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A Structural Equation Modelling of Factors Affecting the Prospective Teachers' Innovativeness Level*

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Abstract

This study aims at investigating the factors affectıng the prospectıve teachers 'ınnovatıveness level by structural equatıon modelıng. For this purpose, the predictive relationships between gender, grade level, department, and risk-taking behaviors, and pre-service teachers' innovativeness levels were analyzed by path analysis. The correlational predictive design was used to investigate the relationship between variables in the study. The participants of the study consisted of 293 science, social studies, and prospective elementary teachers. The Innovativeness Scale and the Academic Risk Taking Scale (ART) were used to collect the data. The results of the study suggest that grade level is not a statistical predictor of both risk taking and innovativeness. However, gender has a significantly small effect on Academic Risk Taking. Furthermore, it was concluded that risk-taking behavior is an important predictor of the pre-service teachers' level of innovativeness. So it can be suggested that prospective teachers should be planned to increase their risk-taking behaviors during the teaching process.

Keywords: Innovativeness, Risk-taking, Prospective teachers, Structural equation modeling, path analysis

Introduction

With the paradigm shifts in education in the 21st century, the skills expected from students changed. In the 21st century, students are expected to have higher-order thinking skills such as critical thinking, entrepreneurship, creativity, risk-taking, and reasoning. One of these skills, risk-taking behavior, which is one of the basic characteristics of innovative individuals (Jaeger et al., 2010) plays an important role in the progress, development, and pioneering of societies despite it having positive and negative consequences. In this respect, individuals should be taught the basic rules and principles related to risk-taking. Innovative individuals can contribute to the development of their community by taking risks. In the 21st century world, which is called the age of technology and where a generation called Z-generation grows, an innovative product emerges at any moment. Therefore, it is important to have innovative behavioral features and risk-taking in the process of accepting and spreading these products.

Innovation is one of the features that the modern labor market seeks for its employees due to its characteristics mentioned (Mykhailyshyn, Kondur & Serman, 2018). In this respect, institutions providing high-level education such as universities, have important roles in developing innovative behavioral characteristics of students. Especially, education faculties where teachers are trained who are responsible for the training of future generations should be organized their curriculum within this framework. However, Shantz (1995) stated that many education faculties design educational programs from an innovative point of view, but they also use traditional methods in practice. For this reason, researching the factors affecting the innovativeness of prospective teachers seems to be important to eliminate this difference between theory and practice. Therefore, this study aimed to examine the predictive relationships between gender, grade level, department and risk-taking behaviors, and prospective teachers' innovation levels with structural equation modeling. For this purpose, the following theoretical model was created.

*This study was presented as an oral presentation at the "International Congress of Research and Practice in Education (INCES 2020)".

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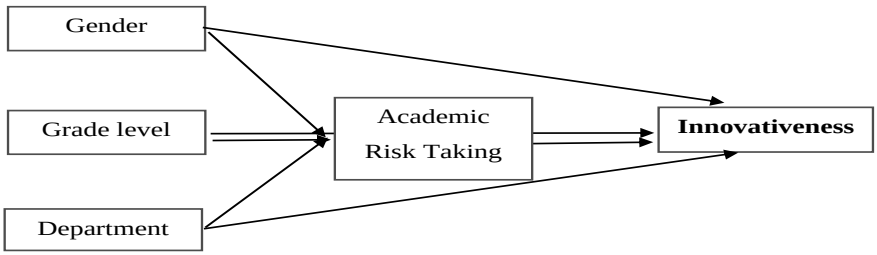

Figure 1. The theoretical model of the study

Theoretical Framework

Innovation

Societies have consistently produced new things in line with their needs and curiosities from past to present. These productions are sometimes produced to meet daily needs, such as clothes, food, and technological devices, and sometimes emerge to develop the mental world of people, such as a thought, knowledge, phenomenon, approach, or theory. Whatever the reason, individuals have always been in search of innovation. Buijs (2007) defined innovation as changing the old from a different perspective or doing something that has not been tried before. Innovation is seen as the key to -being, being ahead of others, and developing individual development, both institutional and social (Kılıçer, 2011). In this respect, innovations lead to better quality services in areas such as education, work, health, or transportation in human life and thus improve the quality of life of individuals (Kemer & Altuntaş, 2017). However, innovations bring about a rapid change in society. While some of individuals in society adapt to this change rapidly, others either fall back to adapt to these innovations or resist not adapting. In the face of innovations and rapidly increasing knowledge in the 21st century world, individuals are expected to accept these innovations without showing resistance and have an innovative identity. Therefore, these innovations that emerged in all areas of society have also affected the characteristics of individuals. The most important of these features is the concept of "innovativeness", which is defined as "adapting to a new situation before others" (Rogers, 2003).

Individuals are expected to accept the changes in the 21st-century world without resistance and to have an innovative identity. Because the aim of innovation is not to destroy the old but to find a solution to an unresolved problem or to make more quality and use an existing situation or service (Konukman, Yokuş & Yanpar Yelken, 2016). Innovation refers to behavioral change rather than cognitive or attitude change (Burns & Krampf, 1992). Kavas (2017) stated that innovative individuals should have the characteristics of recognizing, supporting, and creating an innovative environment. When the literature is examined, some of the features of innovative individuals have been determined. Risk-taking, research and innovation, need for originality, and cosmopolitanism are among these features (Roberts, 2015). Besides, some of the important features of innovative individuals are enjoying new experiences and trying new products (Rogers, 2003). Innovative people are more tolerant of risk-taking against new things, accept innovation, and are open to new experiences. According to Rogers (2003), innovation is generally distributed in a society and people are divided into 5 categories at this point. These categories are defined as follows:

- *Innovators*: Individuals take risks and want to try new ideas. They also have different visions than others.
- *Early Adopters*: They are technology-oriented people who keep other people informed about innovations.
- *Early majority*: They are ready for innovations, but they do not want to take risks.
- *Late majority*: They suspect innovations.
- *Laggards*: They bias the innovations and eventually accept the innovations.

Innovation and Risk-Taking

Theoretically, it is never accepted if an innovation does not fit its target audience. However, if an innovation has a reward value by the social system, it often reveals people who are willing to give up traditional behavior and attempt some change. As Rogers (2003) stated, this increases the tendency of individuals to try new ideas for innovation and take risks. In this regard, innovative individuals are expected to engage in risk behaviors. Hurt, Joseph, and Cook (1977) stated that risk-taking has an important effect on the conceptualization of innovation. In

this respect, risk-taking behavior is very important in forming an innovative society. So risks and risk-taking behaviors are basic components of innovation change (Jaeger et al., 2010).

There are several definitions of risk or risk-taking behavior in the current literature. Risk is defined as how the personerson evaluates the probability of facing a negative result evaluates the probability of facing a negative result (Horvath & Zuckerman, 1993). According to Le Fevre (2014), risk-taking is a behavior that can change in any situation, and risk-taking offers uncertainty about the future. Therefore, risk-taking is often seen as a sensational personality trait or a personal trend for new, diverse, complex, and intensive experiences (Horvath & Zuckerman, 1993). When the definitions are examined, it can be said that risk-taking behavior constitutes a perception that it contains negative results. However, risk-takings should not be associated with only negative consequences. Risk-taking should be perceived as an accepted failure and as an action likely to succeed (Badger, 2009). Le Fevre (2014) stated that risk-taking is a natural aspect of changes in education. He also stated that risk-taking in educational reform processes should be among the important factors to consider.

Individuals take risks, consciously, or unconsciously, in the decision-making process in their daily lives. Risks can sometimes make people happy, sometimes irritated, or busy (Sharma, 2015). Because every risk has positive and negative results in itself, but it can also lead to very important successes. Therefore, individuals need to know the importance of taking risks (Sharma, 2015). However, each risk contains uncertainty, as the risk-taking situations have no definitive consequences. As the perception of harm increases, their risk rate will increase (Le Fevre, 2014). In this case, individuals may have a fear of failure. This fear is one of the most important factors that prevent individuals' risk-taking behavior. In addition to the fear of failure, what people think, others' disapproval, and fear of uncertainty play an important role in the behavior of risk-takers (Pierre, 2015).

Academic Risk-Taking

One of the basic objectives of education is to train individuals who have meta-cognition skills can keep up with digital transformation and make fast decisions using these skills. Therefore, it is aimed to teach students new information, skills, values, and concepts requiring the use of higher-order thinking skills. Every new information contains uncertainty for students (Robinson, 2011). Uncertainty and confusion require taking risks due to unknown output (Badger, 2009). That is because asking questions, sharing ideas, or making new suggestions in learning environments, especially when learning new knowledge, skill, or concept, is risky behavior for students (Beghetto, 2009). It can be defined as academic risk-taking that students take risks and display these behaviors in learning environments. Beghetto (2009) expresses academic risk-taking behavior as being willing to share ideas that are not sure of accuracy, ask questions, and try new and alternative solutions. House (2002) stated that academic risk-taking includes the chance to answer a question correctly that the student does not know the exact answer. Taylor (2010) stated academic risk-taking as a decision-making process that positively affects learning, even though it is uncertainty for the student. Clifford (1988), which is theoretically based on this study, defined academic risk-taking behavior as the options or opportunities students use while making academic choices. In another study, Clifford (1991) discussed risk- taking under four dimensions: Behaviors reflecting the tendency to have negative emotions after failure (NEAF), behaviors reflecting the tendency to prefer difficult tasks (DT), behaviors reflecting the tendency to recover after failure (RAF), and behaviors reflecting the tendency to do homework.

Academic risk-taking involves evaluating the results of a learning activity's known and unknown and making choices about their participation based on the possible benefits and outcomes of participation (Robinson, 2011; Robinson & Bell, 2012). These choices can sometimes lead students to success while sometimes causing failure. However, risk and success are two closely related concepts, and the success of a society is directly related to the willingness of its members to participate in risk-taking practices (Badger, 2009). Therefore, teaching students with the ability to take an academic risk can contribute positively to the development of their risk-taking behavior in daily life. Also, academic risk-taking is critical to improving academic performance. House (2002) stated that students who hesitate to take an academic risk prevent their future chances of success. Attempts to increase academic risk-taking tendencies of students can significantly improve the quality of learning (House, 2002). Therefore, students should be encouraged about academic risk-taking behavior. Korkmaz (2002) stated that academic risk-taking behavior in 'the learning environment shows the students' courage, willingness, or reluctance about their problems. Clifford (1991) stated that students who are more willing to take an academic risk have a higher chance of success than unwilling students. For this reason, it is necessary to determine which variables affect academic risk-taking behavior first and thus these variables should be guided successfully in increasing students' academic risk-taking behavior (Taylor, 2010).

Academic Risk-Taking Behavior of Teachers

Academic risk-taking positively affects students' achievement and entrepreneurship skills both in school life and in their daily lives. In this respect, it is important to teach students about this behavior. Therefore, learning environments should be designed to improve risk-taking behavior. However, in a study between schools, McNeil (1986) stated that schools were traditionally stifling in general and they resisted risk-taking and change. So it requires risk for administrators and teachers in ensuring this change (Ponticell, 2003).

Risk-taking for teachers means going beyond traditional teaching styles (Ponticell, 2003). Risk-taking requires teachers to try new ideas and approaches. However, the fact that administrators do not support teachers in this regard and do not involve them in the decision-making process about organizing educational environments negatively affects teachers' risk-taking behavior (Olorunsola & Olayemi, 2011). Teachers' feeling of underutilization of new technologies is one of the important factors that negatively affect their risk-taking.Risk-taking behavior contributes to the development of creativity, innovation, critical thinking skills, and most importantly, it offers opportunities for positive learning experiences (Pierre, 2015). In this respect, it is thought that there is a positive relationship between academic risk-taking behavior and innovativeness. Because individuals who can take risks are adapt to innovation more quickly. To gain these required behaviors to teachers, the academic risk-taking behaviors of prospective teachers should be improved in the pre-service period because prospective teachers who will be future teachers are also expected to have these features.

Importance of the Study

Köksal & Köseoğlu (2019) stated that prospective teachers' effective use of technology in their teaching processes will support their intellectual risk-taking behaviors. Research has revealed that prospective teachers' risk-taking levels are related to their study skills, fear of negative criticism, active participation in lessons, knowledge creation, and the development of moral imagination (Brown, Parsons & Worley, 2005). Therefore, learning environments should be designed to support prospective teachers' teachers' risk-taking behavior. Another study also found that academic risk taking was associated with innovation behavior (Kontoghiorghes, Awbrey & Feurig, 2005). However, a predictive relationship between academic risk-taking and innovation was not specified in this study. Therefore, determining the variables predicting innovativeness and academic risk with this study is seen as important for prospective teachers to develop their innovation skills.
House (2002) stated that gender affects academic achievement and emphasized that the relationship between academic achievement and academic risk taking is important. Based on this result, determining the relationship between gender and academic risk taking may reduce academic achievement between genders. Furthermore, there are studies in the literature investigating the relationship between gender and class level, and risk-taking or innovativeness (Akdağ et al.; Beghetto, 2009; Byrnes, Miller & Schaffer, 1999; Clifford, Lan, Chou & Qi, 1989; Çuhadar, Bülbül & Ilgaz, 2013; Koloba & May, 2014, Spence, Yore & Williams, 1999; Aydın & Ubuz, 2010). The studies reviewed generally focused on the relationship between the two variables. However, in this study, unlike other studies, all the variables determined by structural equation modeling were included in the model and the causal relationships between the variables were examined holistically. So, it is thought that this aspect will contribute to the literature.

Purpose of the Study

This study aims to determine the relationship between prospective teachers' academic risk-taking, innovativeness, grade level, department, gender.
Accordingly, the hypotheses of the study are stated below.

- Hypothesis 1: ART is a statistically significant predictor of Innovativeness.
- Hypothesis 2: Grade level is a statistically significant predictor of ART.
- Hypothesis 3: Gender is a statistically significant predictor of ART.
- Hypothesis 4: Department is a statistically significant predictor of ART.
- Hypothesis 5: Grade level is a statistically significant predictor of Innovativeness.
- Hypothesis 6: Gender is a statistically significant predictor of Innovativeness.
- Hypothesis 7: Department is a statistically significant predictor of Innovativeness.

Method

The study used quantitative research methods to determine the relationship between prospective teachers' academic risk-taking, innovativeness, and demographic variables. The correlational predictive design was used to investigate the relationship between variables. If there is a sufficiently large relationship between two variables, it is possible to estimate the score on one variable if a score in the other variable is known (Fraenkel, Wallen &

Hyun, 2012). In the study, the relationship between variables was determined using path analysis, a form of structural equation modeling (Fraenkel et al., 2012). While the endogenous variable of the study is innovativeness, exogenous variables of the model are gender, grade level, department, and ART.

Participants

The study participants consisted of 293 science, social studies, and prospective elementary teachers, determining with a purposive sampling method, studying at a public university in the South East of Turkey during the 2019–2020 school year. Teacher training programs are required to know different disciplines in Turkey. These content knowledges are related to science and social sciences. In this respect, prospective teachers with different content knowledge were included in the study. Therefore, purposeful sampling was used as the sampling method in the study (Fraenkel et al., 2012). The distribution of the participants by gender, department, and grade level are given in Table 1.

Table 1. The distribution of the participants

		N	%
Grade level	1. grade	61	20,8
	2. grade	49	16,7
	3. grade	105	35,9
	4. grade	78	26,6
	Total	293	100
Department	Science	69	23,5
	Social Studies	132	45,1
	Elementary	92	31,4
	Total	293	100
Gender	Female	206	70,3
	Male	87	29,7
	Total	293	100

Data collection tools

In this study, prospective teachers' academic risk-taking was determined using the Academic Risk-Taking Scale developed by Clifford (1991) and translated into Turkish by Korkmaz (2002); individual innovation behavior was determined using the Innovativeness Scale developed by Hurt et al. (1997) and translated into Turkish by Kılıçer and Odabaşı (2010).The Innovativeness Scale consists of 20 items. 12 of the scale items were positive (1, 2, 3, 5, 8, 9, 11, 12, 14, 16, 18 and 19), 8 of them were negative items (4, 6, 7, 10, 13, 15, 17 and 20). The Cronbach alpha reliability coefficient of the scale was 0.82 and test-retest reliability was 0.87. According to the results of this research, the Cronbach alpha reliability coefficient is 0.82 and the Guttman Split-half reliability coefficient is 0.82. The Scale of Academic Risk-taking is composed of 4 factors (behaviors reflecting the tendency to have negative emotions after failure (NEAF), behaviors reflecting the tendency to prefer difficult tasks (DT), behaviors that reflect the tendency to recover after failure (RAF). These behaviors reflect the tendency to do homework) and 36 items. The Cronbach alpha reliability coefficient of the scale was 0.89, NEAF was 0.77, DT was 0.73, RAF was 0.78, and Homework was 0.45. According to the results of this research, the Cronbach alpha reliability coefficient is 0.73 and the Guttman Split-half reliability coefficient is 0.73.

Data Analysis

Before the analysis phase, all items were converted to standard z-scores and z-scores less than 3.0 or higher than + 3.0 were considered as outliers (Çokluk, Şekercioğlu & Büyüköztürk, 2010). Means and standard deviation values were calculated, the Kolmogorov-Smirnov test was performed, skewness and kurtosis values were calculated, and histogram / Q-Q plots were examined to determine the suitability of the data for normal distribution. As a result of the analysis, it was decided that the data showed normal distribution in terms of gender, department, and grade level variables, and therefore two-way ANOVA was applied from parametric tests. In the research, the level of significance was determined as 0.05. The multivariate kurtosis coefficient calculated to determine whether the data provided the assumption of multivariate normality was 2.47 for using the path analysis. Bentler (2006) stated that multivariate kurtosis coefficient values of less than 5 data provide multivariate normality.

Correlation coefficients between variables were calculated and a path diagram was drawn. Prior to the path analysis, the one-dimensional usability of the scale was tested by a second-order confirmatory factor analysis to include the one-dimensional variable innovativeness in the path analysis.Then, the hypothesized model was tested with path analysis as a structural equation modeling (SEM). The system of variables can be statistically tested by concurrent analysis to determine how consistent the hypothesized model is with the data in SEM (Byrne, 2016). Since the data corresponds to the multivariate normal distribution, the model was tested using the Maximum Likelihood method (Kline, 2010). The fit indices (χ2/df, GFI, AGFI, RFI, NFI, NNFI, IFI, CFI, RMSEA, RMR, and SRMR) were calculated in the evaluation of model fit and model fit indexes were evaluated in terms of criteria (Çokluk et al., 2010; Hu & Bentler, 1999; Kline, 2010; Schermelleh-Engel, Moosbrugger & Müller, 2003; Tabachnick & Fidell, 2012). R^2 effect-size values were calculated to determine the practical significance of the results. When evaluating effect sizes, R^2: 0.0196 small effects, R^2 =0.193 moderate effect, R^2 =0.2600 was evaluated as a large effect (Cohen, 1988).

Findings

Confirmatory Factor Analysis Results of Innovation Scale

A second-order confirmatory factor analysis tested the one-dimensional usability of the scale to incorporate the one-dimensional innovativeness scale in the path analysis. The fit indices for the innovativeness scale were calculated by drawing a path diagram. The path diagram is in Figure 2.

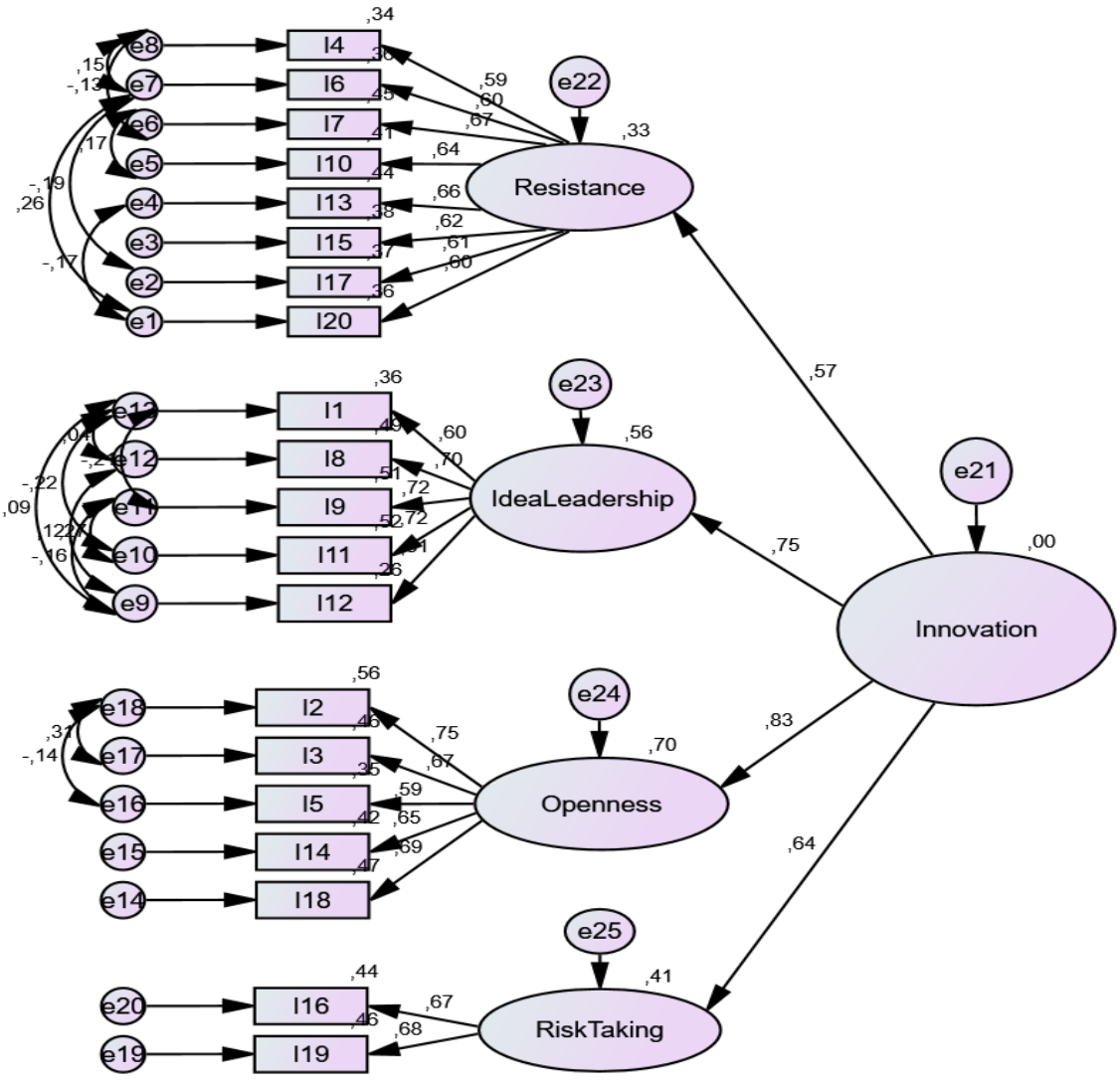

Figure 2. Path diagram of the innovativeness scale

According to the results, the value of $\chi 2$ / df value is 1.67. The standardized factor loadings of the scale ranged from 0.51 to 0.84. It is estimated that the openness factor explains 70 percent of innovation variance the most. Other factors explain idea leadership (56%), risk-taking (41%), and resistance (33%) of the innovation variance, respectively. The fit indices are represented in Table 2.

Table 2. Fit indices of the innovativeness scale

	Good Fit Values	Acceptable Fit Values	Model
$\chi 2$/df	$0 \leq x^2/df \leq 2$	$2 \leq x^2/df \leq 3$	1.67
RMSEA	$0 \leq RMSEA \leq .05$	$.05 \leq RMSEA \leq .08$	0.048
NFI	$.95 \leq NFI \leq 1$	$.90 \leq NFI \leq .95$	0.85
IFI	$.95 \leq IFI \leq 1$	$.90 \leq IFI \leq .95$	0.94
CFI	$.97 \leq CFI \leq 1$	$.95 \leq CFI \leq .97$	0.94
GFI	$.95 \leq GFI \leq 1$	$.90 \leq GFI \leq .95$	0.91
AGFI	$.90 \leq AGFI \leq 1$	$.85 \leq AGFI \leq .90$	0.89

When the fit index values were examined, it was determined that the one-dimensional structure of the innovation scale was confirmed by second-order CFA (Schermelleh-Engel et al., 2003).

