RedFame

Journal of Education and Training Studies
Vol. 6, No. 10; October 2018
ISSN 2324-805X E-ISSN 2324-8068
Published by Redfame Publishing
URL: http://jets.redfame.com

Relationship between Math Teachers' Instructional Styles and Their Educational Philosophical Backgrounds*

Ercan Atasoy[1], Selami Yangın[1], Hüseyin Tolu[1]

[1]Faculty of Education, Recep Tayyip Erdoğan University, Rize, Turkey

Correspondence: Ercan Atasoy, Basic Education, Department of Education, Recep Tayyip Erdogan University, 53200, Cayeli, Rize, Turkey.

Received: July 10, 2018 Accepted: July 31, 2018 Online Published: August 3, 2018

doi:10.11114/jets.v6i10.3510 URL: https://doi.org/10.11114/jets.v6i10.3510

Abstract

The governance of a particular educational philosophy is indispensable for any developed nation in the sense of ruling and governing over its current and future political sociology. Therefore, the purpose of this study is to determine the relationships between mathematics teachers' applied instructional styles and their identified educational philosophical backgrounds. The study was conducted on 124 math teachers working in secondary schools during the 2016-2017 education years. This study aims to use a quantitative research method through the "Philosophical Preference Rating Scale" and the "Teaching Style Scale". The evidence indicates that teachers prefer personal model the most and authoritative teaching style the least. However, it is also determined that these teachers have predominantly experimentalist philosophical backgrounds. The least preferred philosophical approach is the existentialist understanding. In addition, teachers are able to predict their teaching styles, especially from idealistic, realistic, and perennial philosophical points. These indications inform us further on how and why the means of education system has remained much the same while education policies have been reformed many times throughout the recent years in Turkey.

Keywords: mathematics education, teaching skills, educational philosophies, educational politics and policy

1. Introduction

"The education of Children [is called] a Culture of their minds" (Hobbes, 1660, p.189)

The governance of a particular educational philosophy is indispensable for any developed nation in the sense of ruling and governing over its current and future political sociology. Therefore, the purpose of this study is to determine the relationships between mathematics teachers' applied instructional styles and their identified educational philosophical backgrounds. There are various factors that are effective in the successful design of the teaching and learning process and thus the implementation of a particular curriculum (Baykal, 2010). In educational politics and policy, although the curriculum offers certain suggestions of context and content in defining teaching and learning approaches, in actual practice the curriculum also recognizes some forms of flexibility, in particular regarding establishing learning and teaching environments. This flexibility provides teachers with various opportunities for open-ended practice of their instructional styles.

This research aimed to study the relationships between mathematics teachers' applied instructional styles and their identified educational philosophical backgrounds. It is expected that this research will make a significant and certain contribution to the literature on the matter of which teaching styles and educational philosophies are currently dominant among mathematics teachers and how these relations between these two fundamentals are among determinants of effective and sufficient learning and teaching in Turkey. It is further anticipated that the findings that were obtained as a result of this research will contribute to general educational concern, from educational politics and policy to educational practices. These certain contributions might be used to improve the proficiency of mathematics teachers in their teaching styles, and to understand their philosophical approaches, teaching-learning process and classroom management dimensions, to make various suggestions for teaching styles and educational sociology in which mathematics teachers are attempt to employ, and to provide a different view point of what they need to do to enhance these relative concepts, and to understand the development of in-service

*This study is an expanded version of that verbally presented in the "26th International Conference on Educational Sciences" (2017, Antalya, Turkey).

training which may further be helpful in the educational politics. It is also thought that understanding the relationships between instructional styles and educational philosophical backgrounds could provide socio-political assistances to other nations generally by way of relation to the models of mathematics teachers training in the educational system.

1.1 Aim and Object of the Study

Umugiraneza and Bansilal (2017) purported that the most common strategies used in mathematics learning are direct instruction, cooperative learning and problem based instruction. Since observed characteristics only explain a relatively small part of overall teacher quality, a line of research has shifted the focus to teaching practices, that is, what teachers actually do in the classroom (for instance, Van Klaveren (2011), Schwerdt and Wuppermann (2011), Lavy (2011)). These studies show that teaching practices matter for student achievement. However, the evidence is still scarce and not conclusive, especially to identify the best teaching practices. Many proposals to reform education advocate a greater use of modern teaching practices in detriment of a traditional learning style. The purpose of teaching is to simplify learning and to encourage student to learn. The learning and teaching are very important terms, so we need to know what is learning? (Alqurashi, 2018). Teaching methods and techniques are alternatives to how teachers can teach their subjects. In the case of teaching style, the teaching techniques and methods of the lecturers are their own application forms or their original usage (Beyhan, 2018). In addition, revising teaching styles and being innovative inside and outside the classroom is critical as students' learning styles change from year to year and from generation to generation, due to frequent reforms in the educational systems, due to enhancement of technology and due to international influences as well (Radin and Orlova, 2018). Teaching style concerning to the educators' behaviors during their teaching in the lecture. It is composed of a teacher"s individual behavior and the methods used to transport data to or receive it from the learner. Effective teaching style is essential for self-determination, supervision, monitoring and strong attachment by supply a feeling of the learner guide over science. Perfect teachers make study tasks suitable for the learner's standard of recognition. They also understand the singularity or personality of learners and keep away from the bias to require, "mass production" standards that deal with all students as they the same (Sabra, Hassan and Mohammed, 2018).

While there are various interpretations comprehensively argued in the literature on the subject of teaching style, Grasha (2002) has a distinctive set of theories which define teaching style as a "behaviour" displayed by teachers. The behavior is reliably and consistently in the teachers' interactions with their students during the teaching and learning process and classified as; expert, authoritarian, personal model, facilitator and delegator. In the expert teaching style, teachers have knowledge and expertise required for students. Teachers decide when and how to teach: the choices of content and material and the physical structure of learning environment all are centralised. The aim is to convey knowledge and ensure that students are well prepared. Similarly, teachers in the authoritative (formal authority) teaching style have a certain status among students through knowledge they possess and teaching role they adopt. It clearly outlines the behaviour expected from students and the rules to be followed. Teachers with a dominant teaching style of authoritarianism guide students according to these standards that are usually the second planned interest of students. On the other hand, in the personal model (individual model) teaching style, teachers become a model for students to teach behaviour, in that they believe in teaching by giving personal examples and role models. Students encourage observations and practices for teachers' approach. Meanwhile, the facilitator teaching style is a role model that fundamentally emphasizes teacher-student communication. Teachers have more freedom in relation to their students and are sensitive to their individual needs and requirements. It attempts to make facilitating the aim of teaching and its content and teaching strategies are to be used appropriately according to students' characteristics and personalities. Lastly, in the delegator teaching style, teachers are interested in ensuring that their students are able to enhance themselves with their own capacities; supporting students to work and act independently and harmoniously. Teachers assume the part of the resource individual; becoming a counsellor who responds students' questions and concerns and provides periodic feedbacks.

