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A Structural Equation Modeling of Teachers Job Satisfaction: An Application in Saudi Arabia-TALIS 2018

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Abstract Structural equation modeling (SEM) is one of the indispensable multivariate statistical techniques for analyzing complex relationships in many fields. The education field has emerged as an active area of SEM applications due to the inherent nature of its interacting variables. This research applies SEM to provide an in-depth analysis of the factors influencing teachers job satisfaction in Saudi Arabia. The study draws upon data collected from Saudi teachers who participated for the first time in the Teaching and Learning International Survey (TALIS-2018). For this purpose, 2744 teachers and 192 principals from the secondary school level were selected using a stratified sampling strategy. The results indicated school climate, professional practices, motivation and participation, and student-teacher interaction significantly impacted teacher job satisfaction (β=0.35,0.12,0.17 and 0.21) respectively p-value=0.000. Not surprisingly, the stress construct negatively impacted job satisfaction with (β=-0.30) with p-value=0.000. Based on the results, teacher satisfaction can be enhanced by focusing on variables that have a significant influence and avoiding stress causes.

Keywords Structural Equation Modeling, TALIS 2018, Saudi Arabia, Teacher Job Satisfaction, Confirmatory Factor Analysis.

AMS 2010 subject classifications 62-07, 62H12, 62H25, 62H99, 62P99

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1. Introduction

Structural Equation Modeling (SEM) has been extensively utilized in analyzing complex relationships due to its ability to provide a comprehensive analysis of the study variables. It has the ability to analyze direct and indirect relationships while simultaneously dealing with multiple latent and observed variables accounting for measurement error [42, 61, 85].SEM integrates the power of conventional statistical methods such as regression, correlation, path analysis, variance, and covariance analysis providing deeper insights into different aspects of a study [74]. It is also considered a form of hypothesis testing to confirm and validate theoretical models [42, 61]. Two types of SEM were reported in the literature: variance-based SEM, an exploratory approach, and covariance-based SEM (CB), a confirmatory approach [61]. A superior performance of SEM compared to the conventional technique has enriched the literature with applications in different fields such as medical, industrial, environmental, psychological, biological, construction research, social science research, education research [25, 57, 78, 98, 111]. Recently the number of educational research that utilized SEM has dramatically increased due to the complex and diverse nature of the relationships between factors in the academic research [57, 24, 115, 96].

Teaching as an integral part of the education system is one of the most demanding and challenging professions, and teachers' job satisfaction significantly impacts their productivity, absenteeism, and retention in the education sector. Developing and enhancing the teaching-learning process mainly depends on having effective instructors.

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The recently published research on teacher education and the rapid development of the profession indicates the importance of having effective instructors who are satisfied with their jobs. The well-being of teachers and their students is influenced by teacher job satisfaction [101]. Education professionals, policymakers, and other stakeholders are now facing challenges in identifying and keeping such satisfied teachers. Hence, identifying factors affecting teachers job satisfaction has become crucial for maintaining and preventing them from leaving the profession. Job satisfaction can be defined as a state of mind determined by the extent to which the individual perceives her/his job-related needs to be met [35].

One of the most well-known international projects, the Teaching and Learning International Survey (TALIS), is utilized in this research. It focuses on the learning environment and the working conditions of teachers in schools and provides teachers and school principals with the chance to share their perspectives on school contexts. The participating countries can utilize the data to analyze the relationships further and assist in creating policies related to the discovered issues[72].

1.1. Job Satisfaction (JS)

Teachers job satisfaction is a fundamental factor in the effectiveness of any education system. The quality of the education system significantly impacts the country's development and economic growth. Understanding the factors affecting teacher job satisfaction is critical for improving teacher retention and student achievement. It requires advanced statistical methods that provide insight into relationships between such factors

Well-being at work is an important factor to be considered in any research on human well-being. The relationship between them was proven to have a significant and strong correlation. It is found that well-being domains including positive emotions, engagement, relationship, meaning, and achievements are linked to Job satisfaction [30, 32]. Various definitions have been proposed for the concept of job satisfaction.[67] defined work satisfaction as "a pleasurable or positive emotional state resulting from the appraisal of one's job or job experiences," this definition is the most frequently employed in organizational research. Several aspects reflect job satisfaction including salary, promotions, coworkers, supervision, and the task itself. In addition, management, working environment, career opportunities, and recognition are also considered important factors [8, 67]. [48] investigated the factors influencing job satisfaction in the South Australian construction industry. He found that the length of working hours and the amount of assigned tasks affect job satisfaction.[31] identified four factors influencing medical staff job satisfaction including work comfort, work treatment, salary, and incentives. [66] implemented a correlation analysis to show that relations with coworkers and job security significantly correlated with job satisfaction at Nairobi.[88] identified two sets of factors affecting service staff job satisfaction. The main factors are personal fulfillment relationships with coworkers, whereas the secondary factors are salary and education level. [82] indicated that job security, contribution to decision-making, salary increment, promotion opportunities, and flexible working hours significantly affect female employees' job satisfaction in Bangladesh's commercial banks. [41] indicated that salary and communication between colleagues and supervisors, promotion, opportunities, and performance have different levels of influence on the job satisfaction of Vietnamese employees. [83] suggested that motivation and personal development are the top factors affecting Spanish employees in the wood industry. [105] indicated that organizational culture is the most important aspect affecting job satisfaction. [97] conducted a study in the healthcare field and found that work facilities and job satisfaction have a statistically significant linear relationship. The relationship between leadership style and job satisfaction was investigated to be positively related in Malaysian private organizations [1]. [43] found that challenges, recognition, and colleague relationships in organizations are significantly related to job satisfaction.

1.2. Teacher Job Satisfaction

It has been determined that teachers play a vital role in accomplishing the crucial goal of providing high-quality basic education [91]. In addition, teacher job satisfaction may result in higher performance and commitment, hence, improving higher educational outcomes [99]. [73] concluded that teacher job satisfaction is the degree to which an individual identifies, contributes positively, or feels valued within their school. The impact of teacher job satisfaction on learning and education quality has garnered significant attention in recent studies [20, 46, 68, 87, 116]. [33] used confirmatory factor analysis and structural equation modeling to investigate

the relationship between types of leadership and overall satisfaction in the Republic of Cyprus. [112] applied Pearson correlation and multiple regression analysis on the data collected from Malacca. He found a significant relationship between occupational stress and job satisfaction. [81] found that environmental and student behavior factors have significant effects on the job satisfaction of college teachers in West Bengal. [55] implemented multiple regression analyses to investigate the impact of salary, training and personal developments, working environment, and performance appraisal on teacher job satisfaction in Karachi. Three factors have a significant influence including salary, working environment, and performance appraisal. [13] categorized the factors influencing job satisfaction into personal, organizational, managerial, academic, professional, and financial factors.[23] applied partial least squares-path modeling to investigate the effect of communication, involvement, leadership, school climate, and school structure. [116] used the machine learning approach namely the penalized regression method to investigate predictors of JS. They found that school climate and teacher feedback affected Teacher JS. [20] employed the correlation analysis and hierarchical regression approach to predict the teacher JS. They conclude that self-efficacy and collective beliefs have a unique effect on JS. [87] investigated the association between the aspects of leadership and job satisfaction using Artificial neural networks (ANNs). Smet found that there is a significant positive relationship between JS and professional development using a hierarchical linear modeling approach [91]. The direct and indirect relationship between JS and self-efficacy have been investigated in France and the Czech Republic [76]. [46] studied the impact of teacher job satisfaction on the quality of instructions in New Zealand, the United States, Australia, Canada, and the United Kingdom using Multilevel Structural equation modeling. They found that the relationship between the JS and the quality of instructions was partially mediated by teacher-student relations.