Descriptive Analysis Results

Descriptive analysis was performed before path analysis to check the distribution of variables and normality. The descriptive analysis of the variables is represented in Table 3.

Table 3. Descriptive analysis of the variables

		N	%	$\bar{x}$ (Innovativeness)	$\bar{x}$ (ART)
Gender	Female	206	70.3	3.68	3.39
	Male	87	29.7	3.63	3.28
Grade level	1. grade	61	20.8	3.66	3.36
	2. grade	49	16.7	3.65	3.30
	3. grade	105	35.8	3.61	3.32
	4. grade	78	26.6	3.74	3.44
Department	Science Education	69	23.5	3.62	3.35
	Social Studies	132	45.1	3.67	3.34
	Primary Education	92	31.4	3.64	3.40

	Innovativeness	NEAF	DT	RAF	Homework	ART
N	293	293	293	293	293	293
Mean	3.67	3.09	3.27	3.78	3.24	3.36
Std. Deviation	.46	.66	.61	.58	.76	.43
Skewness	.005	-.132	-.031	-.507	-.284	-.129
Kurtosis	.387	-.284	.073	.143	.141	.244

According to the descriptive analysis, the mean test score for innovativeness is 3.67 and the mean score on the ART scale was 3.36. Furthermore, mean scores of innovativeness for 1st, 2th, 3th, and 4th grades were 3.66, 3.65, 3.61, and 3.74, respectively. When the data were analyzed in terms of gender, the mean score of boys was higher than girls.

Findings for Testing the Hypothesized Model

Correlation coefficients of all variables were calculated after preliminary analyzes. Point Biserial correlation values were calculated by controlling their assumptions since gender, grade level and department variables are categorical variables. The correlation between continuous variables was calculated using the Pearson correlation coefficient (Table 4).

Table 4. correlation coefficients between observed variables

		Innovativeness	NEAF	DT	RAF	Homework
Gender	r	-,059	,076	-,173**	-,149*	-,193**
Gradelevel	r	,049	,035	-,002	,124*	,011
Department	r	,050	,032	-,036	,042	,190**
Innovativeness	r	1	,179**	,422**	,553**	,269**

When the table is examined since there is no significant relationship between the independent variables and the Innovativeness variable, hypotheses 5, 6 and 7 were rejected and these paths were deleted. In addition, since it was determined that there was no significant relationship between grade level and NEAF, DT and homework sub-dimensions, it was not included in the model. Thus, the model was updated and the hypothesized model was created.

The hypothesized model is also presented in Figure 3.

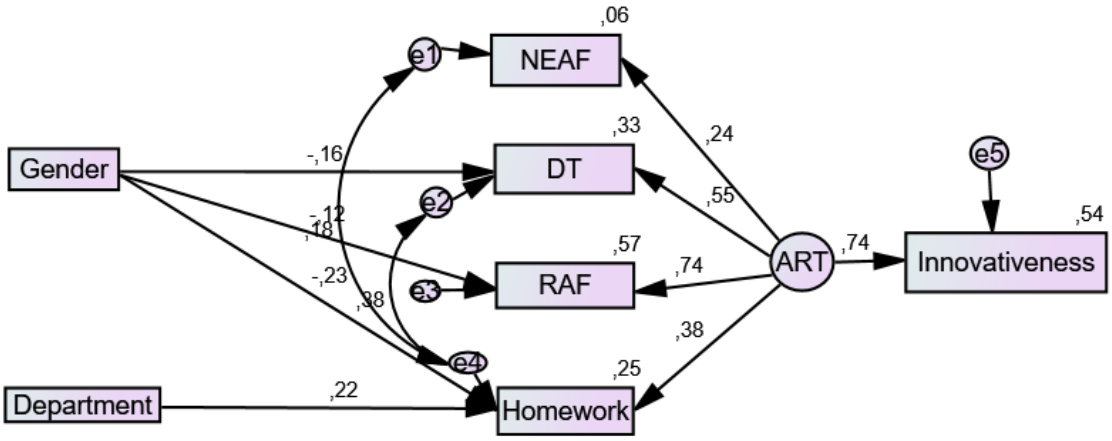

Figure 3. The hypothesized model

The values obtained from testing the hypothesized model are presented in Table 5.

Table 5. Reliability coefficients of the variables and standardized factor loadings of the items

			B	β	S.E.	C.R. (t)	P
Innovativeness	<---	ART	2.135	.736	.611	3.497	***
Homework	<---	ART	1.823	.375	.533	3.422	***
RAF	<---	ART	2.700	.736	.772	3.496	***
DT	<---	ART	2.151	.556	.631	3.407	***
NEAF	<---	ART	1.000	.241			
Homework	<---	Gender	-.379	.230	.087	-4.382	***
RAF	<---	Grade level	.054	.102	.025	2.191	.028
DT	<---	Gender	-.204	-.155	.069	-2.961	.003
Homework	<---	Department	.228	.219	.049	4.658	***
RAF	<---	Gender	-.162	-.130	.060	-2.717	.007

***The probability of getting a critical ratio as large as 3,497 in absolute value is less than 0,001.

The paths that are not statistically significant are deleted one by one to give the final version of the model. The final model was tested and it was concluded that all the paths were significant, as shown in Table 6. The modified path diagram of the model is given in Figure 4.

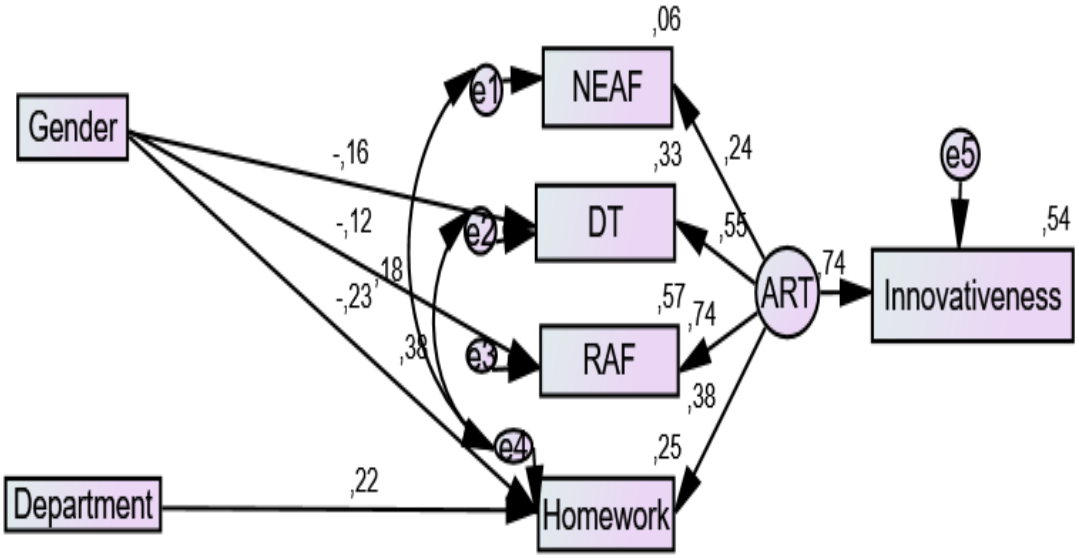

Figure 4. The final model

The standardized regression coefficients and the significance of the regression coefficients are given in Table 6.

Table 6. Reliability coefficients of the variables and standardized factor loadings of the items

			B	β	S.E.	C.R. (t)	P
Innovativeness	<---	ART	2.126	,735	.606	3.511	***
Homework	<---	ART	1.842	,380	.535	3.443	***
RAF	<---	ART	2.718	,742	.774	3.509	***
DT	<---	ART	2.134	,554	.624	3.418	***
NEAF	<---	ART	1.000	,242			
Homework	<---	Department	.229	,220	.048	4.761	***
Homework	<---	Gender	-.379	-,230	.085	-4.451	***
DT	<---	Gender	-.204	-,156	.069	-2.960	.003
RAF	<---	Gender	-.155	-,124	.060	-2.578	.010

***The probability of getting a critical ratio as large as 3,497 in absolute value is less than 0,001.

The results of the analysis showed that ART seems to be positively associated with innovativeness (β=0.74, c.r.=11.339573, p <.01). It is estimated that the predictors of innovativeness explain 54 percent of its variance.. In other words, the error variance of innovativeness is about 46 percent of the variance of innovativeness itself. Therefore, a large effect is observed (Cohen, 1988). When the sub-dimensions of ART were examined, it was found that RAF (R^2 = 0.58) predicted ART the most. Other predictive sub-dimensions are DT (%32), Homework (%18), and NEAF (% 0.5), respectively. According to the findings, none of the indirect effects are statistically significant. The fit indices of the final model values are given in Table 7.

Table 7. Fit indices of the final model

	Good Model Fit	Acceptable Fit Values	Model
$\chi 2$/df	$0 \leq x^2/df \leq 2$	$2 \leq x^2/df \leq 3$	1.75
p			0.06
RMSEA	$0 \leq$ RMSEA $\leq .05$	$.05 \leq$ RMSEA $\leq .08$	0.05
RFI	$.95 \leq$ RFI ≤ 1	$.90 \leq$ RFI $\leq .95$	.90
NFI	$.95 \leq$ NFI ≤ 1	$.90 \leq$ NFI $\leq .95$	.95
NNFI/TLI	$.97 \leq$ NNFI ≤ 1	$.95 \leq$ NNFI $\leq .97$	.95
IFI	$.95 \leq$ IFI ≤ 1	$.90 \leq$ IFI $\leq .95$	.98
CFI	$.97 \leq$ CFI ≤ 1	$.95 \leq$ CFI $\leq .97$	.98
GFI	$.95 \leq$ GFI ≤ 1	$.90 \leq$ GFI $\leq .95$	.98
AGFI	$.90 \leq$ AGFI ≤ 1	$.85 \leq$ AGFI $\leq .90$	.95

When the fit indices were examined, the model was accepted as the values were within the range of "good fit values" (Çokluk et al., 2010; Hu & Bentler, 1999; Kline, 2010; Schermelleh-Engel et al., 2003; Tabachnick & Fidell, 2012). The standardized total effects are given in Table 7.

Table 8. Standardized total effects

	Gender	**Department**	**ART**
NEAF	.000	.000	.242
DT	-.156	.000	.554
RAF	-.124	.000	.742
Homework	-.230	.220	.380
Innovativeness	.000	.000	.735

According to Table 8, ART's standardized total (direct and indirect) effect on Innovativeness is 0.74. That is. due to ART's direct (unmediated) and indirect (mediated) effects on Innovativeness, when ART goes up by 1 standard deviation, Innovativeness goes up by 0.74 standard deviations. Furthermore, ART's standardized total (direct and indirect) effect on RAF is 0.74. Due to both direct (unmediated) and indirect (mediated) effects of ART on RAF, when ART goes up by 1 standard deviation, RAF goes up by 0.74 standard deviations.

Discussion and Conclusion

This study is predictive research designed to examine the relationship of prospective teachers' academic risk-taking and innovativeness, and demographic variables. The endogenous variable of the study is innovativeness, and exogenous variables are gender, grade level, department, and ART. The hypothesized model in the research was tested by drawing a path diagram with structural equation modeling. The innovativeness variable was included in the hypothesized model as an observed variable. Therefore, to control the computability of the mean total score of the innovativeness scale, a second-order CFA was used for the one-dimensional structure of the scale. According to the fit indices obtained from the second-order CFA results, the four-dimensional model was found in the "Good Fit Values" ranges and the model was verified (Çokluk et al., 2010; Hu & Bentler, 1999; Kline, 2010; Schermelleh-Engel et al., 2003; Tabachnick & Fidell, 2012).

Furthermore, the model was created by drawing paths between the variables with statistically significant relationships by calculating the relationships between the variables. After the hypothesized model was tested, paths drawn from grade level were deleted because this path was not significant and the final model was created. Therefore, according to the results of this study, it is concluded that grade level is not a statistical predictor of risk-taking. When the literature is analyzed, it has been determined that, unlike this study, grade level variable affect ART (Açıkgül & Şahin, 2019; Aydın & Ubuz, 2010; Beghetto, 2009; Byrnes, Miller & Schaffer, 1999). Beghetto (2009) stated that students' intellectual risk-taking skills decreased as their grades increased. The results are different from this study may be due to the sample of this study being in different age categories. Because when the studies in the literature are examined, it is determined that the studies are generally carried out at the secondary and high school levels, and ART decreases as the grade level increases in these samples (Akdağ, Köksal & Ertekin, 2017; Beghetto, 2009; Beghetto & Baxter, 2012; Daşçı & Yaman, 2014; Hasan, Sobnom & Uzzaman, 2019). Beghetto (2009) stated that the reasons for the decrease in intellectual risk-taking as the age of the students increases and external pressures such as obtaining a good degree, the expectation for high exam results and the completeness of learning. Daşçı and Yaman (2014), on the other hand, stated that a small child cannot learn without risk, experience success and failure, and the development in this process requires problem-solving, inventing new products, and discovering new events. Therefore, in this study, the lack of difference in grade grade-level among prospective teachers can be explained as the decrease in exam stress and pressure, and learning pressures in this age group and the factors affecting risk-taking between grade levels disappeared. Yapıcı (2016) also reached similar findings from his study.

According to the research results, gender has a significantly small effect on ART. Çuhadar, Bülbül and Ilgaz (2013) found no significant difference in terms of gender variable for the individual innovation characteristics of prospective teachers. Clifford, Lan, Chou and Qi (1989) likewise stated that taking academic risk differs little by gender, similar to this study. Yapıcı (2016) also stated that in their study with prospective biology teachers, girls have higher levels of individual innovation than boys. However, Akdağ et al. (2017) stated that gender did not have a significant effect onsignificantly affect ART. Koloba and May (2014), on the other hand, concluded that there is no difference between boys and girls in terms of innovativeness.

The final model was tested by path analysis and it was found that the values obtained were within the good fit values range and the model was compatible (Çokluk et al., 2010; Hu & Bentler, 1999; Kline, 2010; Schermelleh-

Engel et al., 2003; Tabachnick & Fidell, 2012). Moreover, as a result of testing the final model with path analysis, all paths were found to be significant. According to the findings, when ART goes up by 1 standard deviation, innovation goes up by 0.74 standard deviations. It is estimated that the ART explains 54 percent of innovativeness's variance. So, it can be said that the relationship between innovativeness and ART has a large effect in practice (Cohen, 1988). Therefore, according to these results, it was concluded that prospective teachers' risk-taking levels are a significant predictor in determining their innovativeness. In their study, Kontoghiorghes et al. (2005) found that there was a relationship between innovative behavior and taking an academic risk in a similar way to this study. In addition, this result supports the knowledge that risk-taking by Hurt et al. (1977) has an important effect on the conceptualization of innovation. At the same time, this study proved in practice that risk-taking is a critical component of innovativeness (Jaeger et al., 2010). Roberts (2015) also stated that innovative individuals have risk-taking, research innovation, need for originality, and cosmopolitanism features. Rogers (2003), on the other hand, categorized innovativeness into 5 categories and stated that innovative individuals take risks and want to try new ideas. This study is important because it supports all the theoretical information in the literature and reveals that taking risks predicts innovation at a high level in practice.

In conclusion, this study contributes to the literature by identifying the variables and predictive relationships that affect innovation and risk-taking behavior, which are important determinants of entrepreneurship (Koloba & May, 2014). It can be suggested that risk-taking behavior is an important predictor of the pre-service teachers' level of innovativeness. The prospective teachers should be planned to increase their risk-taking behaviors during the teaching process. This is because risk-taking behavior also contributes to the development of creativity, innovation, and critical thinking, and most importantly, it provides positive learning experiences (Pierre, 2015).Since it is determined that grade level does not predict the risk-taking behaviors of prospective teachers, it may be recommended to arrange teaching processes by organizing the same activities in all grades. According to the results, gender has a significantly small effect on ART and does not affect innovativeness. For this reason, activities that will improve academic risk-taking skills can be organized according to gender in teacher education. Therefore, researchers recommend that they conduct experimental studies to determine these activities according to gender.

In addition, the level of predicting innovation and risk-taking behaviors of different variables can be investigated. This study is limited to prospective teachers. Factors affecting risk-taking and innovation behaviors can be investigated in different sample groups and ages. As a result of this study, only the predictive relational level was determined. With the experimental studies to be conducted, learning environments that will increase the risk-taking behaviors of prospective teachers can be organized, and their innovativeness can be investigated. In these learning environments that provide academic risk-taking, students are primarily directed to taking moderate academic risks and are interested in risk-taking tasks, which enable students to learn with more effort in the learning process (Clifford, 1991).

Authors Contribution Rate

Both researchers contributed at every stage of the research.

Conflicts of Interest

There is no conflicts of interest.

Ethical Approval

Since the data of the study were collected before 2020, ethical committee approval was not obtained.

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Gender in Education: A Systematic Review of the Literature in Turkey

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Gender in Education: A Systematic Review of the Literature in Turkey

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Abstract

Many international and national measures have been taken to advance gender equality in education. The results of scientific research enlightened us on the ongoing problems of inequality in education despite these measures. This study aims to analyze the trend in gender studies in education in terms of year, subject of study, method and findings. The study presents a systematic analysis of 63 theses and 58 articles which were published on gender education in Turkey between 2002 and 2019. 121 studies selected by criterion sampling method were analyzed by content analysis. According to the research results, it was observed that the studies conducted centered on gender representations, gender perception and gender roles. It was determined that qualitative methods were mainly preferred in the studies analyzed. Based on the analysis of the findings of the research, it is possible to gather problem areas related to gender in education under four main titles. These are gender representations reflecting inequality in educational materials, traditional gender perception and attitudes in educational environments, the need for gender education and teacher attitudes and behaviors that are not based on equality. In line with the results of this study, recommendations were made to researchers and policymakers.

Keywords: Gender in education, Gender equity, Gender research, Systematic literature review, Document analysis

Introduction

The main motivational factor for the emergence of gender concept is to emphasize that this concept is different from sex and to draw attention to problem areas related to gender (Delphy, 1993). Oakley (1985, p. 159), who introduced the concept of gender to the literature, stated that sex refers to biological aspects while gender is the term with psychological and cultural meanings. According to this statement, gender is a condition acquired through certain social contexts (Lindsey, 2016, p. 4). Fine (2017) indicated that social context affects who we are, how we think and what we do, and therefore, thoughts, attitudes and behaviors are a part of social context (p. 22). The social context that plays the key role in the construction of gender is culture. Oakley (1985) stated that culture influences deciding on the roles for both sexes. In addition, women and men are stereotyped in different patterns by the society from early childhood to adulthood. Minds shaped by culture largely resist gender equality (Fine, 2017, p. 24). The traditional thoughts about society, norms, gender stereotypes, roles, and behaviors generate differences between men and women and inequalities. Therefore, gender discrimination is often a type of discrimination performed unconsciously and it is quite difficult to struggle against such discrimination (The European Students' Union, 2008).

When the concept of gender is conceived as a cultural construction of gender roles, the crucial role of education system in the development of gender and gender related behaviors becomes even more evident. As Tezcan (1978) also noted, education is based on the culture of the society that produces it, and therefore, in a sense, education is the transmission of its or culture's. In education systems, society's gender role stereotypes are conveyed to students through implicit or explicit messages in learning-teaching processes (TUSIAD, 2000, p. 25). In this case, according to Sayılan (2012), education systems play a key role in regenerating and maintaining the prevailing gendered stereotypes and values embedded within the society in its cultural climate throughout the teaching process (p. 14).

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Since education is a long-term investment, evaluating the effect of national and international steps taken and policies implemented to achieve gender equality in education both in the field of education and on social sphere requires a certain period. Scientific research in this field demonstrates that gender inequality in education still exists despite all the legislative regulations (Hançerli, 2019; Kitiş Çınar, 2013). These researches can provide an insight into whether gender equality policies developed in the field of education are sufficient. Studies in this field play a very important role in determining the causes of gender inequality in education and current problem areas and shedding light on policies, regulations and further studies to solve these problems. For this reason, it is important to analyze the subject areas deeper examining findings and recommendations of the studies conducted in the field of gender education. In the literature, there are other review studies exploring studies on gender (Çelik and Altunbaş, 2019; Gürkan, 2018; Koyuncu Şahin and Çoban, 2019; Yıldırım, Taze, Kurban & Topal, 2019). However, from various aspects, this study differs from existing literature review studies in the literature. First of all, the scope of this study is limited to the papers written in the field of education. In addition, this study provides a comprehensive assessment by analyzing the results of the studies and the thematic and methodological trends in the studies. The purpose of evaluating the existing studies is to identify problem areas related to gender equality in education and to assist decision makers and policy makers in this regardIn this context, answers to the following research questions were sought in line with the aim and objectives of the study. Regarding the studies on gender in education: (1) What is the distribution in terms of subject areas? (2) What is the distribution in terms of research method? (3) What is the distribution in terms of sample / study group? (4) What is the distribution in terms of themes on which findings center?

Gender Inequality and Education

Gender; it is shaped by discourse, language, practices, behaviors and relations, that is, by the socialization process (Adaçay, 2014). At the end of these socialization processes in the family and close environments, children reach school age with a gender identity. After family, the cultural construction of gender roles continues in schools (Bayhan, 2013, p. 154; Lindsey, 2016). Because school has an important role in transferring culture to individuals through education. Learning-teaching processes and the cultural climate of the schools are an effective tool in teaching and reproducing dominant gendered stereotypes and related values (Sayılan, 2012, p. 14).

Through written and visual texts, the materials used in gender roles education are conveyed and reinforced. In particular, implicit learning about gender roles can be realized through textbooks (Adaçay, 2014, p. 65). Research on this subject; showed that women and men are not represented in equal roles and equal ratios in textbooks, and that gender stereotypes and stereotypes take place in texts and images (Aratemur-Çimen & Bayhan, 2019; Çelik, Aydoğan Yenmez & Gökçe, 2019; Doğanay & Çapur, 2021; Demirhan, 2021; Kozallık and Kargı, 2019). This indicates that the steps taken on a national and global scale to make textbooks sensitive to gender equality are not as effective as expected. In addition, apart from scientific and academic research, within the scope of international conventions, systematic and regular data on the extent to which gender stereotypes are cleared from textbooks, educational programs and the daily life of the school are not available (Göğüş Tan, 2018, p.21).

Socio-cultural norms, gender perception of the society, traditional structure and economic factors, and the attitudes and behaviors of administrators and teachers are among the factors that cause gender discrimination in education (Engin-Demir & Çobanoğlu, 2012; Raina, 2012, p. 43). Gender roles are reproduced in schools through official discourses and hidden curriculum (Eren Deniz, 2014, Saldıray, 2017, Sayılan & Özkazanç, 2009). Especially in educational environments, teachers' attitudes and behaviors can be good role models in terms of gender or maintain marginalization and stereotypes (Chisholm & McKinney, 2003). Teachers can reinforce gender inequality, whether they are aware of it or not, through formal or implicit curricula. Teachers' expectations can be effective on students' behavior, their academic success, and even their choice of profession. Tstudents' behavior, their academic success, and even their choice of profession, which can deepen the inequality (Adaçay, 2014, Hançerli, 2019). Fine (2017, p. 60) stated that implicit gender stereotypes regarding achievement in science and mathematics further reinforce gender discrimination regarding achievement, especially in numerical fields. This indicates the need to include gender issues in the curriculum in teacher education.

