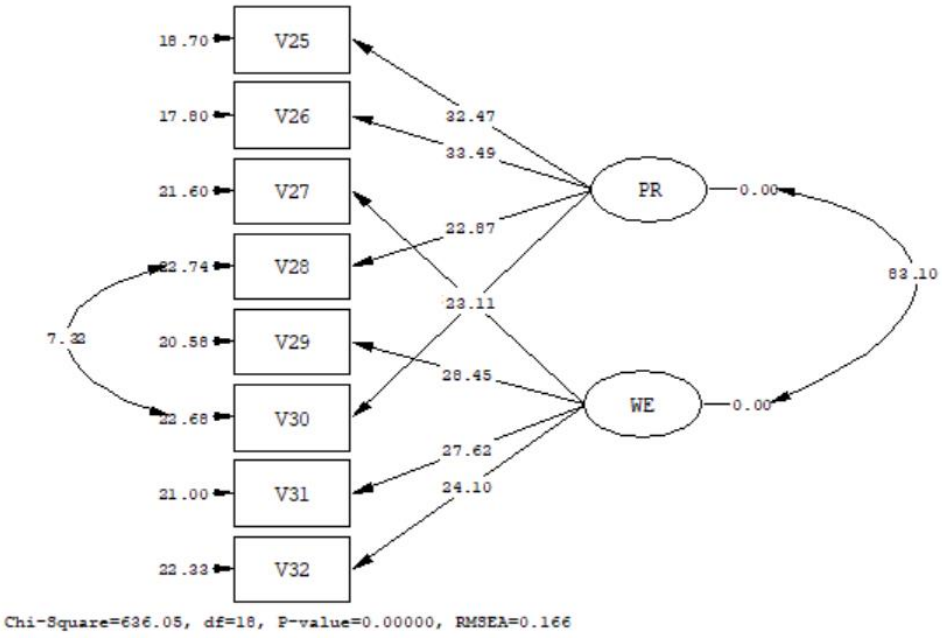


Figure 19. T-values for the measurement model designed for job satisfaction scale after modification

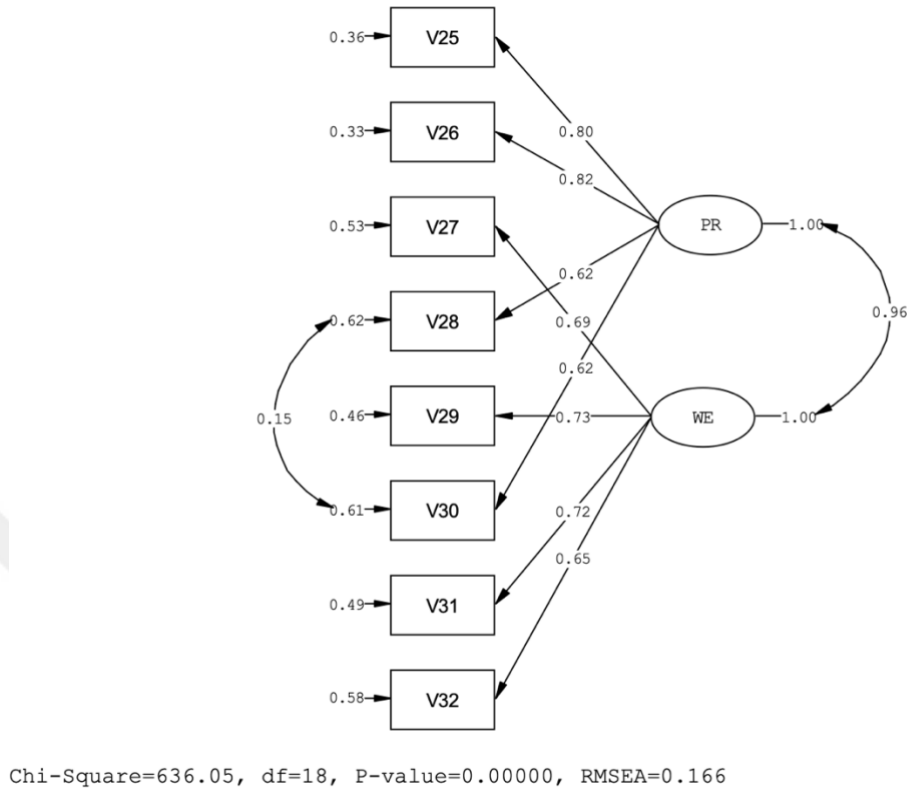


Figure 20. Standardized solution values for the measurement model for job satisfaction scale after modification

As can be seen in the figure 19, all t-values are significant for the measurement model. Figure 20. shows standardized solution value for items and all values are significant for the measurement model ($\geq$ .30). Items having a high correlation between error variances were found and their error covariances were combined to confirm the model's goodness of fit. After modification, the chi-square value decreased by 85.09 and this difference was statistically significant (P= 0.0) The decrease in the chi-square value always contributes to the fit of the model. After modifications, cut-offs result for CFA model evaluation for job satisfaction Chi-square = 636.05 (P= 0.0), NFI = .93, RMSEA=.10 SRMR=.062, CFI =.94.

The mediation test was carried out after the measurement model's compliance values were judged to be sufficient. To demonstrate the effect of mediation, certain criteria must be met (Baron & Kenny, 1986). To discuss about the impact of mediation, it is necessary to assess whether the indirect effect of the independent variable (through the mediator variable) on the dependent variable is significant or not. This is accomplished using various tests, one of which being the Sobel test which is computed by using β coefficient of independent, dependent and mediator variables with their standard error values (Sobel, 1982). In this study, The Sobel test was used to examine mediation effect.

4.6 Structural Models

SEM determines if the given data support a hypothesized structure. In this regard, in SEM, the model should be created first, and then evaluated to see if it is data-verified. To identify the relationships between variables with different alternative models and to test the mediation model, five distinct models were developed.

4.6.1 Structural model for Teaching Practice to predict Job Satisfaction

The structural model 1, which determine the effect of teaching practice (independent variable) on job satisfaction (dependent variable) is shown in figure 21 and 22. When the fix indexes of Model 1 were checked, it was established that the model had acceptable fit indexes. Cut-offs result for structural model evaluation Chi-square = 3347.82 (P= 0.0), NFI = .92 RMSEA=.10, SRMR=.071, CFI =.93. The effect of teaching practice on the job satisfaction is statistically significant (β = 0.66 $p <$.01). The teaching practice were found to predict job satisfaction (H2).

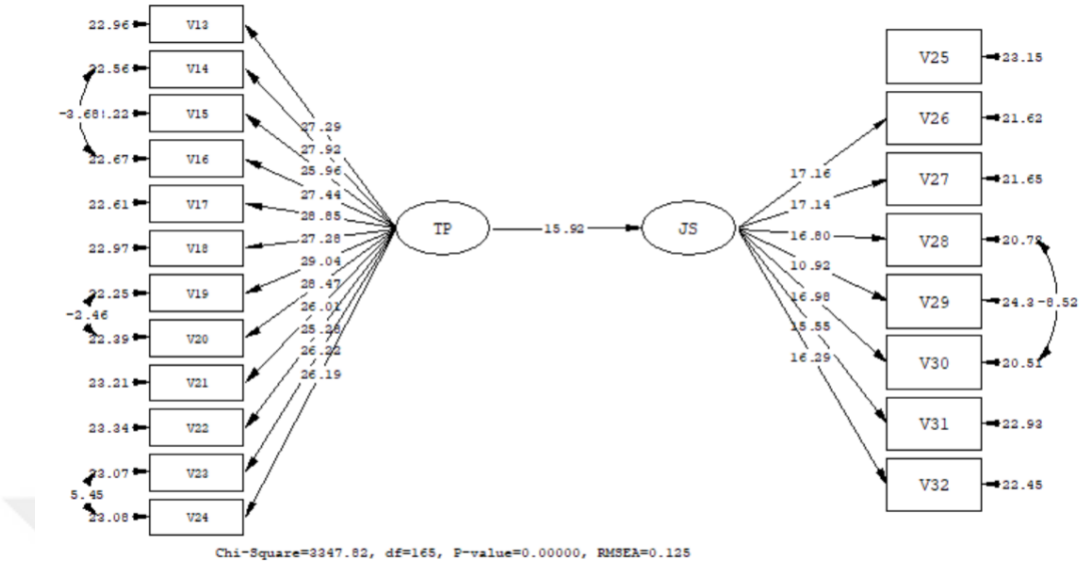


Figure 21.T-values for structural model for teaching practice to predict job satisfaction