1.3. Education in Saudi Arabia

The contribution of education and educators to the development of a country is recognized by Saudi Arabia's Vision 2030, which seeks to revolutionize the country across various aspects. Two strategic objectives were set by Vision 2030, that prioritize education development, including human capital development and national character development [71]. The vision's goals for a cutting-edge, superior educational system that can effectively prepare future generations to contribute to the nations advancement relate to teacher job satisfaction as a tool that has the most significant impact. This relationship emerged in education transformation, human development, cultural and social development, and policy settings. Teacher job satisfaction gained special importance as it is the key to providing quality education. In addition, it can support educational reform and innovation to equip students with the necessary skills. Fostering teacher job satisfaction through professional development, support, and recognition contributes to building a competent and motivated teaching workforce. Job satisfaction can affect educators' dedication to nurturing values and skills essential for the nation's social and cultural growth as aimed by Vision 2023. This study focuses on the case of Saudi Arabia particularly the determinants of teacher job satisfaction utilizing structural equation modeling on data collected from TALIS 2018. Table (1) summarizes the research on teacher job satisfaction in the Saudi Arabian community.

1.4. The Teaching and Learning International Survey (TALIS)

In this study, Large-scale data from the Teaching and Learning International Survey (TALIS), carried out in Saudi Arabia for the first time in 2018, was analyzed using structural equation modeling. The Organization for Economic Cooperation and Development (OECD) administers the TALIS global survey, which is aimed at school principals and teachers, every five years. It is intended to support educators and school administrators in enhancing the quality of the educational program. The survey includes 11 aspects related to teachers and principals, including 'teachers' instructional practices, school leadership, teachers' professional practices, teacher education, and initial preparation, teacher feedback and development, school climate, job satisfaction, motivation, teacher human resource measures and stakeholder relations, teacher self-efficacy, innovation, and equity and diversity [72].

To the researcher's knowledge, limited research was published on analyzing job satisfaction based on TALIS 2018 data collected from Saudi Arabia [9, 118]. [9] used structural equation modeling to show that teacher self-efficacy significantly and positively impacted teaching practices based on the data collected from teachers who

Table 1. Summary of Research on Teachers Job Satisfaction in Saudi Arabia

Reference	Data	Statistical Method	Findings
[17]	Survey Male teachers in ABHA city	T-Test Chi-Square Test Pearson Correlation	There is no significant relationship between job satisfaction and years of experience
[2]	Jeddah Private Elementary School principals and teachers	Descriptive Statistics T-Test Pearson Correlation Regression Analysis	Transactional leadership positively correlated with Job satisfaction
[10]	15 Female secondary schools in Riyadh City	Pearson Correlation Regression Analysis	Work-family conflict and social support correlated with female teacher job satisfaction
[11]	115 male -106 female	Partial Least Squares - Path modelling	The interpersonal relationship affects teacher job satisfaction according to gender differences.
[40]	40 Elementary schools in Najran city	Multivariate analysis of variance (MANOVA)	There were significant differences existed between teachers in each six subscales of job satisfaction based on demographic variables.
[4]	Public secondary schools in Buraidah City	Factor analysis Correlation Regression analysis	There was a significant relationship between the Remuneration and job satisfaction
[118]	TALIS 2018- 38 Countries including Saudi Arabia	Descriptive statistics Job satisfaction means comparisons	Saudi Arabia was identified as one of the countries with low job satisfaction
[7]	20 Headteacher Different stage schools in Eastern province KSA	sequential exploratory strategy employing a mixed methods approach	work/life balance, the female leadership environment, location, financial rewards, and transportation
[63]	A sample of 943 faculty members in the health science program	Regression analysis	Evaluate the level of job satisfaction among faculty members of the health science program at higher education program
[5]	Public sector female teachers	Correlation Analysis Regression Analysis	Used Job satisfaction as a moderator between the independent variable and teacher performance
[51]	Early childhood teachers in private and public schools in Al-Ahsa	Descriptive Statistics Regression analysis	Investigate the level of job satisfaction and its impact on the teaching profession among early childhood teachers
[56]	TALIS 2018	Descriptive statistics Multilevel Model	School predictors do not the variability in Job Satisfaction, whereas teacher characteristics determine Job Satisfaction significantly
[12]	Ten schools in Riyadh	Correlation analysis Test of hypothesis	Studied the impact of participation in decision-making on job satisfaction
[16]	Sample of 321 faculty members	Correlation analysis Test of hypothesis	Studied the impact of psychological resilience on job satisfaction Resilience is key predictor of Job Satisfaction

participated in TALIS 2018. [118] conducted a mean comparative study on job satisfaction across 48 countries that participated in TALIS 2018 to identify the highest and lowest satisfied teachers with their jobs.

1.5. Research Aim

The study's primary goal is to identify the significance of determinants influencing teachers' job satisfaction in Saudi Arabia, using a structural modeling analysis based on data collected from TALIS 2018. In addition, to explore the relationship between these factors, and evaluate their impact on teacher job satisfaction. Latent factors (scales) include stress, professional practices, motivation and practices, school climate, and student-teacher interaction. The

teachers job satisfaction scale is defined in this study by two subscales: satisfaction with the work environment, and the profession. The study's findings may have significant implications for policymakers and education stakeholders in Saudi Arabia. A comprehensive evaluation and understanding of the factors that influence the teaching profession can help develop policies and programs that promote job satisfaction, thereby improving teacher retention rates and the quality of education. In addition, it enriches the applied statistical fields, especially in educational applications.

2. Theoretical Background

2.1. Stress and Job Satisfaction

Job Stress can be defined as the physical and emotional status associated with Job-related aspects [75]. [90] investigated job satisfaction and work-related stress among teachers in Norway. He stated that teaching stress is the mismatch between work demand and racecourses. Additionally, it was concluded that stress can be expressed emotionally or physically due to workload, values conflict, unacceptable student behavior, and cooperation between team members. Table (2) summarizes some literature on the relationship between teacher stress and job satisfaction.

Table 2. Literature on the relationship between teaching stress and job satisfaction

Reference	Methodology	Findings
[109]	Correlation study	There are positive and negative correlations between stress and satisfaction in Thailand depending on other factors such as age and gender.
[53]	Hierarchical ordinal Logistic Regression	Reduction of stress and anxiety leads to greater job satisfaction
[79]	Hierarchical regression	The study indicates that schoolteachers are facing two types of stress; occupational and personal which significantly affect job satisfaction
[37]	Path analysis on data collected from Indonesia	Job stress directly influences job satisfaction
[65]	Frequency analysis, Reliability analysis, Correlation analysis	Job stress negatively affects the job satisfaction of childcare teachers
[54]	Structural equation modeling on data collected from public schools in Turkey	Teacher stress has a direct negative impact on Job Satisfaction stress was used as mediator
[77]	Multivariate analysis of covariance on data from the National Education-al School in Germany	The differentiated instructions increased the teacher's stress which negatively affected job satisfaction

2.2. School Climate and Job Satisfaction

The term School climate refers to the general institute environment including relationships with students, colleagues, and administrators, general ambiance, and social and cultural settings. School climate has a vital role in shaping teacher job satisfaction in several ways including creating supportive relationships within the workplace, encouraging teamwork, increasing appreciation, and supporting self-development. Table (3) lists a few research that investigated this relationship.

