Research Article

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Validity and Reliability Study of Teacher Professional Motivation Scale: A Comparison of Online and Paper-Pencil Administration*

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Abstract

The study aims to develop a valid and reliable measurement tool that evaluates the motivational dynamics of teaching within its unique conditions, and that can be used to determine the levels of teachers' professional motivation. A total of 1054 primary, secondary, and high school teachers at three different stages were included in the study. In the final stage of the process, the confirmatory factor analysis data were collected through the online administration. The findings of the research have indicated that Teacher Professional Motivation Scale consists of four sub-dimensions as in-school factors, out-of-school factors, professional development and respectability, and physical facilities. The results of the confirmatory factor analysis revealed that the four-factor structure of the scale showed acceptable agreement. The factor structure of the paper-pencil administration was also confirmed by the online administration. The internal reliability coefficients of the sub-scales are above acceptable limits for both for paper-pencil administration and online administration. As a result, the study shows strong evidence that both the paper-pencil form and the online form of the scale are a valid and reliable assessment tool that can be used to evaluate teacher motivation in schools.

Keywords: teacher motivation, scale development, online administration, paper-pencil administration.

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Introduction

Motivation is one of the concepts that attract the attention of researchers in social sciences, such as education, psychology, sociology, and management. When the definitions of motivation are examined, it is seen that in the common denominator, the internal and external elements that reveal, guide, and determine the strength and continuity of the behavior come to the forefront (Han & Yin, 2016; Ryan & Deci, 2000; Pinder, 2014; Sieberer-Nagler, 2016). In this context, it can be said that the factors that determine human activities and practices are based on individuals' thoughts, hopes, beliefs, in other words, their desires, needs, and fears (Eren, 2004).

One of the most common approaches in conceptual and practical studies related to motivation is the distinction between intrinsic and extrinsic motivation. Intrinsic motivation is characterized by motivation elements originating from the individual. Internally motivated behaviors are about satisfaction and pleasure for their interests and performance (Deci & Ryan, 1985). Intrinsic motivation inspires actions even when there is no perceived external stimulus or reward. When they are intrinsically motivated, people engage in activities that concern them and display these behaviors freely, with a full sense of will and without the need for financial rewards or restrictions (Deci & Ryan, 1985; Stirling, 2014). Extrinsic motivation encourages actions that are inherently unsatisfactory or uninteresting but may provide benefits in perceived potential outcomes (Stirling, 2014). Extrinsic motivation can arise through incentives or external forces. Extrinsic motivation consists of effects such as punishment and reward (Mahaney & Lederer, 2006).

When the motivation literature is examined, it is seen that two basic approaches are developed as the content and process theories (Ryan & Deci, 2011). The content theories focus on the elements of motivation that are effective in guiding one's behavior; in other words, what gives motivation to individuals; the process theories address the process itself, which determines how human behavior can be guided (Koçel, 2005). The main content theories of motivation are Maslow's Hierarchy of Needs, Alderfer's ERG Theory, Herzberg's Double Factor Theory, and Success-Power Theory. In contrast, the major process theories include Vroom's Expectation Theory, Lawler, and Porter's Enhanced Expectation Theory, Reward Justice (Equality) Theory (Küçüközkan, 2016).

According to Maslow's Hierarchy of Needs, human needs are examined in five groups: physiological, security, belonging, respect, and the need for self-realization. Since the needs are realized hierarchically, it is suggested that creating a social environment for the

employees without meeting their physiological needs will not be motivating. In other words, it is important that the first step for motivation is to provide economic elements and then act for other needs (Ergeneli & Eryiğit, 2001). Alderfer's theory, which is similar to Maslow's theory, has three basic needs: the need for existence, the need for belonging, and the need for development. The need for existence includes material elements such as food and beverage, salary, and well-equipped environments; the need for belonging covers the relationships with other people around the individual; on the other hand, the need for development refers to the situation of the individual producing, putting something in the middle (Oksay, 2005). One of the leading theories that treat human behavior as a process is Vroom's Expectation theory. According to the theory, the factors affecting the behavior of an individual are influenced and determined by the conditions related to the personality and environment of the individual. In addition, people with different needs, desires, and goals make choices according to their perceptions from different behaviors that will lead them to rewards (Eren, 2004).