Table 1. Teaching roles, attitudes and behaviours displayed according to Grasha's teaching styles

Educational Styles	Teaching Roles
Expert	Ruler Counselling
	Interrogator, Short Teaching
Authoritarian	Feedback Transmitter (Evaluator / Summariser)
Personal Model	Coaching (Educator), Role Model
	Feedback Transmitter (Non-Evaluator / Formatter)
Facilitator	Feedback Transmitter (Non-Evaluator / Formatter)
	Active Listener, Facilitating Discussion, Questioner (Open Ended)
	Questioner (Open Ended)
Delegator	Consultant
	Source Person

(Grasha, 2002)

Indeed, teachers are required to take into account of the multiple teaching methods to successfully reach learning objectives. If the accepted method of teaching behaviour is identified with the teachers' adopted style, it is assumed that the educational aim is to be coherently established, as the Table 1 indicates. This also means that teachers have exposed their own styles, because it is important that teachers have a fundamental understanding of the rationale behind the dominant style they have revealed. It is expected that teachers would be more productive and effective in their teaching through understanding the teaching style they employ (Kulinna and Cothran, 2003).

There are various factors in the formation of teaching styles. One of these is the belief and thought of educational politics and policy that teachers have already acquired. The educational teaching styles critically emphasize the educational philosophy which is widely assumed to be one of the determinants of educational outcomes. The teachers' educational philosophical preferences shape their theoretical and practical orientations and so their teaching styles in the learning process. That is, teachers may affect (e.g. approve and/or reflect) their educational philosophies in their particular educational practices. From here, the selection of educational philosophical preferences that teachers have and the evaluation of these preferences together with their instructional styles would be meaningful to make teaching/learning more effective and productive. The examinations of the level of teaching style and the determination of educational philosophical would have influences upon teaching styles preference which would further assist in the understanding and explaining teachers' behaviours (Kumral, 2016).

1.2 Literature Review

In the literature, although there are several diverse studies, some of them explored relative topics such as the anxiety relationship between mathematics teachers and mathematics teacher candidates and their teaching styles and epistemological beliefs (Mutluoğlu and Erdoğan, 2016), the teaching styles of teachers who work at universities (Sürel, 2010), teaching styles of science teachers (Mete and Bakır, 2016; Şahin, 2015; Kılıç and Dilbaz, 2013; Gencel, 2013), the relationship between mathematics success, self-regulation skill and motivation (Damrongpanit and Reungtragul, 2013), the available measurement tools for teaching styles used in mathematics lessons (Güven, et al., 2016), and the relationship between mathematics teachers' beliefs and metacognitive awareness (Hart and Memnun, 2015). According to the above researches, it is supposed that the teaching styles of teachers are considered in relation to many various variables within different circumstances. The distinctive aim of this research is thereby to determine the relationship between teachers' instructional styles and their educational philosophies, for the purpose of,

1. Determining the type and level of predominance of teaching styles and educational philosophies of teachers,

2. Considering the relationship between research independent variables (gender, years of service, in-service training participation) and instructional styles and educational philosophies,

3. Studying how independent variables of this study (educational philosophical approaches, gender, years of service, in-service training participation) predict teaching styles.

2. Method

A relational search method is commonly used to determine the relationship between two or more variables and to reveal cause-effect related situations (Büyüköztürk, et al., 2016). In this study, two variables are considered because the philosophical approach of teachers may influence upon their teaching styles in the learning environment. Each sub-dimension of instructional styles is also considered as a dependent variable. There are 5 sub-dimensions of each variable. In this context, the concepts of instructional styles and educational philosophies were examined and further evaluated whether there are any interactions between them and in which they have been influenced by each other, as two dimensions or sub-dimensions, and whether the relationship has a positive or a negative aspect.

2.1 Population and Sample

The study conducted during the 2016-2017 academic years in the Black Sea Region of Turkey was composed of 124 junior high school mathematics teachers working in Rize. In terms of selecting sample, this research has attempted to get as many participants as possible.

Table 2. Descriptive information on participants

Variables	Types	N	%
Gender	Female	92	74.2
	Male	32	25.8
Service Years (SY)	1-5 years	58	46.7
	6-10 years	40	32.3
	11-15 years	18	14.5
	16 years and over	8	6.5
In-service Training Participation Status (ITPS)	Yes	38	30.6
	No	86	69.4
Total		124	100

According to the Table 2, 92 participants were female (74.2%) and 32 were male (25.8%). When the participants were considered in terms of their years of service, 58 has 1-5 years of experience (46.7%), 40 has 6-10 years of experience (32.3%), 18 has 11-15 years of experience (14.5%), and 8 has 16 years and over of experience (6.5%). When participants' teaching styles were examined in terms of in-service training participation, 38 (30.6%) had participated and 86 (69.4%) had not participated. In total, 124 mathematics teachers participated in this study.

2.2 Instruments

In this study, the "Grasha Teaching Style Scale" and the "Educational-Philosophical Preferences Scale" were used to determine educational philosophy preferences, and the "Personal Information Form" was used to collect demographic information in measuring the teaching styles of mathematics teachers. The Grasha Teaching Style Scale has been adapted by Sarıtaş and Süral (2010) for the Turkish educational system. The Cronbach-Alpha reliability coefficient of the teaching style scale is 0.89. This scale is a likert type consisting of a total of 40 items of 5 types, with 8 subscales in each dimension, with sub-dimensions of expert, authoritarian, personal model, facilitator and delegator (Table 3). The mean scores of values of each subscale were calculated and compared first, and then discussed as to whether they are differed according to the variables.

Table 3. Sub-dimensions and item counts of teaching style scale

Teaching styles	Degree			Article Numbers
	Low	Average	High	
Expert	(1.0 - 2.8)	(2.9 - 3.8)	(3.9 - 5.0)	1-6-11-16-21-26-31-36
Authoritarian	(1.0 - 2.8)	(2.9 - 3.8)	(3.9 - 5.0)	2-7-12-17-22-27-32-37
Personal model	(1.0 - 2.8)	(2.9 - 3.8)	(3.9 - 5.0)	3-8-13-18-23-28-33-38
Facilitator	(1.0 - 2.8)	(2.9 - 3.8)	(3.9 - 5.0)	4-9-14-19-24-29-34-39
Delegator	(1.0 - 2.8)	(2.9 - 3.8)	(3.9 - 5.0)	5-10-15-20-25-30-35-40

2.2.1 Educational-Philosophical Preferences Scale

This data was collected using the personal information form and the "Philosophical Preference Rating Scale" developed by Wiles and Bondi (1993), adapted to Turkish by Doğanay and Sarı (2003). There are 40 items on the educational philosophy preference scale. This scale includes 8 items that reflect the opinions of teacher, student, school, curriculum, learning environment and teaching method in terms of perennialism, idealism, realism, experientialism and existentialist philosophies (Table 4). In the literature, the Cronbach alpha value was set at .81 to determine the reliability of the scale. In the half-test analysis to determine the half-consistency of the scale, the alpha value of the first half is .63; the alpha value of the second half is .74. Guttman Split-half value is .74. For this study, the Cronbach alpha value of the scale was .82. When these values obtained by the researchers regarding this measuring instrument, it is concluded that these are valid and reliable.

Table 4. Sub-dimensions and item numbers of the educational philosophy scale

The title of the educational philosophy	Article Numbers
Perennial Philosophy	6, 8, 10, 13, 15, 31, 34, 37
Idealist Philosophy	9, 11, 19, 21, 24, 27, 29, 33
Realistic Philosophy	4, 7, 12, 20, 22, 23, 26, 28
Experimentalist Philosophy	2, 3, 14, 17, 25, 35, 39, 40
Existentialist Philosophy	1, 5, 16, 18, 30, 32, 36, 38

2.2.2 Personal Information Form

A "Personal Information Form" has been developed to collect information about various characteristics of the teachers. In this form, questions were asked about gender, years of service and instructional styles, and the attendance of in-service training.