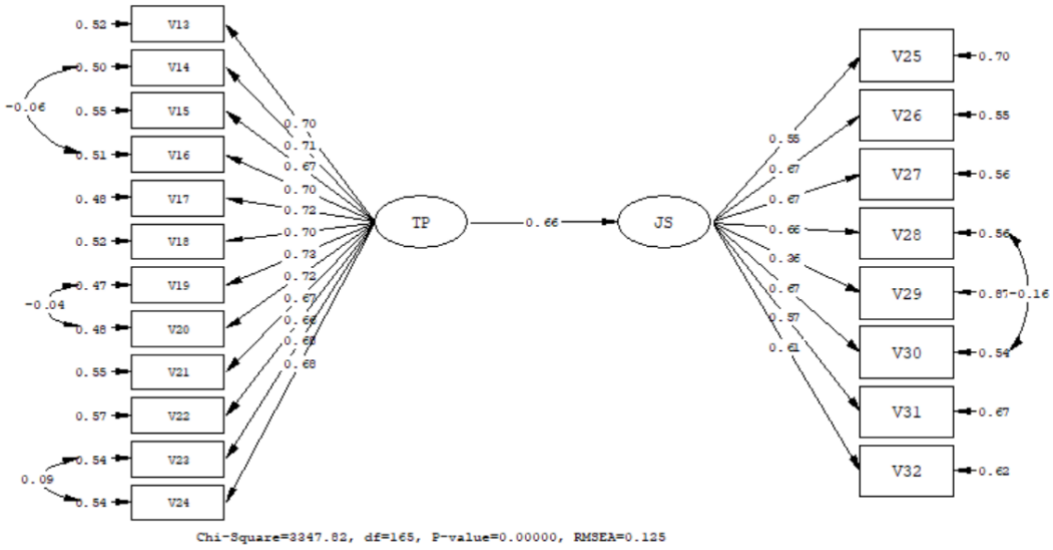


Figure 22. Standard solution values for structural model for teaching practice to predict job satisfaction

4.6.2 Structural model for Teacher Self-efficacy e to predict Job Satisfaction

The structural model 2, which determine the effect of teacher self-efficacy (mediator variable) on job satisfaction (dependent variable) is shown in figure 23 and 24. When the fix indexes of Model 2 were checked, it was established that the model had acceptable fit indexes. Cut-offs result for structural model evaluation Chi-square = 2784.45 (P= 0.0), NFI = .92 RMSEA=.10, SRMR=.073, CFI =.92. In model 2, it was established that teacher self-efficacy has statistically significant effect on job satisfaction ($\beta = 0.32$ $p < .01$). The teacher self-efficacy was found to predict job satisfaction (H3).

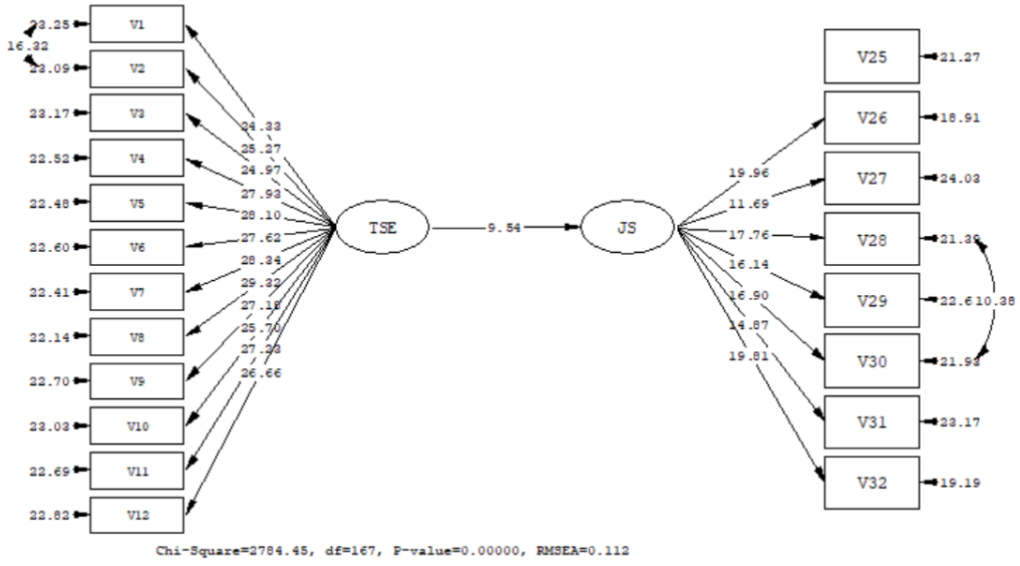


Figure 23.T-values for structural model for teacher self-efficacy to predict job satisfaction

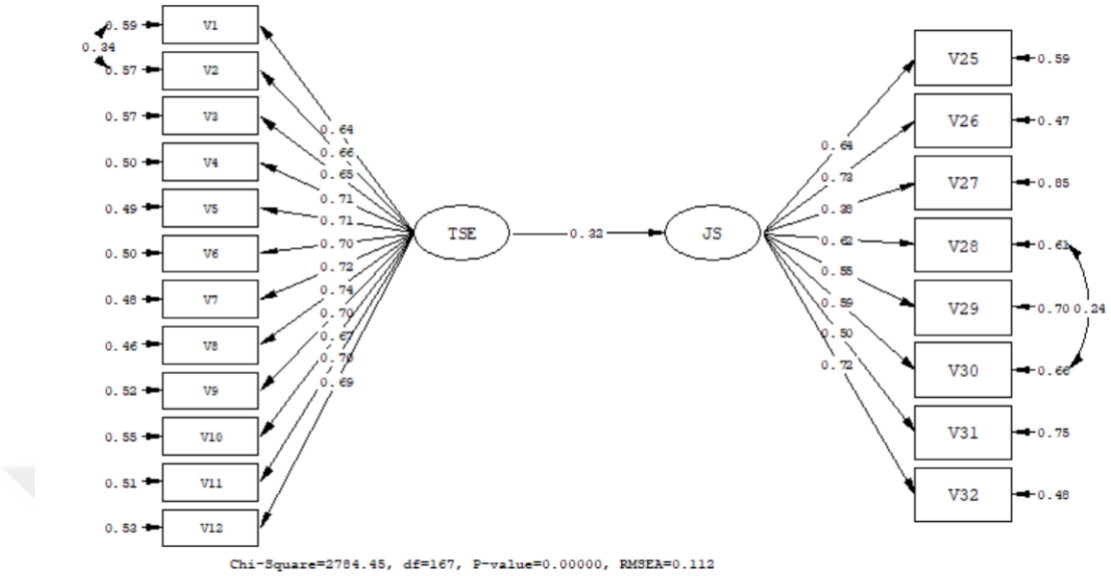


Figure 24. Standardized solution values for structural model for teacher job self-efficacy to predict job satisfaction

4.6.3 Structural model for Teaching Practice to predict Teacher Self-efficacy

The structural model 3, which determine the effect of teaching practices (dependent variable) on teacher self-efficacy (mediator variable) is shown in figure 25 and 26. When the fit indexes of Model 3 were checked, it was established that the model had acceptable fit indexes. Cut-offs result for structural model evaluation Chi-square = 4480.56 (P= 0.0), NFI = .90 RMSEA=.11, SRMR=.072, CFI =.91. In model 3, it was established that teaching practice has statistically significant effect on teacher self-efficacy (β = 0.67 $p < .01$). This means teaching practice predict teacher self-efficacy (H4).