The concept of motivation discussed to increase the work performance of employees in the field of management is dealt with within the context of increasing the academic performance and willingness to work of students and teachers in the field of education. Teacher motivation is considered to be one of the determinants of school success (De Jesus & Lens, 2005) is one of the most studied topics in various sub-disciplines of educational sciences. In this framework, there are many studies in the teacher motivation literature aiming to reveal the relationship of the variable in question with different variables such as job satisfaction (Davis & Wilson, 2000), social communication skills (Doğan & Koçak, 2014), organizational factors and leadership (Thoonen, Sleegers, Oort, Peetsma & Geijsel, 2011), positive psychology (Viseu, De Jesus, Russian & Canavarro, 2016).

The teaching profession shows significant differences in terms of psychological and sociological dynamics compared to many other professions. Interaction with students, colleagues, families, and other education stakeholders is one of the core competence areas of the teaching profession. It can be stated that the effect of emotional processes in the performance of the profession differentiates the dynamics of professional motivation compared to other occupations. Teachers are directly or indirectly influenced by different dynamics such as general social expectations, student and parent expectations, and expectations of senior management in terms of professional processes. According to Ng & Ng (2015), a teacher's motivation is mainly related to the teacher's personal interest and

commitment to teaching and is influenced by the work environment of students, colleagues, and management staff. The main sources of motivation such as interaction with families, students, school administrators, and other colleagues and national education policies (Börü, 2018; Karabağ-Köse, Taş, Küçükçene & Karataş, 2018) are expected to differentiate teacher motivation. Besides, it can be said that factors such as sharing education and school vision differentiate teacher motivation (Kurt, 2005). Therefore, it is important to evaluate teacher motivation beyond the general motivation processes by considering the original dynamics of the profession. On the other hand, in many empirical studies aimed at examining teacher motivation, it is seen that general motivation scales are used to evaluate teacher motivation (e.g., Akman, 2018; Aksel & Elma, 2018; Can, 2015; Güçlü, Recepoğlu & Kılınç, 2014). A similar trend has been observed in teacher motivation surveys conducted in different countries (Lind, 2017; Nie, Chua, Yeung, Ryan & Chan, 2014), but there are limited scales developed for teacher's work-related tasks in the international literature (e.g., Fernet, Senécal, Guay, Marsh & Dowson, 2008; Roth, Assor, Kanat-Maymon & Kaplan, 2007). Fernet et al. (2008) aimed to measure teacher motivation for professional tasks such as classroom management, teaching, and assessment of students in the scale development study they prepared regarding professional tasks. Roth et al. (2007) focused on measuring teaching motivation in their studies, where teachers focused on autonomous motivation experiences. Therefore, it can be said that, beyond the limited professional duties, a professional motivation scale that addresses teacher motivation in a more general context will contribute to the related literature. It is also important to develop such a scale study sensitive to cultural context.

The concept of motivation, which is one of the most widely discussed concepts globally, is closely related to cultural and social context. The characteristics of the social structure in which emotional codes are acquired about what is valuable also shape the elements that motivate individuals. Some situations that can mobilize people in a society may not affect individuals in another society. Accordingly, it is important to evaluate the concept of motivation based on cultural, social, and institutional characteristics (Demir & Okan, 2009; Hofstede, 2001). In this context, it is thought that the study will make a unique contribution to the literature of teacher motivation in Turkish culture in terms of evaluating the original dynamics of the teaching profession in the psychological, social, cultural, and institutional sense. In the literature, the using of the adaptations of general job motivation scales in most of the studies on teacher motivation (e.g., Akman, 2018; Çivilidağ &

Şekercioğlu, 2017; Dündar, Özutku & Taşpınar, 2007; Emirbey, 2017; Güçlü et al., 2014; Yılmaz, 2009); the fact that all aspects of the school and education context are not addressed or the validity and reliability of the studies are not adequately presented in general in the case of scale development studies (e.g., Akdemir & Arslan, 2013; Bektaş, 2010; Polat, 2010) increases the importance of the study. In some scale development studies aimed at teacher motivation (e.g., Akdemir & Arslan, 2013; Ceviz, 2018; Öztürk & Uzunkol, 2013), the factors affecting teacher motivation such as macro education policies, parent and student factors were excluded. The scale development study is expected to make an original contribution to the related literature in order to evaluate the motivation elements of teachers in all aspects of school and out of school.