Table 3. Literature on the relationship between school climate and job satisfaction.

Reference	Methodology	Findings
[103]	Correlation study Multiple Regression	School climate has a significant impact on six aspects of teacher job satisfaction
[15]	Correlation study Analysis of variance	School climate has a positive on teacher job satisfaction in Tehran. The study also investigated the impact of age and gen-der on teacher job satisfaction
[6]	Structural equation modeling	Six factors of school climate were assessed in the Australian high school using structural equation modeling. The study revealed that school climate significantly affects teacher job satisfaction
[117]	Multilevel modeling	The study investigated the personal and general factors that affected Korean teacher satisfaction. They found that self-efficacy and school climate significantly influenced Teacher job satisfaction
[94]	Analysis of variance (ANOVA) Stepwise Regression	The study showed that school climate has a strong impact on teacher Job satisfaction
[36]	Path analysis	The study indicated a positive and direct influence of organizational climate on high school teacher job satisfaction
[118]	Structural equation modeling	The study conducted in Norway showed a strong direct impact of school climate on teacher job satisfaction
[104]	Structural equation modeling	The research tested 4 aspects of school climate on job satisfaction including perceived discipline, which has a negative impact, and teacher-student relation, which has a positive and direct impact.
[120]	Path analysis	The study conducted in the United States showed that school climate significantly and directly influenced teacher job satisfaction

2.3. Professional Practices and Job Satisfaction

Teachers utilize a variety of strategies, beliefs, and skills known as professional practices to support student success and facilitate the learning process. These practices represent the professional standards and expectations of the teaching profession and are the result of best practices, educational theory, and research [19, 28, 29, 64]. [58] demonstrated that teaching practices were composed of correlated factors such as classroom strategies, knowing materials, and practicing the profession. The relationship between teaching professional practices and job satisfaction was reported in the literature and summarized in Table (4).

2.4. Student-Teacher Interaction and Job Satisfaction

Student-teacher interaction refers to the level and frequency of communication between teacher and their students which might include emotional and instructional support and in-class communication [34]. [119] conducted a study in Cyprus schools and indicated that the student-teacher relationship contributed to Cypriot teacher satisfaction. The relationship between student-teacher interaction and teacher job satisfaction is increasingly recognized. [106] indicated that student-teacher interaction appeared to be positively related to job satisfaction. [3] indicated that

Table 4. Literature on the relationship between Professional Practices and job satisfaction

Reference	Methodology	Findings
[113]	Hierarchic regression	The results indicated that teaching professional practices such as cooperation among teachers 'significantly affected job satisfaction
[107]	Structural Equation modeling	The study conducted in the United States shows that stress is linked to negative teaching practices and hence affects job satisfaction.
[62]	Logistic and multiple regression	The study conducted in Canada showed that teaching practices such as teamwork and mentorship significantly influence Job satisfaction
[80]	Quantitative study	The study conducted in the US indicated that teaching practices namely collabo-ration among teachers a significant predictor of Job satisfaction
[45]	Structural Equation Modeling	The research conducted in China indicated that teaching practices are significantly related to job satisfaction in both private and public schools
[102]	Hierarchical linear modeling	The study investigated the relationship between professional collaboration, leadership, and job satisfaction based on TALIS 2013- in United States schools
[110]	Two levels of structural equation models	A positive and significant association between teachers Job satisfaction and professional collaboration was revealed

direct communication of teachers with students is considered the main source of job satisfaction based on a study conducted in the Netherlands. [69] conducted a thematic analysis on data collected from China, Xianning Vocational Technical College and the results revealed that student-teacher relationships positively influenced teacher job satisfaction.

2.5. Motivation, participation, and Job Satisfaction

Motivation and participation are integral parts of a teacher's job. [44]. defined teacher motivation as drivers that encourage teachers to teach and remain within the teaching profession. They also identified teacher motivation as a key factor in student motivation and teaching effectiveness. Table (5) shows selected literature investigating the relationship between teacher motivation and job satisfaction. Teacher participation refers to their involvement and engagement in the teaching profession activities including collaboration with colleagues, decisions, workplace environment, and educational outcomes. Table (6) summarizes selected literature on this relationship

2.6. Conceptual Model and Research Hypothesis

Figure 1 represents the hypothesized relationship between the constructs of the current study.

Research Hypothesis are:

- H1: Stress negatively influences teacher job satisfaction.
- H2: School Climate has a positive impact on teacher job satisfaction.
- H3: Student-teacher interaction has a positive impact on teacher job satisfaction.
- H4: Professional practices positively influence teacher job satisfaction.
- H5: Motivation and participation positively influence teacher job satisfaction.

Table 5. Literature on the relationship between Motivation and job satisfaction.

Reference	Methodology	Findings
[86]	Descriptive statistics and Analysis of variance	Ten factors of teacher motivation were linked to Job satisfaction and dissatisfaction in the northern region of Gana
[14]	Structural Equation Modeling on High Schools in Indonesia	The study indicated a positive correlation between motivation and teacher job satisfaction
[89]	Regression analysis and T-test	The study revealed that motivation significantly impacted teacher job satisfaction in India
[92]	Descriptive statistics	The results indicated a high connection between teacher motivation and job satisfaction in higher education
[70]	Descriptive statistics	There is a significant relationship between teacher motivation and job satisfaction among teachers in Jordan
[114]	Regression analysis Correlation	There was a strong correlation between teacher motivation and job satisfaction in Turkish schools. They studied the internal and external motivation factors and their relationship to Job satisfaction.
[100]	Descriptive statistics and correlation analysis	The research findings demonstrated a positive correlation between job motivation and satisfaction in Albania

Table 6. Literature on the relationship between Teacher participation and job satisfaction

Reference	Methodology	Findings
[47]	Descriptive Statistics and Multiple regression	The research revealed a significant relationship between decision participation and job satisfaction
[108]	Spearman correlation	The study indicated that teacher job satisfaction is influenced by teacher participation in decision-making on school activities in Kenya
[95]	Descriptive Statistics Multiple Regression	The study indicated a significant relationship between teacher decisional participation and job satisfaction in Nigeria
[18]	Descriptive Statistics Simple and Multiple Regression Correlation	The research study indicated that teacher participation in school decisions is the best predictor of job satisfaction

3. Materials and Methods

3.1. Data Collection and Sampling

TALIS (Teaching and Learning International Survey) gave teachers and principals a chance to contribute to the development of the education system through participation in its cycles. In 2018, the third cycle was implemented in 48 countries worldwide at the lower secondary level by the Organization for Economic Cooperation and