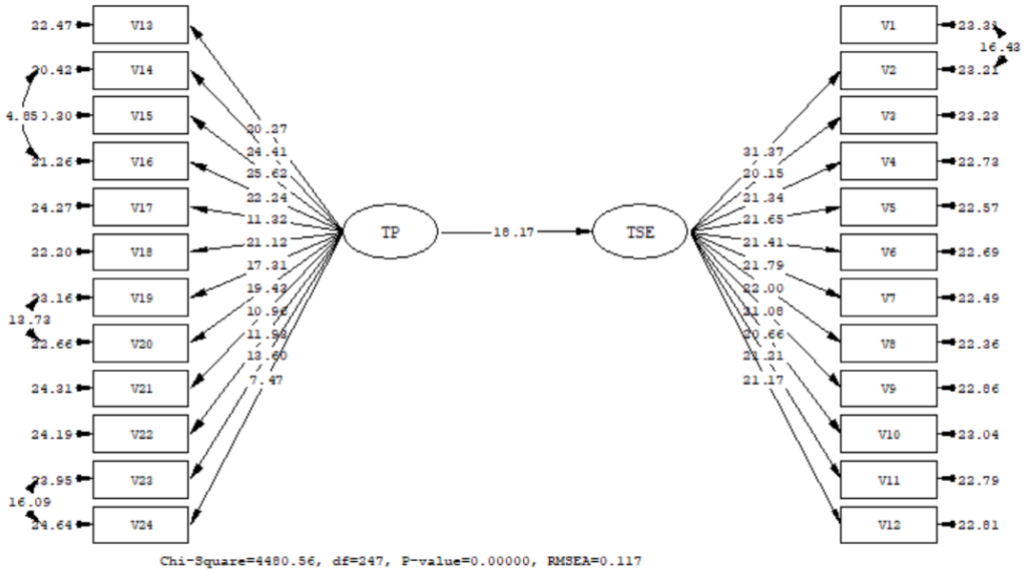


Figure 25. T-values for structural model for teaching practice to predict teacher self-efficacy

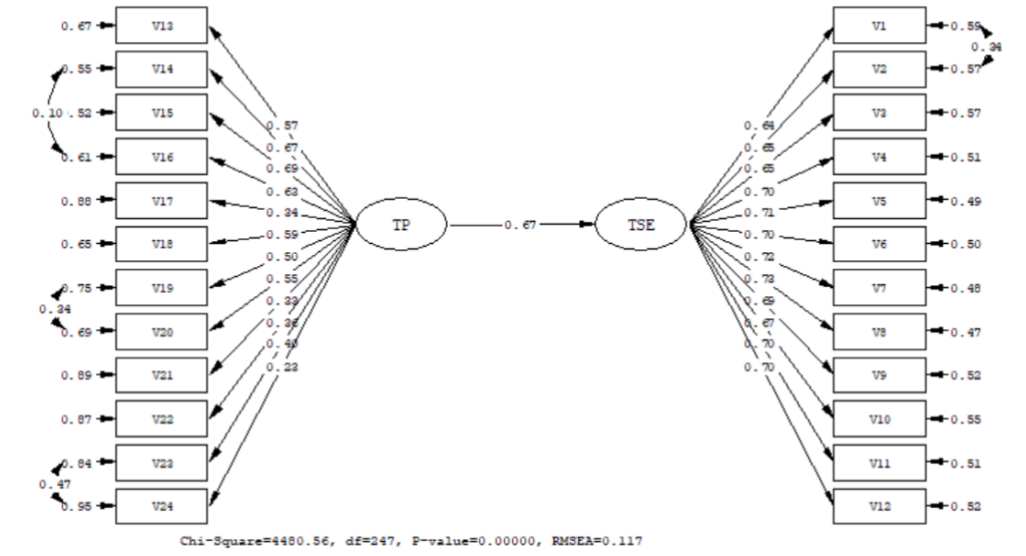


Figure 26. Standardized solution values for structural model for teaching practice to predict teacher self-efficacy

4.6.4 Structural Model for mediator effect of Teacher Self-efficacy on the relationship between Teaching Practice and Job Satisfaction

The structural model 4, which determine the mediator role of the teacher self-efficacy between teaching practice and job satisfaction. Figures 27 and 28 show the structural equality model, which explored the relationship between teaching practice and job satisfaction using the mediator effect of teacher self-efficacy. Cut-offs result for structural model evaluation Chi-square = 6681.12 (P= 0.0), NFI = .90, CFI= .90, RMSEA=.10, SRMR=.076. When the fix indexes of Model 5 were checked, it was established that the model had acceptable fit indexes. In figure 29, standardized regression coefficients between teaching practice and teacher self-efficacy (β = 0.67 $p <.01$) and standardized regression coefficients between teacher self-efficacy and job satisfaction (β = 0.21 $p <.01$) after mediator was added to the model.