2.3 Data Analysis

The relations between teachers' teaching philosophies and their applied teaching styles were calculated by the Pearson Moments Multiplication Correlation technique. Besides this, multiple regression analysis was conducted to examine the effect of mathematics teachers' teaching philosophies on teaching styles. In determining correlation and strength of correlation analysis, it was considered that 1.00-0.70 is high; 0.69-0.30 is moderate and 0.29-0.00 is low. Mahalanobi's distance values and skewness and kurtosis values were checked before starting the regression analysis in the study. The data that was found to interrupt the assumption of normality was excluded from the analysis. Statistical Package for Social Sciences (SPSS) 17.0 was used in the study.

3. Results

In this section, the findings related to the sub-objectives of the study are listed below.

3.1 Descriptive Information on the Variables of the Study

Descriptive information related to these variables is presented in the Table 5 in order to determine the level of teaching styles and educational philosophies of teachers.

Table 5. Descriptive statistics for variables

Variables	Sub-dimensions	$\bar{X}$	Ss
Education Styles	Expert	3,8226	,31973
	Authoritarian	3,4315	,42506
	Personal Model	3,9254	,42432
	Facilitator	3,9032	,41018
	Delegator	3,5806	,44417
Educational Philosophical Approach	Perennialist	3,9093	,42716
	İdealist	3,6431	,43996
	Realist	3,9214	,36722
	Experimentalist	4,1331	,35706
	Existentialist	3,2581	,43881

When the Table 5 was considered, it was found that mathematics teachers had the most personalized model (X = 3.9254; Ss = .42432) and the least mean score was the authoritarian style (X = 3.4315, Ss = .42506) over the maximum of the 5 arithmetic means. However, when we look at educational philosophical insights, it was determined that the most mathematics teachers have experimentalist understanding (X = 4.1331; Ss = .35706). The least preferred philosophical approach is an existentialist understanding (X = 3.2581, Ss = .43881).

3.2 Findings Related to Determining the Relationship Between Independent Variables and Teaching Styles

A Simple Correlation analysis was performed primarily for the purpose of determining the relationship between independent variables and teaching styles, which is the second aim of the research. The analysis results are given in the Table 6.

Table 6. Simple correlation analysis for determining the relationship between teaching styles and demographic variables

	Expert	Authoritarian	Personal Model	Facilitator	Delegator	Gender (Female)	ITPS	SY
Expert	1	,288*	,278*	,191	,282*	-,199	,055	-,220
Authoritarian		1	,394**	,155	,345**	-,153	-,016	,191
Personal Model			1	,683**	,386**	-,094	-,179	-,097
Facilitator				1	,362**	-,072	-,137	-,244
Delegator					1	-,172	,191	,016
Gender (Female)						1	-,125	-,072
ITPS							1	,051
SY								1

*p< .05, **p< .01, ITPS: In-Service Training Participation Status, SY: Service Year.

The Pearson Product Moment Correlation analysis was conducted to determine whether there is a significant relationship between teaching styles and demographic variables. According to the Table 6, it was determined that there is a significant positive correlation between factors. The highest subscale is the facilitator teaching style and the most important subscale associations of these relations is the personal model teaching style (r = .683; p <.01), and has the moderate relation according to the correlation analysis. The lowest subscale is between the expert teaching style sub-dimension and the personal model learning style sub-dimension (r = .278; p <.05). There is no significant correlation between the facilitator-expert and the facilitator-authoritarian sub-dimensions in the positive direction. The reason for this result could be that in terms of understanding teaching and perceiving students, the facilitating teaching style is originated from the different viewpoints unlike the authoritative and expert teaching styles.

Table 7. Simple correlation analysis for determining relationships between educational philosophies and demographic variables

	Perennialist	İdealist	Realist	Experimentalist	Existentialist	Gender (Female)	ITPS	SY
Perennialist	1	,577**	,612**	,495**	,346**	-,192	-,191	,229
Idealist		1	,611**	,237	,399**	,056	,009	,158
Realist			1	,556**	,295*	-,140	-,106	,205
Experimentalist				1	,309*	-,312*	-,014	-,010
Existentialist					1	-,169	,121	-,058
Gender (Female)						1	-,125	-,072
ITPS							1	,051
SY								1

*p< .05, **p< .01, ITPS: In-Service Training Participation Status, SY: Service Year.

The Pearson Product Moment Correlation analysis was conducted to determine whether there is a significant relationship between philosophical approaches and demographic characteristics. According to the Table 7, it was determined that there is a significant positive correlation between factors. The highest value is between the realist and the perennialist subscales (r = .612; p <.01) and realist and idealist subscales (r = .611; p <.01) and has the moderate relation according to the correlation analysis. The lowest correlation value is between the existentialist and experimentalist subscales (r = .295; p <.05). It has been determined that there is no significant relationship between the idealist and experimentalist subscales in the positive direction. The reason for this would be thought because the behaviour of the idealistic philosophy is to learn; and the experimentalist conception is focused on student-centred research and problem-solving.

Table 8. Simple correlation analysis for determining relationships between educational philosophies and teaching styles

	Expert	Authoritarian	Personal Model	Facilitator	Delegator
Perennialist	,214	,051	,146	-,049	,125
İdealist	,453**	,176	,106	,014	,440**
Realist	,220	,173	,464**	,224	,565**
Experimentalist	,212*	,054	,508**	,210	,379*
Existentialist	,151	-,098	,012	-,142	,396*

*p< .05, **p< .01

Looking at the Table 8, it was determined that there is a meaningful relationship between philosophical understandings and teaching styles in the positive direction. Among these relations, the highest correlation level is between the realist philosophy and the delegator teaching style subscales (r = .565; p <.01) and has the moderate relation according to the correlation analysis. The lowest correlation level is between the experimentalist philosophy and the expert teaching style subscales (r = .212; p <.05). There is no significant relationship between the perennialist philosophy and all sub-dimensions of teaching style. Beside this, there is no significant relationship between educational philosophies of the facilitator and the authoritarian teaching styles. In this context, it can be said that despite the necessity of adapting new educational paradigms, they still have in the ambiguity, in terms of their teaching style tendencies and their philosophical preferences because they are still openly resistant to follow the reformation principles.

3.3 Findings on the Determination of Educational Philosophical Approaches to Teaching Styles

Assumptions of Multiple Linear Regression Analysis

The Multi-linear Regression analysis was conducted on the third objective of the study, namely, how the education philosophy predicts the teaching style. To be able to perform multiple linear regression analysis, it was first checked whether fundamental assumptions were made. The result obtained from the assumptions of Single Normality, Multiple Normality and Multi-Colinearity is presented below.

Single Normality Test: One of the hypotheses tested is the assumption of uniform normality. Skewness and kurtosis coefficients were calculated to determine whether the variables have normal distribution. These calculated values are reported in the Table 9 together with some descriptive statistical results.

