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Student Centered Education Scale: A Validity and Reliability Study

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Abstract: The purpose of the study is to develop a valid and reliable scale to measure the teachers' levels of student-centered education practices. The Exploratory Factor Analysis sample included a total of 426 teachers and the Confirmatory Factor Analysis of the scale was conducted on a total of 160 teachers working in the province of Duzce during the spring term of 2014-2015 education year. Exploratory Factor Analysis was performed to test the construct validity of the scale and the model was tested through the Confirmatory Factor Analysis. For the reliability, Cronbach's Alpha internal coefficient was calculated and item analysis was performed based on the corrected item total correlation. The final form of the scale included 32 items and one dimension. These 32 items explained 40.04% of the total variance. The results of the item total correlation analysis indicated that none of the item was below 0.30 and the lowest item correlation coefficient was 0.51. Cronbach's Alpha was found to be 0.95 for the internal consistency of the scale. The reliability and validity results for the Student-Centered Education Scale suggest that this scale is a reliable and valid tool to measure the levels of student-centered educational practices among teachers.

Keywords: *Student centered education, student centered education scale, validity, reliability*

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Introduction

After decades of use, the behaviorist model has not caused significant changes in education environments such as getting students' attention on learning and reducing discipline problems. Rather, it has limited the ability of the learner to become self-directed and self-disciplined, a necessary condition for the use of more complex instruction in teaching and learning (Freiberg & Lamb, 2009). In 19th century, the behaviorist approach was replaced by postmodern philosophy and constructivist approaches that regard individuals as active organisms that seek facts rather than simply passive receivers of external reality (Akpinar & Aydin, 2007; Gultekin, Karadag & Yilmaz, 2007; Koc & Demirel, 2008). Researchers and teachers have observed that there occur permanent deficiencies in the learning process of students when traditional teaching methods are used and a large amount of passive knowledge is transferred passively at every stage of education including university (Perkins, 1999). It is a fact that the education environments where students sitting and watching quietly in their seats while the teacher is acting as an only player do not attract the attention of students. In such environments, it seems impossible to learn effectively and efficiently (Valls & Ponce, 2013).

Student-centered educational approach can be described as designing the planning, application, and evaluation stages of teaching and learning process according to student's opinion (Kilic, 2010). Student-centered education introduces significant cognitive modifications into education, learning and teaching. Thanks to the student-centered education, the focus of instruction has shifted from "What will I teach?", "How will I teach?" "What will I use to teach?" to "What do they want to learn?", "What will they do to learn", "What helps in their learning?" and "How efficiently have they learnt?" (Maden, Durukan & Akbas, 2011). In the student-centered education environments, learners, by interacting with the content of the learning, interpret the parts of the whole and construct the meaningful knowledge out of these parts. Learners internalize the knowledge by performing in-depth research and exploration (Mengi & Schreglman, 2013).

Teachers need to keep a student-centered way of thinking asking, "What will I have them to do in the classroom?", "How will I change them into active participants?", "How will I get them to reflect on, discuss, critique, ask questions and be engaged in the subject?" instead of taking the teacher-centered approach which focuses on "What will I do in the classroom?", "What will I teach?" and "How will I teach?" (Artvinli, 2010). In a traditional classroom, teacher is the

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absolute holder of the knowledge. Teacher intends to transfer this new and complicated knowledge directly to the students by using lecture method, using his/her past experiences and taking exams into account (Brackenbury, 2012). In student-centered education, teacher does not simply transfer the knowledge but plans the necessary activities to achieve the learning outcomes by setting an effective learning environment and make assessments at the end of the learning process in order to determine if the objectives have been attained (Demirdas, 2013; Karacelil, 2010).

Previous studies have shown that student-centered education enhances students' motivation to learn, increases their chances of recalling information and contributes to in-depth understanding (Maden et al., 2011; Smart & Csapo, 2007). It has been observed that student-centered education leads to an increase in creativity, critical thinking, success, student involvement, student satisfaction, student self-esteem, learning, motivation, and so forth, and a decrease in dropouts, negative student behaviors and school absenteeism (Salinas, Kane-Johnson & Vasil-Miller, 2008).