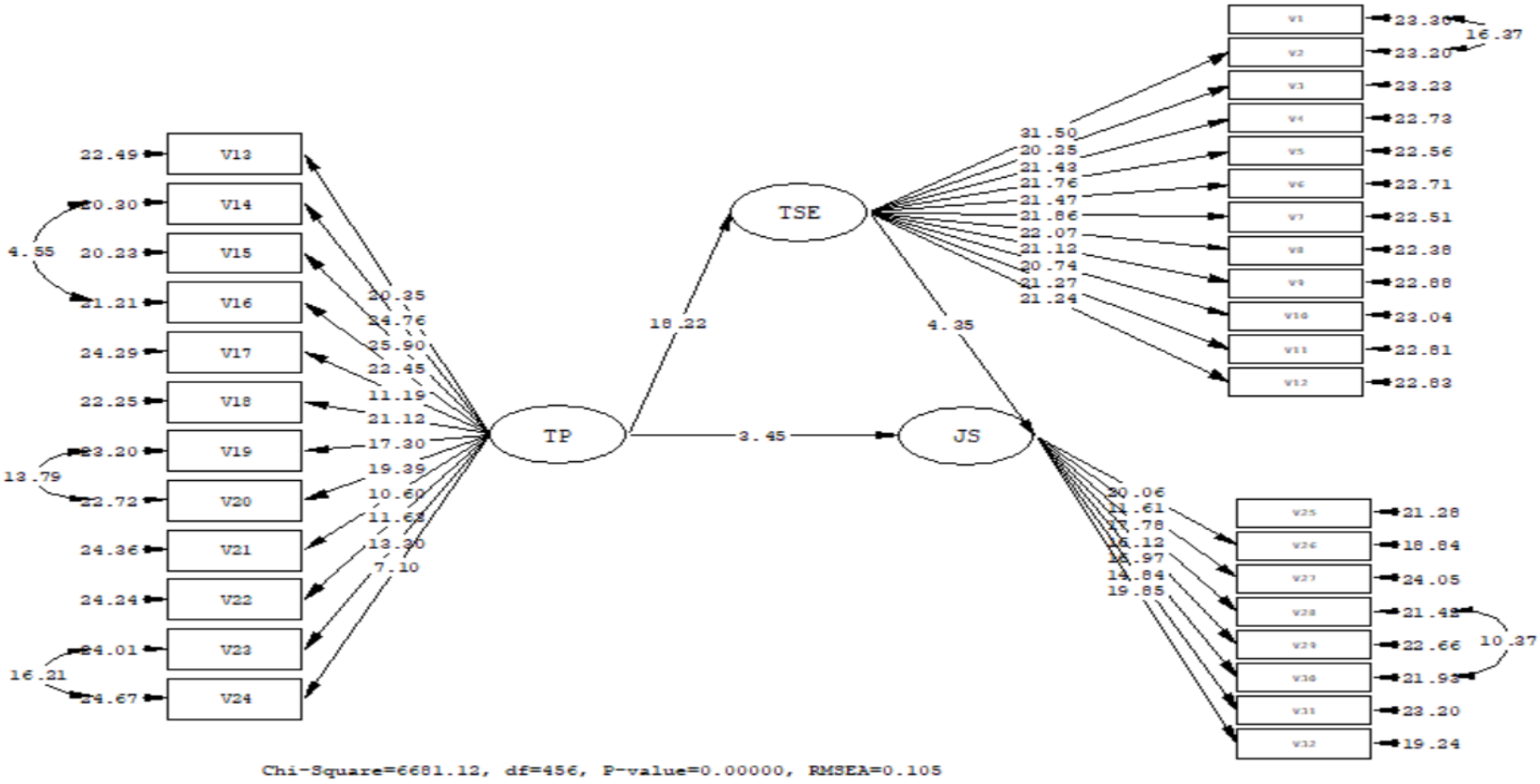


Figure 27. T-values of structural model for mediator effect of teacher self-efficacy on relationship between teaching practice and job satisfaction

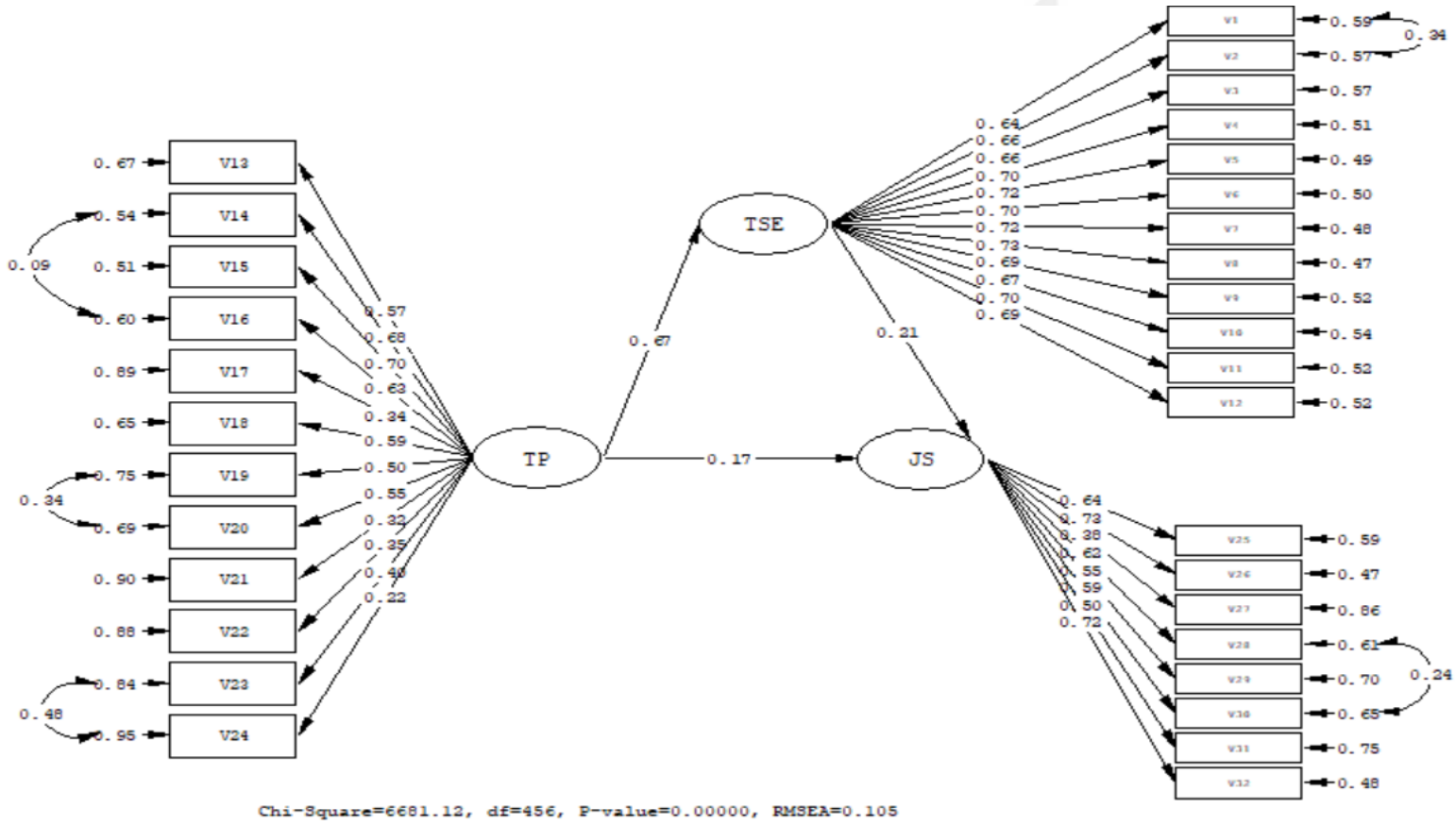


Figure 28. Standardized solution values of structural model for mediator effect of teacher self-efficacy efficacy on relationship between teaching practice and job satisfaction.

Table 12. Direct, indirect, and total effect coefficients between dependent and independent variables

Path	β coefficient
TSE←TP (Direct effect)	.67
JS←TSE (Direct effect)	.21
JS←TP (Direct effect)	.17
JS←TP (Total effect)	.311
JS←TSE←TP (Indirect effect)	.141

When the standardized coefficients given in table 12 were determined with respect to the mediator effect argued by the Baron and Kelly (1986); it was seen that teaching practice significantly predicts the teacher self-efficacy (β= .67, p<.01) and the teacher self-efficacy significantly predicts the job satisfaction (β=.21, p<.01).When the mediator variable (teacher self-efficacy) was integrated to the model, it was observed that the predictive level of teaching practice decreased and statistically significant (β= .17 , p<.01). Therefore, teacher self-efficacy has a mediator role on the influence of teaching practice and job satisfaction (H1). Indirect effect is β= .141 which is calculated by multiplying beta coefficient of direct effect of TP←TSE and JS ←TSE (.67 x .21). Total effect is calculated by summing up direct effect and indirect effect (.17 + .141.). Cut-offs result for Model I evaluation CFI =0.90, NFI= .89, SRMR= 0.086, RMSEA=0.10.

Table 13.Results of SEM for research Model I

Structural Equation	Error Variance	R^2
JS = 0.22*TSE + 0.17*TP	0.87	0.12
TSE = 0.63*TP	0.48	0.45

According to the structural equations obtained in the model, teaching practice and teacher self-efficacy explained 12% of job satisfaction; teaching practice explained 45% of the teacher self-efficacy.

4.6.5 Structural Model for mediator effect of Teacher Self-efficacy on the relationship between Dimension of Teaching Practice and Job Satisfaction

Given the standardized coefficients in table 14, there is a positive effect of clarity of instruction, and cognitive activation on job satisfaction and negative effect of classroom management on job satisfaction (H5, H6 & H7). Clarity of instruction has the greatest impact on job satisfaction when compared to other dimensions. There is a positive effect of clarity of instruction, cognitive activation and classroom management on self-efficacy. It is shown that the dimensions of clarity of instruction, cognitive activation, and classroom management belonging to the teaching practice variable have a direct and indirect impact on job satisfaction. When the indirect effects were computed, the effect of clarity of instruction on job satisfaction via self-efficacy was calculated as .084, whereas the total effect was .234 (H8). Whereas the indirect effect of cognitive activation on job satisfaction through self-efficacy was computed as .069, the total effect was .199 (H9). Lastly, while the indirect effect of classroom management on job satisfaction via self-efficacy was .017, the total effect was -.133 (H10). Model II displayed acceptable fit to the sample covariance matrix with the following fit indices CFI =0.94, NFI= 0.93, SRMR= 0.060, RMSEA=0.078.