Another point that draws attention in the literature on the assessment of teacher motivation is that the assessment tools are designed specifically for specific areas (classroom teaching, English teaching, physics teaching, etc.) (e.g., Carson & Chase, 2009; Choi, 2014; Öztürk & Uzunkol, 2013). It is considered that these measurement tools focused on specific areas are not useful for quantitative-based relational research that requires all teachers in the school to be evaluated as a group. In this context, there are scales developed to assess teacher motivation in different cultures developed in different cultures in the international literature (Fernet et al., 2008; Roth et al., 2007). As the tools for examining teacher motivation in Turkish culture have limitations on the scope and construct validity mentioned above, the study is expected to fill a gap in the literature. Studies comparing online and classical paper-pencil administrations of measurement tools are encountered in different fields, especially in recent years, due to the widespread use of online administrations in empirical researches (Ballester-Arnal, Castro-Calvo, Gil-Julia, Giménez-García & Gil-Llario, 2019; Determann, Lambooij, Steyerberg, De Bekker-Grob & De Wit, 2017). In this regard, the comparative conduct of validity and reliability studies related to online and paper-pencil administrations is among the original contributions of the study to the relevant literature.

Considering that teaching is a unique profession that incorporates psychological, social, physical, cultural, and institutional characteristics, the aim of the study is to develop a valid and reliable measurement tool that evaluates the motivational dynamics of teaching within its unique conditions and that can be used to determine the levels of teachers' professional motivation.

Method

Participants

The population of the study consists of teachers working in primary, secondary, and high schools. Since the research was designed as a scale development study, it was aimed to reach at least ten times the number of participants for each working group reached at different stages of the research (Tinsley & Tinsley, 1987). In this context, a total of 1054 teachers were included in the study; 286 teachers for pilot applications, 345 teachers for paper-pencil tests, and 423 teachers for online administration in the validity study. The details of the study groups are given in Table 1.

Development Process of Measurement Tool

Within the framework of the study, semi-structured interviews were conducted with school principals and teachers, and the factors affecting teacher motivation were evaluated in depth from different perspectives. Scale items were prepared based on the results of the interviews and literature reviews. Accordingly, the motivation elements for the profession are defined operationally, and a comprehensive item pool consisting of 54 items, including the factors stemming from the parents, society, education policies and practices, students, teachers, and administrative elements affecting the motivation of teachers towards the profession has been created. The content validity of the items was evaluated according to the opinions of the field experts. Accordingly, some items were removed from the scale, some items were combined, and the first form of 27 items was obtained for pilot application. For the measurement tool, the pilot application was conducted with the participation of 20 teachers, and the clarity and comprehensibility of the scale items were evaluated.

Data collection was carried out with the participation of 286 primary, secondary, and high school teachers within the scope of the first stage pilot application for the measurement tool, which was finalized with the latest regulations. As a result of the first stage application, item-total correlations of the scale items were evaluated, and it was decided to exclude two items whose item-total correlation was below .30. In order to evaluate the validity and reliability of the 25-item scale, 345 teachers participated in the second stage as the paper-pencil administration. In the final stage, 423 teachers participated in the final online administration to confirm the factor model of the scale.

Table 1. *Demographic Information*

Demographic Information	Groups					
	Pilot (Sample 1)		Paper-Pencil (Sample 2)		Online (Sample 3)	
	n	*%*	*n*	*%*	*n*	*%*
Gender						
Female	154	53.85	191	55.36	224	52.96
Male	132	46.15	154	44.64	199	47.04
Grade						
Primary School	104	36.36	137	39.71	118	27.90
Secondary School	95	33.22	114	33.04	142	33.57
High School	87	30.42	94	27.25	163	38.53
Teaching Branches						
Primary School	87	30.42	104	30.14	97	22.93
Turkish	42	14.69	61	17.68	34	8.04
Social Studies	26	9.09	24	6.96	-	-
Literature	16	5.59	-	-	16	3.78
Philosophy	-	-	8	2.32	-	-
Foreign Language	28	9.79	-	-	84	19.86
Mathematics	38	13.29	50	14.49	71	16.78
Special Training	-	-	16	4.64	-	-
Education of Religion	-	-	43	12.46	79	18.68
Information Technologies	15	5.24	-	-	-	-
Others	34	11.89	39	11.30	42	9.93
Total	286	100.0	345	100.0	423	100.0