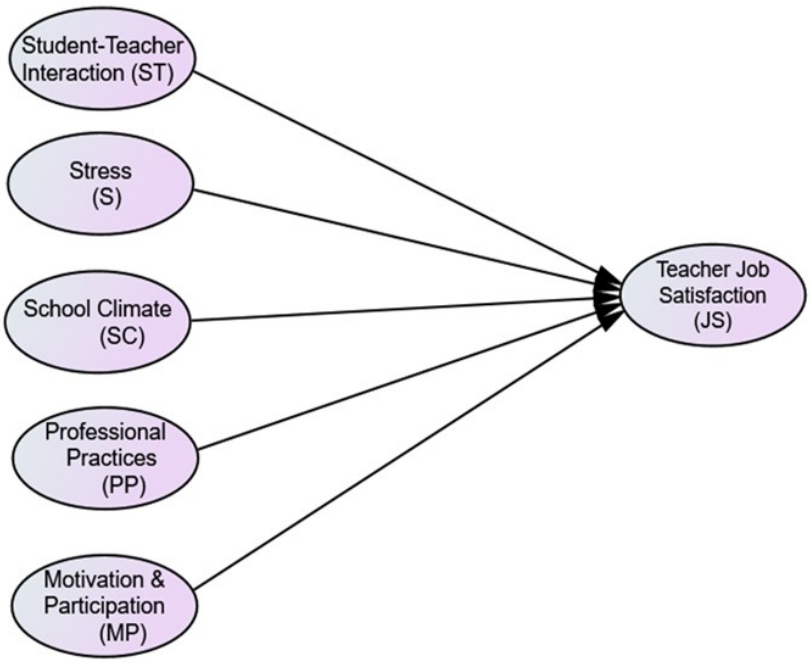

Figure 1. Conceptual Model.

Development (OECD). Saudi Arabia participated for the first time in TALIS 2018 and a sample of 2744 teachers were selected using a stratified two-stage probability sampling strategy. TALIS data were available for the public in June 2018. In the sampling plan, there were 200 lower-secondary schools and in each school, a random sample of 20 teachers was chosen. the data collection follows a rigorous sampling and weighting process conducted by the OECD to accurately reflect the population of teachers and principals in the participating countries. The data were collected based on a two-stage stratified sampling process. The first stage includes the selection of 200 random schools from the eligible school list and the second one includes the selection of 20 teachers within the chosen schools. The OECD implemented a weighting process to ensure that the final sample is representative of the overall population of the participating countries. Three types of weights were used: school, teacher, and post-stratification weights. The first is used to overcome the differences in the school selection probability affected by size and the region. The second weight is the teacher's weight which was applied to ensure that the teachers response was representative of the population. The post-stratification weight is used as an adjustment for the non-response bias. This ensures that respondents reflect the characteristics of the overall population of both teachers and the school [72].

3.2. Statistical Analysis

The Statistical Package for Social Science (SPSS 25) was employed to conduct Exploratory Factor Analysis (EFA). The EFA is an exploratory step used to determine the dimensional structure of the study. The statistical modeling implemented in this study, Structural Equation Modeling (SEM), consists of two interrelated parts, measurement and structural models. The measurement model, a confirmatory factor analysis, is mainly used to confirm a theoretically predetermined structure by the study data. On the other hand, the structural model tests the significance of the causal relationship between the latent factors (Construct). It is critical to assess the suitability of the measurement model before developing the structural model. The measurement and structural models were implemented using Analysis for Moment Structure software (AMOS 26).

3.2.1. Measurement Model The measurement model, a confirmatory factor analysis model, is developed based on observed and latent variables. Each latent variable is linked via paths with a unique group of observed variables (measurements). The factor loadings, variance, and modification indices will be estimated for each latent variable. CFA investigates the covariance relationship among the latent variables [42]. The construct reliability, convergent and discriminant validity, and model fit indices will be calculated to assess the suitability of the CFA model.

3.2.2. Structural Model The structural model, Structural Equation Modelling (SEM), is a comprehensive statistical method that tests complex causal relationships between latent variables. The Covariance-Based SEM (CB-SEM) is used in this study and has five basic phases summarized in [42]. Phase one: Model Specification is the process of specifying the relationship between the latent variables according to a theoretical foundation. In the second phase, model identification, assumptions, and conditions are checked to ensure that parameters can be estimated in the following phase. The structural model parameters are estimated using statistical software in the model estimation phase. Model fit indices including absolute, comparative, and parsimonious fit indices are calculated and compared to their thresholds to ensure the appropriateness of the model. The final phase is implemented based on the fit indices results. The model in this stage is either maintained or modified. The five phases will be demonstrated in the results section.

4. Results

4.1. Research Dimensions and Exploratory Factor Analysis

In this study, five constructs were used including Job satisfaction, stress, school climate, Professional practices, motivation, and participation. The subject-to-item ratio reported by [39] is to have a minimum of 10 for an observed variable meaning that 10*41=410 are required for the analysis. In this study, we have 2744 cases indicating an acceptable sample size. No multicollinearity issues nor outliers were found in the data. The values of kurtosis and skewness were calculated for all variables as shown in Tables (8 to 13) and were found to be between (-7, +7) and (-2, +2) respectively indicating the normality of the study variables [26]. The missing values were imputed by time series transformation.

This step will be conducted to explore the nature of the research constructs. It is also used to reduce the observed variables into a smaller number of latent factors containing the most information in the original variables. The rotation and extraction were used to determine the relationship between variables. Model adequacy was checked using Kaiser-Meyer-Olkin (KMO), a measure of sampling adequacy, and Bartletts test of sphericity for evaluating the overall correlation between variables. Table (7) shows that the KMO test results for all constructs were above 0.8 indicating adequate sampling for conducting EFA. In addition, the results of Bartletts test of sphericity were significant reflecting an acceptable overall correlation matrix.

Table 7. KMO and Bartletts test.

Scale (factor or construct)	KMO	Bartletts test (P-value)
Job Satisfaction	0.805	0.000
Stress	0.856	0.000
School climate	0.854	0.000
Student-Teacher interaction	0.818	0.000
Professional Practices	0.897	0.000
Motivation and participation	0.829	0.000

Hair's rule of thumb for loading greater than or equal to 0.5 was employed to assign the original observed variables to the latent factors yielding the following structure [42]. Loading less than or equal to 0.3 is still acceptable, however, such low loading might cause reliability and validity issues during the implementation of the measurement model. The Job satisfaction construct (Scale) is used as a dependent latent variable, and it

Table 8. Job Satisfaction Construct

Construct	Sub-construct	Items	Code	Skewness	Kurtosis
Job Satisfaction Cronbach's alpha =0.812	Job satisfaction with the work environment (JS1)	I enjoy working at this school	TT3G53E	-0.736	0.614
		I would recommend this school as a good place to work	TT3G53G	-0.701	0.335
		All in all, I am satisfied with my job	TT3G53J	-0.974	1.294
	Job satisfaction with the profession (JS2)	The advantages of being a teacher clearly outweigh the disadvantages	TT3G53A	-0.442	-0.316
		If I could decide again, I would still choose to work as a teacher.	TT3G53B	-0.434	-0.522
		I regret that I decided to become a teacher	TT3G53D*	-0.774	-0.142
		I wonder whether it would have been better to choose another profession	TT3G53F*	0.104	-0.706

is composed of two sub-constructs: Job Satisfaction with the work environment and job satisfaction with the profession. Table (8) provides a detailed explanation of this dimension. The Stress construct (Scale) has three sub-constructs, workplace well-being and stress, workload stress, and student behavior stress as shown in Table (9). The Teacher-student relations are indicated in Table (10) and the school climate construct is presented in Table (11). The professional Practices construct contains two sub-constructs, Exchange and coordination among teachers, and professional collaboration in lessons among teachers as shown in Table (12). The motivation construct contains two sub-constructs, Personal utility motivation to teach and social utility motivation to teach as indicated in Table (13). The internal consistency of the scales was assessed using Cronbachs Alpha where any value between 0.7 and 0.75 indicates an acceptable level of consistency. The reliability analysis results are presented in Tables (8 to 13). It can be seen that all scales show a significant level of consistency.