UNESCO (2015, p.3), a global and international organization, emphasized that gender equality should be promoted in teacher training institutions because gender equality is a priority in the international development agenda and plays a key role in the development of teachers' values, knowledge, human potential and skills. In Turkey, on the other hand, it is noted that gender issues are not sufficiently included in the curriculum of faculties of education (CoHe, 2018).In addition, studies have shown that pre-service teachers have bias and stereotypes about gender that support the patriarchal structure (Aslan, 2015; Öngören, 2019; Seçgin & Tural, 2011). In this case, education policies that will support gender equality and concrete steps to be taken in this direction should be developed to

make education faculties sensitive to gender equality. Because education and gender equality are fundamental and inalienable human rights. Gender equality in education refers to equal access for boys and girls to learning opportunities, fair treatment in the learning process, and equal opportunities in all fields. In order to achieve gender equality in education, the entire education system (laws and policies, educational content, pedagogy, learning environments) should be gender-sensitive, harmonious and transformative (UNESCO, 2013).

Gender in Education: International and National Initiatives

Many documents bearing legal and political obligations have been signed to strengthen gender equality in education, ensure respect and support to human rights, and improve the situation of all groups being exposed to discrimination. Perhaps the most important of these documents was the Universal Declaration of Human Rights declared by the General Assembly of the United Nations (UN) in 1948. In accordance with this Declaration, *"Everyone has the right to education* (Article 26)*"*. Also, *"Everyone is entitled to all the rights and freedoms set forth in this Declaration, without distinction of any kind, such as race, color, sex, language, religion, political or other opinion, national or social origin, property, birth or other status* (Article 2)." In addition to this declaration, in 1952 UN signed the Convention on the Political Rights of Women, which grants women the exercise of political rights such as the right to vote, to elect, and to be elected.After the UN convened the first world conference on the status of women in Mexico City in 1975, the General Assembly initiated global efforts on gender equality. It promoted the advancement of women by declaring the period between 1976 and 1985 as the United Nations Decade for Women (The European Students' Union, 2008).

One of the conventions that made a tremendous impact on gender equality in education in the international area was the Convention on the Elimination of All Forms of Discrimination against Women (CEDAW) adopted in 1979 by the UN General Assembly. In Article 10 of the Convention, equal access to education, equal rights to education, types of education, revision of textbooks, elimination of stereotyped concepts related to gender roles at all levels of education, and the need to adapt curricula and teaching methods were underlined (United Nations Human Rights, n.d.). Additionally, in the resulting documents of the 1995 Fourth World Conference on Women (the Beijing Declaration and the Platform for Action), education was stated as a human right and also an essential tool for achieving the goals of equality, development and peace (Turkish Grand National Assembly-TGNA, 1995). According to Acar (2018), the Beijing Platform for Action is a comprehensive international policy document that includes an implementation plan and it is also a document with a powerful political impact. Another important covenant to ensure gender equality in education on a global scale was the Education for All and Millennium Development Goals agreed by 164 governments in 2000 within the Dakar Framework for Action. This framework aimed to eliminate gender disparities in primary and secondary schooling by 2005 and achieve gender equality in education by 2015 (UNESCO, 2010).

The legal framework of the right to education in Turkey is defined in the Constitution of 1982 and the Basic Law of National Education numbered 1739. Article 42 of the Constitution of 1982 states that no one shall be deprived of the right to receive education, primary education is compulsory for all citizens of both sexes, and it is free of charge in state schools (Constitution of the Republic of Turkey). Turkey undertakes to produce policy towards ensuring gender equality in education and minimizing the conditions against girls and women's education by both international agreements and national legislation (TGNA Committee on Equality of Opportunity for Women and Men, 2011). To ensure equal participation of girls and boys in education, one of the important actions taken was that basic education was introduced as the eight-year uninterrupted compulsory schooling in 1997 and the period of education was later increased to twelve years in 2012. With these initiatives in compulsory education, gender equality has been achieved to a large extent at the primary education level in terms of equal participation in education. A significant progress has been made in secondary education and adult literacy. However, qualitatively, quality education and school completion issues still remain (Erçetin & Arifoğlu, 2016).

Another important action taken regarding gender equality in Turkey is the amendments made in Article 10 of the Constitution in 2004 and 2010. In accordance with the mentioned Article, *"Men and women have equal rights. The State has the obligation to ensure that this equality exists in practice. Measures taken for this purpose shall not be interpreted as contrary to the principle of equality".* In addition to this, in 2009, the Committee on Equality of Opportunity for Women and Men was established to monitor national and international developments in the protection and development of women's rights and in the implementation of gender equality. The Committee published a report on the place and importance of gender equality in Turkish education system in 2011. The report emphasized that it aims to identify the progress and difficulties in ensuring gender equality in education and to determine the measures to be taken in line with the goals to be achieved (TGNA Committee for Equal Opportunities for Women and Men, 2011).

One of the comprehensive steps taken to promote gender equality in education was the Promoting Gender Equality in Education Project. The project which was funded by the European Union and the Government of Turkey was launched in September 2014 and implemented for 24 months. With this project, it aimed to make schools more gender-sensitive in terms of gender equality in education, review education policies and legislation, curricula and textbooks and develop recommendations, train educators, and raise awareness about gender equality in different segments of society. Upon the reactions from the media and various segments towards the project, the Ministry of National Education (MoNE) stated that the project was completed and there was no ongoing project (MoNE, 2019). On the other hand, in 2015, the Council of Higher Education (CoHE) also put gender equality on its agenda and held a well-attended workshop. In the document on attitudes to gender that was published by the CoHE and also in the final report for the workshop held in the same year, it was stated that gender equality course would be included in higher education programs, with the same or a different name, as a compulsory or elective course. The mentioned attitude document was again drafted in 2019 with an emphasis on the concept of "*justice-based women's studies*" (Arkan, 2019, Yılgör, 2019). Göğüş Tan (2020) evaluated the cancellation of gender-related education and projects by the CoHE and MoNE as a regression in respect of ensuring gender equality in education.

Method

Research Model

"A research literature review is a systematic, explicit, and reproducible method for identifying, evaluating, and synthesizing the existing body of completed and recorded work produced by researchers, scholars, and practitioners." (Fink, 2014, p.3). The central aim of this literature review was to identify trends in gender research in education in terms of years, study subject, methods and findings. The reason for choosing this method is that it enables to determine trends and priority areas related to the research subject, summarize the general, methodological and content characteristics of the studies, and classify and interpret the studies within a certain systematic framework.

Study Group of the Research

The study group of this research consists of master's theses and doctoral dissertations completed on gender education and relevant articles published in peer-reviewed journals between 2002 and 2019. Criterion sampling, one of the qualitative sampling methods, was used to determine the research's study group. The criteria determined by the researchers are listed as follows. (1) It is required that the study has been conducted with sample and/or study groups in Turkey. (2) It is required that the study has been permitted for open-access in relevant databases and full-length access to its content. (3) It is required that the study has been conducted in education. (4) It is required that the study provides sufficient data within the scope of research method / that the study is not a review study. (5) It is required that the study is not a book summary, translation study, theoretical study. (6) It is required that only the thesis study is examined in the studies produced as articles from theses.

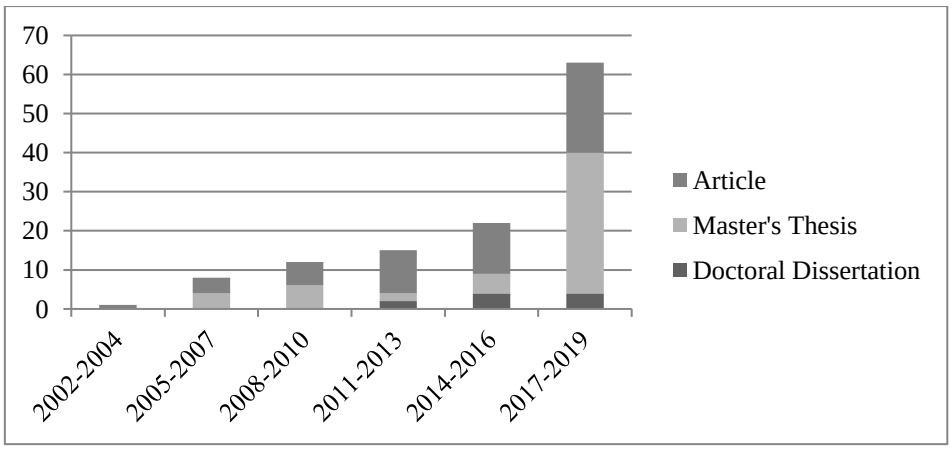

Figure 1. Distribution of studies on gender in education in Turkey according to years

When the studies were eliminated based on these criteria, it was determined that the first study was dated 2002, and by accepting this date as the beginning, the scientific studies conducted between 2002 and 2019 were determined. Again, as a result of elimination in line with these criteria, 121 studies; 10 doctoral dissertations, 53

master's theses and 58 articles, were included in this research. There is an increase in studies on gender in education from 2002 to 2019. Especially, the studies published between 2017 and 2019 constitute almost half of the total research.

Data Collection

Data in the research were collected by using document analysis technique. In the first stage, the researchers conducted a literature review in the CoHE National Thesis Center Database, Turkish National Academic Network and Information Center (ULAKBIM) Social Sciences Database, and Google Scholar's database to access the studies on gender education. The reason for preferring the mentioned databases is that they mostly include the relevant studies at the national level and can meet the accessibility criterion. Due to the conceptual structure of gender, differences in terminology, and frequency rate of the studies produced by gathering different variables or methods, the searches were carried out on various keywords. These keywords are gender education, sexism in education, gender equality in education, and gender in education. The number of 101 postgraduate theses accessed through document analysis decreased to 65 when 'education and training' filter was used. Since there was no access to the content of two theses, 63 theses were included in the research. In addition, since five of the 65 articles accessed at the beginning were produced from a postgraduate thesis and also two articles were a review study, therefore seven articles were excluded and 58 articles were included in the analysis.

Data Analysis

The content analysis method was used to analyze data obtained in the research. In content analysis, excerpts from written texts, speeches or interviews are selected and converted into standard codes. After the codes created for the research problem are classified systematically, the relationships among data are explored to create meaning (Marvasti, 2004). In this study, a scoring matrix was created in the first phase of data analysis to prepare the research data for analysis, and each document was coded (e.g., T1, M1, etc.) and ordered.
In the scope of analysis, the studies were systematically classified under the titles of publication type, subject area, method, sample/study group characteristics and findings. The data regarding the subject area and findings of the studies were collected under subthemes in terms of meaning similarities and the main themes were created after the relationships among the subthemes were determined. Data related to the publication type, method, and sample/study group characteristics of the studies were interpreted using frequency values by considering the frequency of use of word groups. The subject areas and results of the studies were analyzed using an inductive approach.

Validity and Reliability

Validity in qualitative research is related to the proper collection and interpretation of data and also related to the fact that the phenomenon studied and research results reflect and represent the real world properly. Reliability is that the findings obtained after repeating the same research are consistent, and the research results are objective and unbiased (Merriam, 2009; Yin, 2011).

To ensure the internal validity of the research, the identity of documents analyzed in the scope of the research was recorded to be checked by other researchers. In addition, the data were reviewed a few times during the content analysis, and agreement was reached among the researchers when creating the themes. For the external validity of the research, the information about how the research was conducted was conveyed in detail.
To increase the internal validity of the research, intercoder reliability was carried out. To ensure the reliability of coding, the coding of the studies to be included in the analysis must be conducted by at least two coders (Wilson, 2009). For this reason, the coding during the study was made by two experts in the field who have doctoral degree, and then the coding procedures were compared. The reliability of the coding was calculated by using the formula "Reliability = Agreement / (Agreement + Disagreement) x 100" (Miles & Huberman, 1994) and it was found 93%. In this context, it can be said that the coding carried out is reliable (Yıldırım & Şimşek, 2011, p. 233). To ensure the external reliability of the research, the research method and procedures were explained clearly and in detail.

Limitations of the Study

The scope of this study is limited to 63 postgraduate theses and 58 articles published in gender education between 2002 and 2019. Book summary, translation and review studies were excluded from the scope of research. The generalizability of the results obtained from the study is limited to the theses and articles analyzed in the study. The results of this study were obtained through content analysis of theses and articles in specific databases.

Results

This section presents results related to the studies on gender education examined by content analysis in the order and title specified in the sub-objectives.

Distribution of the Studies on Gender in Education According to Subject Areas

The 121 studies included in the study were analyzed in terms of subject areas and the findings obtained were presented in Table 1.

Table 1. Subject areas of the studies on gender in education

Themes	Subthemes		Codes	*(N)*
Gender rep-resentations	Primary school textbooks	Turkish Language	T58, A24, A39, A42	
		Social Studies	T17, A24	
		Life Studies	T58, A24	
		Mathematics	A33	
	Secondary school textbooks	Turkish Language	T24, T26, T41, T44, T48, A42	
		Social Studies	T17, T60	
		English Language	T30, T64	
		Mathematics	A14	
		Citizenship and Democracy	A35	
		Religious Culture and Moral	A63	36
	High school textbooks	Sociology	T32, T33	
		History	T46	
	Undergraduate textbooks	English Language	A7	
	Adult textbook	Family Education	T38	
	Children's book	(Pre-school)	T4, T5, T12, T31, T37, T42, T63	
	Cartoon movies	(Pre-school)	T15, T34, A30, A34, A36	
	Curriculum	Primary-Secondary	A37	
	Columns	(Woman education)	A13	
Gender perception	Teacher/ Adminisrator	Pre-school	T23	
		Primary school	T14, T40	
		Secondary school	T6, T14, T20, T40, M41	
			T8, T61	
	Student	Pre-school	T7, T9, T10, T39	
		Secondary school	T45, T52, A41	
		High school	T61, A29	27
		Pre-service teacher	T13, T19, T55, A3, A5, A17, A45	
		Undergraduate/ Associate degree	A23, A48, A56	
	Parents		A4	
Gender roles	Teacher / Administrator	High school	A46	
	Student	High school	T62, A11,	
		Pre-service teacher	T18, T25, A18, A40, A50	19
		Undergraduate	A9, A15, A19, A20, A38, A44, A54, A58, A59, A61, A64	

Curriculum development / activity designing	Student	Pre-school	T43, A51	16
		Primary school	T11	
		Secondary school	T29, T49, T50	
		High school	A2	
		Undergraduate	T35, A28	
		Pre-service teacher	T3, T22, T65, A6, A21, A26	
	Adult		A55	
Vocational education/choice of profession	Student	Primary school	A16	8
		High school	T28, T47, T53, A27, A47	
		Pre-service teacher	A22, A31	
Gender discrimination	Teacher		T51, A10	7
	Student	Primary school	A32	
		Secondary school	T57, A43	
		Undergraduate	A8	
		Pre-service teacher	A25	
Gender awareness		Teacher	T59, A52	2
Hidden curriculum		Primary school	T27, T36	2
Achievement		Secondary school	T56	1
Gender constancy		Pre-school	T54	1
Problem-solving skill		Pre-school	T21	1
Gender policies			A12	1

Table 1 demonstrates that twelve themes were determined as a result of the content analysis for the subject areas of the studies examined. These themes were listed in terms of the frequency of being studied, respectively, as gender representations *(N = 36)*, gender perception *(N = 27)*, gender roles *(N = 19)*, curriculum development/activity designing *(N = 16)*, vocational education/choice of profession *(N = 8)*, gender discrimination *(N = 7)*, gender awareness *(N = 2)*, hidden curriculum *(N = 2)*, achievement *(N = 2)*, gender constancy *(N = 1)*, problem solving skill *(N = 1)*, and gender policies *(N = 1)*. It was determined that primary and secondary school textbooks, which are mostly verbal (Turkish, life studies, social studies, etc.) under the theme of gender representations, were examined. On the other hand, it was seen that researches on pre-service teachers under the theme of gender perception and research on undergraduate students under the theme of gender roles were predominant. In addition, it had been determined that program development studies for pre-service teachers were mostly included under the theme of curriculum development and activity design, and educational activities were integrated into the social studies course in studies within the scope of basic education.

Distribution of the Studies on Gender in Education According to Methods

Findings regarding the research method of the studies on gender in education were presented below (Figure 2):

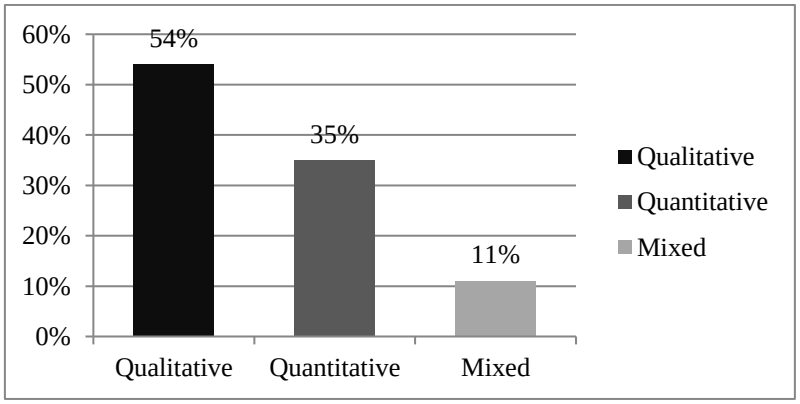

Figure 2. Distribution of the studies on gender in education according to the research methods

Figure 2 illustrates that the qualitative research method (54%) was predominantly used in the studies on gender education. In addition, quantitative methods (35%) were preferred in most of the studies, while mixed-method research were preferred least (11%). The research design was not specified in most studies conducted by qualitative research method (*N = 43*). It was observed that descriptive research (*N = 8*), case study (*N = 6*), phenomenology (*N = 5*), feminist methodology (*N = 2*) and action research (*N = 1*) were used in the studies in which the research

design was specified. Regarding the studies in which quantitative research method was preferred, survey research design (*N = 16*) was used at most. Other quantitative research models used in the studies were experimental design (*N = 5*), correlational design (*N = 3*) and causal-comparative design (*N = 1*), respectively. It was also found that quantitative research design was not specified in many studies (*N = 18*). The research designs preferred in the mixed methods studies were sequential explanatory (*N = 3*), convergent parallel (*N = 1*), triangulation (*N = 1*), and concurrent transformative (*N = 1*). The design of seven out of thirteen mixed methods studies was also not specified.

Distribution of the Studies on Gender in Education According to Sample / Study Groups

Findings regarding the sample/study groups obtained as a result of the analysis of the studies on gender in education were presented in Figure 3.

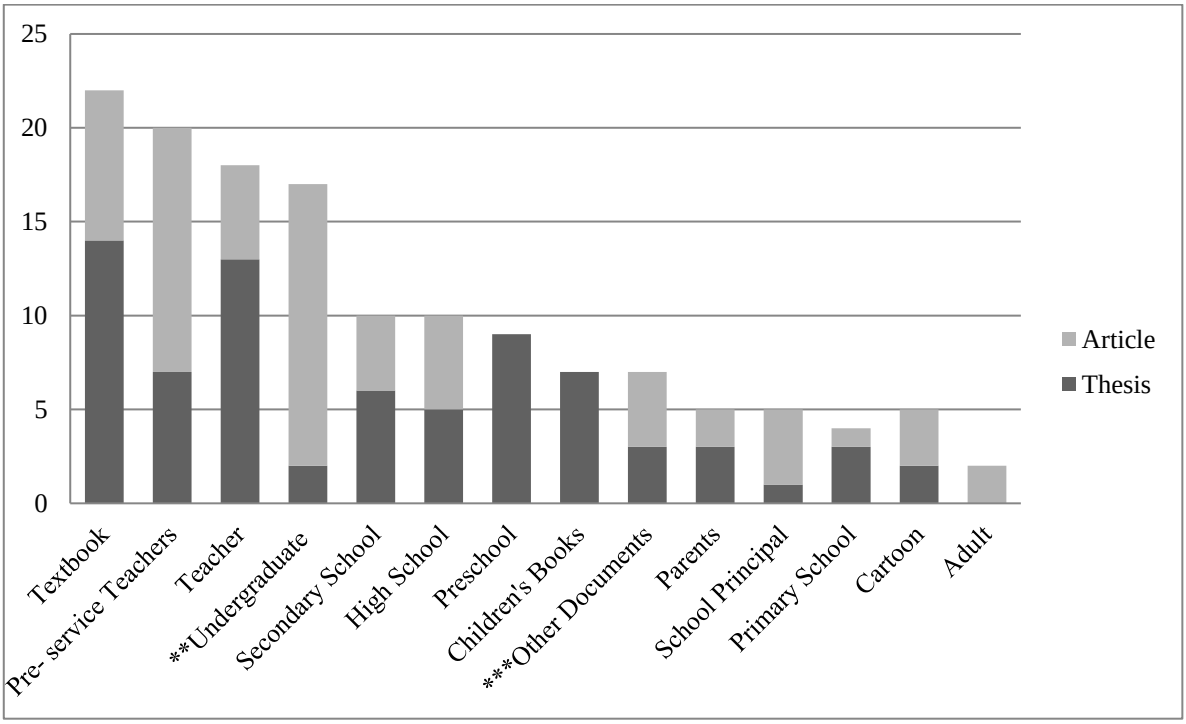

Figure 3. Distribution of the studies on gender in education according to the sample/study group

Notes. *In some studies, more than one sample or study group was used.
**Other undergraduate students except pre-service teachers.
***Reports, guidelines, statistics, studies, publications, transcripts, and etc.

Figure 3 illustrates that the sample/study group mostly selected in the studies on gender education were textbooks (*N = 22*), pre-service teachers (*N = 20*), teachers (*N = 18*) and undergraduate students (*N = 17*), respectively. These were followed by secondary school *(N = 10)* and high school *(N = 10)* students, preschoolers (*N = 9*), children's books (*N = 7*), other documents (*N = 7*), parents (*N = 5*), school principals (*N = 5*), primary school students (*N = 4*), cartoons (*N = 4*), and adults (*N = 2*), respectively.

Distribution of the Findings of the Studies on Gender in Education According to Themes

The findings of the studies on gender in education were thematically analyzed and classified. Findings revealed as a result of analysis are presented in Table 2.

Table 2. Distribution of the findings of the studies on gender in education according to themes

Themes	Sub-themes	Concepts	*Codes	Total
Gender representations	Educational materials	Inequality in representation rates, Inequality in professional representation, Private-public field distinction, Inequality in gender roles	T4, T12, T15, T17, T24, T26, T30, T31, T32, T33, T34, T37, T38, T41, T44, T46, T48, T58, T60, T63, T64, A14, A24, A30, A33, A34, A35, A36, A37, A39, A42, A63	32
Gender perception/ attitudes towards gender roles	Teacher/ administrator	Traditional gender roles Gendered discourse, Stereotyping and bias, Patriarchal understanding	T6, T8, T14, T20, T59, T61, A27, A41, A46, A51	10
	Student /K12	Stereotyping and bias Traditional gender roles	T7, T8, T9, T39, T45, T47, T52, T55, T61, T62, A2, A41, A51,	13
		Parents influence	T7, T9, T45, T57, T62, A32, A43	7
		Curriculum, teacher, and administrator influence	T47	1
	Student/Higher education	Egalitarian perception/attitude	T13, T18, T19, T25, A17, A19, A20, A38, A44, A54, A56, A61	12
		Stereotyping and bias	T55, A3, A5, A40, A50	5
Educational activity /curriculum designing	Student	Positive attitude/perceptions	T3, T11, T22, T29, T35, T43, T49, T50, T65, A21, A26, A28, A51, A55	14
		Educational needs,	T65, A2, A6	3
Teacher behaviors and attitudes		Gendered discourse, Discrimination, Patriarchal understanding	T6, T8, T20, T27, T36, T47, T59, T61, A25, A27, A41, A43	12

Notes. *The most frequently repeated findings in the studies were included. The criterion of frequency is that frequency is 10 or more.