Data Analysis

The cases of meeting the assumptions of normality and linearity of the data sets used in the study were examined. Mahalanobis distances and outliers were examined on the basis of items and scale, and kurtosis and skewness coefficients were evaluated ($-2<z<2$; $p<.001$). The data distributions were found to meet the assumptions about single and multiple normalities. Principal component analysis (PCA) and confirmatory factor analysis (CFA)

studies were conducted to evaluate the construct validity of the measurement tool. The suitability of the data for factor analysis and factor extraction for PCA was evaluated with KMO and Bartlett tests. KMO (.88) and Bartlett tests ($X^2(345)=3370.16$; $p<.001$) showed that the data was suitable. Scree plot graphs were examined, and eigenvalue one was taken to evaluate the factor structure of the measurement tool. Since the sub-dimensions are theoretically related to each other, inclined rotation is preferred. The factor load value differences between the items were taken as a minimum .1, and the lowest factor load that a substance should have was accepted as .32 (Tabachnick & Fidell, 2013). For the CFA, the chi-square fit test ($\chi 2$), which is the commonly used fit values, Goodness of Fit Index (GFI), Adjusted Goodness of Fit Index (AGFI), Root Mean Square Error of Approximation (RMSEA), Comparative Fit Index (CFI), and Normed Fit Index (NFI) were examined (Gefen, Straub & Boudreau, 2000; McDonald & Ho, 2002). Cronbach Alpha internal consistency coefficients and correlation values between sub-dimensions were evaluated for reliability. In order to evaluate the discriminating power of the scale, the differences between the upper and lower 27% groups were examined by the MANOVA test.

Findings

In the first stage, a 27-item measurement tool that was made ready for pilot implementation was applied with the participation of 286 teachers (Sample 1). Accordingly, it was decided to exclude the 17th item (Complaints from mechanisms such as telephone, BIMER, etc. affects my motivation negatively.) and the 18th item (Over-involvement of families in this school affects my motivation negatively.) from the scale whose total item correlations remained below .30. According to the results of the first stage application, total item correlation values of 25 items that were decided to remain in the scale ranged between .32 and .62.

In the second stage, PCA was conducted on a different study group data (Sample 2) in order to evaluate the structural properties of the 25-item measuring instrument. PCA results are presented in Table 2.

When Table 2 is examined, it is seen that 25 items are divided into four different factors, which can be named as physical facilities, in-school factors, out-of-school factors, and professional respectability and development. As a result of the PCA, the item to be removed from the scale was not detected. The variance explained by each factor varies between 6.6% and 32.03%. These factors explain 58.03% of the total variance. The

corrected item-total correlations of the items and the eigenvalues of the items in each factor and the total variance explained by the factors are presented in detail in Table 2.

Table 2. *Principal Component Analysis Results*

		Items				Corrected Total Item Correlation
		1	2	3	4	
Factor 1 Physical Facilities	The quality of the physical environment in this school			.740		.511
	Availability of new technologies in this school			.764		.466
	Availability of the equipment needed in this school			.766		.491
	Number of social and sporting activities in this school			.711		.494
	Parental support in this school			.698		.601
	Socio-economic environment of this school			.672		.534
Factor 2 In-School Factors	The sincerity of the atmosphere in this school	.696				.497
	The value given to people in this school	.799				.548
	The level of appreciation of the work done in this school	.727				.618
	Students' success levels in this school	.572				.536
	The effects of my studies on students in this school	.596				.544
	The level of professional cooperation and solidarity in this school	.752				.516
	Teachers' participation in decision-making on school-related issues at this school	.817				.614
	Justice in this school	.812				.608
	Behavior of the school administrator in this school	.802				.608
	Taking into consideration the demands of course hours, watch etc. in this school	.644				.464
Factor 3 Out-of-School	Changes in educational policies and practices		.824			.377
	Training programs prepared by the Ministry		.839			.413
	Textbooks prepared by the Ministry		.749			.339