Table 9. Stress Construct

Construct	Sub-construct	Items	Code	Skewness	Kurtosis
Stress Cronbach's alpha =0.876	Workplace wellbeing and stress (S1)	I experience stress in my work	TT3G51A	0.582	0.010
		My job negatively impacts my mental health	TT3G51C	-0.551	0.204
		My job negatively impacts my physical health	TT3G51D	0.454	-0.572
	Workload stress (S2)	Having too much lesson preparation	TT3G52A	-0.068	-0.845
		Having too many lessons to teach	TT3G52B	-0.222	-0.854
		Having too much marking	TT3G52C	-0.357	-0.676
		Having too much administrative work to do (e.g. filling out forms)	TT3G52D	0.463	-0.440
		Having extra duties due to absent teachers	TT3G52E	0.318	-0.601
	Student behavior stress (S3)	Being held responsible for students achievement	TT3G52F	-0.398	-0.540
		Maintaining classroom discipline	TT3G52G	-0.386	-0.879
		Being intimidated or verbally abused by students	TT3G52H	1.602	1.873

Table 10. The Student-Teacher Interaction Construct

Construct	Items	Code	Skewness	Kurtosis
Student- Teacher Interaction (ST) Cronbach's alpha =0.861	Teachers and students usually get on well with each other	TT3G49A	-0.969	2.087
	Most teachers believe that the students well-being is important	TT3G49B	-1.089	2.035
	Most teachers are interested in what students have to say	TT3G49C	-0.649	1.108
	If a student needs extra assistance, the school provides it.	TT3G49D	-0.839	1.561

Table 11. School Climate Construct

Construct	Items	Code	Skewness	Kurtosis
School Climate (SC) Cronbach's alpha =0.899	This school provides staff with opportunities to actively participate in school decisions	TT3G48A	-0.613	0.200
	This school provides parents or guardians with opportunities to actively participate in school decisions	TT3G48B	-0.359	-0.094
	This school provides students with opportunities to actively participate in school decisions	TT3G48C	-0.345	-0.085
	This school has a culture of shared responsibility for school issues	TT3G48D	-0.629	0.486
	There is a collaborative school culture which is characterized by mutual support	TT3G48E	-0.815	1.272

Table 12. Professional Practices Construct

Construct	Sub-construct	Items	Code	Skewness	Kurtosis
Professional practices Cronbach's alpha =0.879	Exchange and coordination among teachers (PP1)	Exchange or develop teaching materials with colleagues	TT3G33D	0.395	-0.520
		Discuss the learning development of specific students	TT3G33E	0.025	-0.810
		Work with other teachers in this school to ensure common standards in evaluations for assessing student progress	TT3G33F	0.334	-0.716
		Attend team conferences	TT3G33G	1.068	0.601
	Professional collaboration in lessons among teachers (PP2)	Teach jointly as a team in the same class	TT3G33A	1.178	0.426
		Provide feedback to other teachers about their practice	TT3G33B	1.080	1.034
		Engage in joint activities across different classes and age groups (e.g. projects)	TT3G33C	0.391	-0.557
		Participate in collaborative professional learning	TT3G33H	0.040	-1.032

4.2. Measurement Model

The measurement model, a Confirmatory Factor Analysis (CFA), was used to confirm the relationships explored by EFA as shown in Figure (2). It shows six latent variables, each consisting of sub-scales based on EFA results and the TALIS technical report [72]. The doubled-headed arrows represent the correlation between the latent variables and the observed variables, represented by rectangles, were assigned to sub-scales according to EFA results. Five

Table 13. Motivation and Participation Construct

Construct	Sub-Construct	Items	Code	Skewness	Kurtosis
Motivation and Participation Cronbach's alpha =0.869	Personal utility motivation to teach (MP1)	Teaching offered a steady career path	TT3G07A	-1.594	2.076
		Teaching provided a reliable income	TT3G07B	-1.937	3.348
		Teaching was a secure job	TT3G07C	-1.933	3.090
		The teaching schedule (e.g.hours, holidays, part-time positions) fits with the responsibilities of my personal life	TT3G07D	-1.189	0.577
	Social utility motivation to teach (MP2)	Teaching allowed me to influence the development of children and young people	TT3G07E	-2.149	4.585
		Teaching allowed me to benefit the socially disadvantaged	TT3G07F	-1.713	2.473
		Teaching allowed me to contribute to society	TT3G07G	-2.041	3.973

basic phases were followed in conducting CFA: Model specification, model identification, model estimation, and modification. In the first phase, theoretical background and prior knowledge were used to specify the [52]. In the second phase, the sample variance-covariance matrix was used to classify the model as either under-identified, just-identified, or over-identified. The decision is made based on the amount of information used to estimate the parameters which was satisfactory for our model [85]. Then, model parameters including factor loading, variance, and error were estimated using a Maximum Likelihood Estimator (MLE). Alternative estimation methods can also be used that fit the nature of the ordinal data [93]. The Maximum likelihood estimation method was preferred due to several advantages compared to other estimation methods. One advantage is that its estimates are efficient, and unbiased, and tend to converge to true population parameters for large samples. In addition, the ML estimates are consistent when large samples are used (asymptotic property). Most of the goodness of fit indices used to evaluate the SEM model are designed to be used when MLE is implemented providing robust model evaluation [61]. The factor loading of all observed variables exceeded the generally accepted threshold of 0.5 except for the variable TT3G52H was 0.47 which is still acceptable according to [61]. In addition, the average loading across the three variables was 0.66 indicating a moderate overall relationship with the latent variable (S3). Table (14) shows the measurement model results.

The model was assessed using three types of indices: Absolute, incremental, and parsimonious fit indices. It provides insight into how the overall structure fits the data [61]. The model fit was further improved using modification indices that aim to correlate the error terms within the same latent factor. Table (15) presents the most common fit indices, the threshold, and fit results after using the modification indices. It is noted that χ^2/df index was not achieved due to its sensitivity to a large sample size [61, 85].