Table 9. Descriptive statistics of the variables of the study, skewness and kurtosis coefficients

Variables	Skewness	Kurtosis
Expert	-.286	.826
Authoritative	-.140	-.713
Personal Model	-.680	-1.545
Facilitator	-.782	-1.395
Delegator	.184	-1.975
Perennialist	.415	-1.037
İdealist	.622	-.822
Realist	-.197	-1.023
Experimentalist	.347	-.903
Existentialist	.562	-1.115

In order for the variables to exhibit a normal distribution, the skewness coefficient and the kurtosis coefficient should be less than respectively |3.0| and |10.0| (Kline, 2011). When the Table 9 is considered, it is seen that the values of the kurtosis and skewness coefficients of the research variables are smaller than the limited values. Therefore, it can be said that the variables have uniform normality.

Multiple Normality Test: Another hypothesis is that it should be tested for the ability to perform multiple linear regression analysis as to whether the variables have multiple normality. For this purpose, the Mahalonobis' distance value was calculated to determine whether the variables had extreme values. It is proposed to extract these extreme values from the data set. Considering that there are five independent variables and five dependent variables in this study, it is seen in the Kay Square (X2) distribution chart that the degree of freedom (sd) which is corresponding to 0.01 level of significance, is 15.24 (Laurencelle and Dupuis, 2002). As a result of the analysis made, it was determined that the Mahalonobis values of the variables are not higher than the above mentioned. It is assumed that variables on this scale have multiple norms.

Multi-Colinearity Test: The level of the relationships between variables is another hypothesis that should be tested for the ability to perform the multiple linear regression analysis. In this context, it has been tested whether there is any multicollinearity problem regarding the relation between variables. If the correlation between variables is above .90, it is stated that there is a problem of multiple connections (Şencan, 2005). The correlation coefficients between the variables ranged from .0212 to .565 (Table 8). In order to avoid the problem of multiple connections, the VIF value is smaller than 10 and the TV value should also be bigger than 0.2 (Field, 2009). The results of the calculated VIF and TV values are presented in the Table 10. When these values are examined, it is understood that there is no problem of multiple connection between the variables.

Test of Autocorrelation: One of the hypothesized controlled variables for performing the multiple linear regression analysis is whether or not there is an autocorrelation between the variables. For this purpose, the Durbin-Watson coefficient is calculated. This value is expected to be between 1.5 and 2.5 (Kalaycı, 2009). Since the calculated mean of the Durbin-Watson coefficient is 2.526, it is understood that there is no autocorrelation among the variables (Table 10).

3.4 Multiple Linear Regression Analysis

It has been checked whether several of assumptions have been made in order to be able to perform the multiple linear regression analysis above. As a result, it is understood that the assumptions mentioned are provided. After this stage, it has been tried to determine how each sub-dimension of educational philosophies, which are considered as the independent variables of this research, predicts each sub-dimension of the dependent teaching style. The results of the multiple linear regression analysis performed for this purpose are given in the Table 10.

Table 10. Multilinear regression analysis to determine how education philosophies predict teaching styles

	Independent Variables	B	Std. Error	B	t	P	Dual r	Partial r	TV	VIF	Durbin Watson
Expert Style	Constant	2,547	,525	-	4,852	,000***	-	-	-	-	
	Perennialist	-,037	,130	-,050	-,288	,774	,214	-,038	,505	1,982	
	İdealist	,297	,129	,409	2,306	,025*	,453	,395	,482	2,073	
	Realist	-,094	,165	-,108	-,570	,571	,220	-,076	,424	2,356	2,485
	Experimentalist	,187	,144	,209	1,293	,201	,212	,170	,584	1,713	
	Existentialist	-,020	,101	-,027	-,197	,845	,151	-,026	,785	1,274	
		$F_{(5-62)}$= 1,979		p< .001		R=,387		R^2=,15			
	Independent Variables	B	Std. Error	B	t	p	Dual r	Partial r	TV	VIF	Durbin Watson
Authoritative Style	Constant	3,001	,758	-	3,956	,000***	-	-	-	-	
	Perennialist	-,123	,188	-,118	-,654	,516	,051	-,087	,505	1,982	
	İdealist	,230	,186	,228	1,235	,222	,176	,163	,482	2,073	
	Realist	,172	,238	,142	,724	,472	,173	,096	,424	2,356	1,894
	Experimentalist	,052	,209	,042	,249	,804	,054	,033	,584	1,713	
	Existentialist	-,205	,146	-,203	-1,404	,166	-,098	-,184	,785	1,274	
		$F_{(5-62)}$= ,985		p< .001		R=,284		R^2=,081			
	Independent Variables	B	Std. Error	B	t	p	Dual r	Partial r	TV	VIF	Durbin Watson
Personal Model Style	Constant	1,855	,661	-	2,805	,007**	-	-	-	-	
	Perennialist	-,169	,163	-,170	-1,031	,307	,146	-,137	,505	1,982	
	İdealist	-,028	,162	-,030	-,176	,861	,106	-,023	,482	2,073	
	Realist	,375	,207	,324	1,808	,076	,364	,235	,424	2,356	2,107
	Experimentalist	,424	,182	,357	2,334	,023	,408	,298	,584	1,713	
	Existentialist	-,120	,128	-,124	-,939	,352	,012	-,124	,785	1,274	
		$F_{(5-62)}$= 3,434		p< .001		R=,484		R^2=,235			
	Independent Variables	B	Std. Error	B	t	p	Dual r	Partial r	TV	VIF	Durbin Watson
Facilitator Style	Constant	3,060	,665	-	4,599	,000***	-	-	-	-	
	Perennialist	-,295	,165	-,307	-1,791	,079	-,049	-,233	,505	1,982	
	İdealist	,016	,163	,018	,100	,920	,014	,013	,482	2,073	
	Realist	,370	,209	,331	1,772	,082	,224	,230	,424	2,356	2,589
	Experimentalist	,276	,183	,240	1,508	,137	,210	,198	,584	1,713	
	Existentialist	-,201	,128	-,215	-1,564	,123	-,142	-,205	,785	1,274	
		$F_{(5-421)}$= 2,304		p< .001		R= ,413		R^2= 171			
	Independent Variables	B	Std. Error	B	t	p	Dual r	Partial r	TV	VIF	Durbin Watson
Delegator Style	Constant	1,043	,625	-	1,669	,101	-	-	-	-	
	Perennialist	-,382	,155	-,383	-2,469	,017*	,125	-,313	,505	1,982	
	İdealist	,158	,153	,163	1,028	,308	,340	,136	,482	2,073	
	Realist	,566	,196	,489	2,889	,005**	,465	,360	,424	2,356	2,041
	Experimentalist	,119	,172	,100	,694	,491	,279	,092	,584	1,713	
	Existentialist	,182	,121	,188	1,509	,137	,296	,198	,785	1,274	
		$F_{(5-62)}$= 5,240		p< .001		R= ,565		R^2=,319			

*p<.05, **p< .01, ***p< .001

In order for the regression process to yield correct results, the predicted changes ought to be independent of each other; that is, there should not be a high degree of relationship between the predictor variables. The shortest way to control the relationship between predictor variables is to look at their correlations among themselves. The multiple correlations are mentioned among the predictive variables, which are highly correlated, such as .80-.90. In this study, it was determined that the correlation coefficients between the predictive variables according to the Table 7 change between .29 and .61.