Factors	Workload of the profession			.682		.302
	Wage level I received			.618		.442
Factor 4 Professional Development and Respectability	Respect for the profession				-.685	.484
	Profession love				-.717	.447
	Opportunities for the personal and professional development of my profession				-.817	.543
	Access to publications related to my field (articles, journals, etc.)				-.769	.470
	Eigenvalues	8.01	3.07	1.78	1.65	
	Explained Variance (%)	32.03	12.28	7.12	6.60	
	Explained Total Variance (%)	58.03				

In order to evaluate the model fit of the factor structure revealed by PCA, CFA was performed on the data of the second study group consisting of 345 teachers (Sample 2) and on the third study group consisting of 423 teachers (sample 3). CFA results are given in Figure 1.

The fit values of the factor structure shown in Figure 1 show that the model fit for the paper-pencil administration [X^2/sd=2.17; RMSEA=.06; GFI=.86; AGFI=.82; CFI=.90; and NFI=.83] and online administration [X^2/sd=4.95; RMSEA=.07; GFI=.88; AGFI=.85; CFI=.93; and NFI=.91] is acceptable (Cole, 1987; Tabachnik & Fidell, 2013). The standardized regression weights indicating factor loads for the items ranged from .30 to .82 for paper-pencil administration and .59 to .90 for online administration.