Table 2 demonstrates that four themes were determined due to analyzing the findings of the studies on gender education. These themes were gender representations, gender perception/roles, curriculum development/activity designing, teacher behavior and attitudes. As seen in the table, four themes were determined as a result of examining the findings of gender education research. These themes are gender representations, gender perception/role attitudes, curriculum development/activity design, and teacher behaviors. Under the theme of gender representations related to the findings of the studies, inequality in representation rates, inequality in professional representations, distinction between private and public spheres and inequality in gender roles came to the fore. Under the theme of gender perceptions/roles; in research on teachers and school administrators, gendered discourse, stereotyping and bias, patriarchal understanding, and traditional gender roles (N = 10); in research on elementary students, family influence (N = 7); Stereotyping/bias and traditional gender roles (N = 13); In studies conducted at the university level, the terms egalitarian attitude/perception (N = 12) and stereotype/bias (N = 5) were found to be repeated more frequently. While the concepts of positive perception / role attitude (N = 14) and training need (N = 2) stand out under the theme of curriculum development/activity design; Under the theme of teacher behaviors and attitudes (N = 12), gendered discourse, discrimination and patriarchal understanding were frequently repeated findings.

Conclusion and Discussion

In this study, the distributions of the subject areas, methodological trends and findings of the studies on gender in education were analyzed and the following results were obtained.

When analyzing gender education studies in terms of distribution by year of publication, a steady increase in the number of studies was found from 2002 to 2016. Based on this result, it can be concluded that the interest in gender in education research has increased. It can be assumed that the topic of gender equality put on the agenda by the CoHE between 2015 and 2019 and the final report of the workshop published in 2015, as well as the Promoting Gender Equality in Education project carried out between 2014 and 2016, have contributed significantly to the increase in interest. This finding is supported by the results of other research (Çelik & Altunbaş, 2019; Koyuncu Şahin & Çoban, 2019).

Twelve themes were determined as a result of content analysis for the subject areas of the studies on gender education. These themes were gender representations, gender perception, gender roles, curriculum development or activity designing, vocational education or choice of profession, gender discrimination, gender awareness, hidden curriculum, achievement, gender constancy, problem-solving skill, and gender policies. The most frequently studied topics in gender in education in recent years (2017-2019) were gender representations (N = 21), gender perceptions (N = 16), curriculum development/activity design (N = 9), and gender roles (N = 6).

Under the theme of gender representations, 23 of the 36 studies were about textbooks. A significant amountof the studies examining textbooks were related to Turkish *(N = 10)* textbooks (Kırbaşoğlu Kılıç & Eyüp, 2011; Kitiş Çınar, 2013; Kozallık-Çebi & Kargı, 2019; Saydam, 2019). In addition, it was determined that among the textbooks related to positive sciences (science, physics, chemistry, biology, mathematics, etc.), only primary and secondary school mathematics textbooks were examined. In contrast, only sociology and history textbooks were examined at the high school level. It has been observed that there was a lack of research on textbooks on positive sciences in the field of gender in education, especially at the high school level. Studies in which story/fairy tales books (Peker, 2019; Salman Erden, 2019), cartoon movies (Kalem, 2019; Kalaycı, 2015) and columns (Çelik & Uysal, 2012) for preschoolers were analyzed in terms of gender were also encountered. Another theme emerging from the content analysis of the studies on gender was determined as gender perception. It was observed that the number of studies on gender perception increased in 2017 and afterward and teachers *(N = 8)* and pre-service teachers *(N = 7)* were included in a considerable part of the research. No research was found examining the gender perception of primary school students. Another prominent theme was gender roles, and a significant part of the research *(N = 19)* on this subject was aimed at undergraduate *(N = 10)* students (Çelikkaleli & Avcı, 2016; Elgün & Yeniceri Alemdar, 2017). Under the theme of gender roles, there was a lack of studies for preschool, primary and secondary school students. Primary and secondary school education are considered the educational levels at which students discover their interests and abilities and the foundations for profession choices were laid. Therefore, the analysis of gender perception of students at this educational levels will provide valuable data for determining their education needs. In addition, there is a need for research that examines both gender perception and gender roles of academics for more holistic assessments. Except these, it can be said that curriculum development, activity designing, and so on, are among the research subjects studied increasingly as related to gender education. The gender equality attitude document published by the CoHEthe CoHE published in 2015 is considered to influence research subject trends of gender education studies (CoHE, 2015). This situation revealed the need for gender equality curriculum in higher education and accelerated the curriculum development studies conducted especially for teacher education at undergraduate level. Some studies scientifically supported that topics related to gender can be integrated into the courses such as social studies and history at the primary and secondary school levels (Dilek, 2012; Seçgin, 2012). On the other hand, there had been a tendency towards vocational education and choice of profession in studies on gender education after 2014. In addition to these, research on hidden curriculum was limited to two studies at primary school level. Hidden curriculum research at preschool, secondary school, high school and undergraduate level will provide important data on how gender is constructed in educational environments.

The distribution of studies on gender education in terms of research methods was analyzed and it was found that the qualitative research paradigm was predominant in most of the studies. The least preferred method in the studies was mixed-methods research. Qualitative methods were usually used to analyze printed and visual materials such as textbooks, children's books, and cartoons which constitute a significant part of the research. These results are also consistent with the results of other studies on this subject in the literature (Koyuncu & Şahin, 2019; Yıldırım et al., 2019). However, in the study conducted by Çelik and Altunbaş (2019), it was determined that quantitative research models were preferred more. While it was seen that descriptive research, case study, phenomenology, feminist methodology, action research were used in the studies in which the research design was specified, the

research design of a significant number of studies was not specified. While survey research design preferred mostly in quantitative research studies it was found that the quantitative research design was not specified in many studies. Considering the research methods of the studies on gender education, it is possible to say that mixed-methods, experimental, and action research are in limited number.

Based on the analysis of the findings of studies on gender in education, main problem areas related to gender in education can be collected under four titles. These are *(i)* gender representations reflecting inequality in educational materials, *(ii)* traditional gender perception and attitude in educational environments, *(iii)* the need for gender education and *(iv)* teacher attitude and behaviors reflecting gender inequality. The continuance of these problem areas as of the years when discussions on gender in education have started indicates that the relevant steps taken so far are not enough. In addition, although international conventions and legal regulations have created a positive perception in terms of gender equality, it was supported by scientific data in consideration of the findings of the studies that progress could not be achieved at the targeted level in implementation.

When the findings of studies examining educational materials such as textbooks, curricula, cartoons and children's books in terms of gender, were evaluated, it was seen that four concepts stand out in general. These were inequality in representation rates, inequality in professional representations, distinction between private and public spheres and inequality in gender roles. According to these findings, girls or women characters were less included than men in educational materials. While more occupations were recommended for men, the recommended number of occupations for women had remained limited. In addition, occupations were represented in accordance with the traditional gender roles of women and men. On the other hand, women mostly do housekeeping, child care, etc. men were depicted as a figure working outside the home while jobs and dutiesjobs represented them and dutiesjobs represented them and dutiesjobs and duties represented them represented them. In conclusion, the findings of the studies showed that gender stereotypes and bias were included in educational materials. In some studies examining textbooks and children's books, it had been emphasized that although there were some improvements in the representation of genders, this was not enough and that messages reinforcing gender inequality were still present in images or texts (Başaran, 2019; Karakuş, Mutlu, & Çoşkun, 2018; Özmeriç Taştekin, 2019). These results revealed that educational materials, especially textbooks, should be freed from gendered stereotypes and bias. Because educational materials convey the dominant gender culture through written and visual texts. This situation lays the foundation for the realization of implicit learning about gender roles and the reproduction of inequality (Adaçay, 2014). Cleansing educational materials of gendered elements may not be sufficient by itself to ensure gender equality, but it is believed to be effective for mental change.In the Article 10 of the Convention CEDAW, which is for education, the necessity of revising textbooks and eliminating gender stereotypes from almost all levels of education was emphasized (United Nations Human Rights, n.d.). In the Article 6 of the MoNE Regulation on Textbooks and Educational Materials, the statement that *"It introduces an approach to support fundamental human right and freedoms and to refuse all kinds of discrimination."* was included among the qualities of textbooks (Official Gazette, 2012). However, in the light of the findings of the studies on gender in education, it was revealed that the contents of textbooks, children's books, cartoons and curricula examined did not reflect gender equality, were in a gendered structure and promoted traditional gender roles. Similar findings were also obtained in a study carried out on the issue (Koyuncu Şahin & Çoban, 2019). In fact, all these findings showed that this problem might continue to exist for long years in future unless necessary precautions about sexism in textbooks were taken and implemented. (Aratemur-Çimen and Bayhan, 2018, 2019; Esen, 2007; Kancı, 2008).

In the analysis regarding the findings of the studies on gender in education, attitudes towards gender perception and gender roles were analyzed under a single title. The results of the studies showed that teachers and school administrators adopt a gendered discourse and a patriarchal understanding. Teachers, school administrators, and students at the basic education level have gender stereotypes and bias and internalize traditional gender roles *(N = 10).* On the other hand, the results of the studies mentioned above revealed that the family is effective in the perception of gender and attitudes towards gender roles of students at the basic education level *(N = 7).* In addition, in most of the gender studies conducted at the higher education level, it was concluded that university students have egalitarian perceptions and attitudes towards gender roles *(N = 12).* In fact, the findings showed that female students adopted gender equality more than male students. However, in some studies, it was found that university students had gender stereotypes and bias *(N = 5).* It was thought that these different research results on gender in higher education were due to the measurement tools used in the research and the difference in research methods. In fact, studies that concluded that students have egalitarian perceptions or attitudes tended to favour quantitative research methods and techniques and used the Gender Perception Scale (Altınova and Duyan, 2013) and the Gender Roles Attitude Scale (Zeyneloğlu and Terzioğlu, 2011) as measurement instruments.

Gender perceptions or attitudes of teachers affect their behavior towards male and female students (Tsouroufli, 2002). Therefore, teachers have a key role in learning and reproducing gender roles in education systems.

However, the findings of gender education research revealed that teachers adopted a patriarchal understanding. Teachers made gender discrimination with practices and behaviors that were not based on equality and gendered discourses (Durmaz, 2019; Esen, 2013; Hançerli, 2019). It can be said that these gendered attitudes and behaviors of teachers are a reflection of the culture they grew up in (Fine, 2010; Lindsey, 2016).

The results of gender studies in the field of education had shown that the steps taken to improve gender equality in education in Turkey were insufficient. For this reason, the dominant gendered stereotypes and values of the society are reproduced and maintained in education processes (Sayılan, 2012). In this context, gender education is needed at almost every level of education. However, no education initiative will support gender equality neither at the basic education level nor in the faculties of education. In fact, studies had revealed that especially undergraduate education is insufficient in developing perceptions and attitudes towards gender equality (Acar-Erdol, Özen & Toraman, 2019, Baba, 2007, Direk & Irmak, 2017, Kızılaslan & Diktaş, 2011). This situation supported that the studies on curriculum development and educational activities in the field of gender were carried out due to the gaps and needs in this field. In researches on preschool students, it had been determined that gender education activities helped students break stereotypes about tasks such as indoor and outdoor tasks, jobs, professions and toy preferences, and change students' attitudes positively *(N = 2).* In the studies conducted for primary and secondary school levels *(N = 4),* the activities were integrated into the social studies course. The students gained gender awareness and sensitivity at the end of the training. Studies with pre-service teachers and other undergraduate students *(N = 6) show that training* or activities had positive effects on students' perceptions and attitudes towards gender. All these results showed that systematic and regularly planned gender education will be an important step in improving gender equality.

Recommendations

In consideration of the obtained results of this study, the following recommendations can be made. (i) Studies on gender education may be analyzed at regular intervals and by using content analysis in order to obtain various studies with richer content. (ii) It is considered that action research will provide unique data regarding current situation analyses for gender equality in educational environments, problems encountered in the process, and solutions to these problems. For this reason, action research which will enable teachers to gain experience should be included in studies on gender education. (iii) It was determined that studies including preschoolers and primary school students as sample and study groups in the studies on gender education were limited, and studies for school administrators and academicians were not in sufficient in number. For this reason, it is recommended that research be conducted to fill this gap in this area. (iv) Considering the results of the gender education studies analyzed in this study, it was found that the problem areas were grouped under four titles. It is recommended that policy makers and practitioners develop strategies and take action on these problem areas.

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Author (s) Contribution Rate

The authors contributed equally to the study.

Conflicts of Interest

No potential conflict of interest was reported by the authors.

Ethical Approval

Ethics committee approval is not required as it does not involve clinical researches on humans as well as it does not contain Retrospective studies in accordance with the Law on Protection of Personal Data.

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The Effect of Project Approach-Based Education on Children's Early Literacy Skills

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The Effect of Project Approach-Based Education on Children's Early Literacy Skills

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Abstract

This study aimed to determine the effect of project-based education on children's early literacy skills. Experimental design with pre-test-post-test control group was used in the research. The study group of the research consisted of a total of 36 children in the experimental (n: 18) and control (n: 18) groups, who attended independent kindergartens affiliated to the Ministry of National Education in the city center of Afyon, which were randomly selected from the population. As a data collection tool in the study, the "General Information Form" developed by the researchers to collect personal information about children and families (gender, number of siblings, duration of pre-school education, parents' ages, educational status, occupation) and to evaluate early literacy skills the "Test of Early Literacy" (TEL) developed by Kargın, Güldenoğlu and Ergül (2015) were used. A project-based education program was applied to the children in the experimental group, 3 days a week for 8 weeks. A statistically significant difference was found between the pre-test and post-test mean scores of children in the experimental and control groups on all TEL and its subdimensions, in favor of the scores they obtained in the post-test. Because of the positive change in the experimental and control groups, the differences between the pre-test and post-test scores were compared between the children in the experimental and control groups. As a result of the comparison, a statistically significant difference was found in favor of the experimental group.

Keywords: Early literacy, preschool education, project approach.

Introduction

The pre-school years encompass the period when an individual's development and learning is at its highest from the time of birth to age six. In this period, children realize with great curiosity and excitement that there are different keys to recognizing their environment, making sense of it, and interpreting the world. One of these keys is reading and writing the stimuli around (Enerem, 2018; Özdemir & Bayraktar, 2015). From reading a written text to using a technological tool, literacy skills that are used in all areas of life and make life easier are used throughout life (Barratt Pugh, 2000). Early literacy skills, which are a prerequisite for children to acquire literacy skills, should be examined (Karaman, 2014).

Early literacy includes all the knowledge, skills and attitudes that children have until they learn to read and write (Reese et al., 2003; Rhyner et al., 2009). In the literature on the concept of early literacy, different expressions such as "burgeoning, developing or developing literacy and the incubation period in primary literacy teaching" are used (Whitehurst & Lonigan, 1998). It focuses on different perspectives on early literacy, such as developmental (Strommen & Mates, 2000), knowledge and skills components (Van Kleeck, 1998), and environmental impact (McNaughton, 1995; Wasik & Hendrickson, 2004). In line with these perspectives, early literacy skills are included in the early literacy skills of verbal language skills and vocabulary, alphabet and letter knowledge, phonological awareness, print awareness within the scope of reading and writing skills (Elliott & Olliff, 2008; Neuman & Dickinson, 2001).

For reading to take place, children must first be in a developmental process that includes recognizing and feeling the phonem, establishing a relationship between letters and phonem, and understanding what they are writing (Oktay & Unutkan, 2003). This development is expressed in the form of readiness to read. All the knowledge and

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skills that children need to acquire to be ready to read can be listed as a spoken language, visual and auditory perception, establishing cause-effect relationships, generalization and language skills (Girgin, 2003). Verbal language skills and vocabulary are called the ability to use words in the communication process and are defined as expressions used between reading, writing, speaking and listening and perceived (Ranweiler, 2004; Rathvon, 2004). Another important element of learning words and gaining awareness is listening and speaking. Children understand, evaluate, and organize nonverbal and verbal messages by listening and speaking. Listening and speaking is a skill that should be developed systematically in children. These skills have an important place in developing children's language skills and vocabulary (Taşer, 2012).

Alphabet knowledge is knowing that each letter has a different phonem and children could match letter names with written symbols. With the acquisition of alphabet knowledge, children comprehend the names of the letters, which have a visual, written form, and the phonem they represent, and the relationship between all these (Pence, 2006; Yumuş, 2018). Phonological awareness is the ability to comprehend the phonem equivalent of alphabet knowledge in verbal language, the similarity and difference of phonemes. Phonological awareness is the ability to separate and manipulate words into syllables and syllables into phonemes (Griffith et al., 2008; Schnobrich, 2009). Phonological awareness is the ability to distinguish the first and last phonemes of a word, to pronounce the first/last phoneme of a word, to add a phoneme to the beginning/end of a word, to group words by beginning/end phonemes, to take a part of a word and use it in place of a part of another word, to pronounce the syllables of a word, and to name the number of phonemes (Hoover, 2002). Written awareness is the ability to understand the structure, rules, and function of written language.In this process, children acquire concepts that will form the prerequisites for writing skills such as holding the book correctly, turning the pages in the right direction, knowing the direction of the writing, knowing where to start reading the text (Clay, 2000; Justice & Ezell, 2004).

Early literacy skills that support the child's lifelong learning process and academic skills (Bredekamp, 2015; Dickinson & Neuman, 2018) should be evaluated as a whole to effectively support themsupport them. At the same time, it is important for preschool teachers to plan and implement effective processes to acquire early literacy skills (Kargın, Güldenoğlu & Birkan, 2017). National (Çetin, 2019; Güldenoğlu, Kargın, & Ergül, 2016; Turan & Akoğlu, 2011; Uyanık & Alisinanoğlu, 2016; Yalman, 2020) and international (Broemmel et al., 2015; Justice & Ezell, 2004; Kammermeyer et al., 2016**;** Kumar Roul, 2014) experimental studies have been carried out on the changes in the dimensions of early literacy skills. Studies examining early literacy research and postgraduate theses emphasize that more comprehensive evaluations should be made in Turkey (Altun & Sarı, 2018; Tanju Aslışen & Hakkoymaz, 2020). The constructivist, child-centered and process-oriented project approach, which enables children to explore the world from an early age, is defined as a set of activities carried out under the guidance of the teacher on a topic related to real-life situations determined in line with the interests of children (Helm & Katz, 2001; Katz & Chard, 2000). This approach positively affects cognitive development in terms of problem-solving skills, cause-and-effect relationship making, and visual perceptual skills; language development in terms of verbal expression of what children know and wonder; social-emotional development in terms of play, movement, and art activities; and motor development in terms of fine and gross motor skills (Helm, 2004; Katz & Chard, 2000; Temel et al., 2005). During the project study, teachers should include activities and games that improve children's awareness of phonemes and writing, processes that improve children's questioning and listening skills when a guest expert comes to the classroom, and written/visual materials that children can examine in the classroom, reading books that relate to the topic studied in the classroom, and children's early reading skills. It also enables the development of their skills (Helm, 2004). In project studies, children begin to take an interest in literacy and experience literacy skills while doing in-depth research on a research topic they are interested in. Project studies consist of initiation, implementation and termination phases. In the initial phase, the topic is determined according to the interests and needs of the children, their experiences, the characteristics of the family and the society to which they belong, and all the necessary preparations are made. All activities planned during the implementation phase are carried out, field trips are made, and guest experts are called. In the finalization phase, the project process is evaluated, the resulting products are exhibited, and sharing is made with families, other teachers at the school, children, and staff (Katz & Chard, 2000; Tahta & İvrendi, 2007; Temel et al., 2005).

Project study should not be seen as a separate issue but as an integral part of the training program (Katz, 1998). Therefore, project studies can be integrated into the training program being implemented. In some studies on the project approach, it had been concluded that children positively support the skills of different developmental areas (Arıkan & Kimzan, 2016; Gizir Ergen, 2013; Metin & Aral, 2014; Oğuz, 2012; Yıldız Bıçakçı, 2009). Çağlar Kabacık and Deretarla Gül (2016) concluded that as a result of the project approach-based vegetable applications they conducted with kindergarten children, the children's level of knowledge about vegetables increased and skills such as problem solving, language, social adaptation, and integration of acquired knowledge into daily life developed. Arıkan (2020) examined the experiences of the project studies carried out in a kindergarten where disadvantaged children attend, and determined that the cognitive, language and social-emotional development of

the children improved, the awareness of the families increased, and the teachers adopted some of the practices that they learned about the project implementations. In the literature, it was seen that only one of the studies carried out to support children's early literacy skills is related to an alternative approach. In the study conducted by Kaynak Ekici (2017), it was concluded that the pyramid method was effective on the language and early literacy skills of five-year-old children. There is a need for a study that examines the impact of project-based practices on early literacy skills. Based on these considerations, this study aimed to examine the effect of the project-based education program on the early literacy skills of five-year-old children. Within the scope of this study, project studies were integrated into the Ministry of National Education Pre-School Education Program (2013), which is being implemented in Turkey, by utilizing the integrative and complementary feature of the project approach.

Method

Research Design

Experimental design with pre-test-post-test control group was used in the research. Experimental studies are studies to test the effect of the differences created by the researcher on the dependent variable. The main purpose of experimental designs is to test the cause-effect relationship between the variables. (Buyukozturk et al., 2010).

The dependent variable in the study's experimental design is the early literacy skills of 5-year-old children attending a pre-school education institution. The independent variable is Project-Based Education, whose effect was examined on children's early literacy skills.

Study Group

The research study population consists of children with typical development aged 5 years old, who attend kindergartens affiliated to the Afyonkarahisar province center, Directorate of National Education in the 2018-2019 academic year. The research study group consisted of children who were randomly selected from among the population, attending an independent kindergarten affiliated to the Ministry of National Education in Afyon city center and had not been given a project-based education program before. In this direction, the selected study group consisted of 36 children, including the experimental (n: 18) and control (n: 18) groups.

Data Collection Tools

As a data collection tool in the study, the "General Information Form" and the "Test of Early Literacy (TEL)" were used.

General Information Form

General Information Form developed by researchers. The form included questions about the child's gender, birth order, number of siblings, parents' age, education level of the parents, and the parents' profession.

Test of Early Literacy (TEL)

The Test of Early Literacy assesses the early literacy skills of five-year-old children attending kindergarten. TEL consists of seven dimensions and 102 items, namely Receptive Language, Expressive Language, Function Knowledge, Category Naming, Letter Knowledge, Phonological Awareness, and Listening Comprehension. The Test of Early Literacy was developed by Kargın, Güldenoğlu, and Ergül (2015). As a result of the validity and reliability calculations, it was concluded that the test measures early literacy skills in a valid and reliable way.

Project-Based Education Program

Before the project-based education program was prepared, the "Ministry of National Education Pre-School Education Program (2013) was used and the achievements and indicators to support children's early literacy skills were determined. Within the scope of the training program based on the project approach, three different projects were prepared: "Milk Project", "Coffee Project" and "Bird Project". Three separate training plans were created within the scope of each project.

The education program based on the project approach was prepared by the researchers considering the children's age group, interests, needs, and developmental processes in line with the determined achievements and indicators.

The stages of the project approach were taken into consideration while creating the learning processes in the education program based on the project approach, and in each determined project, the stages of starting-planning, implementing the project, finalizing the project and evaluating were included. Within the scope of the project-based education program, there are Turkish activities, art activities, game activities, movement activities, drama activities, music activities, science and math activities. The education program based on the project approach was applied to the children in the experimental group three days a week for eight weeks.

Data Collection

Ethics committee approval for the research was issued by Afyon Kocatepe University Social and Human Sciences Scientific Research and Publication Ethics Committee, dated 11.01.2019 and numbered 13. The research was collected in the province of Afyonkarahisar in February-May in the 2018-2019 academic years. Before the project-based education program was implemented, the Test of Early Literacy (TEL) was administered to the children in the experimental and control groups as a pre-test by one of the researchers who had the practitioner certificate. TEL was held in a quiet room separate from the educational environments, sitting opposite each other on tables and chairs suitable for children, to attract the children's attention and ensure their motivation. After the pre-tests were applied, a project-based education program was applied to the children in the experimental group. The children in the control group continued their education for the Ministry of National Education Preschool Education Program (2013). After the project-based education program was applied to the children in the experimental group, TEL was applied to the children in the experimental and control groups as a post-test.