Naturally, as the regression model is added into the analysis, the explanation for the change in the dependent variable is increased, but this explanation will be mixed with a "mistake that caused by the luck change explanation". The corrected R2 is the offset of the described change, and is smaller than the normally calculated R2. The R2 is the correlation coefficient between the observed value of the predicted variable of R and the predicted values of the regression line and the R2 shows how much of the predicted variance can be explained in the model according to the present data of the regression analysis. The corrected R2 shows how much of the change in the predicted variant can be explained in the model from which we take the sample. The model can be generable if there is a smaller difference between R2 and corrected R2 and this is the desirable situation. Since the p value in the ANOVA table which tests the significance of R in the regression model is smaller than of 0.01, it can be said that there is a meaningful relation

between the predicted variable and the predictive variables. In this context, as a result of the multiple linear regressions analysis (Table 10) carried out separately for each teaching style in order to show how the sub-dimensions of the education philosophies thought to be influential on the teaching styles of teachers:

For the Expert Teaching Style; perennialist, idealist, realist, experimentalist, and existentialist mentalities together exhibited a meaningful relationship with the expert teaching style (R= .387, R2= .15). In particular, the five variables explain 15% of the change in the combined teaching style scores. According to the standardized regression coefficients, the relative importance order of the predictor variables on the expert teaching style is idealist (β = .409), experimentalist (β = .209), realist (β = .108), perennialist (β = .050) and existentialist (β =.027). Looking at the regression model that emerged in this example, the following can be said for the coefficients: The predictor explaining the change in the alternative predicts that only the idealist philosophy explains the change at a significant level [t = 2.306, p <.05 (p = .025)]. In other words, only the idealist philosophy is found to be a significant predictor of the expert teaching style scores. The focus of the idealist philosophy is B concentration = .297. Accordingly, an increase of 1 unit in the idealist philosophy leads to an increase of .297 units in dependent variable (teacher's teaching style score). When we look at the relationship between the predictive variables and the expert teaching style, it is seen that there are correlations with the idealist philosophy (r=.214), the effect of other predictive variables is controlled (r=-.038); with the idealist philosophy (r= .453), the effect of other predictive variables is controlled (r = .395); with the realistic philosophy (r= .220), the effect of other predictive variables is controlled (r = -. 076); with the experimentalist philosophy (r= .212), the effect of other predictive variables is controlled (r = .170) and with the existentialist understanding (r = .151), the effect of other predictive variables is controlled (r = -. 026). According to the results of regression analysis, the regression equation which predicts the expert teaching style is as follows:

The expert teaching style score: (.297 x idealist philosophy score) + (.187 x experimentalist philosophy score) + (.097 x realist philosophy score) + (-037 x perennialist philosophy score) + (-020 x existentialist philosophy score).

For the Authoritative Teaching Style; perennialist, idealist, realist, experimentalist, and existentialist mentalities together exhibited a meaningful relationship with the authoritarian teaching style (R= .284, R2= .081). In particular, the five variables together account for 8% of the change in authoritarian teaching style scores. According to the standardized regression coefficients, the relative importance order of the predictive variables on the authoritarian teaching style is idealistic (β = .228), existentialist (β = -. 203), realist (β = .142), perennialist (β = .118) and experimentalist (β = .042) philosophies. According to the regression model formed in this context, the coefficients can be stated as follows: None of the predictors that explain the change in the predicted variable explain the change at a significant level. When we look at the relationship between the predictive variables and the expert teaching style, it is seen that there are correlations with the perennialist philosophy (r = -0.051), the effect of other predictive variables is controlled (r = -. 087); with the idealistic philosophy (r = .176), the effect of other predictive variables is controlled (r = .163); with the realist philosophy (r = .173), the effect of other predictive variables is controlled (r = -.096); with the experimentalist philosophy (r = .054), the effect of other predictive variables is controlled (r = .033) and with the existentialist philosophy (r = -.098), and when the effect of other predictors is controlled (r = -.184). The results show that educational philosophy preferences do not lead to significant changes in teachers' authoritarian teaching style scores.

For the Personal Model Teaching Style; perennialist, idealist, realist, experimentalist, and existentialist mentalities together exhibited a meaningful relationship with the personal model teaching style (R = .484, R2 = .235). In particular, the five variables together account for 24% of the change in the individual model teaching style scores. According to the standardized regression coefficients, the relative importance order of the predictive variables on the individual model teaching style is the same as the experimentalist (β = .357), realist (β = .324), perennialist (β = -. 170) and idealist (β = -. 030) philosophies. In this context, one of the predictors explains the change at a significant level. When we look at the relationships between predictive variables and the individual model teaching style, it is seen that there are correlations with the perennialist philosophy (r = .146), the effect of other predictive variables is controlled (r = -.137); with the idealist philosophy (r = .106), the effect of other predictive variables is controlled (r = -. 023); with the realistic philosophy (r = .364), the effect of other predictive variables was controlled (r = .235); with the experimentalist philosophy (r = .408), the effect of other predictive variables was controlled (r = .298) and existentialist approach (r = .012), and when the effect of other predictors was controlled (r = -. 124). According to the results obtained, the educational philosophical understandings of the teachers did not cause a significant change in the personal model teaching style scores.

For the Facilitating Teaching Style; perennialist, idealistic, realist, experimentalist, and existentialist mentalities together exhibited a meaningful relationship with the facilitating teaching style (R = .413, R2 = .171). The five variables describe 17% of the variation in co-facilitator teaching style scores. The relative importance of the predictive variables with the standardized regression coefficients on the facilitating teaching style is realist (β = .331), perennialist (β = -.307), experimentalist (β = .240), and existentialist (β = .018) philosophies. According to the regression model formed

in this context, none of the predictors explain the change at a significant level. When we examine the relationship between the predictive variables and the facilitating teaching style, it is seen that there are correlation with the perennialist philosophy (r = -. 049), the influence of other predictive variables is controlled (r = -. 233); with the idealist philosophy (r = .014), the influence of other predictive variables is controlled (r = -. 013); with the realistic philosophy (r = .224), the effect of other predictive variables is controlled (r = .230); with the experimentalist philosophy (r = .210), the effect of other predictive variables is controlled (r = .198) and with the existentialist understanding (r = -.142), the effect of other predictive variables is controlled (r = -.205). In this context, it can be said that educational philosophical insights did not lead to meaningful changes in teachers' facilitative teaching style scores.

For the Delegator Teaching Style; perennialist, idealistic, realist, experimentalist and existentialist mentalities together exhibited a meaningful relationship with the representative teaching style (R = .565, R2 = .319). That said, the five variables describe 32% of the change in representative teaching style scores. According to standardized regression coefficients, the relative importance order of the predictive variables on the representative teaching style is the realist (β = .489), perennialist (β = - .383), existentialist (β = .188), idealist (β = .163) and experimentalist (β = .100) philosophies. The realist (p <.01) and perennialist (p <.05) philosophical understandings explain the change at a significant level from the predictors that explain the predicted change by looking at the regression model that emerged in this example. In other words, realist and perennialist understandings on the representative teaching style scores were found to be significant predictors. The focus of the realistic philosophy is $B_{concentration}$ = .566 and the focus factor of the perennialist concept is $B_{concentration}$ = - .382. Thus, the 1 unit increase in the realist philosophy leads to an increase of .566 units in the dependent variable (teacher's representative teaching style score). The coefficient B can be negative and then the dependent variable shows a decrease instead of an increase. In other words, the direction of the relationship between the B coefficients is also specified. Thus, the 1 unit increase in the perennialist philosophy causes a decrease of .382 units in the dependent variable (teacher's representative teaching style score). When we look at the relations between the predictive variables and the representative teaching style, it is seen that there are correlations with the perennialist philosophy (r = .125), the influence of other predictive variables is controlled(r=-.313); with the idealist philosophy (r = - .340), the influence of other predictive variables is controlled (r=.136); with realist philosophy (r=.465), the influence of other predictive variables is controlled(r=.360);with the experimentalist philosophy (r = .279), the influence of other predictive variables is controlled (r=.092) and existentialist philosophy (r=.296), the influence of other predictive variables is controlled (r=.198). According to the results of regression analysis, the regression equation that predicts the representative teaching style is as follows:

The delegator teaching style score: (.566 x realist philosophy score) + (-.382 x perennialist philosophy) + (.182 x existentialist philosophy score) + (.158 x idealist philosophy score) + (.119 x experimentalist philosophy score).