For the teachers who, as a student, have experienced the teacher-centered education and who, as an educator, have used the same traditional approach for years, it could be quite difficult to help students take the responsibility of their own learning (Howell, 2006). It would be a demanding challenge for teachers to leave their absolute dominant role in content-based lessons, and adopt and bring a learner-centered perspective into the classroom. This involves the discrepancy of being a teacher and a student simultaneously (Wohlfarth et al., 2008). A majority of teachers prefer teacher-centered didactic methods to student-centered methods and techniques, as they are worried that the success rate of their students might decline in the examinations (Daigle, 2000). It is seen that the students who are taught with and become accustomed to the teacher-centered approach sometimes complain about the student-centered education and prefer teacher-centered approach since they find it challenging to take the responsibility of their own learning (Hains & Smith, 2012).

The realization of the expected transformation in the education system, above all, is associated with the adoption of these changes by the teachers who are the executors of education system. Otherwise, the approaches that need to be put into effect, as required by the curriculum, might be put aside under the excuse that "the model is not working" (Akpinar & Aydin 2007). It is therefore important to know how teachers perceive the student-centered education and to what extent they can transfer and use it in the classroom.

In the literature, there are several studies on developing a scale in relation to student-centered education. Koc's (2014) "Scale of Attitudes towards Using Student-Centered Teaching Methods and Techniques" study consists of four dimensions; "appreciation", "resistance", "positive effects" and "notion of cost". Bulut (2008) developed "New Student-Centred Primary School Curriculum Assessment Scale" consisting of 22 items. Based on the results obtained, it was found that teachers implement the new programs as a student-centered approach at a "moderate" level. Using the "Student-Centered Learning Environments Scale", Ozturk (2011) evaluated the Social Sciences learning environments in terms of student-centered education.

A review of literature showed that there is no assessment tool specifically developed for teachers that measures the levels of implementation of student-centered education among teachers working in primary, secondary and high school. This study is expected to help filling this gap in the field. In this context, the purpose of the study is to develop a valid and reliable scale to measure the teachers' levels of student-centered education practices.

Methodology

Sample

Exploratory Factor Analysis (EFA) and Confirmatory Factor Analyses (CFA) of the scale were conducted on different samples. The EFA sample included a total of 426 teachers -125 primary school, 131 secondary school and 170 high school teachers- working in the province of Duzce during the spring term of 2014-2015 education year. Of these teachers, 269 (63%) were female and 157 (37%) were male. Tabachnick & Fidell (2007) regard a sample size of 300 as "good", 500 as "very good", and 1000 as "excellent" for factor analysis. According to these criteria, it can be said that the sample size of the present study was appropriate for factor analysis.

The CFA of the scale was conducted on a total of 160 teachers -50 primary school, 60 secondary school and 50 high school teachers- in the province center of Duzce in the academic year of 2015-2016. Of the teachers 79 (59.31%) were female and 81 (40.69%) were male.

Data Collection and Analyzing

A review of literature was completed prior to the development of items and both teacher and student centered approaches were examined. Based on the theoretical framework, a scale draft consisting of 94 items was produced. One of the most commonly used methods for determining the content validity of scales is to take the opinions of experts (Buyukozturk, 2007). For this purpose, draft scale items were sent to eight experts of educational sciences to check them in terms of language style and content. The experts were asked to assess the items as "applicable", "inapplicable", and "needs revision" and to write the reasons for their evaluations in the explanation sections given next to the items. Based on the views of the four experts who responded, 14 items were modified and 19 others were excluded from the scale. The remaining items were randomly placed in the form and the final trial version was constructed.

30 for teacher-centered and 45 for student-centered approach, a total of 75 items were included in the scale. Rated on a 5-point likert scale, the item responses ranged as follow; "strongly disagree" (1 point), "disagree" (2 points), "neutral" (3 points), "agree" (4 points) and "strongly agree" (5 points). Items for the teacher-centered approach were rated inversely.

EFA was performed to test the construct validity of the scale and the model was tested through the CFA. For the reliability, Cronbach's Alpha internal coefficient was calculated and item analysis was performed based on the corrected item total correlation.

Findings

Exploratory Factor Analysis (EFA)

After data obtained from trial form regulated and items were rated inversely, statistical analyzes were performed. Firstly, corrected item total correlation were analyzed. Buyukozturk (2007) stated that items with a total correlation of 0.30 and higher show a significant correlation with the scale scores and distinguish each other well, therefore 21 items (3, 13, 18, 21, 25, 28, 35, 38, 39, 44, 45, 46, 48, 54, 56, 58, 59, 61, 64, 65 and 74) with a value of lower than 0.30 were excluded from the trial version. It was seen that all the excluded items were those for teacher-centered approach.