Data Analysis

In the study, the data collected with the "General Information Form" and " Test of Early Literacy (TEL)" were evaluated with the SPSS program. Shapiro-Wilk test was applied on the pre-test and post-test measurements of the scales to determine whether the scores obtained from the data collection tools of the children in the experimental and control groups showed a normal distribution. As a result of the Shapiro Wilk Test applied to the pre-test and post-test scores of all scales and their sub-dimensions, results showing normal distribution and non-distribution were obtained. For this reason, the Mann Whitney U test was used for the values that did not have a normal distribution in the comparisons between two independent groups, and the t test for the dependent groups (paired samples test) was used for the values that had a normal distribution in the comparisons between the two spouses in the dependent groups.

Results

The results of the Test of Early Literacy (TEL) pre-test-post-test scores, which were filled in by evaluating the individual early literacy levels of the children in the experimental and control groups, were given in the tables below:

Table 1. Dependent t-Test Results of the Pre-Test Scores of the Children in the Experimental and Control Groups Received from TEL

TEL	Group	Mean±Sd.	Min.- Max.	t	p
Receptive Language	Experimental	11.78-1.73	8.00-14.00	0.339	0.737
	Control	11.56-2.18	6.00-15.00		
Expressive Language	Experimental	9.17-2.50	3.00-13.00	-0.064	0.949
	Control	9.22-2.67	3.00-12.00		
Category Naming	Experimental	7.72-1.53	4.00-10.00	-0.095	0.925
	Control	7.78-1.96	4.00-10.00		
Function Knowledge	Experimental	7.44-1.42	5.00-10.00	0.000	1.000
	Control	7.44-2.01	3.00-10.00		
Phonological Awareness	Experimental	11.67-5.39	3.00-26.00	2.203	0.034
	Control	8.44-3.07	4.00-14.00		
Letter Knowledge	Experimental	4.22-2.39	2.00-6.00	1.186	0.244
	Control	3.44-1.42	1.00-6.00		

Listening Comprehension	Experimental	4.33-1.08	2.00-6.00	-0.419	0.678
	Control	4.50-1.29	2.00-6.00		
Total	Experimental	56.33-10.08	37.00-82.00	1.170	0.250
	Control	52.39-10.15	26.00-68.00		

When Table 1 was examined, according to the dependent t-Test results; TEL of the children in the experimental and control groups: "Receptive Language (t=0.339, p<.05), Expressive Language (t=-0.064, p<.05), Category Naming (t=-0.095, p<.05), Function Knowledge (t=0.000, p<.05), Letter Knowledge (t=1,186, p<.05), Listening Comprehension (t=-0.419, p<.05)" sub-dimensions and total (t=1,170, p<.05) no statistically significant difference was found between their pre-test mean scores. It was seen that there was a statistically significant difference in favor of the experimental group in the sub-dimension of "Phonological Awareness (t= 2.203, p<.05)".

Table 2. Dependent t-Test Results of the Pre-Test Post-Test Scores Received from TEL by the Children in the Experimental Group

TEL	**Group**	**Mean±Sd.**	**Min.- Max.**	**t**	**p**
Receptive Language	Pre-test	11.78±1.73	8.00-14.00	-6.274	<0.001
	Post-test	14.22±0.81	13.00-15.00		
Expressive Language	Pre-test	9.17±2.50	3.00-13.00	-9.263	<0.001
	Post-test	13.61±1.33	10.00-15.00		
Category Naming	Pre-test	7.72±1.53	4.00-10.00	-3.551	0.002
	Post-test	9.00±1.28	6.00-10.00		
Function Knowledge	Pre-test	7.44±1.42	5.00-10.00	-3.927	0.001
	Post-test	8.83±1.04	7.00-10.00		
Phonological Awareness	Pre-test	11.67±5.39	3.00-26.00	-8.250	<0.001
	Post-test	21.06±3.08	14.00-25.00		
Letter Knowledge	Pre-test	4.22±2.39	2.00-6.00	-10.574	<0.001
	Post-test	9.94±2.10	5.00-13.00		
Listening Comprehension	Pre-test	4.33±1.08	2.00-6.00	-6.101	<0.001
	Post-test	5.83±0.38	5.00-6.00		
Total	Pre-test	56.33±10.08	37.00-82.00	-14.442	<0.001
	Post-test	82.50±6.39	67.00-91.00		

The results of the dependent t-test in Table 2 show that the post-test mean scores of the children in the experimental group were higher in Receptive Language (t=-6.274, p <.05), Expressive Language (t=-9.263, p <.05), Naming Categories (t=- 3.551, p <.05), Functional Information (t=-3.927, p <.05), Phonological Awareness (t=-8.250, p <.05), Letter Knowledge (t=-10.574, p <.05), Listening Comprehension (t=-6.101, p <.05)" sub-dimensions and overall (t=-14.442, p <.05) of TEL were statistically significantly higher than the pre-test mean scores.

Table 3. Dependent t-Test Results of the Pre-Test Post-Test Scores of the Children in the Control Group Received from TEL

TEL	**Test**	**Mean±Sd.**	**Min.- Max.**	**t**	**p**
Receptive Language	Pre-test	11.56-2.18	6.00-15.00	-7.507	<0.001
	Post-test	13.61-1.33	10.00-15.00		
Expressive Language	Pre-test	9.22-2.67	3.00-12.00	-7.873	<0.001
	Post-test	11.50-2.38	6.00-15.00		
Category Naming	Pre-test	7.78-1.96	4.00-10.00	-3.289	0.004
	Post-test	8.56-1.46	5.00-10.00		
Function Knowledge	Pre-test	7.44-2.01	3.00-10.00	-3.986	0.001

Phonological Awareness	Post-test	8.56-1.54	5.00-10.00	-5.466	<0.001
	Pre-test	8.44-3.07	4.00-14.00		
	Post-test	12.28-3.64	5.00-19.00		
Letter Knowledge	Pre-test	3.44-1.42	1.00-6.00	-4.441	<0.001
	Post-test	5.06-1.70	1.00-7.00		
Listening Comprehension	Pre-test	4.50-1.29	2.00-6.00	-5.236	<0.001
	Post-test	5.61-0.61	4.00-6.00		
Total	Pre-test	52.39-10.15	26.00-68.00	-10.276	<0.001
	Post-test	65.17-7.89	47.00-77.00		

When Table 3 was examined, according to the Dependent t-Test results; TEL's "Receptive Language (t=-7.507, p<.05), Expressive Language (t=-7.873, p<.05), Category Naming (t=-3.289, p<.05), Function Knowledge (t=-3.986, p<.05), Phonological Awareness (t=-5.466, p<.05), Letter Knowledge (t=-4.441, p<.05), Listening Comprehension (t=-5.236, p<.05)" sub-dimensions and total (t=-10.276, p<.05) post-test mean scores were statistically significantly higher than pre-test mean scores.

Table 4. Mann Whitney U Test Results Regarding the Pre-Test Post-Test Scores Differences of Children in the Experimental and Control Groups from TEL

TEL	Group	Mean±Sd.	Min.- Max.	U	p
Receptive Language	Experimental	2.44-1.65	1.00-7.00	149.500	0.696
	Control	2.06-1.16	0.00-4.00		
Expressive Language	Experimental	4.44-2.04	1.00-8.00	64.000	0.001
	Control	2.28-1.23	0.00-4.00		
Category Naming	Experimental	1.28-1.53	-2.00-4.00	129.000	0.308
	Control	0.78-1.00	-1.00-2.00		
Function Knowledge	Experimental	1.39-1.50	-2.00-4.00	130.000	0.323
	Control	1.11-1.18	0.00-4.00		
Phonological Awareness	Experimental	9.39-4.83	-3.00-21.00	4.156*	<0.001
	Control	3.83-2.98	-1.00-9.00		
Letter Knowledge	Experimental	5.72-2.30	1.00-10.00	23.500	<0.001
	Control	1.61-1.54	-1.00-5.00		
Listening Comprehension	Experimental	1.50-1.04	0.00-3.00	126.000	0.265
	Control	1.11-0.90	0.00-3.00		
Total	Experimental	26.17-7.69	9.00-46.00	6.093*	<0.001
	Control	12.78-5.28	2.00-22.00		

Examining Table 4, according to the Mann Whitney U and independent t tests, the EROT scores of the children in the experimental and control groups were found to be significantly different in favor of the experimental group on the sub-dimensions of Expressive Language (U=64.0, p <.05), Phonological Awareness (t=4.156, p <.05), Letter Knowledge (U=23.50, p <.05), and Total Score (t=6.093, p <.05) pre-test and post-test.

Discussion

Supporting early literacy skills is very important in the preschool period (Ergül et al., 2016), which is considered an important determinant of academic success at all education levels (Spira, Bracken & Fischel, 2005). In order to enable preschool children to develop positive attitudes towards reading and writing, teachers should create learning environments full of rich stimuli where children can interact with different literacy materials and organize activities with different content (Ozen Altinkaynak, 2019). Project-based practices that support children's ability to express what they learn, wonder and express their ideas enable them to experience early literacy skills and be motivated about literacy effectively. The project approach, which includes meaningful processes for children and

related to their daily lives, includes reading, writing, listening, speaking and researching different ideas. Therefore, the project approach could be used effectively to support literacy skills that are part of life. (Beneke, 2003).

In the study examining the effect of the project-based instruction program on children's early literacy skills, it was found that the mean scores of children in the experimental group were significantly higher than the pre-test mean scores on the subdimensions of receptive language, expressive language, category naming, functional knowledge, phonological awareness, letter knowledge, and listening comprehension, and overall on TEL post-test. In the project study organized within the framework of milk, coffee and bird themes that enable children to connect with their daily life experiences easily, natural opportunities were created where children can use language effectively and interact with their environment. In the project work, the children were guided to turn their experiences into stories while questioning them and dramatizing and dramatizing the stories. Concept maps created with the children in the initial stages of the projects were placed in an area accessible to the children, and the children added pictures and texts to the concept map throughout the project and followed the process. Children recorded what they learned through project diaries, and their vocabulary increased by learning the meaning of different words and terms during the practices. During the in-class activities and field trips carried out during the implementation phase of the projects, the children had the opportunity to ask the questions they had determined/listed beforehand to the relevant authorities and discuss and interpret what they learned. In addition, children expressed themselves during conversations and brainstorming in daily assessments.

In the literature, some studies concluded that early literacy programs prepared with different contents (Çetin, 2019; Yalman**,** 2020; Yumuş, 2018) and different book reading methods (Doğan, 2019; Efe & Temel, 2018; Ergül et al., 2016; Lever & Sénéchal, 2011; Yalavaç, 2020) improve children's early literacy skills. Xu, Chin, Reed, and Hutchinson (2014) examined the effects of an early literacy project applied to children from low-income families on children's school readiness skills. As a result of their work, children's verbal and expressive language skills, phonological and writing awareness, and alphabet knowledge have significantly increased, and families' awareness of literacy skills has increased. In some studies (Bayraktar & Temel, 2014; Çetin, 2019; Özen Altınkaynak & Akman, 2016; Parbucu & Dinç, 2017) it was emphasized that parents should cooperate with teachers in developing children's early literacy skills. It is important to get the support of families to achieve the goals set in the project work, ensure the necessary efficiency from the project, and reinforce what children have learned within the scope of the project (Helm & Katz, 2001). Within the scope of the current study, the families of the children in the experimental group were informed about all the stages of the project work by using different family communication activities such as news letters and audio/visual recordings. Families supported the project work on issues such as providing the necessary materials, helping the teacher in field trips and activities in the classroom, carrying out the suggested family participation activities at home with their children, and participating in the exhibitions held at the end of the project. Studies emphasize that the arrangements made in learning environments contribute to children's early literacy skills (Gök, 2013; Xu et al., 2014). During the project work, children in the learning centers interacted with literacy materials as magazines, books, albums, tickets, etc., which are related to the theme and had the opportunity to examine books, magazines and visuals with different content related to the project themes during the activities. All these situations support the early literacy skills of the children who take part in the projects based on the project approach.

In this study, it was found that receptive language, expressive language, general naming, functional knowledge, phonological awareness, letter knowledge, listening comprehension, and overall post-test mean scores were significantly higher in control group children than pre-test mean scores. This observed change in the early literacy skills of the children in the control group who had not participated in the project studies could be explained by the fact that the children continued their developmental processes and the activities that had been prepared in accordance with the performances and indicators of early literacy skills in the MEB Preschool Education Program (2013) were applied to the control group.Similar to this result, Yalman (2020) obtained the result that the early literacy skills of the children in the control group who did not receive education also improved in the study in a quasi-experimental design, in which he examined the effect of the education given in the library on the early literacy skills of children. Some studies concluded that preschool education positively affects children’s language, cognitive, social development and academic skills (Koçak, Ergin & Yalçın, 2014).

The current study determined that expressive language, phonological awareness, letter knowledge sub-dimensions of EROT and total post-test mean scores of the children in the experimental group were significantly higher than the children in the control group. According to this result, it could be said that the education program based on the project approach improves the early literacy skills of children better. In addition, it could be explained that the activities carried out within the scope of the projects cover the criteria for developing early literacy skills. Cetin (2019) and Munoz, Valenzuela, and Orellana (2018) determined that, in parallel with the findings obtained from this study, the early literacy skills of the children in both the control and experimental groups improved, but the

skills of the children in the experimental group for which the program was applied increased more. In the literature, some studies concluded that the applications based on the project approach affect the language and cognitive skills of children positively (Aral et al., 2010; Çağlar Kabacık & Deretarla Gül, 2016; Kefi, 2017; Yıldız Bicakci and Gursoy, 2010). In the study conducted by Sayuti et al. (2020), it was concluded that project-based practices improve children's speaking skills. Similarly, Jaya, Hermansyah and Rosmiyati (2019) stated that project-based practices effectively develop children's self-efficacy in using language and speaking skills. Considering the results showing that the foundations for lifelong early literacy skills are laid in the preschool period (Krajewski & Schneider, 2009) and that children's skills in longitudinal studies influence their processes in the first grade of elementary school (Ergül et al., 2017; Güldenoğlu, Kargın ve Ergül, 2016), it could be considered an important development that the program based on the project approach developed in this study is effective. Moreover, it is considered that the application of an alternative approach in early childhood that supports children's early literacy skills as a whole provides a different perspective from the literature.

Conclusion and Recommendations

As a result of this study, it was found that there was no statistically significant difference between the pre-test mean scores of the children in the experimental and control groups from the total of TEL and its sub-dimensions, except for the sub-dimensions of phonological awareness. This result shows that the early literacy skills of the experimental and control groups were at a similar level at the beginning of the study. As a result of the comparisons between the pre-test and post-test mean scores obtained from the total of TEL and its subdimensions, it was found to be significantly different in favor of the experimental group on the sub-dimensions of expressive language, phonological awareness, letter knowledge and total score.

In line with the results obtained from the study, the following recommendations could be made:

- More comprehensive activities to develop children's early literacy skills should be implemented in pre-school classes, and necessary arrangements should be made by including different literacy materials in learning environments.
- In-service training should be organized so that preschool teachers could have the necessary knowledge and skills to develop early literacy skills through project-based practices.
- Educational programs based on different approaches to improve the early literacy skills of preschool children should be prepared and experimental studies should be planned on the effectiveness of these programs.

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Conflicts of Interest

The authors declared no potential conflicts of interest regarding the research, authorship or publication on this article.

Ethical Approval

Ethical permission 11/01/2019-13 was obtained from Afyon Kocatepe University Social and Human Sciences Scientific Research and Publication Ethics Committee, for this research.

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Barriers and Facilitators of Educational Sustainability: Metaphorical Perceptions and Views of Teachers

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Abstract

According to UNESCO, educational sustainability is an integral part of education. It requires participatory teaching and learning methods that motivate and empower learners to change their behaviours and act for sustainable development for lifelong learning to provide a quality system. This study aimed to reveal metaphors, barriers, and facilitators on educational sustainability based on the teachers' views. To this end, the study adopted a phenomenological research design. The participants, selected through purposeful criterion sampling, were teachers and data came from semi-structured interviews. Findings showed that (a) educational sustainability was perceived metaphorically as continuity, order, executive action, resilience, and goal orientation; (b) the education policies, stakeholders, management style, environment, and change were barriers to educational sustainability; (c) education system, improvement of administrative processes, building a future-oriented structure, increasing quality, breaking the influence of politics in education, following the developments and considering common values should be carried out to eliminate these barriers; and (d) educational policies, creating opportunities, and administrative actions were both facilitators and practices to increase these facilitators for educational sustainability.

Keywords: Barriers to sustainability, Educational sustainability, Facilitators for sustainability, Metaphor, Qualitative method

Introduction

Sustainability often referred to as sustainable development (Dresner 2004), became prominent during the United Nations World Commission on Environment and Development (WCED) conference in 1987, and its most accepted and cited description was presented as the "Brundtland Definition" (1987) in this conference. Based on this definition, sustainability is accepted as a development that satisfies the needs of the present without risking future generations' meets. In time, sustainability and sustainable development evolved to be defined as development that meets the needs of the present without compromising the ability of future generations to meet their (own) needs with an emphasis on both equity between generations and equity within generations (Dresner 2004). Many reports such as World Conservation Strategy, Brundtland Report, and Convention on Climate Change considered the term sustainability from different angles,, including economy, environment, and biology, the United Nations Conference in Stockholm in 1972 linked these perspectives to education. This action provided sustainability to be considered in a broader way, including individual development rather than just spatial activities, and brought educational sustainability prominence (Sezen-Gultekin 2019).

Educational sustainability is directly related to sustainable development. Both theoretical and universal approaches can prove this. Based on Wang and Lin's (2017) study, one of the main approaches to sustainability is the Triple Bottom Line, which explains sustainability through a trivet structure. This trivet composes of economy, ecology, and society. In line with this approach, it is claimed that sustainable development can only be ensured if these three categories can be supported together. Similarly, the United Nations evaluates sustainable development using these categories. All member states of the United Nations have adopted the 2030 Agenda for Sustainable Development to create a common plan for peace and prosperity for people and the planet, now and in the future (United Nations 2015).The agenda issued an urgent call for action for seventeen categories to all countries. These categories were named as 17 sustainable development goals under the following titles: no

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poverty, zero hunger, good health and well-being, quality education, gender equality, clean water and sanitation, affordable and clean energy, decent work and economic growth, industry, innovation and infrastructure, reduced inequalities, sustainable cities and communities, responsible consumption and production, climate action, life below water, life on land, peace, justice and strong institutions, and partnerships for the goals.

Accordingly, as we have seen, sustainable development should be evaluated in terms of the economy, ecology, society, health, and education, all of which are unbreakable chains of sustainability.Selvanathan (2013) states that education is the additional fifth factor that influences the way how economy, environment, society, and culture perform in terms of sustainability. Thus, the weakness or lack of luster performance of any of the five factors is likely to negatively affect sustainability. Similarly, according to McKeown (2002), when education levels are low, economies are often limited to resource extraction and agriculture. In many countries, the current level of basic education is so low that it severely hinders development options and plans for a sustainable future. Hence, education should have priority to provide sustainable development. Accordingly, this study focuses upon educational sustainability.

In an educational context, sustainability is the ability of individuals and schools to continue to improve to meet new challenges and complexity in a way that does not damage individuals or the wider community but builds capacity and capability to be successful in new and demanding contexts (Davies 2007). Educational sustainability means education practices that encourage students and educators are responsible and work cooperatively towards a sustainable educational environment informing society both locally and globally. It also aims to empower and equip current and future generations to meet their needs using a balanced and integrated approach to sustainable development's economic, social, and environmental dimensions (UNESCO 2014). It teaches people that their efforts, actions, and decisions impact natural resource utilization, and fosters or impedes sustainable development (Roberts 2012).

These definitions require quality education systems where learners have lifelong awareness of the 2030 sustainable goals. To provide such a quality system, it should be known that educational sustainability is an integral part of education that requires participatory teaching and learning methods that motivate and empower learners to change their behaviour and take action for sustainable development in terms of lifelong learning (Jackson 2018; UNESCO, 2014). For this reason, educational sustainability requires a transformation of education such a way that all stakeholders including policymakers, executives, teachers, lecturers, support staff, parents, employers, and learners should worry about what needs to change and where to start that change, which factors trigger or block educational sustainability. In this way, it is more likely to develop a sustainable capacity for education.

Fullan's (2005) study also agrees with this idea, suggesting that educational sustainability in education is the ability of a system to engage in the complexity of continuous improvement that is consistent with the deep values of human purpose. To accomplish this capacity, educational sustainability implies four descriptors: educational policy and practice, which is sustaining, tenable, healthy, and durable (Sterling 2001). That’s why, it is important to have educational strategies that allow for easy adaptation for both students and teachers, ensuring sustainable and continuous development of learning and teaching respectively (Alonso-García, Garrido-Letrán and Sánchez-Alzola 2021). Otherwise, it is possible to encounter any barriers to educational sustainability.

Types of barriers to sustainability can severely change across different fields. However, previous studies in the literature (e.g., de Paiva Duarte 2015; Mwanza and Mbohwa 2017) show that the main barriers to sustainability are lack of clarity of the concept, resistance to change, lack of systems thinking, political factors, inability to ensure sustainable behaviour among suppliers, and the consumer culture of global capitalism, technology, quality and demand, cost and capacity, market share and legislation, and environmental issues. Unless these obstacles are overcome, the required sustainability will not be achieved.In this context, it can be claimed that if the point is to make education sustainable, it is essential to overcome the barriers to sustainability and to create new pathways to facilitate it. For this reason, considering the ongoing importance and vitality of sustainability in the field of education, this study aims to identify the barriers to and facilitators for educational sustainability and teachers’ metaphorical perceptions of it. Accordingly, this study adopted the following research problems:

According to teachers,

1. What are the metaphorical perceptions of educational sustainability?
2. What are the views on sustainability activities carried out in Turkey in education?
3. What are the factors posing barriers to educational sustainability?
4. What can be done to eliminate the barriers?
5. What are the factors facilitating educational sustainability?

6. What can be done to increase the facilitators?

Method

Design

This study adopted the phenomenology design, one of the qualitative research methods. The reason for using this pattern is to examine situations that do not seem different to us, but for which we have not developed a deep understanding (Yildirim and Simsek 2003). It is a form of qualitative research in which the researcher attempts to identify commonalities in the perceptions of several people about a particular phenomenon (Fraenkel, Wallen and Hyun 1993). In this context, an in-depth examination of the teachers' opinions about the concept of educational sustainability was conducted.

Study Group

The participants were sampled through criterion sampling, which is one of the purposeful sampling methods. According to Patton, purposeful sampling enables in-depth study of situations that are thought to have rich information. In this sense, purposeful sampling methods are considered helpful in discovering and explaining facts and events in many cases (Glesne 2012). The basic understanding in the criteria sampling method is that all situations that meet a predetermined set of criteria are studied (Yildirim and Simsek 2003). For this reason, in this study, the condition of "being a teacher who has a bachelor's degree and at the same time continues to master education on Educational Sciences" was determined as the criteria. The reasons for this are threefold: first, teachers have the potential to respond more effectively to questions about educational sustainability because they work directly in educational organizations. Second, the preference for these individuals as participants can be viewed as a sustainability movement, as teachers continuing postgraduate education are eager to learn new information and have the potential to share that information with schools. Third, giving preference to teachers who are pursuing master's degrees, especially in education, can help them see the future of the education system in terms of sustainable development and promote sustainable steps in education firsthand.In this context, the study group of the research consisted of twenty-four teachers studying for their master's degree at Sakarya University Institute of Educational Sciences. The demographic information about the study group was presented in Table 1.