4. Discussion and Recommendations

4.1 What Are the Teaching Styles of Math Teachers?

In this study, it was found that the five subscales related to the teaching styles, mathematics teachers most preferred the personal model, and least they preferred the authoritarian teaching style. According to the research by Brekelmans, Levy and Rodriguez (1993) and Grasha (2002), teachers who prefer the authoritarian style focus more on the presentation of the course content and expect students to take notes on that content. They think that their students will gain more knowledge and skills by listening. Taking these results into account, it appears that the authoritarian teaching style involves more traditional and teacher-centred practices. On the other hand, as preferred in this research, teachers with a personalized model according to Grasha (2002) are more interested in the student-centred learning and are more likely to engage in lessons in the classroom out of a desire to work hard. It also emphasizes organizing group activities when necessary to ensure their active learning. Teachers in the personal model teaching style provide a particular model for how learners can think and act. Teachers ought to learn how to deal with the problem and how to solve it. Teacher's confidence at this point is complete. It is important that they are competent in taking samples as well. This requires that teachers have the knowledge of how to best teach the subjects in their fields and they ought to have sufficient knowledge of how to enrich the course.

Kaleci (2013) revealed that the least preferred style was "representative" with 4.8%, while the most preferred was "facilitating" teaching style with 67.4% for the study of mathematics teacher candidates. On the other hand, Gencel (2013) argues that the personal model and delegator teaching styles are preferred at the mid-level and other expert, authoritarian and facilitative instructional styles at the high levels in Turkey. Üredi (2011) found that the facilitator, personal model and expert teaching styles were preferred in the primary and secondary school teachers. However, in terms of other teaching style groups, it has been found that the student-centred teaching styles are more preferred in the primary schools than the secondary schools. The primary school is a period in which children need to learn based on concrete life experiences, meaningful learning by doing and living. It may be mentioned that teachers at the level of

basic education prefer their own particular preferred teaching style to the more centralized ones.

In the literature, the common aspect of the research conducted on the subject concerned is that mathematics and other branch teachers prefer predominantly the student-centred teaching style groups. Similarly, it can be said that the student-centred teaching style is preferred more dominantly in this study as well, which is due to the interpretation, understanding and so implementation of the formal program. When any educational philosophical preferences mingle with the student-centred teaching styles, teachers reflect their own individual skills by requesting and spending all their opportunities. It is very important for mathematics teachers to prefer the student-centred instructional style rather than the teacher-centred instructional styles as emphasized in the constructivist learning approach, because such an approach is aimed at creating a particular learning environment that addresses individual differences among learners and meets student needs and requirements. Teachers can only reach all students using different teaching styles because of individual subjectivism. Participants in this study may predominantly be thought to be influenced by the resulting outcome of female teachers. On the other hand, it is suggested that gender, age and marital status are not important in choosing teaching style by Kılıç and Dilbaz (2013).

4.2 What Are the Philosophical Preferences of Mathematics Teachers?

This research aims to determine the relationship between the educational philosophies and the teachers' teaching styles applied in mathematics teaching, and it was revealed how these philosophical preferences predict the teaching styles. In this context, it has been determined to which teaching style teachers who have a particular philosophical approach. First of all, mathematics teachers were found to have the most experimentalist thoughts in the educational philosophy. The least preferred philosophical approach is found to be the existentialist understanding. Teachers have adopted the least existentialist thoughts due to the fact that Turkey is a highly religious nation. Livingston, McClain and DeSpain (1995), Doğanay and Sarı (2003) and Duman and Ulubey (2008) also found the similar results. Oliva (2005) and Doğanay (2011) suggest that educators often preferred the philosophy of progressivity, the other name of experimentalism. The researches carried out by Doğanay (2011) and Tekin and Üstün (2008) stated that the highest positive average of the candidates of mathematics teachers is the experimentalist philosophy. According to these results, it can be argued that mathematics teachers' philosophical preferences in the pre-service education have become clearer and they continue in their professional lives. According to experimentalist understanding, teachers are aware of facilitating learning, encouraging research, exchanging and improving. Teachers who consider the experimentalist philosophy are more concerned with the educational process, and so the reformation ought to be continuous and that the schooling is effective in particular social development and enhancement, so that curricula and programs ought to be directed to the solution of social problems and that knowledge can be learned through researching and inquiring their role in the progress that is to be encouraged. The actual task is to facilitate learning.

Another conclusion reached in the study is that education-related thoughts of mathematics teachers do not concentrate entirely on a single philosophical view. Teachers' philosophical preferences are more in the direction of the experimentalist philosophy, as are scores of other philosophies. The scores for philosophical insights varied between 3.25 and 4.13 out of 5. This preference distribution is required to compare the educational philosophy of our country and to determine the inconsistencies between the teaching philosophy and the philosophical views of teachers as a result of this comparison. This also means that it is possible to compare what is achieved within the targets. This comparison will shed the light on the decisions about what can be done to achieve a more qualified teaching-learning environment in terms of mathematics. As Livingston, McClain, and DeSpain (1995) point out, the philosophical view that teachers have influence how they can teach students in a meaningful and functional sense. The philosophy of these opinions and beliefs will guide the teachers in determining their aims, in the arrangement of the learning-teaching environment and in choosing the evaluation method. Teachers act in a certain way when choosing the teaching methods and techniques in their classroom. The educational philosophy is the direction of these usages. Teachers who have a lack of certain degree of philosophical understanding will not have a consistent decision-making process in their choices, so that they would be able to give priority to the direction of teaching rather than the educational aspect of methods and techniques they selected. However, the teaching methods and techniques should be handled in a certain nature, not in the disconnected fashion from the philosophical context. In this context, it is necessary to try to embrace mathematics teacher training programs in a distinct, contemporary philosophical context and to adopt these philosophical understandings through both open and implicit programs during their pre-service training.

4.3 Is There a Relationship Between Teaching Styles and Philosophical Preferences of Mathematics Teachers?

The Pearson multiplication moment correlation analysis was conducted to determine whether there is a significant relationship among the teaching styles of mathematics teachers and it was determined that there is a significant positive correlation between these factors. The highest relationship is between the facilitator and the personal model teaching styles; the lowest is realized between the expert and the representative teaching style sub-dimensions. According to this

result, teachers are able to prefer more than one teaching style. At the same time teacher who have dominant in the personal model teaching style are also shows an increase in the facilitating teaching style. Nevertheless, it has been found that there is no meaningful relationship between the facilitator-facilitator and the facilitator-authoritarian sub-dimensions in the positive direction in the study. This is the student-centred form of the facilitating teaching style; whereas the authoritarian and specialist teaching styles may be the idea of placing for teachers at the centre by feeding different perspectives to their concepts, such as various forms of teaching and learning.