Kaiser-Meyer-Olkin (KMO) and Barlett test results were examined to check whether the remaining 54 items were suitable for factor analysis and it was seen that these values were statistically significant (KMO=0.948 and $p<0.01$). According to Hutcheson & Sofroniou (1999), a KMO value between 0.80 and 0.90 indicates a very good sample size. Based on these values, it was decided to apply an EFA to the dataset.

Although the load value of an item is expected to be 0.45 or higher when determining the factor structure of a scale, the reduction of this value until 0.30 is also regarded as acceptable (Buyukozturk, 2007). High factor loads are seen as an indicator of the possibility that the variable may fall under the same factor. In the present study, item loading values were taken as minimum 0.45.

Factor analysis was conducted without limiting the number of factors and without using the rotation technique. The overall goal of the rotation process is to present factor loadings more simply and clearly. Research studies can be designed so that the factors are directly interpretable without rotation, then the first-principal factor is the solution (Gorsuch, 1974). Based on the results of the first factor analyses, 11 items (73, 15, 26, 52, 33, 1, 14, 17, 43, 6, 9) with factor loads of less than 0.45, and loaded under two different factors were removed. After the second analysis, two items (29 and 60); after the third analysis, one item (67); after the fourth analysis, two items (71 and 72); after the fifth analysis, one item (62); after the sixth analysis, one item (53); after the seventh analysis, one item (51), after the eighth analysis, one item (75); after the ninth analysis, one item (70) and after the last analysis, one item (63) was removed from the scale. After removing a total of 22 items, the final form of the scale included 32 items and one dimension. It was seen that all the items remaining in the scale were those focusing on the student-centered approach. These 32 items explained 40.037% of the total variance.

The findings regarding the total variance of the scale are shown in Table 1.

Table 1. Total Variance of the Scale

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	12,812	40,037	40,037	12,812	40,037	40,037
2	1,800	5,626	45,663			
3	1,515	4,735	50,398			
4	1,198	3,743	54,141			
5	,974	3,044	57,185			
6	,942	2,942	60,127			
7	,851	2,658	62,785			
8	,825	2,579	65,364			
9	,759	2,371	67,735			
10	,726	2,269	70,004			
11	,701	2,192	72,196			
12	,698	2,180	74,376			
13	,674	2,106	76,482			
14	,626	1,958	78,440			
15	,572	1,788	80,227			
16	,554	1,730	81,958			
17	,525	1,641	83,599			
18	,491	1,535	85,134			
19	,465	1,453	86,587			
20	,442	1,382	87,969			
21	,431	1,347	89,316			
22	,395	1,234	90,550			
23	,373	1,166	91,716			
24	,359	1,121	92,837			
25	,354	1,107	93,944			
26	,345	1,078	95,022			
27	,313	,979	96,002			
28	,297	,928	96,930			
29	,287	,897	97,827			
30	,254	,793	98,619			
31	,247	,771	99,390			
32	,195	,610	100,000			

Extraction Method: Principal Component Analysis.

The scree plot displays the eigenvalues is shown in Figure1.