Table 14. Standardized Effects of the Mediating Model II

Path	Direct Effect	Indirect Effect	Total Effect
TSE←Clarity of Instruction	.40	---	.40
JS←Clarity of Instruction	.15	.084	.234
TSE←Classroom Management	.08	---	.08
JS ←Classroom Management	-.15	.017	-.133
TSE←Cognitive Activation	.33	---	.33
JS ←Cognitive Activation	.13	.069	.199
JS ← TSE	.21	---	.21

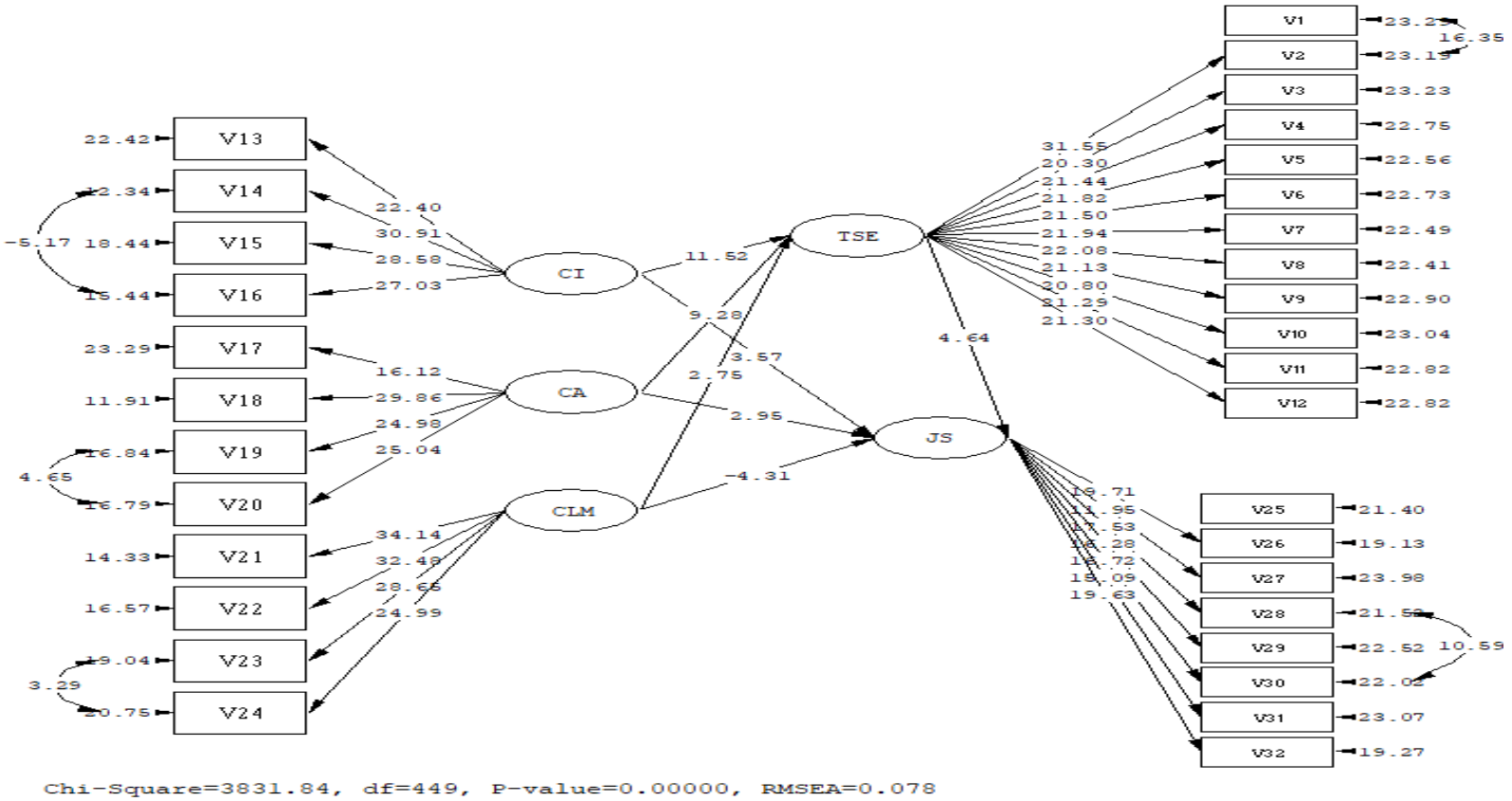


Figure 29. T-values of structural model for mediator effect of teacher self-efficacy on relationship between sub-dimensions of teaching and job satisfaction

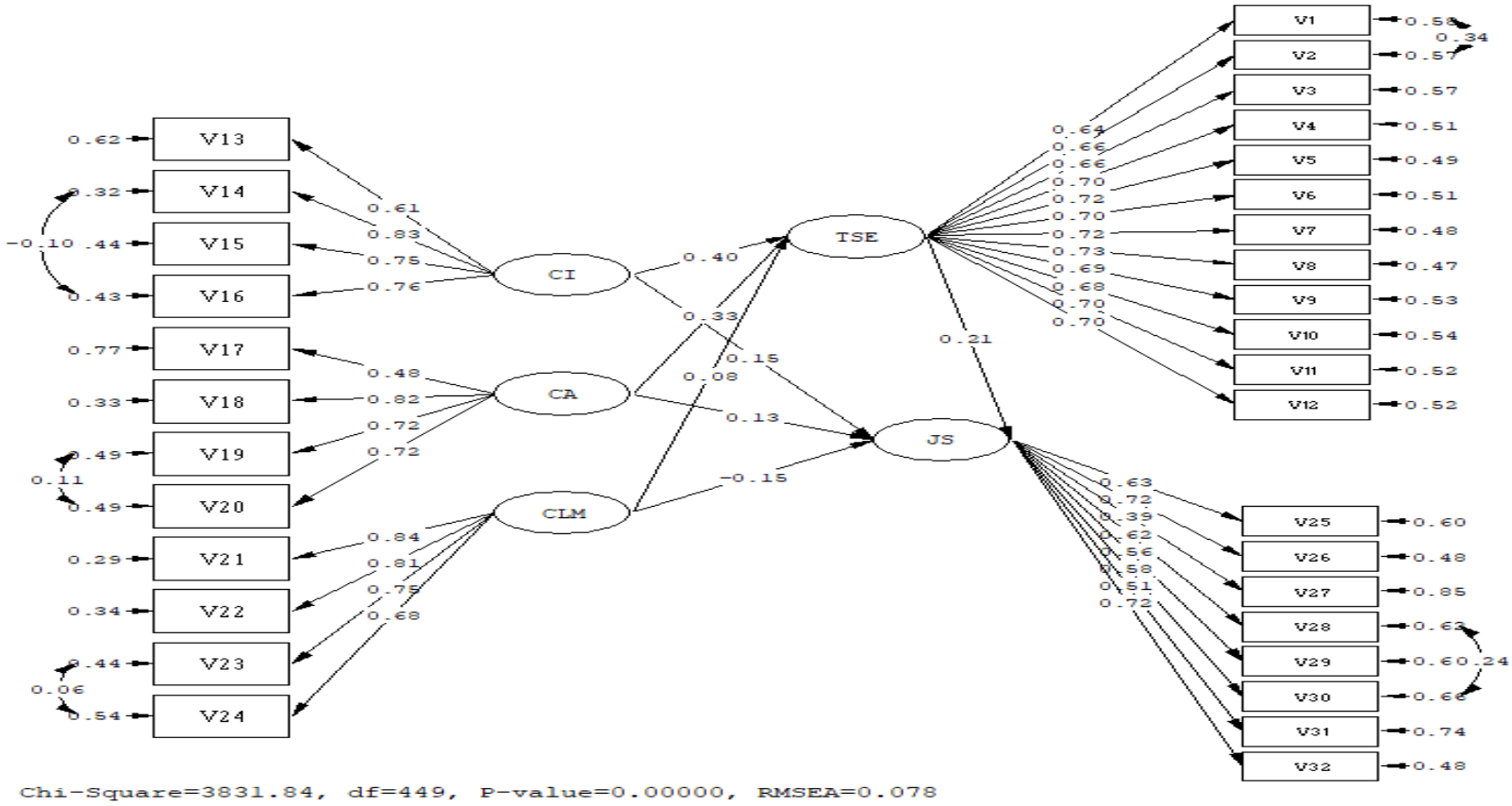


Figure 30. Standardized solution values of structural model for mediator effect of teacher self-efficacy efficacy on relationship between sub-dimensions of teaching practice and job satisfaction