Although χ^2/df statistics is known to be used in most SEM applications to evaluate the fit of the model. However, it is sensitive when using large sample sizes, such as the case with TALIS data, resulting in overestimation and misinterpretation of model fit, hence leading to false conclusions. In other words, it will flag any minor difference as significant and inflate its value. Although some literature suggested the use of χ^2/df, however, [84] also indicated that the use of χ^2/df will also be affected by large sample size and the issue will not be resolved. Therefore, the researcher relied on other fit indices such as RMSEA, CFA, and TLI which are less affected by large sample sizes to compensate for chi-square limitations and ensure a robust interpretation of the model. The use of these alternatives is supported by [61, 85]. Measurement invariance ensures the equivalence of the functioning of the measurement model across groups or conditions [61]. It was checked through three consecutive steps: configural invariance, metric invariance, and scalar invariance where each step is designed to

Table 14. Measurement model

Construct	sub-Construct	Item	Standardized	Unstandardized	S. E	p-value	decision
Job Satisfaction	**JS1**	TT3G53E	0.81	1			
		TT3G53G	0.70	0.911	0.028	0.000	Significant
		TT3G53J	0.60	0.702	0.024	0.000	Significant
	JS2	TT3G53A	0.65	1			
		TT3G53B	0.82	1.331	0.046	0.000	Significant
		TT3G53D*	0.55	0.881	0.038	0.000	Significant
		TT3G53F*	0.52	0.834	0.037	0.000	Significant
Stress	**S1**	TT3G51A	0.63	1			
		TT3G51C	0.92	1.624	0.045	0.000	Significant
		TT3G51D	0.88	1.575	0.044	0.000	Significant
	S2	TT3G52A	0.72	1			
		TT3G52B	0.79	1.105	0.021	0.000	Significant
		TT3G52C	0.85	1.148	0.030	0.000	Significant
		TT3G52D	0.64	0.878	0.027	0.000	Significant
		TT3G52E	0.65	0.882	0.030	0.000	Significant
	S3	TT3G52F	0.84	1			
		TT3G52G	0.64	0.896	0.030	0.000	Significant
		TT3G52H	0.47	0.542	0.028	0.000	Significant
Professional Practices	**PP1**	TT3G33D	0.79	1			
		TT3G33E	0.81	1.044	0.023	0.000	Significant
		TT3G33F	0.82	1.106	0.024	0.000	Significant
		TT3G33G	0.64	0.791	0.024	0.000	Significant
	PP2	TT3G33B	0.66	1			
		TT3G33C	0.70	1.210	0.040	0.000	Significant
		TT3G33H	0.73	1.375	0.045	0.000	Significant
Motivation and Participation	**MP1**	TT3G07A	0.69	1			
		TT3G07B	0.60	1.091	0.031	0.000	Significant
		TT3G07C	0.78	1.107	0.032	0.000	Significant
		TT3G07D	0.67	0.902	0.35	0.000	Significant
	MP2	TT3G07E	0.77	1			
		TT3G07F	0.83	1.184	0.28	0.000	Significant
		TT3G07G	0.83	1.093	0.26	0.000	Significant
School Climate		TT3G48A	0.84	1			
		TT3G48B	0.78	0.930	0.021	0.000	Significant
		TT3G48C	0.82	0.944	0.020	0.000	Significant
		TT3G48D	0.88	0.903	0.019	0.000	Significant
		TT3G48E	0.67	0.716	0.019	0.000	Significant
Student- Teacher Interaction		TT3G49A	0.82	1			
		TT3G49B	0.79	0.939	0.021	0.000	Significant
		TT3G49C	0.81	1.006	0.022	0.000	Significant
		TT3G49D	0.70	0.915	0.24	0.000	Significant

check on a specific property. Configural invariance ensures that the pattern is the same across groups, whereas metric invariance checks the factors loading are equal across the groups. On the other hand, scalar invariance ensures that items intercepts are invariant across the groups [21, 42, 61]. The model invariant: configural, metric, and scaler were assessed based on the recommended rule of thumb. The resulting model expressed the same pattern across male and female students indicating evidence of configural invariance (TLI=0.912>0.9, CFI=0.920>0.9, RAMSE=0.034<0.06, χ^2/df= 3.969<5). After constraining the parameters and evaluating the model, the results showed an equivalence of factor loadings, indicating metric invariance (TLI=0.912>0.9, CFI=0.918>0.9, RAMSE=0.033<0.06, χ^2/df= 3.977<5, χ^2=6073.171). The chi-square index is known to be very sensitive to large sample sizes meaning that it will be significant even to a minimal difference between

Table 15. Measurement model-Fit Indices

Absolute Fit Indices		**Threshold**	**Results**
Goodness of fit	GFI	≥ 0.90	0.909 - Achieved
Root means a square error of approximation	RAMSE	<0.06	0.046 Achieved
Standardized root means square residual	SRMR	≤ 0.06	0.059 Achieved
Incremental Fit Indices		**Threshold**	**Results**
Normed fit index	NFI	≥ 0.90	0.910 - Achieved
Incremental fit index	IFI	≥ 0.90	0.923 - Achieved
Adjusted GFI	AGFI	≥ 0.90	0.900 - Achieved
TuckerLewis index	TLI	≥ 0.90	0.915 Achieved
Comparative fit index	CFI	≥ 0.90	0.923 Achieved
Parsimonious fit indices		**Threshold**	**Results**
Parsimony-adjusted NFI	PNFI	≥ 0.50	0.834 - Achieved
Chi-square/degrees of freedom	χ^2/df	<3	6.73 Not achieved

the metric and configural models hence other fit indices were used [59]. The property was evaluated using the differences in the RAMSE, TLI, and CFI indices according to [21, 78]. The analysis indicated evidence of metric invariance since ΔCFI=0.002$<$0.01, ΔTLI= 0.00$<$0.05, ΔRAMSE=0.01$<$0.015 and ΔSRMR=0.001$<$0.01. The scaler invariance was evaluated using differences in fit indices between metric and scaler models including ΔCFI$\leq$ 0.01, ΔRAMSE$<$0.015, and ΔSRMR$<$0.005. The model was approved to be scaler invariant because the fit indices achieved the criteria ΔCFI=0.006$<$0.01,ΔSRMR=0.004$<$0.005,and ΔRAMSE=0.002$<$0.015.

Table (16) summarizes the results of the convergent and discriminant validity of the measurement model. The convergent validity of the measurement model was calculated to ensure that the constructs are well-represented by their observed variables (items). The average variance extracted (AVE) greater than or equal to 0.5 was used as an indication of convergent validity and it is given by:

$$\text{AVE} = \frac{\sum_{i=1}^{n} L_i^2}{n} \tag{1}$$

where (L_i) represents the standardized factor loading, and i is the number of the observed variable [42]. From Table (16), it can be seen that convergent validity was achieved because AVE values exceed 0.5. The discriminant validity, a measure of discrimination between the constructs, was also achieved because it satisfied the Fornell-Larcker Criterion that the square root of AVE for each factor is larger than the correlation coefficients between factors according to [38]. Composite reliability (CR), also known as construct reliability, estimates the internal consistency between measured variables, and it is given by:

$$CR = \frac{\left(\sum_{i=1}^{n} L_i\right)^2}{\left(\sum_{i=1}^{n} L_i\right)^2 + \sum_{i=1}^{n} e_i} \tag{2}$$

where (L_i) represents factor loadings for each factor and (e_i) is the error variance terms for a factor. CR has the same threshold as the well-known reliability coefficient Cronbachs Alpha coefficient, that is any value between 0.7 and 0.75 indicates an acceptable level of reliability [22, 42]. Results demonstrated an acceptable reliability ($\alpha >$ 0.7).