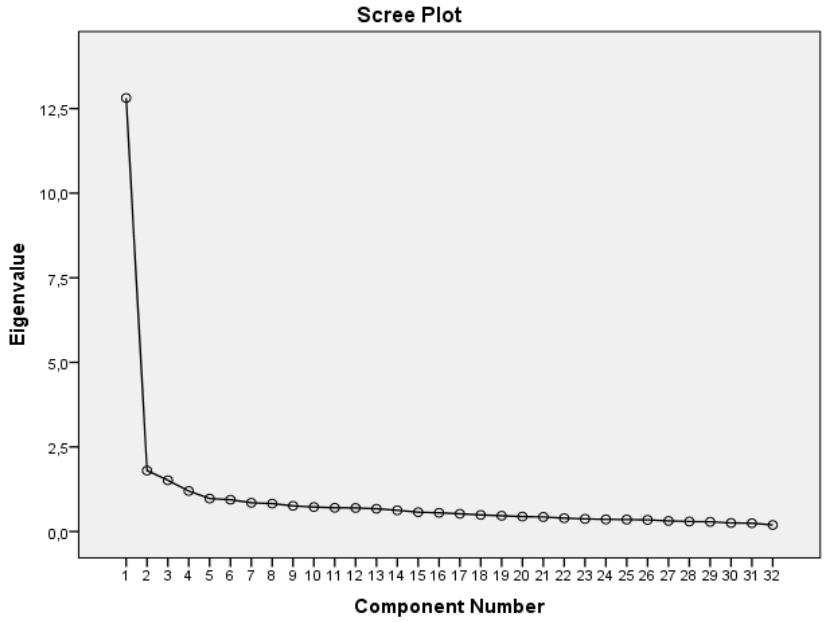

Figure 1. Scree Plot

The findings regarding the factor loads of the scale are shown in Table 2.

Table 2. Factor Loadings of the Scale

Items No	Factor Load	Items No	Factor Load
37	.743	36	.634
41	.708	5	.634
32	.703	19	.630
42	.699	10	.615
47	.682	22	.609
31	.680	11	.601
24	.670	16	.594
12	.670	27	.592
7	.668	66	.574
30	.667	8	.569
49	.664	50	.569
23	.659	4	.567
69	.650	57	.564
34	.646	68	.548
20	.646	55	.545
40	.642	2	.536

Confirmatory Factor Analysis (CFA)

The structure of the one factor model that was formed as the result of the EFA was tested through the CFA. CFA is used to test whether the data fit a hypothesized measurement model. Path diagram, factor loading values and error variances regarding the items are shown in Figure 2; the path diagram including t-values of the items is shown in Figure 3.