Table 15. Results of SEM for research Model II

Structural Equation	Error Variance	R^2
JS = 0.22*TSE + 0.15*CI +0.13*CA-0.15*CLM	0.83	0.15
TSE = 0.37*CI + 0.31*CA+ 0.071*CLM	0.50	0.42

According to the structural equations obtained in the model, teaching practice (clarity of instruction, cognitive activation, and classroom management dimensions) and teacher self-efficacy explained 15% of job satisfaction; teaching practice explained 42% teacher self-efficacy.

Moreover, the Sobel test referred to test the mediator effect on the influence of the independent variable and dependent variable (Sobel, 1982). The Sobel test is used to detect if there is a decrease in the relationship between the dependent and independent variables after adding the mediator variable. In other words, this test measures whether the instrument is significant or not. Only big samples are suitable for the Sobel test. Therefore, the most important and strong assumption of the Sobel test is normality because there is a problem of skewness in small samples.

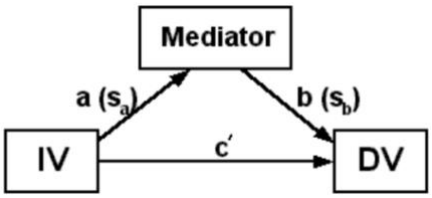


Figure 31.Ilustration of mediation

As in figure 30. a represents coefficient for the association between independent variable and mediator.s_a means standard error of *a*. *b* represents raw

coefficient for the association between the mediator and the dependent variable and s_b refers to the standard error of *b*. Considering multivariate normality, the precise formula for the standard error of the indirect effect, or ab, the Z test statistic calculation for the Sobel test is shown in Equation 1.

$$Z = ab / \sqrt{b^2 s_a^2 + a^2 s_b^2} \qquad (1)$$

Regression analysis was performed twice in SPSS. Firstly, mediator which was taken as a dependent variable and independent variable were used in regression analysis. Secondly, both mediator and dependent variable were taken as a dependent variable and independent variable were used in regression. According to regression results and given equation, z-value is found 8.249. If the Z-value is greater than 1.96 then the mediator variable is significantly mediating between dependent and independent variables. In conclusion, calculated Z-value is greater than 1.96. This means that teacher self-efficacy is significantly mediating between teaching practice and job satisfaction.

CHAPTER 5

DISCUSSION AND IMPLICATIONS

The findings were reported in the previous chapter, and the implications for additional research and practice were provided in this chapter

5.1 Discussion of the Results

Shortages and increasing rates of teacher attrition have become an international concern in recent years, and these occurrences are associated with teacher job satisfaction (Henry and Redding 2020). When it is regarded that teachers are so important in shaping the future of societies, it is essential that they have job satisfaction. It is impossible to expect efficiency from a teacher who is not happy with their job and who is working in a job that does not fulfill their expectations (Erden, 2007). In other words, teachers have a crucial role in the education system, thus it is critical that they are pleased, creative, and efficient for the improvement of the country. As a result, it is important to investigate teacher job satisfaction.

The current study aimed to investigate the mediating effects of teacher self-efficacy on relationships between teaching practice and job satisfaction of teachers using SEM. In this research, by testing several models that includes three sets of variables that are frequently studied in education, it is concerned to what extent relation of teaching practice, teacher self-efficacy, and teacher job satisfaction, respectively, by considering the mediation effects of teacher self-efficacy. Two

structural equation models were examined, as is the current tendency when testing for multiple models. The first model (Model I) was less well-fitting to the data covariance matrix than the second (Model II). As a result, model II is regarded to better represent the interrelationship of the variables.

Both factors have been discovered to be supportive of instructors' teaching beliefs and attitudes in general. This research is noteworthy because it not only confirms the relationships when all variables are included, but it also provides evidence of mediation effects to link teaching practice with job satisfaction. This is critical for teachers' well-being and teaching and learning results. However, there is not much research investigating the variables that affect teachers' job satisfaction in terms of teaching practice and teacher self-efficacy simultaneously. Two mediation models were proposed in this study to see if teaching practice and its dimensions had an influence on teacher job satisfaction through the mediation of teacher self-efficacy. The findings of the present study confirmed that teacher job satisfaction was indirectly influenced by teaching practice through the mediation of teacher self-efficacy, whereas dimensions of teaching practice can also affect teacher job satisfaction indirectly via the mediation of teachers' self-efficacy.

Performing with satisfaction implies professional achievement. This may be true for many occupations, but it is especially crucial for teachers because their enthusiasm, self-efficacy, or feelings of dissatisfaction, can all have an impact on the passion and drive of their students. Being satisfied indicates that one's real self is viewed as being near to one's ideal self. Teachers who teach effectively are likely to have a strong self-concept and, as a result, anticipate earning high levels of satisfaction from their instruction. This study's findings that teacher self-efficacy belief has a direct and positive impact on job satisfaction are consistent with the previous findings in literature. Katsantonis (2020) stated that self-efficacy had a significant effect on job satisfaction based on data from TALIS 2018 collected from primary school teachers in 15 countries, including Turkey. Similarly, Zakariya (2020) discovered that self-efficacy had a direct effect on job satisfaction using TALIS 2018 data from Norwegian middle school teachers. Teacher self-

efficacy was a statistically significant predictor of job satisfaction, according to research by Bolton (2018) and Caprara et al. (2006). Saraçoğlu, Aldan Karademir, Dedebali (2007) also discovered a low-level, significantly positive relation between teacher self-efficacy and job satisfaction in their study. Likewise, Türkoğlu, Cansoy and Parlar found that all aspects of teachers' self-efficacy exhibited a low-level positive relation with job satisfaction, and teacher self-efficacy was a significant determinants of job satisfaction, according to the study. When the literature is investigated, the findings of many local and international studies on the influence of self-efficacy on job satisfaction may be found (Caprara et al., 2003; Edinger & Edinger, 2018; Skaalvik & Skaalvik, 2014). The findings of these studies and the results of the current study are remarkably similar to each other. These results, which are associated to teacher self-efficacy and job satisfaction, have a positive impact on one another. People's judgments are influenced by their emotions and self-confidence. Aligning the ideal self with the real self is more than just logic: self-representations are packed with feelings, hopes, motivation to accomplish some personal standards, sense of failure, perceptions of capacity to fulfill one's ideals, and possibly more. Similarly, findings demonstrated that job satisfaction is influenced by self-efficacy beliefs. As a result, it is reasonable to conclude that strengthening teacher self-efficacy will improve job satisfaction.