Table 1. Demographic information about the study group

Variables		f	%
Gender	Female	4	20
	Male	20	80
Professional seniority	6-10 years	1	5
	11-15 years	7	32
	16-20 years	10	45
	21+ years	4	18
Administerial seniority	1-5 years	6	33
	6-10 years	6	33
	11-15 years	4	23
	16-20 years	2	11
	21+ years	-	0
Type of school	Primary School	8	36
	Secondary School	6	27
	High School	7	32
	Others (Public Education Center)	1	5

Data Collection

A semi-structured interview form prepared by the researchers was developed to elicit the opinions of the teachers. Semi-structured interviews are well suited for exploring the perceptions and opinions of respondents regarding complex and sometimes sensitive issues as well as enabling them to probe for more information, and clarification of answers. Also, the participants' varied professional, educational, and personal histories preclude using a standardized interview schedule (Barriball and While 1994). In this context, six questions were asked in the form about the metaphorical perceptions, barriers, and facilitators related to educational sustainability, and what could be done to remove these barriers and increase these facilitators. For the fill-in-the-blank statements, a short instruction was given at the top of the form on what the metaphor is, what should be done in the form, and how

much time they have. The developed form was presented to three experts, one of whom was an expert in language teaching and two of whom were experts in education. These experts evaluated the form in terms of linguistic, scientific, and structural aspects. According to the experts' feedback, the form was finalized and included the following questions.

1. In my opinion, educational sustainability is …… like because …… .
2. What are your views on sustainability activities carried out in Turkey in the field of education?
3. In your opinion, what are the factors that pose barriers to educational sustainability?
4. If you were to develop an education policy, what would you do to eliminate those barriers to educational sustainability?
5. In your opinion, what are the factors that facilitate educational sustainability?
6. If you were to develop an education policy, what would you do to increase those facilitators for educational sustainability?

Validity and Reliability

According to Lincoln and Guba, qualitative research does not test the traditional validity and reliability criteria of quantitative research, such as internal-external validity, reliability, and objectivity, but instead tests validity and reliability based on "credibility, transferability, dependability, and confirmability" (Jackson 2007).. For this reason, in this qualitative study, the following principles were followed to ensure validity and reliability by considering the criteria of credibility, transferability, reliability, and approval.

In order to ensure credibility, (1) the developed form was presented to expert opinion and the form was finalized in line with their feedback; (2) the responses from the participants were adhered to the study and the direct quotations from these responses were presented in the study; (3) in addition, the observer duplexing method was used in the evaluation of the obtained answers so that different perspectives evaluated the data and a common result was reached. Moreover, among the purposive sampling types, the criterion sampling method was preferred to ensure transferability, reliability, and objectivity. Accordingly, the study group (1) was defined in detail so that it could be compared with other samples; (2) was diversified by recruiting postgraduate students who had first-hand exposure to the topic and were studying in different disciplines (i.e., educational administration and supervision, educational programs, and teaching). For the reliability of the study based on the observer duplexing, the intercoder reliability formula developed by Miles and Huberman (1994:64) was used: “Intercoder reliability=number of agreements / total number of agreements + disagreements”. In this context, the opinions of two different experts on the coding were compared, and intercoder reliability was 98%. According to Miles and Huberman (1994), a compliance percentage above 70% is considered sufficient. Accordingly, the reliability of the study was ensured with the compliance value.

Findings

The findings for educational sustainability were categorized in the following tables, and the participants had a chance to state more than one view.

Table 2. Categorization of metaphors for educational sustainability

Categories	Metaphor Codes
Continuity (f=10)	Relay, mill, a journey from the past to the future, necessity, human life, uninterrupted reaching the goal, civilization, continuation of the generation, rainfall cycle, walking action
Layout (f=3)	Striving human, night and day, life
Execution action (f=3)	Air-water-food, organism (f=2)
Resilience (f=2)	Pine tree, state's most important body
Goal focus (f=2)	Education policy, a delicate plan
Other (f=2)	Football team with many alternative footballers, flow of a river

Table 2 present the categories created by examining the reasons for the metaphors that the participants produced for educational sustainability. In this context, it was seen that educational sustainability is grouped under the categories of continuity, order, executive action, resilience, goal orientation, and the others. In this case, it can be stated that educational sustainability was mostly perceived as continuity. The expressions regarding categories can be exemplified as follows:

P4: "In my opinion, educational sustainability is like human life. Because human life is consistent with evolution." (Continuity category)
P3: "In my opinion, educational sustainability is like night and day. Because it should be continuous, steady, and consistent, not from evening to morning. Fifty teachers change up to a child complete the school…" (Layout category)
P2: "In my opinion, educational sustainability is like an organism. Because you cannot keep the organism alive and develop the factory without a sustainable education." (Execution category)
P12: "In my opinion, educational sustainability is like a pine tree. Because it is always upright, green, and strong. It blossoms once in 100 years. The activities should be sustainable since its future will be planned." (Resilience category)
P20: "In my opinion, educational sustainability is like a delicate plan. Because it is possible with a good planning in which education should be commended to competent people…" (Goal focus category)
P19: "In my opinion, educational sustainability is like a flow of a river. Because it is dealing with dynamic and living beings." (Goal focus category)

Table 3. Categorization of participants' views on educational sustainability activities implemented in Turkey

Categories	Codes
None (f=27)	Lack (f=13), continuous change (f=5), limited education (f=2), discarding the old ones, continious new applications, being not suitable for needs, short-termism, populist policies, unconsciousness, limitlessness
Yes, but insufficient (f=6)	Exist but irregular, yes but not consistent and valuable, insufficient, plans are not left to experts, insufficient, implementations are made independently from stakeholders, not welcomed, insufficient, incomplete, false, non-national practices exist, yes but inadequate, good managers are essential
Yes, but developing (f=3)	Yes, development of new programs, technological infrastructure, developing, available through various applications

When the teachers' opinions were examined, it was seen that one participant did not answer this question. In contrast, the three participants did not comment for sustainability activities in education in Turkey although they were knowledgeable about sustainability. For this reason, the data on these 4 forms was not included in the analysis, and the data on the remaining 20 forms were evaluated. There were some participants who thought there were no sustainability activities in the way that they were taught in Turkey. Some participants said there were activities, but they were not enough; some participants said there were activities and they were growing over time.In this case, it was seen that the most repetitive category among the categories was "none". All in all, majority of teachers thought there are no activities related to educational sustainability in Turkey. In contrast, very few of them stated that there are some practices regarding this issue. In this case, based on the feedback from participants, the activities towards educational sustainability in Turkey are almost none at all, which can be considered inadequate. The expressions regarding categories can be exemplified as follow:

P18: "In Turkey, education is planned to reach the short-term goals. It is not thought too far ahead, and a result cannot be the starting point of another thing." (None category)
P3: "It is not consistent and valuable. For example, 4+4 system, TEOG system, university entrance exam, vocational high schools. Stability is important. How much we educators trust in education?" (Yes, but insufficient category)
P: "Recently, scientific progress has been made with the improvement of new programs and technological infrastructures. This shows that we have caught up with the era in a certain way…" (Yes, but developing category)

Table 4. Categorization of factors posing a barrier to educational sustainability

Categories	Codes
Barriers related to educational policy (f=53)	Not achieving goals, dependencies, not being holistic, rapid change, low teacher quality (f=3), unchanging teaching methods, unchanging paradigms, emptying the contents of textbooks, course materials, education not being independent, political interference in education (f=4), lack of educational spirit, heads of education not being "educators", separating education from civilization, education not being suitable for national interests, economy, memorization, incompetent transactions (f = 3), financial difficulties (f = 2), curriculum, controversy, not addressing needs, employment pattern (f = 2), lack of

	education of decision-making politicians, lack of objective criteria, teachers' attitude, unrelated student, unplannedness (f = 2), political concerns, indecision of politicians, lack of a resilient educational infrastructure (f = 2), union interventions, frequent manager changes, system, not paying attention to sustainability, leaving sustainability to people rather than legislation, not identifying processes correctly, uniform education, wrong training policies, inadequate managers (f = 2), managers' perspective
Barriers related to stakeholders (f=18)	Not including families in education, fanatic thinking, unconscious students, unconscious community members, unconscious parents, gender, satisfaction, education level, lack of awareness about education, willingness to continue daily routine, culture level, spirituality, belief that education is completely finished after formal education is completed, parent complaints, age, lifestyle, lack of time, mentality and perception
Barriers related to management style (f=10)	Lack of communication between subordinates and superiors, egocentricity, public relations, conflicts, lack of control, lack of power of school administration (f=2), prejudice (f=2), not being encouraged
Barriers related to the environment (f=9)	Geographical location, an institution of work, environmental deterioration, unchanging school environment, physical impossibilities, health problems, increasing cities, single-mindedness, traffic stress
Barriers related to change (f=5)	Impotence to development, increase in technology, inability to keep up with technology, failure to follow new developments, the difference in the concept of a new generation family

In In Table 4, the teachers' opinions about the factors posing barriers to educational sustainability are presented under different categories. When these categories were examined, it was seen that according to the teachers, educational sustainability could be prevented due to the categories of barriers related to education policies, stakeholders, management style, environment, and change. When the categories were perused within themselves, the most potent barriers to educational sustainability in the educational policies category were relatively political interference in education, low teacher quality, incompetent operations, financial difficulties, employment style, unplannedness, and lack of resilience educational infrastructure, and inadequate managers. In contrast, the most potent barriers to educational sustainability in the management style category were school administrators' lack of power and prejudices. In this case, it can be stated that although educational sustainability is affected by different factors, it is mostly hindered by the factors originating from educational policies. The expressions regarding categories can be exemplified as follow:

> *P14: "Political concerns, separating education from civilization." (Barriers related to educational policy category)*
> *P23: "Policy and partisanship, mindset and perception, fanaticism (blind adherence to one's own opinion, insistence." (Barriers related to stakeholders category)*
> *P7: "Lack of subordinate-upper communication." (Barriers related to management style category)*
> *P5: "Traffic stress, increasing cities, environmental deterioration." (Barriers related to the environment category)*
> *P11: "Failing to keep up with changing technology, new generation family concepts' being different in every aspect, educational institution employees' being not open to change." (Barriers related to change)*

Table 5. Categorization regarding practices to eliminate the barriers to educational sustainability

Categories	Codes
Practices for the regulation of the education system (f=17)	Establishing a fair and transparent education system, Providing little, concise, clear information, increasing skill applications, researching how to use knowledge, researching how to reach knowledge, not changing the education system much, nationalizing education, large-scale projects, subjects open to interpretation, curriculum change, students directing to applied education, practicing, creating a fixed examination system, preventing system change, making applications, informing at the university level, removing the university exam
Practices for the improvement of administrative processes (f=8)	Not granting the right to appoint a teacher who is in the first year for four years, in-service training, consultation, establishing a merit-based, and objective assignment system, to carry out activities that attach importance to motivation, to ensure that school principals form their working staff and supervise them, to make schools ready to expand the authority of school principals, doing business based on results

Practices for building a future-oriented structure (f=7)	Developing the understanding that will ensure that education is long-lasting, preventing daily policies, not allowing short-term policies, legal promotion of sustainability (f=2), determining a roadmap for sustainability (plan), creating sustainability policies
Practices for increasing quality (f=6)	Raising the standards of the educator, employing competent people, providing vertical mobility in the staff, removing the educated illiterate from education, taking the opinions of the teachers through questionnaires, doing not only exams but also oral exams and process evaluations in the recruitment of practice teachers
Practices for breaking the influence of politics in education (f=5)	Fight against addiction, transferring education from politicians to educators, de-politicizing education, not allowing intervention of different groups in education, removing all union activities
Practices for following the developments (f=5)	Renewal of the environment, creating programs under the changing order, examining developed countries in education, ensuring that teachers keep themselves up to date, introducing technology into schools in a controlled manner
Practices for considering common values (f=3)	Implementing not individual but social ideas, gaining universal values, informing the public

Table 5 shows the teachers' perspectives on actions that may be implemented to eliminate the issues that are preventing educational sustainability.. According to the teachers, the practices related to the regulation of the education system, the improvement of administrative processes, building a future-oriented structure, increasing quality, breaking the influence of politics in education, following the developments, and considering common values could eliminate the barriers to educational sustainability. In this case, even though it was stated that the different practices could be made to eliminate the factors that pose barriers to educational sustainability, it can be put forward that the practices for the regulation of the education system are the most preferred. The expressions regarding categories are exemplified as follows:

P15: "I would prevent the system changes. For example, minor arrangements can be done for the duration of the university and high school exams based on a fixed roof. However, short-termed radical changes destroy all the studies made depending on these exams. To me, this is the basis of the case." (Practices for the regulation of the education system category)
P12: "I would pay attention to the studies giving importance to motivation." (Practices for the improvement of administrative processes category)
P22: "I would issue a regulation on standards and sustainable education environments that would cover all the institutions of the Ministry of National Education." (Practices for building a future-oriented structure category)
P7: "I would ensure that good examples are evaluated, and professional help is obtained from specialist organizations." (Practices for an increasing quality category)
P4: "I would say that education is the work of the educator and withdraw the hands of the politicians. I would also remove all the union activities." (Practices for breaking the influence of politics in education)
P8: "I would introduce technology into schools in a controlled manner." (Practices for following the developments category)
P14: "Universal values should be given to children." (Practices for building considering common values category)

Table 6. Categorization regarding factors facilitating educational sustainability

Categories	Codes
Facilitators for educational policy (f=33)	Advancing step by step, research, dynamic education studies, continuing the education system without interruption, raising awareness (f=2), updating education policies, establishing a quality structure (f=13), determination, going from easy to difficult, merit-based assignment, curiosity waking up (f=2), supporting original ideas, system not changing much, politicians' view of education, evaluation of results, developing inquiry, establishing standards, implementation, being open to innovation
Facilitators for creating opportunities (f=29)	Geographical possibilities, providing family support for children to love school, creating a democratic environment (f=4), state support, educational opportunities (f=3), strong financial opportunities (f=5), needs (f=2), socio-cultural environment, conditions and environment, utilization of technology (f=4), accessibility (f=2), applicability (f=2), long-term plans, free education

Facilitators for administrative actions (f=11)	Deciding together (f=2), discipline, being sensitive, sincerity in communication, showing interest, motivation (f=2), awards, practitioner-centered acting, sanctions.

In Table 6, the teachers' opinions about the factors that facilitate educational sustainability are summarized. According to the teachers, educational sustainability could be facilitated by the factors related to educational policies, creating opportunities, and administrative actions. When the categories were examined further, it was observed that in the category of the facilitators for educational policies, among the factors that mostly facilitate educational sustainability were as follow: establishing a quality structure, strong financial opportunities, creating the most democratic environment for facilitators, technology utilization, educational opportunities, arousing curiosity, raising awareness, needs, accessibility, feasibility; in facilitators towards managerial actions, the most common decision-making, and motivation. Thus, it can be argued that although the sustainability of education is influenced by various factors, it is primarily influenced by the promoters of educational policy. The expressions concerning the categories can be illustrated as follows:

> *P16: "Administrative competence, merit-based appointment, actionable decisions" (Facilitators for educational policy category)*
> *P7: "Acting in consensus, sincere communication, practitioner-centered action." (Facilitators for creating opportunities category)*
> *P4: "Arousing curiosity, motivation, research, questioning, application." (Facilitators for administrative actions category)*

Table 7. Categorization regarding practices to increase the factors facilitating educational sustainability

Categories	Codes
Facilitators for educational policy (f=22)	Increasing the research and development centers, updating the success evaluation system, increasing the skills training, considering the expectations and requests (f=4), keeping the education at the level of civilization, making a future plan that recognizes the past, reducing mistakes, establishing a permanent education policy, increasing the cultural level, establishing a national education policy (f=3), promoting sustainability by creating exemplary institutions, pilot applications, professional and ethical assignment, avoiding frequent system changes, inclusion of sustainability in the curriculum, arrangement of appointments, competency-based orientation
Facilitators for creating opportunities (f=10)	Providing various educational opportunities, raising awareness through education (f=5), organizing activities for educators, giving gift books, increasing technology, increasing artistic activities
Facilitators for administrative actions (f=9)	Expanding the powers of school principals, determining the criteria, ensuring the satisfaction of the staff, preventing unwarranted complaints, making the clerical and training meetings effective, increasing the municipal development courses, inter-institutional dialogue, strengthening the stakeholder relationship, activating local administrations

Table 7 shows teachers' perspectives on activities that could be performed to improve the factors that promote educational sustainability. Teachers feel that elements such as educational policy, opportunity development, and administrative measures can help to promote the long-term viability of education.. When the categories were examined within themselves, the factors that primarily increase the facilitation of educational sustainability were considering expectations and demands and establishing a national education policy, while raising awareness through education was the one in the category of the facilitators for creating opportunities. Overall, it can be claimed that although different factors increase the facilitation of educational sustainability, the facilitators of education policies are the one that is likely to increase the facilitation. The expressions regarding categories can be exemplified as follows:

> *P15: "Each young person's choice of occupational groups according to their skills will ensure the smooth functioning of all systems to be applied in education." (Facilitators for educational policy category)*
> *P3: "There should be activities and workshops in which educators participate." (Facilitators for creating opportunities category)*
> *P19: "organizing cultural tours, in-service training, gift books, inter-institutional dialogue." (Facilitators for administrative actions category)*

Conclusion, Discussion, and Suggestions

Metaphors

In this study, different metaphor codes related to the concept of educational sustainability were produced. Although these metaphors were collected in the categories of sustainability continuity, order, execution, resilience, and goal-orientation, it was found that educational sustainability was mainly perceived as continuity metaphorically. The concept of sustainability in the literature also reflects continuity in its essence, and researchers such as Coblentz (2002), Wals and Schwarzin (2012), Kapitulčinová, AtKisson, Perdue, and Will (2018), and Sezen-Gultekin (2019), Sezen-Gultekin and Argon (2020a; 2020b) also define sustainability in terms of continuity through expressions such as resilience, stability, continuity, the search for balance, and the pursuit of a future.Accordingly, it is recommended that the concept of educational sustainability should be focused on continuing in line with the objectives; however, in addition to this, it should be perceived as establishing order, carrying out actions, focusing on the target and being resilient. Moreover, it can be thought that these results refer to the primary needs of the COVID-19 pandemic period since the continuous, resilient, aim-focused, regular systems have more chances to sustain human life. To this end, the concept of educational sustainability should be referred to in a broader sense. Also, a comparative study on determining the educational sustainability metaphorically before and during the COVID-19 process could be investigated in further studies.

When teachers were asked about educational sustainability practices implemented in Turkey, the majority indicated that there were no such activities and that existing activities were insufficient. However, a small number of teachers indicated that there are some activities, such as the development of technological infrastructure. These results can be considered remarkable in terms of ensuring sustainability in education.Given that teachers are both in the system and try to continue their education with their own efforts, it should be considered that they think that there are no educational sustainability activities in the Turkish education system.
Furthermore, earlier studies conducted in the Turkish context (e.g., Kayihan and Tonuk 2008, 2011; Ozdemir 2010; Ozdemir and Corakci 2011; Toran 2016) show that many studies in Turkey mostly remained at the level of environmental sustainability. Although some National Education Directorates (NEDs) have addressed the issue of sustainability in education, such as Gaziantep Province NED (2019), Yalova Province NED (2020), and Etimesgut District NED (2020), the Turkish Ministry of National Education, which oversees all schools in Turkey, has taken no concrete steps. As a result, in order to ensure educational sustainability, which has been and will continue to be important for years, it is necessary to conduct special studies in the Turkish education system and develop strategies by organizing activities not only from an environmental standpoint, but also from an economic, cultural, social, and administrative standpoint. During the COVID -19 pandemic, the value of these discoveries was once again demonstrated. As a result, adopting solutions for long-term education is not a choice, but a need.

Barriers

Educational policies, stakeholders, managerial style, environment, and change were all identified as barriers in the study. Furthermore, low teacher quality, political intervention in education, incompetent transactions, financial challenges, type of work, lack of planning, lack of sound educational infrastructure, and insufficient administrators were among the most common comments. These findings are significant because removing barriers to education can help to sustain educational systems. On the other hand, while several hurdles to educational sustainability have been highlighted in the international literature, there is no study in the literature that explicitly tackles the barriers to educational sustainability of education systems in Turkey.

For example, according to Milbrath (1995), some of thre barriers stem from deficiencies in consciousness, knowledge, and information. Some teachers may not have sufficient information about educational sustainability resulting in poor practice in the classroom and the school. Kang (2019) suggested that teachers taking courses on education for sustainable development in pre-service teacher education were about five times more likely to contribute to the practices related to educational sustainability. In addition, according to Joyner-Wells (2006), educational sustainability may be difficult to achieve because of incompatibility between the beliefs and assumptions that provide the foundation for the whole school reform initiative and those of the individuals who will be implementing the program. Continuation of whole-school reform over time requires a continuous commitment to enacting expectations, assumptions, beliefs, and strategies of the adopted improvement initiative. Akins and his colleagues (2019) also found that management and policy makers' lack of support significantly affects the success of practices related to educational sustainability. Hargreaves (2007) states that there are some enemies of educational sustainability like enforced short-term goals, extreme testing, and rapid political wins at the expense of deep learning for all students.

As can be seen, there are many barriers to educational sustainability, and these barriers vary depending on the situation. For that purpose, it is recommended to accurately identify barriers to educational sustainability in detail. In this way, early, appropriate, and satisfactory steps could be taken to eliminate factors posing barriers to educational sustainability. One of the most critical steps in achieving this is the more active evolution of education policies and development plans towards educational sustainability. After all, within the scope of the Turkish 11th Development Plan (Turkish Presidency Strategy and Budget Office n.d.), sustainability has been mainly addressed in terms of environment, tourism, and health. Therefore, it is recommended to address this situation in more detail in the 12th Development Plan regarding educational sustainability and active policies. In addition, to eliminate the factors constituting barriers to educational sustainability, it is suggested that the implementation of practices aiming to organize the education system, improving administrative procedures, establishing a future-oriented structure, increasing quality, breaking the influence of politics in education, following developments, and considering common values should be set to work.

Facilitators

Educational sustainability was considered as most conducive to aspects such as raising awareness, building a quality structure, and sparking interest in the study, while there were also favorable elements for educational policy, opportunity creation, and administrative action. These findings appear to be in line with what has been published in the literature. Ensuring educational sustainability involves keeping a school system alive, meeting the needs of students, teachers, and parents with the services it provides, and educating students to adapt to the conditions of life in the future. The multi-dimensional nature of educational sustainability implies more than one factor that facilitates educational sustainability (Koybasi Semin 2019). However, the facilitators of educational sustainability as well as its facilitating roles on other things.

As far as the literature has been accessed, there is no study explicitly addressing the facilitators for educational sustainability in the Turkish education system, but there have been numerous studies on the facilitators for educational sustainability in the foreign literature.For example, one of the most effective facilitators of educational sustainability is sustainable leadership performed by educational leaders. Sustainable educational leadership maintains and improves deep learning, which positively benefits people around us continuously (Hargreaves 2006). From another perspective, according to Chen and his colleagues, if sustainable education is to be accomplished, a sustainable development plan which contains personal and social practices should be carried out (Burbules, Fan and Repp 2020). Furthermore, open pedagogy, interaction with communities and society, and lifelong learning should all be considered in order to ensure educational sustainability, as the concept of "breadth of life" (Jackson 2011) provides insight into an educational institution's ability to recognize and value learning and personal growth, which is necessary for success and personal fulfillment in a complex world. All of these findings are identical to the ones reported in this study.

As can be seen, there are many different facilitators of educational sustainability. Therefore, it is important to increase these facilitators, use them for their intended purpose, and spread them. For this reason, it is recommended that the educational policies emerging as a result of this study, namely creating opportunities and managerial actions, should be put into practice actively. Kang (2019) put forward that in-service training activities are very useful tools to improve teachers' knowledge and skills on educational sustainability. Based on the results of this study, we also suggest organizing in-service training activities for teachers. Pre-service teachers might also be encouraged to take courses about educational sustainability during their pre-service education. Future research is suggested to study barriers and facilitators to educational sustainability in higher education contexts. Furthermore, comparative studies should be done through in-depth analysis of educational sustainability, barriers, and facilitators, including before and during the COVID-19 pandemic.