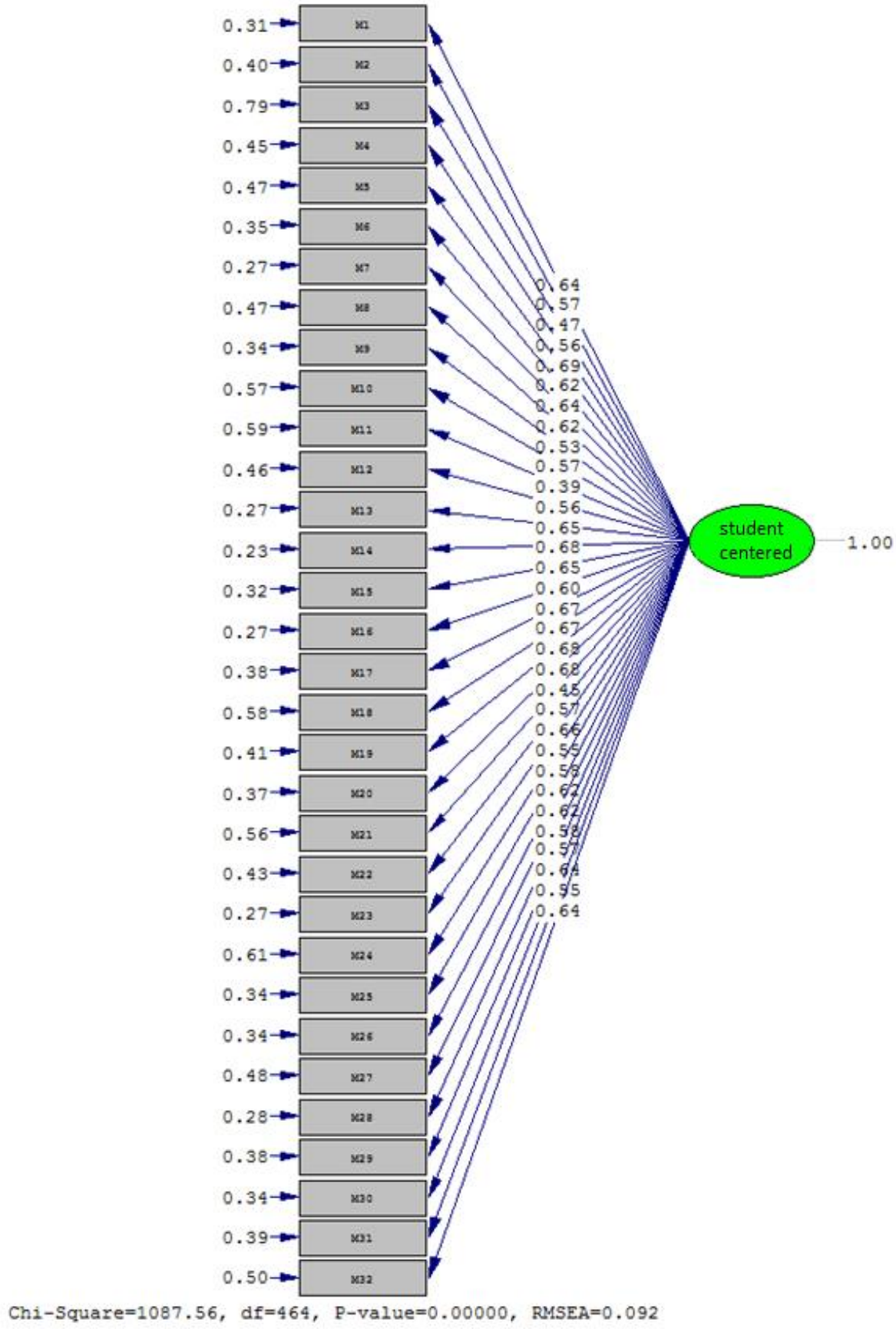

Figure 2. Confirmatory Factor Analysis Model (Standardize Solution)