When we look at the relations between the philosophical preferences of mathematics teachers, the highest relationships are between the realist and perennialist philosophies and the realist and idealist conceptions; the lowest was between the existentialist and experimentalist approaches. It has been determined that there is no significant relationship between the idealist philosophy and the experimentalist understanding. The reason for this is that the behaviourist of the idealistic philosophy is learning; and that the experimentalist approach focuses more on the student-centred research and problem solving. According to these results, it is determined that there are strong correlations between the perennialist, idealist and realist perceptions which are in the teacher-centred approaches. In other words, if teachers' realist understanding is dominant, then perhaps the perennialist and idealist thoughts also increase in the same direction. On the other hand, there was a very low correlation between the student-centred conception and the experimentalist and existentialist conceptions. This result may mean that teachers defend the understanding of experimentalist empiricism because they cannot reach a meaningful level of existentialist understanding from the mental side and remain under the pressure of the program. It is possible to say that although the dominant educational concept is the experimentalist thought, the average scores are close to each other, the student-centred existentialist has the lowest score, and the teachers are in philosophical chaos because the teaching styles are the personal models. In other words, the minds of mathematics teachers about what is being completed about the teaching-learning environment are not clear and specific.

In this context, it has been determined that there is a significant positive relationship between philosophical understandings and teaching styles in the study. The relationship at the highest level is between the realist philosophy and the representative teaching style; while the lowest is between the experimentalist philosophy and the specialized teaching style. There is no meaningful relationship between the perennialist philosophy and all sub-dimensions of teaching style. However, there is no significant relationship between the facilitative and authoritarian teaching styles and no educational philosophical preference. According to these results, although mathematics teachers are expected to be adapting to the educational paradigms which change with official applications, it is seen that they still exhibit ambiguity in their teaching style tendencies and their philosophical preferences because they are remain openly resistant to any educational reformation.

4.4 How Do the Philosophical Approaches of Mathematics Teachers predict Teaching Styles?

In the findings of the third sub-problem of the research, the relationship between the sub-dimensions of pedagogical philosophical understandings of mathematics teachers (perennialist, idealist, realist, experimentalist and existentialist) teaching style groups was examined. From the predictors that explain the change in the teaching style of the expert, only the idealistic philosophy explains the change at a meaningful level. In other words, only the idealist philosophy is found to be a significant predictor of the expert teaching style scores. However, the realist and perennialist philosophical understandings explain change at a meaningful level from the predictors that explain the change in the representative teaching style. In other words, the realist and perennialist understandings on the representative teaching style scores were found to be significant predictors. According to this, while a 1 unit increase in the realistic philosophy leads to an increase of .566 units in the representative teaching style score of teachers, a 1 unit increase in the perennialist philosophy, which was found to have an reverse direction relation, leads to a decrease of .382 units in the representative teaching style score of teachers. In short, if teachers show an increase in realist thinking, the representative teaching style also increases; On the other hand, if the perennialist is dominant, it is a departure from the representative teaching style. There is no finding in the study that explains the significant level change between the other predictors and the predicted variables. In the literature, it is difficult to discuss the findings of a similar subject, but the results obtained in the study; teachers' teaching style preferences can be predicted by looking at educational philosophical notions, especially in the idealist, realist and perennialist philosophical scores.

In this context, it is possible to say that the more a teacher's sense of idealism becomes, the closer he/she gets to the expert teaching style. On the other hand, the more dominant his/her sense of realism becomes, the closer he/she gets to the representative teaching style. On the other hand, the decrease in the delegator teaching style scores of mathematics teachers with an increase in the perennialist thinking is the issue. As a result; the findings of the relationship between the teaching style preferences and the philosophical approaches of mathematics teachers show that teachers may change depending on their philosophical notions of teaching style preferences. If mathematics teaching is intended to provide more effective, lasting and meaningful learning, it is necessary to examine the educational perspectives and philosophical understandings of teachers before questioning the teaching styles they are willing to apply into their

classroom practices. The effectiveness of philosophical insights on the teaching styles that teachers have is a matter that should be emphasized. In the literature, the fact that teachers do not study any relation between the educational philosophy and the teaching styles reveals the necessity of conducting further research on this topic.

As Émile Durkheim stated “each new generation is reared by its predecessor; the latter must therefore improve in order to improve its successor. The movement is circular” (1951, p.372), if the public wants to improve educational movements and so democratic principles. Turkey has been fundamentally improving its educational and philosophical thoughts based on democratic principles, but there are still so many educational issues. Turkey ought to recognise that any particular education is more than a bureaucratic administration or system of inert rules to design curricula; it is an interacting scheme throughout various networking. No solitary ground in such a scheme can function appropriately without some sustenance from another ground, or often from all of the enduring grounds, as this study had fundamentally argued. For instance, educators in a democracy regime require the provision of an additional continuing education that promises educators their right of philosophical and educational connections. In the interacting scheme, what is unfortunately known as "schools mirror society; they do not drive it," Goodlad (1997, p.56), therefore the most important concept is that “the problem is not the child, but the parent and teacher; the problem is to educate the educator” (Osho, 2009, p.71).

4.5 Limitation of the Study

In academia, any theologies or methodologies provide a set of approaches, capabilities and limitations that ought to be sightseen and recognised by researchers. In this sense, any quantitative research encompasses designed questionnaire with close ended questions. Therefore, it may lead to limited results and cannot permanently characterise the definite occurring, in a comprehensive system. Similarly, the respondents have restricted selections of answers, driven by the variety prepared by researchers, as in this research. Although quantitative research may generalizable thorough its sample and population, this study is only considered within one part of Turkey due to the fact that the data in this study may be perceived, as not robust enough to clarify these multifaceted educational issues. Therefore, after comprehensively extending the sample, this result may apply to Turkey as a whole. This study has also not focused on full complexity of teachers’ experiences or perceptions and their instructional styles. There are particular relations but it is not indeed clear enough why and how these relationships have occurred. Therefore, this study ought to extend its aim in the next project to comprehensively get these relationships further.

References

Alqurashi, M. (2018). An Exploratory Study To Identify Teaching Styles In Saudi Arabia Based On Three Learning Theories. *People: International Journal of Social Sciences, 3*(3), 1442-1454. https://doi.org/10.20319/pijss.2018.33.14421454

Baykal, A. (2010). The Condition of the Education, unpublished observation, at http://inet-tr.org.tr/inetconf16/sunum/fatih-alibaykal.pdf.

Beyhan, Ö. (2018). Student Perceptions on the Teaching Styles of Their Teachers. *Hacettepe University Journal of Education,* 1-11. https://doi.org/10.16986/HUJE.2018036946

Brekelmans, M., Levy, J., & Rodriguez, R. (1993). A typology of Teacher Communication Style. In T. Wubbels, & J. Levy (Eds.), *Do you know what you look like*? (pp. 46–55). London: The Falmer Press.