Limitations

This study has some limitations: First, it was conducted through phenomenology, examining situations to identify commonalities in the perceptions. Future studies can be designed with other methodologies such as quantitative or mixed type methods to reach different and more generalisable results. Second, data were collected only via the semi-structured interview form prepared by the researchers. Future studies can use different data collection tools by expanding the context of this form. Third, the sample size was small, which was limited with twenty-four participants. However, there were two reasons behind this: The authors tried to reach all of them since the participants were master students at a state university. Although metaphor studies can be conducted with much more participants, this study used a phenomenology design and asked for both metaphors and views at the same

time. So, it would have been too complicated to have s larger sample. Qualitative studies do not require a certain number of participants since they do not aim to generalize the results. Due to these reasons, the participants were limited to this number. Fourth, it is also limited to the teachers who were selected by certain criteria, which was being a teacher who has a bachelor's degree and pursuing master education at the same time. Future studies can change or expand this number and criteria to evaluate different views on educational sustainability.

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Author (s) Contribution Rate
Both researchers contributed at every stage of the research.

Conflicts of Interest
Authors declare that they have no conflict of interest.

Ethical Approval
Ethical permission (E-61923333-050.99-124076) was obtained from Sakarya University Rectorate Ethics Committee for this research.

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Barriers and Facilitators of Educational Sustainability: Metaphorical Perceptions and Views of Teachers

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Abstract

According to UNESCO, educational sustainability is an integral part of education. It requires participatory teaching and learning methods that motivate and empower learners to change their behaviours and act for sustainable development for lifelong learning to provide a quality system. This study aimed to reveal metaphors, barriers, and facilitators on educational sustainability based on the teachers' views. To this end, the study adopted a phenomenological research design. The participants, selected through purposeful criterion sampling, were teachers and data came from semi-structured interviews. Findings showed that (a) educational sustainability was perceived metaphorically as continuity, order, executive action, resilience, and goal orientation; (b) the education policies, stakeholders, management style, environment, and change were barriers to educational sustainability; (c) education system, improvement of administrative processes, building a future-oriented structure, increasing quality, breaking the influence of politics in education, following the developments and considering common values should be carried out to eliminate these barriers; and (d) educational policies, creating opportunities, and administrative actions were both facilitators and practices to increase these facilitators for educational sustainability.

Keywords: Barriers to sustainability, Educational sustainability, Facilitators for sustainability, Metaphor, Qualitative method

Introduction

Sustainability often referred to as sustainable development (Dresner 2004), became prominent during the United Nations World Commission on Environment and Development (WCED) conference in 1987, and its most accepted and cited description was presented as the "Brundtland Definition" (1987) in this conference. Based on this definition, sustainability is accepted as a development that satisfies the needs of the present without risking future generations' meets. In time, sustainability and sustainable development evolved to be defined as development that meets the needs of the present without compromising the ability of future generations to meet their (own) needs with an emphasis on both equity between generations and equity within generations (Dresner 2004). Many reports such as World Conservation Strategy, Brundtland Report, and Convention on Climate Change considered the term sustainability from different angles,, including economy, environment, and biology, the United Nations Conference in Stockholm in 1972 linked these perspectives to education. This action provided sustainability to be considered in a broader way, including individual development rather than just spatial activities, and brought educational sustainability prominence (Sezen-Gultekin 2019).

Educational sustainability is directly related to sustainable development. Both theoretical and universal approaches can prove this. Based on Wang and Lin's (2017) study, one of the main approaches to sustainability is the Triple Bottom Line, which explains sustainability through a trivet structure. This trivet composes of economy, ecology, and society. In line with this approach, it is claimed that sustainable development can only be ensured if these three categories can be supported together. Similarly, the United Nations evaluates sustainable development using these categories. All member states of the United Nations have adopted the 2030 Agenda for Sustainable Development to create a common plan for peace and prosperity for people and the planet, now and in the future (United Nations 2015).The agenda issued an urgent call for action for seventeen categories to all countries. These categories were named as 17 sustainable development goals under the following titles: no

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poverty, zero hunger, good health and well-being, quality education, gender equality, clean water and sanitation, affordable and clean energy, decent work and economic growth, industry, innovation and infrastructure, reduced inequalities, sustainable cities and communities, responsible consumption and production, climate action, life below water, life on land, peace, justice and strong institutions, and partnerships for the goals.

Accordingly, as we have seen, sustainable development should be evaluated in terms of the economy, ecology, society, health, and education, all of which are unbreakable chains of sustainability.Selvanathan (2013) states that education is the additional fifth factor that influences the way how economy, environment, society, and culture perform in terms of sustainability. Thus, the weakness or lack of luster performance of any of the five factors is likely to negatively affect sustainability. Similarly, according to McKeown (2002), when education levels are low, economies are often limited to resource extraction and agriculture. In many countries, the current level of basic education is so low that it severely hinders development options and plans for a sustainable future. Hence, education should have priority to provide sustainable development. Accordingly, this study focuses upon educational sustainability.

In an educational context, sustainability is the ability of individuals and schools to continue to improve to meet new challenges and complexity in a way that does not damage individuals or the wider community but builds capacity and capability to be successful in new and demanding contexts (Davies 2007). Educational sustainability means education practices that encourage students and educators are responsible and work cooperatively towards a sustainable educational environment informing society both locally and globally. It also aims to empower and equip current and future generations to meet their needs using a balanced and integrated approach to sustainable development's economic, social, and environmental dimensions (UNESCO 2014). It teaches people that their efforts, actions, and decisions impact natural resource utilization, and fosters or impedes sustainable development (Roberts 2012).

These definitions require quality education systems where learners have lifelong awareness of the 2030 sustainable goals. To provide such a quality system, it should be known that educational sustainability is an integral part of education that requires participatory teaching and learning methods that motivate and empower learners to change their behaviour and take action for sustainable development in terms of lifelong learning (Jackson 2018; UNESCO, 2014). For this reason, educational sustainability requires a transformation of education such a way that all stakeholders including policymakers, executives, teachers, lecturers, support staff, parents, employers, and learners should worry about what needs to change and where to start that change, which factors trigger or block educational sustainability. In this way, it is more likely to develop a sustainable capacity for education.

Fullan's (2005) study also agrees with this idea, suggesting that educational sustainability in education is the ability of a system to engage in the complexity of continuous improvement that is consistent with the deep values of human purpose. To accomplish this capacity, educational sustainability implies four descriptors: educational policy and practice, which is sustaining, tenable, healthy, and durable (Sterling 2001). That’s why, it is important to have educational strategies that allow for easy adaptation for both students and teachers, ensuring sustainable and continuous development of learning and teaching respectively (Alonso-García, Garrido-Letrán and Sánchez-Alzola 2021). Otherwise, it is possible to encounter any barriers to educational sustainability.

Types of barriers to sustainability can severely change across different fields. However, previous studies in the literature (e.g., de Paiva Duarte 2015; Mwanza and Mbohwa 2017) show that the main barriers to sustainability are lack of clarity of the concept, resistance to change, lack of systems thinking, political factors, inability to ensure sustainable behaviour among suppliers, and the consumer culture of global capitalism, technology, quality and demand, cost and capacity, market share and legislation, and environmental issues. Unless these obstacles are overcome, the required sustainability will not be achieved.In this context, it can be claimed that if the point is to make education sustainable, it is essential to overcome the barriers to sustainability and to create new pathways to facilitate it. For this reason, considering the ongoing importance and vitality of sustainability in the field of education, this study aims to identify the barriers to and facilitators for educational sustainability and teachers’ metaphorical perceptions of it. Accordingly, this study adopted the following research problems:

According to teachers,

1. What are the metaphorical perceptions of educational sustainability?
2. What are the views on sustainability activities carried out in Turkey in education?
3. What are the factors posing barriers to educational sustainability?
4. What can be done to eliminate the barriers?
5. What are the factors facilitating educational sustainability?

6. What can be done to increase the facilitators?

Method

Design

This study adopted the phenomenology design, one of the qualitative research methods. The reason for using this pattern is to examine situations that do not seem different to us, but for which we have not developed a deep understanding (Yildirim and Simsek 2003). It is a form of qualitative research in which the researcher attempts to identify commonalities in the perceptions of several people about a particular phenomenon (Fraenkel, Wallen and Hyun 1993). In this context, an in-depth examination of the teachers' opinions about the concept of educational sustainability was conducted.

Study Group

The participants were sampled through criterion sampling, which is one of the purposeful sampling methods. According to Patton, purposeful sampling enables in-depth study of situations that are thought to have rich information. In this sense, purposeful sampling methods are considered helpful in discovering and explaining facts and events in many cases (Glesne 2012). The basic understanding in the criteria sampling method is that all situations that meet a predetermined set of criteria are studied (Yildirim and Simsek 2003). For this reason, in this study, the condition of "being a teacher who has a bachelor's degree and at the same time continues to master education on Educational Sciences" was determined as the criteria. The reasons for this are threefold: first, teachers have the potential to respond more effectively to questions about educational sustainability because they work directly in educational organizations. Second, the preference for these individuals as participants can be viewed as a sustainability movement, as teachers continuing postgraduate education are eager to learn new information and have the potential to share that information with schools. Third, giving preference to teachers who are pursuing master's degrees, especially in education, can help them see the future of the education system in terms of sustainable development and promote sustainable steps in education firsthand.In this context, the study group of the research consisted of twenty-four teachers studying for their master's degree at Sakarya University Institute of Educational Sciences. The demographic information about the study group was presented in Table 1.

Table 1. Demographic information about the study group

Variables		f	%
Gender	Female	4	20
	Male	20	80
Professional seniority	6-10 years	1	5
	11-15 years	7	32
	16-20 years	10	45
	21+ years	4	18
Administerial seniority	1-5 years	6	33
	6-10 years	6	33
	11-15 years	4	23
	16-20 years	2	11
	21+ years	-	0
Type of school	Primary School	8	36
	Secondary School	6	27
	High School	7	32
	Others (Public Education Center)	1	5

Data Collection

A semi-structured interview form prepared by the researchers was developed to elicit the opinions of the teachers. Semi-structured interviews are well suited for exploring the perceptions and opinions of respondents regarding complex and sometimes sensitive issues as well as enabling them to probe for more information, and clarification of answers. Also, the participants' varied professional, educational, and personal histories preclude using a standardized interview schedule (Barriball and While 1994). In this context, six questions were asked in the form about the metaphorical perceptions, barriers, and facilitators related to educational sustainability, and what could be done to remove these barriers and increase these facilitators. For the fill-in-the-blank statements, a short instruction was given at the top of the form on what the metaphor is, what should be done in the form, and how

much time they have. The developed form was presented to three experts, one of whom was an expert in language teaching and two of whom were experts in education. These experts evaluated the form in terms of linguistic, scientific, and structural aspects. According to the experts' feedback, the form was finalized and included the following questions.

1. In my opinion, educational sustainability is …… like because …… .
2. What are your views on sustainability activities carried out in Turkey in the field of education?
3. In your opinion, what are the factors that pose barriers to educational sustainability?
4. If you were to develop an education policy, what would you do to eliminate those barriers to educational sustainability?
5. In your opinion, what are the factors that facilitate educational sustainability?
6. If you were to develop an education policy, what would you do to increase those facilitators for educational sustainability?

Validity and Reliability

According to Lincoln and Guba, qualitative research does not test the traditional validity and reliability criteria of quantitative research, such as internal-external validity, reliability, and objectivity, but instead tests validity and reliability based on "credibility, transferability, dependability, and confirmability" (Jackson 2007).. For this reason, in this qualitative study, the following principles were followed to ensure validity and reliability by considering the criteria of credibility, transferability, reliability, and approval.

In order to ensure credibility, (1) the developed form was presented to expert opinion and the form was finalized in line with their feedback; (2) the responses from the participants were adhered to the study and the direct quotations from these responses were presented in the study; (3) in addition, the observer duplexing method was used in the evaluation of the obtained answers so that different perspectives evaluated the data and a common result was reached. Moreover, among the purposive sampling types, the criterion sampling method was preferred to ensure transferability, reliability, and objectivity. Accordingly, the study group (1) was defined in detail so that it could be compared with other samples; (2) was diversified by recruiting postgraduate students who had first-hand exposure to the topic and were studying in different disciplines (i.e., educational administration and supervision, educational programs, and teaching). For the reliability of the study based on the observer duplexing, the intercoder reliability formula developed by Miles and Huberman (1994:64) was used: “Intercoder reliability=number of agreements / total number of agreements + disagreements”. In this context, the opinions of two different experts on the coding were compared, and intercoder reliability was 98%. According to Miles and Huberman (1994), a compliance percentage above 70% is considered sufficient. Accordingly, the reliability of the study was ensured with the compliance value.

Findings

The findings for educational sustainability were categorized in the following tables, and the participants had a chance to state more than one view.

Table 2. Categorization of metaphors for educational sustainability

Categories	Metaphor Codes
Continuity (f=10)	Relay, mill, a journey from the past to the future, necessity, human life, uninterrupted reaching the goal, civilization, continuation of the generation, rainfall cycle, walking action
Layout (f=3)	Striving human, night and day, life
Execution action (f=3)	Air-water-food, organism (f=2)
Resilience (f=2)	Pine tree, state's most important body
Goal focus (f=2)	Education policy, a delicate plan
Other (f=2)	Football team with many alternative footballers, flow of a river

Table 2 present the categories created by examining the reasons for the metaphors that the participants produced for educational sustainability. In this context, it was seen that educational sustainability is grouped under the categories of continuity, order, executive action, resilience, goal orientation, and the others. In this case, it can be stated that educational sustainability was mostly perceived as continuity. The expressions regarding categories can be exemplified as follows:

P4: "In my opinion, educational sustainability is like human life. Because human life is consistent with evolution." (Continuity category)
P3: "In my opinion, educational sustainability is like night and day. Because it should be continuous, steady, and consistent, not from evening to morning. Fifty teachers change up to a child complete the school…" (Layout category)
P2: "In my opinion, educational sustainability is like an organism. Because you cannot keep the organism alive and develop the factory without a sustainable education." (Execution category)
P12: "In my opinion, educational sustainability is like a pine tree. Because it is always upright, green, and strong. It blossoms once in 100 years. The activities should be sustainable since its future will be planned." (Resilience category)
P20: "In my opinion, educational sustainability is like a delicate plan. Because it is possible with a good planning in which education should be commended to competent people…" (Goal focus category)
P19: "In my opinion, educational sustainability is like a flow of a river. Because it is dealing with dynamic and living beings." (Goal focus category)

Table 3. Categorization of participants' views on educational sustainability activities implemented in Turkey

Categories	Codes
None (f=27)	Lack (f=13), continuous change (f=5), limited education (f=2), discarding the old ones, continious new applications, being not suitable for needs, short-termism, populist policies, unconsciousness, limitlessness
Yes, but insufficient (f=6)	Exist but irregular, yes but not consistent and valuable, insufficient, plans are not left to experts, insufficient, implementations are made independently from stakeholders, not welcomed, insufficient, incomplete, false, non-national practices exist, yes but inadequate, good managers are essential
Yes, but developing (f=3)	Yes, development of new programs, technological infrastructure, developing, available through various applications

When the teachers' opinions were examined, it was seen that one participant did not answer this question. In contrast, the three participants did not comment for sustainability activities in education in Turkey although they were knowledgeable about sustainability. For this reason, the data on these 4 forms was not included in the analysis, and the data on the remaining 20 forms were evaluated. There were some participants who thought there were no sustainability activities in the way that they were taught in Turkey. Some participants said there were activities, but they were not enough; some participants said there were activities and they were growing over time.In this case, it was seen that the most repetitive category among the categories was "none". All in all, majority of teachers thought there are no activities related to educational sustainability in Turkey. In contrast, very few of them stated that there are some practices regarding this issue. In this case, based on the feedback from participants, the activities towards educational sustainability in Turkey are almost none at all, which can be considered inadequate. The expressions regarding categories can be exemplified as follow:

P18: "In Turkey, education is planned to reach the short-term goals. It is not thought too far ahead, and a result cannot be the starting point of another thing." (None category)
P3: "It is not consistent and valuable. For example, 4+4 system, TEOG system, university entrance exam, vocational high schools. Stability is important. How much we educators trust in education?" (Yes, but insufficient category)
P: "Recently, scientific progress has been made with the improvement of new programs and technological infrastructures. This shows that we have caught up with the era in a certain way…" (Yes, but developing category)

Table 4. Categorization of factors posing a barrier to educational sustainability

Categories	Codes
Barriers related to educational policy (f=53)	Not achieving goals, dependencies, not being holistic, rapid change, low teacher quality (f=3), unchanging teaching methods, unchanging paradigms, emptying the contents of textbooks, course materials, education not being independent, political interference in education (f=4), lack of educational spirit, heads of education not being "educators", separating education from civilization, education not being suitable for national interests, economy, memorization, incompetent transactions (f = 3), financial difficulties (f = 2), curriculum, controversy, not addressing needs, employment pattern (f = 2), lack of

	education of decision-making politicians, lack of objective criteria, teachers' attitude, unrelated student, unplannedness (f = 2), political concerns, indecision of politicians, lack of a resilient educational infrastructure (f = 2), union interventions, frequent manager changes, system, not paying attention to sustainability, leaving sustainability to people rather than legislation, not identifying processes correctly, uniform education, wrong training policies, inadequate managers (f = 2), managers' perspective
Barriers related to stakeholders (f=18)	Not including families in education, fanatic thinking, unconscious students, unconscious community members, unconscious parents, gender, satisfaction, education level, lack of awareness about education, willingness to continue daily routine, culture level, spirituality, belief that education is completely finished after formal education is completed, parent complaints, age, lifestyle, lack of time, mentality and perception
Barriers related to management style (f=10)	Lack of communication between subordinates and superiors, egocentricity, public relations, conflicts, lack of control, lack of power of school administration (f=2), prejudice (f=2), not being encouraged
Barriers related to the environment (f=9)	Geographical location, an institution of work, environmental deterioration, unchanging school environment, physical impossibilities, health problems, increasing cities, single-mindedness, traffic stress
Barriers related to change (f=5)	Impotence to development, increase in technology, inability to keep up with technology, failure to follow new developments, the difference in the concept of a new generation family

In In Table 4, the teachers' opinions about the factors posing barriers to educational sustainability are presented under different categories. When these categories were examined, it was seen that according to the teachers, educational sustainability could be prevented due to the categories of barriers related to education policies, stakeholders, management style, environment, and change. When the categories were perused within themselves, the most potent barriers to educational sustainability in the educational policies category were relatively political interference in education, low teacher quality, incompetent operations, financial difficulties, employment style, unplannedness, and lack of resilience educational infrastructure, and inadequate managers. In contrast, the most potent barriers to educational sustainability in the management style category were school administrators' lack of power and prejudices. In this case, it can be stated that although educational sustainability is affected by different factors, it is mostly hindered by the factors originating from educational policies. The expressions regarding categories can be exemplified as follow:

> *P14: "Political concerns, separating education from civilization." (Barriers related to educational policy category)*
> *P23: "Policy and partisanship, mindset and perception, fanaticism (blind adherence to one's own opinion, insistence." (Barriers related to stakeholders category)*
> *P7: "Lack of subordinate-upper communication." (Barriers related to management style category)*
> *P5: "Traffic stress, increasing cities, environmental deterioration." (Barriers related to the environment category)*
> *P11: "Failing to keep up with changing technology, new generation family concepts' being different in every aspect, educational institution employees' being not open to change." (Barriers related to change)*

Table 5. Categorization regarding practices to eliminate the barriers to educational sustainability

Categories	Codes
Practices for the regulation of the education system (f=17)	Establishing a fair and transparent education system, Providing little, concise, clear information, increasing skill applications, researching how to use knowledge, researching how to reach knowledge, not changing the education system much, nationalizing education, large-scale projects, subjects open to interpretation, curriculum change, students directing to applied education, practicing, creating a fixed examination system, preventing system change, making applications, informing at the university level, removing the university exam
Practices for the improvement of administrative processes (f=8)	Not granting the right to appoint a teacher who is in the first year for four years, in-service training, consultation, establishing a merit-based, and objective assignment system, to carry out activities that attach importance to motivation, to ensure that school principals form their working staff and supervise them, to make schools ready to expand the authority of school principals, doing business based on results

Practices for building a future-oriented structure (f=7)	Developing the understanding that will ensure that education is long-lasting, preventing daily policies, not allowing short-term policies, legal promotion of sustainability (f=2), determining a roadmap for sustainability (plan), creating sustainability policies
Practices for increasing quality (f=6)	Raising the standards of the educator, employing competent people, providing vertical mobility in the staff, removing the educated illiterate from education, taking the opinions of the teachers through questionnaires, doing not only exams but also oral exams and process evaluations in the recruitment of practice teachers
Practices for breaking the influence of politics in education (f=5)	Fight against addiction, transferring education from politicians to educators, de-politicizing education, not allowing intervention of different groups in education, removing all union activities
Practices for following the developments (f=5)	Renewal of the environment, creating programs under the changing order, examining developed countries in education, ensuring that teachers keep themselves up to date, introducing technology into schools in a controlled manner
Practices for considering common values (f=3)	Implementing not individual but social ideas, gaining universal values, informing the public

Table 5 shows the teachers' perspectives on actions that may be implemented to eliminate the issues that are preventing educational sustainability.. According to the teachers, the practices related to the regulation of the education system, the improvement of administrative processes, building a future-oriented structure, increasing quality, breaking the influence of politics in education, following the developments, and considering common values could eliminate the barriers to educational sustainability. In this case, even though it was stated that the different practices could be made to eliminate the factors that pose barriers to educational sustainability, it can be put forward that the practices for the regulation of the education system are the most preferred. The expressions regarding categories are exemplified as follows:

P15: "I would prevent the system changes. For example, minor arrangements can be done for the duration of the university and high school exams based on a fixed roof. However, short-termed radical changes destroy all the studies made depending on these exams. To me, this is the basis of the case." (Practices for the regulation of the education system category)
P12: "I would pay attention to the studies giving importance to motivation." (Practices for the improvement of administrative processes category)
P22: "I would issue a regulation on standards and sustainable education environments that would cover all the institutions of the Ministry of National Education." (Practices for building a future-oriented structure category)
P7: "I would ensure that good examples are evaluated, and professional help is obtained from specialist organizations." (Practices for an increasing quality category)
P4: "I would say that education is the work of the educator and withdraw the hands of the politicians. I would also remove all the union activities." (Practices for breaking the influence of politics in education)
P8: "I would introduce technology into schools in a controlled manner." (Practices for following the developments category)
P14: "Universal values should be given to children." (Practices for building considering common values category)

Table 6. Categorization regarding factors facilitating educational sustainability

Categories	Codes
Facilitators for educational policy (f=33)	Advancing step by step, research, dynamic education studies, continuing the education system without interruption, raising awareness (f=2), updating education policies, establishing a quality structure (f=13), determination, going from easy to difficult, merit-based assignment, curiosity waking up (f=2), supporting original ideas, system not changing much, politicians' view of education, evaluation of results, developing inquiry, establishing standards, implementation, being open to innovation
Facilitators for creating opportunities (f=29)	Geographical possibilities, providing family support for children to love school, creating a democratic environment (f=4), state support, educational opportunities (f=3), strong financial opportunities (f=5), needs (f=2), socio-cultural environment, conditions and environment, utilization of technology (f=4), accessibility (f=2), applicability (f=2), long-term plans, free education

Facilitators for administrative actions (f=11)	Deciding together (f=2), discipline, being sensitive, sincerity in communication, showing interest, motivation (f=2), awards, practitioner-centered acting, sanctions.