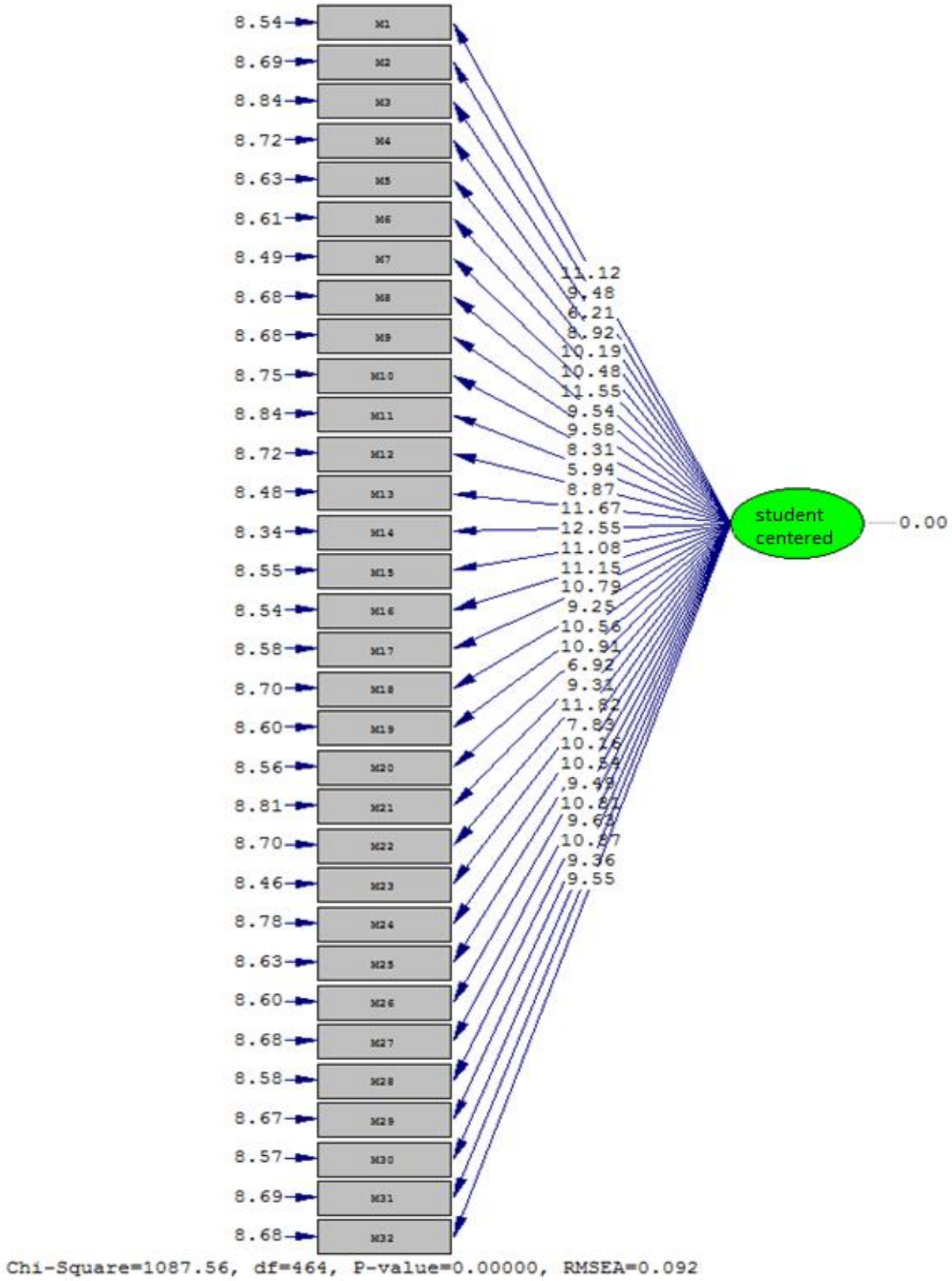

Figure 3. Confirmatory Factor Analysis Model (t-values)

Cokluk et al. (2014), reported that path diagram as well as goodness of fit needs to be examined and evaluated. To this end, the path diagram including the t values should firstly be examined and the items with insignificant t values need to be identified and excluded from the scale. The Figure 2 representing this diagram indicates that the t values of all items are statistically significant at Alpha 0.05.

Another part that should be examined is the path diagram of the standard coefficients. In this diagram, there are coefficients regarding the relationships between latent variables, factor loadings and standard errors of the items. Goodness of fit indices should be analyzed and interpreted along with these coefficients. The fit values calculated regarding the convenience of the model are given in Table 3.

Table 3. Fit Indexes of the Model

Fit Indexes	**Values**
X^2	1087,56
sd	464
X^2/sd	2,34
p-Value	0,00
RMSEA (Root Mean Square Error of Approximation)	0,09
NFI (Normed Fit Index)	0.94
NNFI (Non-Normed Fit Index)	0.97
RMR (Root Mean Square Residual)	0.04
GFI (Goodness of Fit Index)	0.70
AGFI (Adjusted Goodness of Fit Index)	0.66
CFI (Comparative Fit Index)	0.97

As can be seen in Table 2, X^2=1087,56 and df=464 and the (X^2/df) proportion is 2.34. If this proportion is smaller than 5, it corresponds to moderate level of fit and if it is smaller than 3, it corresponds to perfect fit (Kline, 2005). Analysis of the goodness of fit indices shows that the RMSEA is 0.009. RMSEA<0,10 is an acceptable value for the model fit (Cokluk et al., 2014; Marsh, Hau & Wen, 2004). As a result, it can be said that the computed fit index is at an acceptable level.

It is seen that the GFI is 0.70 and the AGFI is 0.66. GFI>0,85 and AGFI>0,80 is an acceptable value for the model fit (Cokluk et al., 2014; Simsek, 2007). The GFI and AGFI values we found are slightly smaller than the standard fit indices. Both CFI and NNFI values were found to be 0.97 indicating perfect fit, as values higher than 0.95 correspond to perfect fit and those higher than 0.90 show good fit (Sumer, 2000). The standardized RMR was found 0.04, which is indicative of perfect fit, as values smaller than 0.05 indicate a perfect fit and values smaller than 0.08 correspond to good fit (McDonald & Moon-Ho, 2002).

As the result of the analyses, the fit values calculated regarding the convenience of the model are examined, it can be said that most of the the values were acceptable fit limits according to the fit index limits stated by Simsek (2007). In this context, it can be said that the one factor structure consisting of 32 items is confirmed as a model.

Item Total Correlation

An item analysis was conducted based on item total correlation in order to ensure the internal reliability of the scale. Item statistics point out to the relationship between the value each item in the measuring tool takes and the total value taken from the entire measuring tool. In a scale, items with a value above 0.20 are regarded to be at an acceptable level and values above 0.30 are interpreted to be at a good level. Besides, although not a definite rule, item total correlations are expected to be not negative for the additivity of the scale (Ozguven, 1994; Tekin, 1996).

In the present study, the item analysis was conducted to check the presence of items that showed a significant correlation with the scale scores at a level of 0.30 and above. As the result of the item total correlation analysis conducted for 32 items, it was seen that none of the items were below 0.30, and the lowest item correlation coefficient was 0.51. The correlations between the score series of each item and the total score of the scale are shown in Table 3.