4.3. Structural Model

The goal of using CB-SEM in this study is to model the relationships, test the hypothesis, validate, and approve the theoretical model. The structural model was applied using the maximum likelihood estimation (MLE) because the data is normally distributed [61]. The resulting model was assessed to determine whether the collected data supported the theoretical base. Figure (3) shows the structural model between the five constructs: school climate,

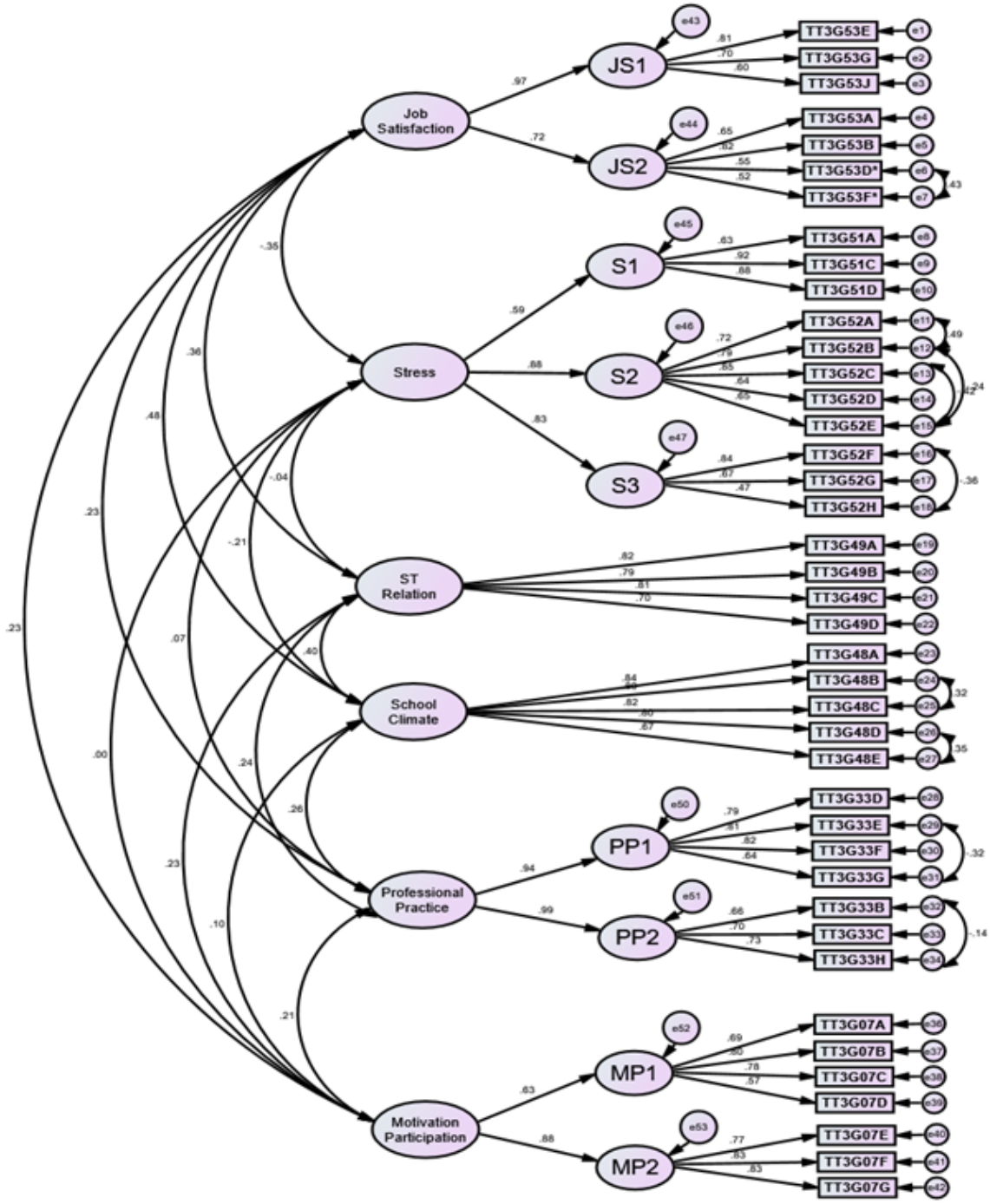

Figure 2. Measurement Model.

Table 16. Convergent and discriminant validity

	CR	AVE	MSV	MaxR(H)	MP	JS	S	SC	PP	ST
MP	0.737	0.590	0.054	0.806	0.768					
JS	0.844	0.735	0.226	0.945	0.232	0.857				
S	0.820	0.609	0.116	0.863	0.006	-0.341	0.780			
SC	0.890	0.620	0.226	0.898	0.098	0.475	-0.200	0.788		
PP	0.966	0.934	0.066	0.984	0.209	0.229	0.063	0.257	0.966	
ST	0.864	0.615	0.161	0.870	0.233	0.364	-0.030	0.401	0.238	0.784

stress, professional practices, student-teacher interaction, motivation and participation, and the output construct: Job satisfaction.

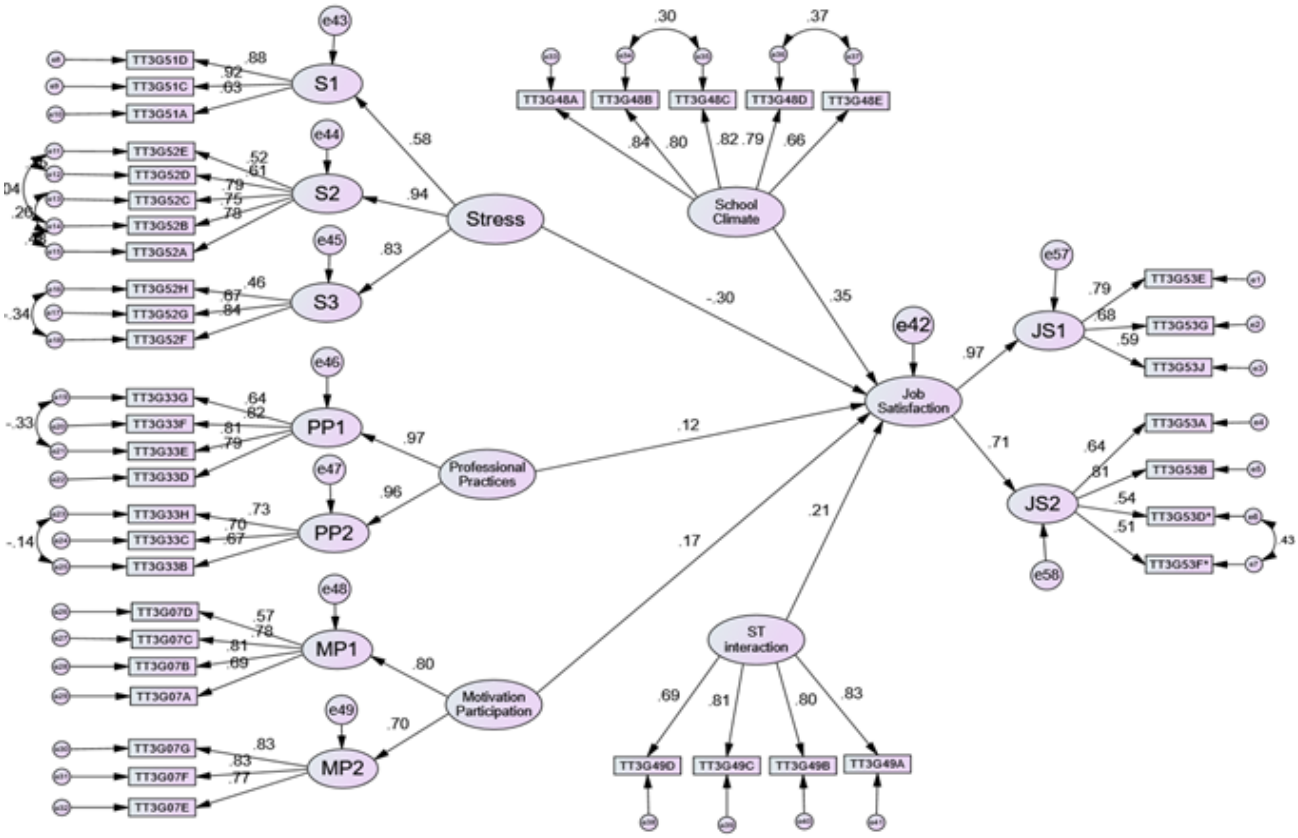

Figure 3. Structural Model.