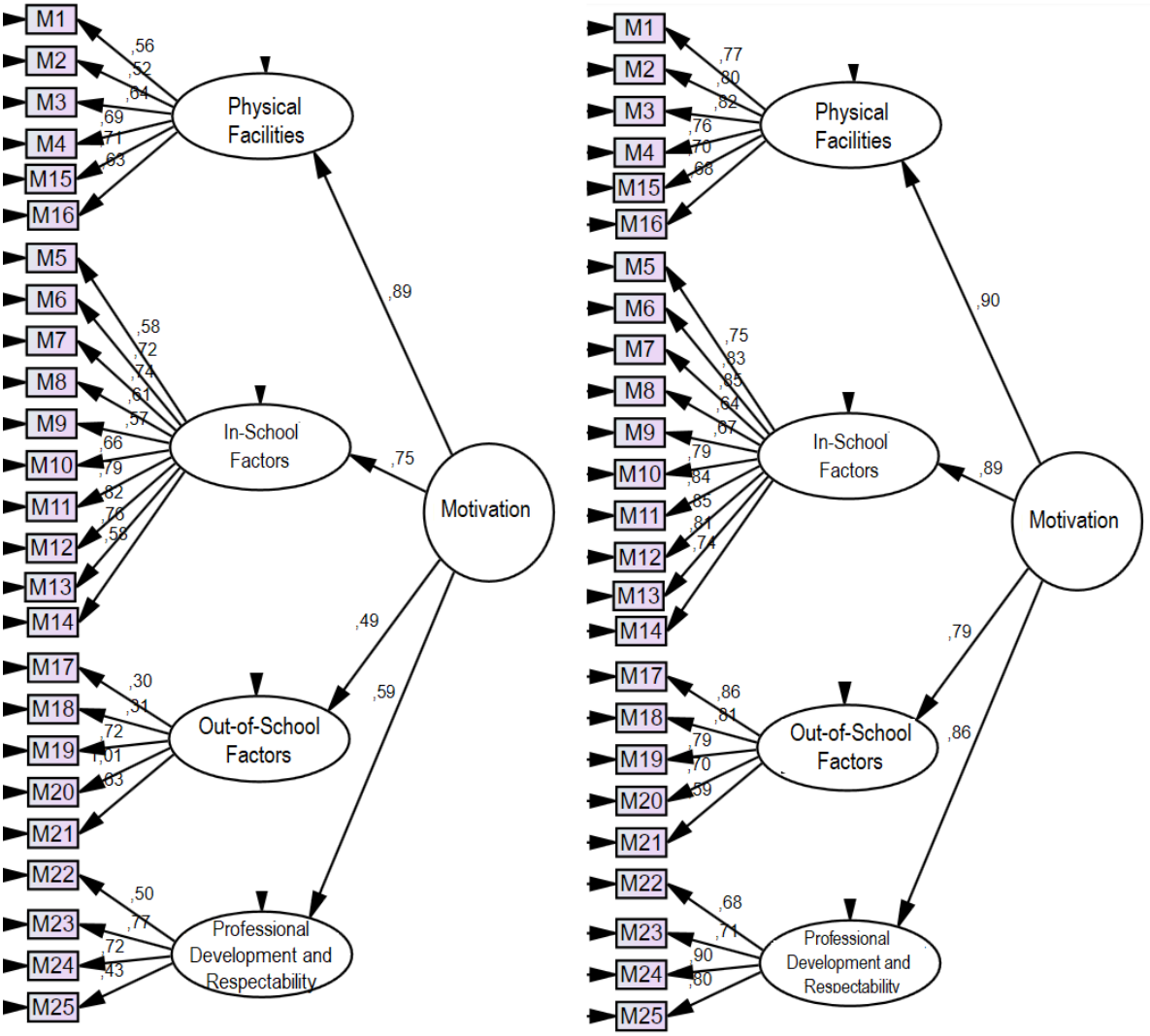

Figure 1. *CFA Results for Online (left) and Paper-pen (right) Administrations*

Internal consistency coefficients were examined to evaluate the reliability characteristics of the scale. Besides, correlation values between sub-factors were examined. The values related to the reliability of the scale are given in Table 3.

When Table 3 is examined, it is seen that the reliability values of the scale are above the .70 lower limit for each factor according to the final application results. Although the correlation values between the sub-factors of the scale reveal significant relationships, they do not require factor consolidation in multiple correlations ($r^2_{(max)}$=.33). On the other hand, the sub-dimensions of the scale were found to be highly correlated with the whole scale.

Table 3. *Descriptive Statistics, Correlation, and Internal Consistency Coefficients*

		$\bar{X}$	*df*	α	Components			
					1	2	3	4
1	Total Scale	3.70	.52	-	1			
2	In-School Factors	4.18	.62	.90	.802**	1		
3	Out-of-School Factors	2.79	.82	.81	.591**	.177**	1	
4	Professional Development and Respectability	3.70	.78	.76	.703**	.399**	.441**	1
5	Physical Facilities	3.64	.74	.78	.759**	.578**	.227**	.440**

*$p < .001$.

In order to evaluate the discriminative power of the scale, the MANOVA test was used to evaluate the multiple mean differences between the upper and lower 27% groups. Accordingly, multiple variance differences were found to be significant [λ=.15, $F_{(5, 123)} = 136.49$, $p < .001$]. Table 4 shows the differentiation between lower and upper groups for the scale and subscales.

Table 4. *Differentiation between Lower and Upper Groups*

Factors	Groups	$\bar{\chi}$	df	*F*	*p**
In-School Factors	Lower	3.52	0.69	149.78	.000
	Upper	4.65	0.26		
Out-of-School Factors	Lower	2.17	0.53	146.34	.000
	Upper	3.52	0.71		
Professional Development and Respectability	Lower	2.96	0.74	186.89	.000
	Upper	4.45	0.48		
Physical Facilities	Lower	2.88	0.70	177.02	.000
	Upper	4.25	0.44		

$p < .01$.

As shown in Table 4, ANOVA tests for sub-factors also give meaningful results and reveal that the difference between the lower and upper groups is significant. The results show that the scale has high discriminatory power.

Scoring

Teacher Professional Motivation Scale consists of 25 items of 5-point Likert type under four factors. There are no items that need to be scored in reverse on the scale. Items 1, 2, 3, 4, 15, and 16th are the *physical facilities* sub-dimension, items 5, 6, 7, 8, 9, 10, 11, 12, 13, and 14th are the *in-school factors* sub-dimension, items 17 to 21 are the *out-of-school factors* and items 22 to 25 are the sub-dimension of *professional development and respectability*. The scores for the sub-factors can be found by the sum of the items under this factor. The scale score is obtained by summing the sub-factor scores. The total score varies between 25 and 125. The scores obtained in the present study varied between 25 and 125 for both online and paper-pencil administrations.