Büyüköztürk, Ş., Kılıç-Çakmak, E., Akgün, Ö. E., Karadeniz, Ş., & Demirel, F. (2016). *Scientific Research Methods (22nd Press)*. Ankara: Pegem Academy

Damrongpanit, S., & Reungtragul, A. (2013). Matching of Learning Styles and Teaching Styles: Advantage and Disadvantage on Ninth-Grade Students’ Academic Achievements, *Educational Research and Reviews, 8* (20) 1937-1947. https://doi.org/10.5897/ERR2013.1583

Doğanay, A. (2011). The Effect of Pre-Service Teacher Education on the Educational Philosophies of Prospective Teachers, *Education and Science, 36*(161), 332-348.

Doğanay, A., & Sarı, M. (2003). Evaluation of Perceptions Related to the Educational Philosophies of Elementary School Teachers-Teachers' Philosophies of Education, *The Journal of Turkish Educational Sciences (JTES), 1*(3), 321-337.

Duman, B., & Ulubey, Ö. (2008). Opinions of Prospective Teachers about the Effect of Educational Philosophy on Educational Technology and Internet Usage Levels, *Journal of Social Sciences and Humanities Researches, 20*, 95-114.

Durkheim, E. (1951). *Suicide, a Study in Sociology*, Simon and Schuster

Field, A. (2009). *Discovering Statistics Using SPSS*. London: Sage.

Gencel, E. İ. (2013). Teachers' Teaching Styles Preferences: A Comparison of Turkey and the USA, *Turkish Studies - International Periodical For The Languages, Literature and History of Turkish or Turkic, 8* (8), 635-648.

Goodlad, J. (1997). Making Democracy Safe for Education, *Education Week*, *40*, 56.

Grasha, A. (2002). *The Dynamics of One-On-One Teaching. College Teaching. 50*(4), 139-146. https://doi.org/10.1080/87567550209595895

Güven, M., Polat, M., Yıldızer, G., Sönmez, T., & Yetim, N. (2016). An Examination of the Researches Related to Teaching Styles Measurement Instruments, *International Journal of Curriculum and Instructional Studies, 6*(11), 117-138.

Hart, L. C., & Memnun, D. S. (2015). The Relationship between Preservice Elementary Mathematics Teachers' Beliefs and Metacognitive Awareness, *Journal of Education and Training Studies*, *3*(5), 70-77. https://doi.org/10.11114/jets.v3i5.840

Hobbes (1660). *Leviathan*, at https://www.ttu.ee/public/m/mart-murdvee/EconPsy/6/Hobbes_Thomas_1660_The_Leviathan.pdf

Kalaycı, Ş. (2009). *SPSS Applied Multivariate Statistical Techniques.* Ankara: Asil Publications.

Kaleci, F. (2013). The Relationship between Pre-Service Mathematics Teacher's Epistemological Beliefs and Their Learning and Teaching Styles, *Journal of Research in Education and Teaching*, *2*(4), 23-32.

Kılıç, F., & Dilbaz, G. (2013). The Investigation of Working in High School Science Teachers' Teaching Styles in terms of Various Variables, *The Journal of Academic Social Science Studies*, *6*(6), 715-738. https://doi.org/10.9761/JASSS1628

Kline, R. (2011). *Principles and practice of structural equation modelling*, (2nd ed.). New York: The Guilford Press.

Kulinna, P. H., & Cothran, D. J. (2003). Physical Education Teacher's Self-Reported Use and Perceptions of Various Teaching Styles. *Learning and Instruction*, *13*, 36,4, (597- 609). https://doi.org/10.1016/S0959-4752(02)00044-0

Kumral, O. (2016). A Trial for Curriculum Development: The Effect of Educational Philosophy Curriculum on the Attitudes towards Course and Educational Views, *Journal of Education and Training Studies*, *4*(3), 174-188. https://doi.org/10.11114/jets.v4i3.1384

Laurencelle, L., & Dupuis, F. (2002). *Statistical Tables Explained and Applied*. Singapore: World Scientific Publishing Co. Pte. Ltd. https://doi.org/10.1142/4935

Lavy, V. (2011). *What Makes an Efective Teacher?* Quasi-Experimental Evidence. NBER Working Paper No. 16885.

Livingston, M. J., McClain, B. R., & DeSpain, B. C. (1995). Assessing the Consistency between Teachers' Philosophies and Educational Goals. *Education*, *116*(1), 124-129.

Mete, H., & Bakır, S. (2016). Teaching Styles of Science Teachers, *Journal of Educational Science Research, International E-Journal*, *6*(2), 95-111.

Mutluoğlu, A., & Erdoğan, A. (2016). Examining Primary Mathematics Teachers' Technological Pedagogical Content Knowledge (TPACK) Levels According to Their Preferred Teaching Styles, *International Journal of Society Researches*, *6*(10), 100-124.

Oliva, P. F. (2005). *Developing the curriculum* (6th ed.). Boston, MA: Pearson.

Osho. 2009. *The Supreme Science*, Osho.

Radin, M. A., & Orlova, O. A. (2018). *University Level Teaching Styles With High School Students And International Teaching And Learning.* Society. Integration. Education Proceedings of the International Scientific Conference. I, 464-475. https://doi.org/10.17770/sie2018vol1.3321

Sabra, H. E., Hassan, A. T., & Mohammed, H. M. (2018). Relation between Students' Perception of Teaching Styles and Students' Academic Engagement in South Valley and Assiut Universities. *Egyptian Journal of Health Care, EJHC, 9*(1), 187-204.

Şahin, E. (2015). The Examination of Self-Directed Learning Readiness Levels and Teaching Style Preferences of Vocational High School Teachers (Bursa County Sample), *Abant İzzet Baysal University Educational Department Journal, 15*(2), 297-316.

Sarıtaş, E., & Süral, S. (2010). Turkish Adaptation Study of Grasha-Reichmann Learning and Teaching Style Scales, *E-Journal of New World Sciences Academy*, *5*(4), 22162-2177.

Schwerdt, G., & Wuppermann, A. C. (2011). Is traditional teaching really all that bad? A within-student between-subject

approach. *Economics of Education Review, 30*, 365-379. https://doi.org/10.1016/j.econedurev.2010.11.005

Şencan, H. (2005). *Reliability and Validity in Social and Behavioral Measurements*. Ankara: Seçkin Publishing.

Sürel, S. (2010). The Comparison of Teaching Styles of Teaching Staff Who Worked in Different Faculties of Pamukkale University, *e-Journal of New World Sciences Academy*, *5*(3), 1226-1242.

Tekin, S., & Üstün, A. (2008). Determination of the Philosophical Preferences of Teacher Candidates of the Amasya Faculty of Education on the Education Process. *Ahmet Kelesoglu Education Faculty (AKEF) Journal, 25*, 145 -158.

Umugiraneza, O., & Bansilal, S. (2017). Exploring Teachers' Practices in Teaching Mathematics and Statistics in Kwazulu-Natal Schools. *South African Journal of Education, 37*(2), 1-13. https://doi.org/10.15700/saje.v37n2a1306

Üredi, L. (2011). The Relationship between Elementary School Teachers' Teaching Style Preferences and Demographic Features, *e-Journal of New World Sciences Academy* (NWSA), *6*(1), 1129-1141.

Van Klaveren, C. (2011). Lecturing Style Teaching and Student Performance. *Economics of Education Review, 30*, 729-739. https://doi.org/10.1016/j.econedurev.2010.08.007

Wiles, J., & Bondi, J. (1993). *Curriculum Development*. USA: Macmillan Publishing Company.