The structural model appears to be an acceptable fit to the data as indicated by fit indices Table (17): CFI=0.914>0.9, TLI=0.907>0.9, GFI=0.902>0.9, NFI=0.902>0.9, RAMSE=0.048<0.06, SRMR=0.08≤0.08 [49, 61]. However, χ^2/df=7.295 did not achieve the cutoff criteria due to its sensitivity to a large sample size [61, 85].The results presented in Table (18) reveal that school climate professional practices, motivation and participation, and student-teacher relationship significantly impacted teacher job satisfaction (β=0.35,0.12,0.17 and 0.21) respectively p-value=0.000. On the other hand, teacher stress negatively impacted job satisfaction (β=0.30, p-value=0.00).

Table 17. Structural model-Fit Indices

Absolute Fit Indices		**Threshold**	**Results**
Goodness of fit	GFI	≥ 0.90	0.902 - Achieved
Root means a square error of approximation	RAMSE	<0.06	0.048 Achieved
Incremental Fit Indices		**Threshold**	**Results**
Normed fit index	NFI	≥ 0.90	0.902 - Achieved
TuckerLewis index	TLI	≥ 0.90	0.907 Achieved
Comparative fit index	CFI	≥ 0.90	0.914 Achieved
Parsimonious fit indices		**Threshold**	**Results**
Chi-square/degrees of freedom	χ^2/df	<3	7.295 Not achieved

Table 18. Model Coefficients

Dependent	**Independent**	**Unstandardized** β	**Standardized** β	**P-value**	**Hypothesis supported?**
Job Satisfaction	**School Climate (SC)**	0.21	0.35	0.000	Supported
	Stress (S)	-0.25	-0.30	0.000	Supported
	Professional Practices (PP)	0.05	0.12	0.000	Supported
	Motivation and Participation (MP)	0.18	0.17	0.000	Supported
	Student-teacher Interaction (ST)	0.20	0.21	0.000	Supported

5. Conclusion

This study utilized the data collected from the Teaching and Learning International Survey (TALIS 2018) implemented by the OECD to apply the Structural Equation Modeling (SEM) in order to investigate the determinants of teacher job satisfaction in Saudi Arabia. Such applications enrich the structural equation modeling literature in the education sector. Understanding the factors influencing teacher job satisfaction is crucial as it affects teachers and the whole education system in a broader context. In particular, satisfied teachers may affect student outcomes and enhance teacher-student relationships. Additionally, it is associated with a high retention rate, which is important for school sustainability [50]. A Limited number of studies investigated job satisfaction in Saudi Arabia using different statistical tools as shown in Table (1), however, no published research utilizing structural equation modeling on data collected from TALIS 2018 to investigate teacher job satisfaction.

The researcher constructed the structural model to analyze the causal relationship between teacher stress, professional practices, school climate, teacher-student interaction, motivation, participation, and teacher job satisfaction in Saudi Arabia. The analysis exhibited a good fit indicating that the data verified the hypothesized model. The model coefficients are 0.12, 0.35, 0.21, 0.17, and 0.30 respectively with p-value 0.000 indicating significant relationships. While professional practices, school climate, teacher-student interaction, motivation, and participation positively and significantly affected job satisfaction, teacher stress is the only variable that negatively affected teacher satisfaction. The negative impact of the stress scale on job satisfaction was supported by literature [54, 65]. The finding of this study is consistent with the conclusion drawn by Karabatk and Alanoglu, who applied SEM on TALIS data in Turkey [54]. A safe, supportive, and well-organized work environment increases the employee's loyalty and job satisfaction. On the other hand, stress caused by workload, workplace, and student behavior affects overall teacher job satisfaction.The analysis also showed that school climate has a higher significant impact on teacher job satisfaction. This conclusion is consistent with the findings drawn from the application of different statistical methods to data sets other than TALIS survey data worldwide [15, 103, 117, 118]. Teacher motivation and participation, by fostering engagement in decisions and commitment to tasks, leads to a more satisfying teaching experience resulting in a positive attitude toward work, reduces stress, and enhances their ability to manage classroom challenges effectively [18, 60, 70, 14, 86]. This supported the positive and significant

relationship concluded from the current study model and other research conducted in Indonesia, India, and Jordan [14, 89, 70]. The findings also indicate that professional practices significantly impacted job satisfaction through skills improvement and confidence enhancement [27]. Teachers who participate in ongoing learning development programs, and collaborate with other teachers feel capable of delivering their tasks, support other teachers by exchanging valuable information and hence more satisfied. This conclusion is supported by the study conducted in Kenya and Nigeria [95, 108]

Based on this study's findings, the researcher proposes a few suggestions related to independent factors to improve teacher job satisfaction. As education is one of the core aspects of Saudi Arabia's Vision 2030, it is recommended to invest in relevant professional development programs that address individual teacher needs and career paths such as mentoring programs which will enhance collaboration between teachers and promote open communications, hence improving teacher efficacy, the school climate by fostering a collaborative work environment, and professional practices. Recognition of teacher achievements and implementation of reward systems foster inherent motivations, allowing for professional growth and job satisfaction. In addition, it is recommended to introduce policies to reduce non-teaching duties and increase staff administrative support which directly affects teacher stress, increasing their job satisfaction.

Although the TALIS survey focused on lower teachers and principals, some participating countries expanded the study by including the primary and upper-secondary level teachers. Saudi Arabia participated for the first time in the TALIS cycle 2018 with a focus on the secondary school level. The participation of Saudi Arabia in the 2024 cycle was confirmed and reported on the OCED website with the collaboration of the Saudi Education and Training Evaluation Commission (ETEC). In addition, they also participated in other international assessments such as TIMSS and PISA, which focus on other education aspects such as students achievements, indicating that Saudi Arabia is showing interest in international assessments to enhance its education system. This is an opportunity to expand the current study to analyze 2024 data and other linked assessments, hence the findings can be compared and generalized.

Vision 2023, the main driver of the recent developments in Saudi Arabia, focuses on education and introduces multiple initiatives to enhance the quality of education to meet global standards. Generally, Regular participation in international assessment programs such as TALIS provides regular assessment of different aspects of education, allowing policymakers to adjust the education policies, rules, and regulations over time considering the stakeholder's requirements. This study introduces potential research directions such as exploring other factors reported in the TALIS survey related to teacher job satisfaction. The researcher plans to extend the research to compare teacher job satisfaction in countries similar in culture and community customs. In addition, the direct and indirect influence of several factors on teacher job satisfaction taking into account the cultural and contextual factors unique to Saudi Arabia which required an in-depth analysis of future reforms. I believe that such factors will customize the policies and regulations making their implementation faster and more feasible to meet the education system requirements in Saudi Arabia which represents extensive future research.

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