Discussion and Conclusion

In this study, which focuses on occupational specific factors affecting motivation, it is aimed to develop a valid and reliable measurement tool that will help to evaluate the factors that affect teachers' professional motivation. In the direction of the interviews with teachers and administrators and related literature, the factors affecting the motivation of teachers were turned into items, and the first form of the measurement tool was obtained. Data were collected from three different study groups for validity and reliability analysis of the instrument. The validity and reliability analysis carried out separately on the data collected via online and paper-pencil provide strong evidence that *Teacher Professional Motivation Scale* is a valid and reliable measurement tool that can be used by researchers and practitioners to assess teacher motivation in schools sensitive to cultural, social and institutional contexts. It is seen that the internal reliability of the scale is high, and the sub-dimensions of the scale evaluate different characteristics of integrity.

Structural analysis of the assessment tool revealed that teacher motivation could be evaluated in four sub-dimensions as in-school factors, out-of-school factors, physical facilities, and professional development and respectability. In-school factors sub-dimension is related to the elements such as teachers' professional and personal communication with the students, colleagues, and administrators and student success. Out-of-school factors sub-dimension consists of elements related to central policies such as education program, textbooks, workload, and wages. The sub-dimension of professional development and respectability evaluates teachers' perceptions of the love of the profession, respectability of the profession, and openness to development. The last sub-dimension of the measurement tool consists of the items related to physical facilities, the social support provided to the

school and the quality of the physical environment, and accessibility to equipment and educational technologies.

In studies related to teacher motivation in the literature (e.g., Akdemir & Arslan, 2013; Claeys, 2011; Kauffman, Yılmaz-Soylu & Duke, 2011; Öztürk & Uzunkol, 2013; Visser-Wijnveen, Stes & Petegem, 2012), it is observed that internal and external motivation factors are handled in close conceptual contexts. The study conducted by Akdemir and Arslan (2013) evaluates teacher motivation in the sub-dimensions of communication, professional development, institutions, and expectations. In the study conducted by Öztürk and Uzunkol (2013), teacher motivation is examined in four sub-dimensions: "positive attitude towards the profession and professional success," "appreciation and professional happiness," "avoidance of profession" and "internalization of the profession." Unlike these studies, socio-economic factors and the effects of educational policies on teachers were also included in this study. Some qualitative research findings suggesting that teacher motivation is affected positively or negatively by national education policies such as the FATİH Project, 12-year compulsory education system, and curriculum studies (e.g., Ada, Akan, Ayık, Yıldırım & Yalçın, 2013; Börü, 2018; Ertürk & Aydın, 2017; Karabağ-Köse et al., 2018) contribute to this study more important. Also, it is observed that some scale studies related to teacher motivation in the literature (e.g., Bektaş, 2010; Ceviz, 2018; Polat, 2010) do not cover some contexts related to parents, students, schools, education policies, and other educational processes. When the scale studies in the literature are analyzed methodologically, it is seen that in many studies (e.g., Akdemir & Arslan, 2013; Bektaş, 2010; Polat, 2010), structural features and reliability levels of the measurement tools are not tested with strong analyzes, and in some studies, it is seen that the harmony of the conceptual models obtained is not evaluated with CFA. Therefore, it can be concluded that the scale developed in this study will fill a gap in the literature as a useful, cultural context-sensitive, valid, and reliable tool for researchers and practitioners.

Although the research focuses mainly on motivation factors specific to the teaching profession, the fact that the study groups consist of teachers working in primary and secondary schools constitutes the main limitation of the research. New research can be conducted to assess the structural differences that the assessment tool will present in teacher groups with different working conditions, such as preschool teachers, teachers working with special areas (i.e., vocational education, adult education, special education, gifted education, etc.). It is recommended that the assessment tool be used by researchers to assess teachers'

motivation for the profession in educational research. It is also a valid and reliable tool for educational administrators to assess teacher motivation for the profession.

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