Table 4. Corrected Item-Total Correlation Results

Item-Total Statistics				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
M37	125.91	225.906	.715	.948
M41	125.71	229.220	.670	.948
M32	125.74	229.889	.667	.948
M42	125.96	225.817	.671	.948
M47	125.92	228.095	.651	.948
M31	125.60	229.929	.638	.949
M24	125.61	230.360	.631	.949
M12	125.84	227.963	.644	.948
M7	125.79	228.282	.645	.948
M30	125.69	229.896	.628	.949
M49	125.93	227.997	.634	.948
M23	125.55	231.490	.618	.949
M69	125.93	228.829	.624	.949
M34	125.72	229.287	.610	.949
M20	126.25	227.612	.619	.949
M40	126.00	228.144	.611	.949
M36	125.80	228.725	.597	.949
M5	126.02	226.171	.610	.949
M19	125.88	230.250	.597	.949
M10	126.00	229.452	.588	.949
M22	125.90	232.310	.575	.949
M11	125.73	231.298	.572	.949
M16	125.95	229.149	.562	.949
M27	125.83	231.919	.554	.949
M66	125.92	231.454	.544	.949
M8	125.75	228.398	.542	.949
M50	126.05	229.462	.537	.949
M4	125.81	229.685	.543	.949
M57	126.22	229.113	.536	.949
M68	126.04	231.473	.519	.949
M55	125.96	232.123	.517	.949
M2	125.71	231.121	.510	.950

Cronbach's Alpha

Cronbach Alpha coefficient value is a measure of the internal consistency between test scores of the scale. In the internal consistency analysis of the scale, which consisted of 32 items in its final form, Cronbach's Alpha coefficient was calculated as 0.95. Being greater than 0.70, this value shows that the scale is highly reliable (Tezbasaran, 1996; Buyukozturk, 2007).

Conclusion

Today, one of the greatest tasks for education is to prepare students who can solve problems, apply knowledge, work collaboratively and keep learning throughout life (Hains & Smith, 2012). It is a fact that the educational environments where the students sitting quietly in their seats and watching, while the teacher is acting as an only player don't draw the attention of the students. In such environments, it seems impossible to learn effectively and deeply (Valls & Ponce, 2013).

It is thought that students are more likely to actively take part in educational activities, make better sense of what they learn and display permanent behavioral changes when teacher prefer teaching methods and techniques that place students in the center, attract their attention and make them active learners instead of using unappealing teacher-centered methods and techniques.

It is crucial to know how teachers perceive student-centered approach and to what extent they can transfer it to their classes. This is the only way to identify and overcome the inadequacies of teachers in this area. In this sense, the study

was aimed at developing a scale that measures the levels of student-centered educational practices among teachers and therefore the "Student-Centered Education Scale" was produced.

EFA was performed to test the construct validity of the scale. Following the EFA, it was found that the items of the Student-Centered Education Scale with 32 remaining items were grouped under one dimension. It was seen that the items explained 40.037% of the total variance of the scale. Buyukozturk (2007) suggests that a proportion of 30% or greater for the total explained variance is satisfactory in one-factor scales in behavioral sciences and Tavsancil (2002) reports that a proportion of 40% is acceptable in the studies in social sciences. On the basis of these suggestions, it can be concluded that the scale is valid and reliable.

CFA is used to test whether the data fit a hypothesized measurement model. As the result of the analyses, the fit values calculated regarding the convenience of the model are examined, it can be said that most of the the values were acceptable fit limits according to the fit index limits stated by Simsek (2007).

Internal consistency coefficients were calculated for the reliability of the scale. The results of the item total correlation analysis revealed that none of the items was below 0.30. Furthermore, the Cronbach's Alpha coefficient was found 0.95 for the scale. Being greater than 0.70, this value shows that the scale is highly reliable (Tezbasaran, 1996; Buyukozturk, 2007).

According to the scores from the Student-Centered Education Scale, teachers' levels of student-centered educational practices were determined as very low (32-57), low (58-83), moderate (84-109), high (110-135) and very high (136-160). Teachers scoring high in the scale have higher levels of student-centered educational practices while those scoring low have lower levels of student-centered educational practices.

The reliability and validity results for the Student-Centered Education Scale suggest that this scale is a reliable and valid tool to measure the levels of student-centered educational practices among teachers.

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