In the literature, most of the research investigated the effect of teacher self-efficacy on teaching practice. TSE is directly related to certain aspects of instructional quality (e.g., Holzberger, Philipp, & Kunter, 2013; Künsting, Neuber, & Lipowsky, 2016). Similarly, Tschannen-Moran (1998) and Woolfolk (1990), teachers who have high self-efficacy beliefs had higher instructional quality, as measured by the three dimensions of clarity of instruction, cognitive activation, and classroom management, whether evaluated by the teachers individually or by their students. Based on previous researches, it is reasonable to predict a reciprocal relationship between teaching practice and self-efficacy. For instance, effective instructional practice, in particular, may be a predictor of a teacher's self-efficacy or teaching practices may come from certain beliefs. Researchers agree that there is no

single, well-defined best way of teaching. Effective instruction has a significant impact on student learning, which is a desirable consequence and major objective of higher education. Teaching practices may help shape the teachers' belief. For example, personal qualities, motivation, and classroom-management abilities were discovered to be major determinants of self-efficacy by Poulou (2007). Teachers' self-efficacy is particularly linked to their teaching practice and quality of instruction (Holzberger et al. 2013). Instructors' classroom practice is critical to teaching and learning process since teachers' activities have the greatest direct influence on students' learning outcomes (Hattie, 2009). When teachers are good at handling misbehaviors during lecture or they have enough information about learned content by using appropriate teaching method, their beliefs about themselves expected to be high at the end of the lesson. Effective instructional practices, for instance, may cause changes in beliefs, and teachers' beliefs may influence teaching practices (Pajares, 1992; Smagorinsky et al., 2004). Current analyses confirmed that the positive relationship between teaching practice and teacher self-efficacy beliefs. This study's findings that teaching practices has a direct and positive impact on teacher self-efficacy are consistent with the previous findings in research. Similarly, high-quality instruction resulted in a rise in teachers' self-efficacy beliefs the following school year (Holzberger, Kunter, Philipp, 2014). In a longitudinal panel study, this research expands past research on teachers' self-efficacy by investigating the reciprocal impacts of TSE and teaching quality. They found that high cognitive activation in the classroom at time 1 resulted in a rise in TSE beliefs after one year. Similarly, one year later, the degree of classroom management affected teachers' self-efficacy perceptions. These results support the view that mastery experiences are an important source for instructors who want to change their self-efficacy beliefs (Bandura, 1997). Some researchers contend that teacher self-efficacy has an indirect impact on student outcomes, i.e., through its influence on teaching practices (Guo, McDonald Connor, Yang, Roehrig, & Morrisson, 2012; Woolfolk Hoy & Davis, 2005).

According to research, successful teachers not only teach well and create optimum learning environments, but they also feel well-being and job satisfaction:

being able to deliver good teaching and being satisfied with one's own job are both required for defining effective teachers (Klusmann et al., 2008). Current study confirmed that the positive relationship between teaching practice and job satisfaction. Conversely, Moe, Pazzaglia and Ronconi (2010) claimed that teaching practice on its own might be damaging to job satisfaction. This is an interesting and surprising outcome. Notably, it implies that some instructors are capable of teaching well but believe they are not, i.e., lack self-efficacy. They are capable, but they feel they are not. Others, on the other hand, do an excellent job teaching yet do not get the benefits of their efforts. As a result, they do not feel satisfied, and the better they teach, the less satisfied they are. According to the findings of present research, there is a mediator effect of teacher self-efficacy on the influence of teaching practice on job satisfaction. Likewise, Moe, Pazzaglia and Ronconi (2010) confirmed that an indirect relationship between teaching practice and job satisfaction. In their study, two self-rating scales which were strategies and praxes were used to evaluate teaching practice. Rather than observing behaviors during instruction, self-report assessments are used. On a 5-point scale, participants were asked to evaluate how frequently they utilized each strategy/praxis. They confirmed that for there to be job satisfaction both positive affect and self-efficacy are required. High perceived teaching practice is desirable, yet it is insufficient to provide instructors with job satisfaction: It is necessary to feel good (positive affect plus self-efficacy). Self-efficacy perception is not a stable variable; although it is influenced by other factors in one aspect, it may also influence other variables in another. Teaching practice can influence teachers' self-efficacy beliefs, which in turn can influence teacher job satisfaction. The present study's result that teaching practice indirectly impacts job satisfaction via self-efficacy confirms this viewpoint. It is possible to find studies relationships teaching practice, job satisfaction and teacher self-efficacy relation (Perera, Maghsoudlu, Miller, McIlveen, Barber, Part & Reyes 2022). Likewise, Katsantonis (2020) investigated that self-efficacy is a mediating variable of the relation between school climate and job satisfaction by using 51,782 primary school teachers from 15 countries upon

the TALIS 2018. Nevertheless, there is no much research has been done to assess teacher self-efficacy has a mediating influence on teaching practice and job satisfaction. As a result, no comparisons with other research on the subject were conducted in terms of the mediation effect.

In Model II, there is a positive effect of clarity of instruction, and cognitive activation on job satisfaction. Clarity of instruction has the greatest effect on teacher self-efficacy and job satisfaction among dimensions of teaching practice. It is not surprising because this dimension is concerned with providing pupils with an overview of the lesson at the ending of the class, being able to connect new and old concepts, and offering clear and thorough instruction and learning goal (Hospel and Galand, 2016). And there is a negative effect of classroom management on job satisfaction. Because this dimension of the evaluation scale contains negative statements, the negative effect of classroom management perspective should be examined. Teachers' job satisfaction is influenced negatively by the greater effort and time they spend providing discipline in schools and classes when the rules are not being implemented properly. Similar findings may also be shown on the OECD's TALIS research from 2013. It has been claimed that nations and economies with a larger number of students with behavioral difficulties have poorer teacher job satisfaction (OECD, 2014). There are studies supporting this finding. According to Aldrup and Klusmann (2015), one of the most prominent sources of stress in the class is classroom management and discipline, which may have a detrimental impact on teachers' job satisfaction. Similarly, since several students with behavioral issues are increasingly being serviced in general education classes, these unprepared instructors experience poor classroom management, low job satisfaction and increasing rate of teacher turnover (Brunsting, Sreckovic & Lane, 2014). Furthermore, the teachers' self-efficacy positively affects job satisfaction. Lastly, when the teacher self-efficacy variable is included in the model, the impact of teaching practice on job satisfaction reduces. Also, the dimensions of clarity of instruction, cognitive activation and classroom management of the teaching practice positively affect job satisfaction through self-efficacy. Based on these

findings, it is possible to conclude that the teachers' self-efficacy has a mediator role in estimating on job satisfaction.

5.2 Conclusion

The purpose of this research was to examine the effect of teaching practice on job satisfaction integrating teacher self-efficacy as a mediator. When the data were analyzed, it was discovered that all of the study hypotheses were approved within the parameters of the constructed structural model. According to the model's findings, teaching practice affect job satisfaction of teachers positively. Results showed that teaching practice affects teacher self-efficacy and job satisfaction directly. Also, teacher self-efficacy beliefs are predictive of teacher job satisfaction.

Moreover, the effect of teaching practices on job satisfaction decreased when teacher self-efficacy was added to the model. That is, the teacher self-efficacy variable diminishes the effect of both teaching practice and job satisfaction. As a result, it has been shown that the influence of teaching practice on job satisfaction is partially mediated by teacher self-efficacy. Hence, it has been discovered that teaching practices have both direct and indirect impacts on job satisfaction. This study finding indicates that when teachers are effective in their teaching practice, their self-efficacy beliefs increasing which make important contribution to increasing job satisfaction. As a consequence, teaching practice and teacher self-efficacy among teachers are essential variables in determining job satisfaction.

5.3 Implications

Through SEM, the main findings are as follows: (1) There is positive and significant relationship between teaching practice and teacher self-efficacy. (2)

There is positive and significant relationship between teacher self-efficacy and job satisfaction. (3) There is a positive and direct relationship between teaching practice and job satisfaction. (4) There is an indirect relationship between teaching practice and job satisfaction in the presence of self-efficacy as a mediator. (5) There is a positive relationship between clarity of instruction and job satisfaction. (6) There is a positive relationship between cognitive activation and job satisfaction. (7) There is a negative relationship between classroom management and job satisfaction. (8) The dimension of clarity of instruction of the teaching practice positively affects job satisfaction through self-efficacy. (9) The dimension of cognitive activation of the teaching practice positively affects job satisfaction through self-efficacy. (10) The dimension of classroom management of the teaching practice positively affects job satisfaction through self-efficacy. To sum up, it appears that multidimensional construct ‘‘teaching practice’’ has a significant effect on teacher self-efficacy and job satisfaction. This result suggests changes that should be implemented in order to promote job satisfaction via teaching practice.

Based on the findings of the study, additional courses linked to teaching and self-efficacy should be included in curriculum design to assist instructors in the future workplace and help them become more confident. Furthermore, instructors can be offered in-service training to help them increase their self-efficacy. Furthermore, required training in teaching techniques, student cognitive development, teenage psychology, and adolescent behaviors should be organized and linked with continual internship practices to enhance teacher self-efficacy.

Teachers have extensive instructing experience, combined with several teaching methods, which can boost student involvement. In schools, teachers may meet regularly to discuss instructional practices, specific topics, and to organize and prepare teaching materials together. Groups of instructors who teach the same topic can meet to discuss individual student issues and find solutions. In this way, both teaching practice, teacher self-efficacy and job satisfaction might be improved. Significantly, the higher the degree of job satisfaction in 44 nations and economies,

the less likely teachers are to indicate an intention to quit their jobs early. Promoting teachers' feeling of fulfillment and job satisfaction should thus be a common objective of educational institutions (OECD, 2020).

5.4 Suggestions for further research

According to the TALIS findings, it is important to examine intrinsic motivation and attitudes toward becoming lifelong learners and professional employees as part of the requirements for choosing individuals for the teaching profession. (OECD, 2020) Future research should look at reports like TALIS and PISA, which allow comparisons of OECD countries in terms of education across several variables. Individual research in various cultures are encouraged, given that the factors examined in the OECD reports that analyze the behavior of teachers, students, and school principals represent existing literature. Moreover, future study might include student evaluations (e.g. observations) as well as self-perceptions, allowing for a better understanding of the relationships between satisfaction, self-efficacy, positive affect, and instruction. This can be accomplished by TALIS-PISA link reported by OECD.

TALIS 2018 study is a cross-sectional, self-reported research approach. In the next, longitudinal study to follow potential differences in levels of teacher job satisfaction and the accompanying contributing factors should be considered. This study's target population is teachers in Turkey in high school level. Future research might compare eastern and western nations in order to determine what characteristics influence job satisfaction of teachers. Three variables are included in this study. Other variables should be used in future research to further examine how levels of teacher job satisfaction can be altered.

Moreover, the model, which determines the links between teaching practice, teachers' self-efficacy, and job satisfaction, might serve as a fundamental predictor for future study. As a result, qualitative research may be used to investigate the

impacts of teaching practice on job satisfaction and teacher self-efficacy, as well as the reasons of these effects. Integrating different mediator variables into the model while analyzing the influence of teaching practice in characterizing job satisfaction can assist research studies to acquire more effective findings.

Future research may examine the effect of teacher characteristics on these latent variables. Future research may examine the psychometric properties of teacher self-efficacy scale, teaching practice scale and job satisfaction scale by testing the reliability and validity of scales.

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APPENDICES

A. Teacher Self-efficacy Scale Items

34. In your teaching, to what extent can you do the following?

Please mark one choice in each row.

		Not at all	To some extent	Quite a bit	A lot
a)	Get students to believe they can do well in school work	☐ 1	☐ 2	☐ 3	☐ 4
b)	Help students value learning	☐ 1	☐ 2	☐ 3	☐ 4
c)	Craft good questions for students	☐ 1	☐ 2	☐ 3	☐ 4
d)	Control disruptive behaviour in the classroom	☐ 1	☐ 2	☐ 3	☐ 4
e)	Motivate students who show low interest in school work	☐ 1	☐ 2	☐ 3	☐ 4
f)	Make my expectations about student behaviour clear	☐ 1	☐ 2	☐ 3	☐ 4
g)	Help students think critically	☐ 1	☐ 2	☐ 3	☐ 4
h)	Get students to follow classroom rules	☐ 1	☐ 2	☐ 3	☐ 4
i)	Calm a student who is disruptive or noisy	☐ 1	☐ 2	☐ 3	☐ 4
j)	Use a variety of assessment strategies	☐ 1	☐ 2	☐ 3	☐ 4
k)	Provide an alternative explanation, for example when students are confused	☐ 1	☐ 2	☐ 3	☐ 4
l)	Vary instructional strategies in my classroom	☐ 1	☐ 2	☐ 3	☐ 4
m)	Support student learning through the use of digital technology (e.g. computers, tablets, smart boards)	☐ 1	☐ 2	☐ 3	☐ 4

A. Teaching Practice Scale Items

42. Thinking about your teaching in the <target class>, how often do you do the following?

Please mark one choice in each row.

		Never or almost never	Occasionally	Frequently	Always
a)	I present a summary of recently learned content.	☐ 1	☐ 2	☐ 3	☐ 4
b)	I set goals at the beginning of instruction.	☐ 1	☐ 2	☐ 3	☐ 4
c)	I explain what I expect the students to learn.	☐ 1	☐ 2	☐ 3	☐ 4
d)	I explain how new and old topics are related.	☐ 1	☐ 2	☐ 3	☐ 4
e)	I present tasks for which there is no obvious solution.	☐ 1	☐ 2	☐ 3	☐ 4
f)	I give tasks that require students to think critically.	☐ 1	☐ 2	☐ 3	☐ 4
g)	I have students work in small groups to come up with a joint solution to a problem or task.	☐ 1	☐ 2	☐ 3	☐ 4
h)	I ask students to decide on their own procedures for solving complex tasks.	☐ 1	☐ 2	☐ 3	☐ 4
i)	I tell students to follow classroom rules.	☐ 1	☐ 2	☐ 3	☐ 4
j)	I tell students to listen to what I say.	☐ 1	☐ 2	☐ 3	☐ 4
k)	I calm students who are disruptive.	☐ 1	☐ 2	☐ 3	☐ 4
l)	When the lesson begins, I tell students to quieten down quickly.	☐ 1	☐ 2	☐ 3	☐ 4
m)	I refer to a problem from everyday life or work to demonstrate why new knowledge is useful.	☐ 1	☐ 2	☐ 3	☐ 4
n)	I let students practise similar tasks until I know that every student has understood the subject matter.	☐ 1	☐ 2	☐ 3	☐ 4
o)	I give students projects that require at least one week to complete.	☐ 1	☐ 2	☐ 3	☐ 4
p)	I let students use ICT (information and communication technology) for projects or class work.	☐ 1	☐ 2	☐ 3	☐ 4

B. Teacher Job Satisfaction Scale Items

53. We would like to know how you generally feel about your job. How strongly do you agree or disagree with the following statements?

Please mark one choice in each row.

		Strongly disagree	Disagree	Agree	Strongly agree
a)	The advantages of being a teacher clearly outweigh the disadvantages.	☐ 1	☐ 2	☐ 3	☐ 4
b)	If I could decide again, I would still choose to work as a teacher.	☐ 1	☐ 2	☐ 3	☐ 4
c)	I would like to change to another school if that were possible.	☐ 1	☐ 2	☐ 3	☐ 4
d)	I regret that I decided to become a teacher.	☐ 1	☐ 2	☐ 3	☐ 4
e)	I enjoy working at this school.	☐ 1	☐ 2	☐ 3	☐ 4
f)	I wonder whether it would have been better to choose another profession.	☐ 1	☐ 2	☐ 3	☐ 4
g)	I would recommend this school as a good place to work.	☐ 1	☐ 2	☐ 3	☐ 4
h)	I think that the teaching profession is valued in society.	☐ 1	☐ 2	☐ 3	☐ 4
i)	I am satisfied with my performance in this school.	☐ 1	☐ 2	☐ 3	☐ 4
j)	All in all, I am satisfied with my job.	☐ 1	☐ 2	☐ 3	☐ 4