In Table 6, the teachers' opinions about the factors that facilitate educational sustainability are summarized. According to the teachers, educational sustainability could be facilitated by the factors related to educational policies, creating opportunities, and administrative actions. When the categories were examined further, it was observed that in the category of the facilitators for educational policies, among the factors that mostly facilitate educational sustainability were as follow: establishing a quality structure, strong financial opportunities, creating the most democratic environment for facilitators, technology utilization, educational opportunities, arousing curiosity, raising awareness, needs, accessibility, feasibility; in facilitators towards managerial actions, the most common decision-making, and motivation. Thus, it can be argued that although the sustainability of education is influenced by various factors, it is primarily influenced by the promoters of educational policy. The expressions concerning the categories can be illustrated as follows:

> *P16: "Administrative competence, merit-based appointment, actionable decisions" (Facilitators for educational policy category)*
> *P7: "Acting in consensus, sincere communication, practitioner-centered action." (Facilitators for creating opportunities category)*
> *P4: "Arousing curiosity, motivation, research, questioning, application." (Facilitators for administrative actions category)*

Table 7. Categorization regarding practices to increase the factors facilitating educational sustainability

Categories	Codes
Facilitators for educational policy (f=22)	Increasing the research and development centers, updating the success evaluation system, increasing the skills training, considering the expectations and requests (f=4), keeping the education at the level of civilization, making a future plan that recognizes the past, reducing mistakes, establishing a permanent education policy, increasing the cultural level, establishing a national education policy (f=3), promoting sustainability by creating exemplary institutions, pilot applications, professional and ethical assignment, avoiding frequent system changes, inclusion of sustainability in the curriculum, arrangement of appointments, competency-based orientation
Facilitators for creating opportunities (f=10)	Providing various educational opportunities, raising awareness through education (f=5), organizing activities for educators, giving gift books, increasing technology, increasing artistic activities
Facilitators for administrative actions (f=9)	Expanding the powers of school principals, determining the criteria, ensuring the satisfaction of the staff, preventing unwarranted complaints, making the clerical and training meetings effective, increasing the municipal development courses, inter-institutional dialogue, strengthening the stakeholder relationship, activating local administrations

Table 7 shows teachers' perspectives on activities that could be performed to improve the factors that promote educational sustainability. Teachers feel that elements such as educational policy, opportunity development, and administrative measures can help to promote the long-term viability of education.. When the categories were examined within themselves, the factors that primarily increase the facilitation of educational sustainability were considering expectations and demands and establishing a national education policy, while raising awareness through education was the one in the category of the facilitators for creating opportunities. Overall, it can be claimed that although different factors increase the facilitation of educational sustainability, the facilitators of education policies are the one that is likely to increase the facilitation. The expressions regarding categories can be exemplified as follows:

> *P15: "Each young person's choice of occupational groups according to their skills will ensure the smooth functioning of all systems to be applied in education." (Facilitators for educational policy category)*
> *P3: "There should be activities and workshops in which educators participate." (Facilitators for creating opportunities category)*
> *P19: "organizing cultural tours, in-service training, gift books, inter-institutional dialogue." (Facilitators for administrative actions category)*

Conclusion, Discussion, and Suggestions

Metaphors

In this study, different metaphor codes related to the concept of educational sustainability were produced. Although these metaphors were collected in the categories of sustainability continuity, order, execution, resilience, and goal-orientation, it was found that educational sustainability was mainly perceived as continuity metaphorically. The concept of sustainability in the literature also reflects continuity in its essence, and researchers such as Coblentz (2002), Wals and Schwarzin (2012), Kapitulčinová, AtKisson, Perdue, and Will (2018), and Sezen-Gultekin (2019), Sezen-Gultekin and Argon (2020a; 2020b) also define sustainability in terms of continuity through expressions such as resilience, stability, continuity, the search for balance, and the pursuit of a future.Accordingly, it is recommended that the concept of educational sustainability should be focused on continuing in line with the objectives; however, in addition to this, it should be perceived as establishing order, carrying out actions, focusing on the target and being resilient. Moreover, it can be thought that these results refer to the primary needs of the COVID-19 pandemic period since the continuous, resilient, aim-focused, regular systems have more chances to sustain human life. To this end, the concept of educational sustainability should be referred to in a broader sense. Also, a comparative study on determining the educational sustainability metaphorically before and during the COVID-19 process could be investigated in further studies.

When teachers were asked about educational sustainability practices implemented in Turkey, the majority indicated that there were no such activities and that existing activities were insufficient. However, a small number of teachers indicated that there are some activities, such as the development of technological infrastructure. These results can be considered remarkable in terms of ensuring sustainability in education.Given that teachers are both in the system and try to continue their education with their own efforts, it should be considered that they think that there are no educational sustainability activities in the Turkish education system.
Furthermore, earlier studies conducted in the Turkish context (e.g., Kayihan and Tonuk 2008, 2011; Ozdemir 2010; Ozdemir and Corakci 2011; Toran 2016) show that many studies in Turkey mostly remained at the level of environmental sustainability. Although some National Education Directorates (NEDs) have addressed the issue of sustainability in education, such as Gaziantep Province NED (2019), Yalova Province NED (2020), and Etimesgut District NED (2020), the Turkish Ministry of National Education, which oversees all schools in Turkey, has taken no concrete steps. As a result, in order to ensure educational sustainability, which has been and will continue to be important for years, it is necessary to conduct special studies in the Turkish education system and develop strategies by organizing activities not only from an environmental standpoint, but also from an economic, cultural, social, and administrative standpoint. During the COVID -19 pandemic, the value of these discoveries was once again demonstrated. As a result, adopting solutions for long-term education is not a choice, but a need.

Barriers

Educational policies, stakeholders, managerial style, environment, and change were all identified as barriers in the study. Furthermore, low teacher quality, political intervention in education, incompetent transactions, financial challenges, type of work, lack of planning, lack of sound educational infrastructure, and insufficient administrators were among the most common comments. These findings are significant because removing barriers to education can help to sustain educational systems. On the other hand, while several hurdles to educational sustainability have been highlighted in the international literature, there is no study in the literature that explicitly tackles the barriers to educational sustainability of education systems in Turkey.

For example, according to Milbrath (1995), some of thre barriers stem from deficiencies in consciousness, knowledge, and information. Some teachers may not have sufficient information about educational sustainability resulting in poor practice in the classroom and the school. Kang (2019) suggested that teachers taking courses on education for sustainable development in pre-service teacher education were about five times more likely to contribute to the practices related to educational sustainability. In addition, according to Joyner-Wells (2006), educational sustainability may be difficult to achieve because of incompatibility between the beliefs and assumptions that provide the foundation for the whole school reform initiative and those of the individuals who will be implementing the program. Continuation of whole-school reform over time requires a continuous commitment to enacting expectations, assumptions, beliefs, and strategies of the adopted improvement initiative. Akins and his colleagues (2019) also found that management and policy makers' lack of support significantly affects the success of practices related to educational sustainability. Hargreaves (2007) states that there are some enemies of educational sustainability like enforced short-term goals, extreme testing, and rapid political wins at the expense of deep learning for all students.

As can be seen, there are many barriers to educational sustainability, and these barriers vary depending on the situation. For that purpose, it is recommended to accurately identify barriers to educational sustainability in detail. In this way, early, appropriate, and satisfactory steps could be taken to eliminate factors posing barriers to educational sustainability. One of the most critical steps in achieving this is the more active evolution of education policies and development plans towards educational sustainability. After all, within the scope of the Turkish 11th Development Plan (Turkish Presidency Strategy and Budget Office n.d.), sustainability has been mainly addressed in terms of environment, tourism, and health. Therefore, it is recommended to address this situation in more detail in the 12th Development Plan regarding educational sustainability and active policies. In addition, to eliminate the factors constituting barriers to educational sustainability, it is suggested that the implementation of practices aiming to organize the education system, improving administrative procedures, establishing a future-oriented structure, increasing quality, breaking the influence of politics in education, following developments, and considering common values should be set to work.

Facilitators

Educational sustainability was considered as most conducive to aspects such as raising awareness, building a quality structure, and sparking interest in the study, while there were also favorable elements for educational policy, opportunity creation, and administrative action. These findings appear to be in line with what has been published in the literature. Ensuring educational sustainability involves keeping a school system alive, meeting the needs of students, teachers, and parents with the services it provides, and educating students to adapt to the conditions of life in the future. The multi-dimensional nature of educational sustainability implies more than one factor that facilitates educational sustainability (Koybasi Semin 2019). However, the facilitators of educational sustainability as well as its facilitating roles on other things.

As far as the literature has been accessed, there is no study explicitly addressing the facilitators for educational sustainability in the Turkish education system, but there have been numerous studies on the facilitators for educational sustainability in the foreign literature.For example, one of the most effective facilitators of educational sustainability is sustainable leadership performed by educational leaders. Sustainable educational leadership maintains and improves deep learning, which positively benefits people around us continuously (Hargreaves 2006). From another perspective, according to Chen and his colleagues, if sustainable education is to be accomplished, a sustainable development plan which contains personal and social practices should be carried out (Burbules, Fan and Repp 2020). Furthermore, open pedagogy, interaction with communities and society, and lifelong learning should all be considered in order to ensure educational sustainability, as the concept of "breadth of life" (Jackson 2011) provides insight into an educational institution's ability to recognize and value learning and personal growth, which is necessary for success and personal fulfillment in a complex world. All of these findings are identical to the ones reported in this study.

As can be seen, there are many different facilitators of educational sustainability. Therefore, it is important to increase these facilitators, use them for their intended purpose, and spread them. For this reason, it is recommended that the educational policies emerging as a result of this study, namely creating opportunities and managerial actions, should be put into practice actively. Kang (2019) put forward that in-service training activities are very useful tools to improve teachers' knowledge and skills on educational sustainability. Based on the results of this study, we also suggest organizing in-service training activities for teachers. Pre-service teachers might also be encouraged to take courses about educational sustainability during their pre-service education. Future research is suggested to study barriers and facilitators to educational sustainability in higher education contexts. Furthermore, comparative studies should be done through in-depth analysis of educational sustainability, barriers, and facilitators, including before and during the COVID-19 pandemic.

Limitations

This study has some limitations: First, it was conducted through phenomenology, examining situations to identify commonalities in the perceptions. Future studies can be designed with other methodologies such as quantitative or mixed type methods to reach different and more generalisable results. Second, data were collected only via the semi-structured interview form prepared by the researchers. Future studies can use different data collection tools by expanding the context of this form. Third, the sample size was small, which was limited with twenty-four participants. However, there were two reasons behind this: The authors tried to reach all of them since the participants were master students at a state university. Although metaphor studies can be conducted with much more participants, this study used a phenomenology design and asked for both metaphors and views at the same

time. So, it would have been too complicated to have s larger sample. Qualitative studies do not require a certain number of participants since they do not aim to generalize the results. Due to these reasons, the participants were limited to this number. Fourth, it is also limited to the teachers who were selected by certain criteria, which was being a teacher who has a bachelor's degree and pursuing master education at the same time. Future studies can change or expand this number and criteria to evaluate different views on educational sustainability.

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Author (s) Contribution Rate
Both researchers contributed at every stage of the research.

Conflicts of Interest
Authors declare that they have no conflict of interest.

Ethical Approval
Ethical permission (E-61923333-050.99-124076) was obtained from Sakarya University Rectorate Ethics Committee for this research.

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The Investigation of The Effect of Secure Attachment to Mother on Self-Perception in Middle Childhood

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The Investigation of the Effect of Secure Attachment to Mother on Self-Perception in Middle Childhood

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Abstract

The relationship between parents and children is important for realizing developmental tasks, intra-family, and peer relationships. Self-concept and self-esteem are closely related to a person's personality and identity. This study examined the relationship between 5th grade primary school students' secure attachment to their mothers and their self-perceptions. The study group consisted of 431 5th grade students in a secondary school, aged 12-13 years.Piers Harris' Child Self-Concept Scale (PHCSCS) and Kerns Secure Attachment Scale-KSS were used to collecting data. The correlation coefficient and the decision tree CHAID algorithm, one of the classification techniques, were used to estimate data trends in the data analysis. The CHAID analysis was used to decide whether demographic characteristics and secure attachment to the mother, which are independent variables, affect self-perception, the dependent variable, and the extent of this effect. Finally, secure attachment to the mother and self-perception in middle childhood were related to the father's occupation; family structure, birth order, and gender were important variables in the child's self-perception. It was found that the mother-child secure attachment pattern in middle childhood affected the development of high self-perception. It is foreseen that the consequences of the study will provide to the literature.

Keywords: Middle childhood, Secure attachment, Self-perception, Attachment to mother

Introduction

The relationship between parents and children is important for realizing developmental tasks, intra-family, and peer relationships. Emotional interaction with parents, especially with the mother during childhood and called "attachment" is important for shaping interpersonal relationships and confidence in the outside world. Attachment begins as a form of interaction with the mother after birth and affects the individual's whole life. The attachment style of the individuals is effective on their personality development, and it continues to influence the development of their behavior in childhood, adolescence, and adulthood (Tok and Öğretir Özçelik, 2018). The concept of attachment includes the individual's confidence in the existence of the attachment figure to be used as a secure fundament. The attachment figure is a haven where the individuals can freely explore their environment when they are not in distress and seek support or protection in cases of distress. The environmental exploration of the individuals includes the physical world, their relationships with other people, and the reflection of this exploration on their inner experience. The attachment style is derived from John Bowlby's attachment theory (1969) and generally expresses characteristic relationships in close relationships with attachment figures such as parents-children (Levy et al., 2011). Attachment figures vary according to the developmental period; attachment to parents or other people can be developed.

Main, Kaplan, and Cassidy (1985) suggested that observable attachment behaviour and attachment representations should be identifiable in attachment processes. Evidence for this was found in studies of middle childhood. Kerns and Brumariu (2016) identified several typical characteristics for the system of attachment behaviours in middle childhood. Accordingly; Accordingly;

- the purpose of the attachment system changes from proximity to the attachment figure in early childhood to accessibility to the attachment figure in middle childhood. These changes are due partly to the child's increased self-regulation and partly to parents' and children's expectations of greater child autonomy.

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However, children need to feel that they can reach the caregiver when needed.parents continue to be primary attachment figures in middle childhood. When asked about situations that may lead to the need for an attachment figure, even 11 to 12-year-old children often prefer parents over their peers (Kerns, Tomich and Kim 2006; Seibert and Kerns, 2009).

- trust-based contact between the child and parent figure is a shift towards more co-regulation.
- in middle childhood, attachment figures continue to function safe havens in times of distress and safe bases supporting the child's discovery. In middle childhood, attachment figures support exploration as children's worlds expand. Thus, one indicator of secure attachment is the ability of parent-child dyads to coordinate and balance care needs with their needs for exploration. (Kerns, Mathews, Koehn, Williams and Siener, 2015).

People internalizing positive representations or models of others and self-have a secure attachment style observed in various social situations. Secure attachment is associated with coping with stress, more adaptive emotion regulation, and self-esteem (Steele and Steele, 2008). Self-concept and self-esteem are strongly related to an individual's personality and identity. These are structures intertwined with culture. The concept of self is a versatile and hierarchical structure including self-cognition in various areas such as physical appearance, relationships with peers and parents, and academic life (Nishikawa, Hägglöf and Sundbom, 2010).

On the other hand, self-esteem consists of two different dimensions, namely competence and value (Gecas and Schwalbe 1983). The competence dimension expresses the degree to which people see themselves as competent, and the value dimension expresses the degree to which individuals feel as valuable persons. High self-esteem expresses a highly positive view of the self, while low self-esteem refers to vague or purely negative evaluations (Campbell vd., 1996). Self-esteem is not necessarily right or wrong. High levels of self-esteem may be proportional to an individual's qualities and achievements, or these feelings of self-worth may have little to do with any objective assessment of the individual. This is crucial because self-esteem reflects perception rather than reality (Zeigler-Hill, 2013).

The mental representation of the self in relation to others, attachment is correlated with other variables of the child's self-representations and self-concept. Attachment theorists argue that attachment to parents affects expectations about other close relationships (Sroufe & Fleeson, 1986). In secure attachment, caregivers always give feedback effectively, allowing children to develop confidence and dependence. Secure individuals have confident models of self and others; secure attachment affects to self-confidence and security (Wu, 2009). Theory and research also support the view that securely attached children are more social, few hostile, more adaptable, and unrestricted to discovering new exercises and practices (Kerns, Klepac, and Cole, 1996). The positive effects of secure attachment can be observed at any age from a developmental point of view. Especially in adolescence, when secure attachment effectively reduces risky behaviors and mental illnesses and increases social relations, the importance of attachment security increases even more (Nalbant, Kalaycı, and Akdemir, 2020). In most studies, positive relationships between secure attachment and general self-perception are noticed (Davila, Hammen, Bürge and Daley, 1996; Verschueren, Marcoen and Schoefs, 1996). It was found that there are studies on issues such as self-concept among primary school students (Özyürek et al., 2020), adolescents (Algünerhan, 2017) and high school students (Adana, Arslantaş and Şahbaz, 2012); attachment and loneliness in adolescents (Karakuş, 2012), variables related to attachment (Morsünbül and Çok, 2011), attachment and social anxiety in adolescents (Tok and İlkir Özçelik, 2018).

Regarding attachment and self-perception, Suemer and Anafarta Şendağ (2009) concluded in their study examining the effects of attachment to parents in middle childhood on self-perception and anxiety that secure attachment to parents is associated with positive evaluation in all self domains and low anxiety. Toprak's (2020) study found that there are positive relationships between how students are attached to their mothers and their self-esteem.In their study, Kaya and Öz (2020) determined that perceived parental attitudes and attachment styles significantly affect adolescents' self-development. Dogruyol and Yetim (2019), on the other hand, found that self-esteem has a partial mediating role in the relationship between attachment to mother and peer attachment. Secure attachment to parents in childhood creates a positive self-perception, and it is vital in terms of its positive effects on peer relations, school adjustment, and social-emotional competencies. (Doğruyol and Yetim, 2019; Morsünbül and Çok, 2011; Sümer and Anafarta Şendağ, 2009). Grounding on the literature knowledge, the importance of the attachment to the mother regarding self-perception in middle childhood can be inferred (Kaya and Öz, 2020; Toprak, 2020). This study proposed investigating the relation between 5th-grade secondary school students' secure attachment to their mothers and self-perceptions. In this stage, which can be described as the transition period to adolescence, variables affecting mother attachment and self-esteem were tried to be revealed. It is foreseen that the consequences of the study will provide to the literature. In the study, it is sought to answers for the following questions:

1. What variables affect the level of secure attachment of children to their mothers?

2. What are the variables which affect children self-perception?
3. Does the secure attachment of children to their mothers affect their self-perceptions?
4. How does the relationship between children secure attachment to their mothers and self-perception?

Method

Research Design

The study designed quantitatively is in the relational survey model.

Participants

In the population of the study, students attending secondary school in Safranbolu District of Karabük Province in the 2018-2019 academic year. The sample group was formed from all children (n=431) attending 5th grade and ages 12-13 in five secondary schools (Kanuni Secondary School, Misak-ı Milli Secondary School, Ünsal Tülbentçi Secondary School, Harmanlar Secondary School, and Safranbolu Imam Hatip Secondary School) who gave their consent for the study by using a cluster sampling method. The demographic characteristics of the study group are shown in Table 1.

Table 1. Some Personal Information About Study Group

		f	%			F	%
Gender	Female	188	43.6	Number of Siblings	Only Child	47	10.9
	Male	243	56.4		2 Siblings	238	55.2
					3 Siblings	105	24.4
					4 and more	41	9.5
Birth Order	First- Child	205	47.6	Family Structures	Nuclear Family	358	83.1
	Last- Child	160	37.1		Extended Family	58	13.5
	Middle- Child	66	15.3		Single Parent F.	15	3.5
Mother's Age	Younger than 31 y.	18	4.2	Father's Age	Younger than 35	38	8.8
	31-34 y.	103	23.9		35-39 y.	148	34.3
	35-39 y.	180	41.8		40-45 y.	193	44.8
	40-45 y.	113	26.2		46 years and above	52	12.1
	46 years and above	17	3.9				
Mother's Education Status	Primary Sch.	119	27.6	Father's Education Status	Primary Sch.	62	14.4
	Secondary Sch.	74	17.2		Secondary Sch.	77	17.9
	High Sch.	147	34.1		High Sch.	154	35.7
	Bachelor	91	21.1		Bachelor	138	32.0
Mother's Profession	Not-working	257	59.6	Father's Profession	Retired	102	23.7
	Worker	55	12.8		Civil Servant	92	21.3
	Civil Servant	46	10.7		Self-Employed	26	6.0
	Self-Employed	39	9.0		Worker	142	32.9
	Professional	34	7.9		Professional	69	16.0

According to Table 1, 43.6% of students are female, 55.2% have two siblings, and 24.4% have three siblings. 47.6% of the students were born as the first child and 37.1% as the last child, and 83.1% of their families are nuclear families. 41.8% of mothers are in the 35-39 age group and 44.8% of fathers are in the 40-45 age group. 59.6% of mothers are housewives and 32.9% of fathers are workers.

Data Collection Tools

The Personal Information Form was used to collect the data and to obtain some personal information of the participants. In addition, Piers Harris Children's Self-Concept Scale (PHCSCS) and Kerns' Security Scale (KSS) were used.

Piers Harris Children's Self-Concept Scale (PHCSCS); can be applied to the 9-16 age group and aims to determine the participants' feelings, thoughts, and attitudes about themselves. The level of agreement with the statements in

the 80-item scale is indicated as "Yes" or "No". It consists of six sub-dimensions: Happiness/Satisfaction, Anxiety, Popularity/Social Admiration or Being Favor, Behavior and Compliance/Confirmation, Physical Appearance, Mental and School Status. High scores except for the anxiety sub-dimension are considered positive and low scores are regarded as negative self-concept. The scale's reliability coefficient, which was adapted into Turkish by Çataklı and Öner, was found to be between .81 and .89 (Öner, 2005). Yan et al. (1996) evaluated the PHCSCS mean score as 45–60. While a high score (>60) indicates positive self-evaluation, a low score (<45) indicates negative self-concept (Eryılmaz, 2008). In this study, the average PHCSCS score of 431 students in the sample group was found to be 51.16. Accordingly, it was interpreted that the self-concept of the students in the sample group was at an average level.

Kerns Secure Attachment Scale-KESS (Kern's Security Scale-CSS); It is a 15-item scale developed by Kerns et al. (1996), adapted into Turkish by Sümer and Anafarta Şendağ (2009), and aims to measure the level of secure attachment of children to their parents. The scale was developed as suitable for children aged 9-12. The scale measures how much children trust their attachment figures as delicate and accessible, their inclination to trust attachment figures when under pressure, and the easiness and willingness levels of communication with attachment figures. There are two contradictory statements for items. Students are asked to mark how much they are more similar to children identified on the right or left of the box written "BUT" for each statement. They are then asked to go to the chosen side and mark how similar they are to the child described (very similar to me - somewhat similar to me). Seven items are reverse coded and scored by the total score in the scale, which can be completed separately for mother and father. A high score is interpreted as an increase in secure attachment to parents. In the study of the scale conducted with 194 5th and 6th grade students, the reliability coefficient for the mother form was .84 (Sümer and Anafarta Şendağ, 2009).

Data Collection and Analysis

In this study, before collecting data to use the measure, the support of Prof. Dr. Nebi Sümer, who adapted the scale, the approval of the Ethics Committee of Karabuk University of Social and Human Sciences (decision dated 16/10/2018 and number 2018/10(03)) and the approval of the Governor of Karabuk were obtained. The measurement tools were applied to participants in their classroom environment, accompanied by school counselors. The students were asked to fill the KSS form only thinking of their mothers. The students who filled both scale forms were evaluated, and the data were entered into the computer.

The correlation coefficient and CHAID decision tree algorithm were used for data analysis. CHAID decision tree algorithm is one of the classification techniques used to estimate data trends. The CHAID analysis was used to decide whether demographic characteristics and secure attachment to the mother, which are independent variables, affect self-perception, the dependent variable, and the extent of this effect.

Findings

Under the heading of findings, the results of study and their comments obtained in line with the sub-problems are given.

What variables affect the level of secure attachment of children to their mothers?

Demographic variables were included in the analysis. As a result of CHAID analysis, a decision tree structure consisting of three nodes at a single level is formed, which explains the attachment level of children in the decision tree structure, and it is given in Figure 1.

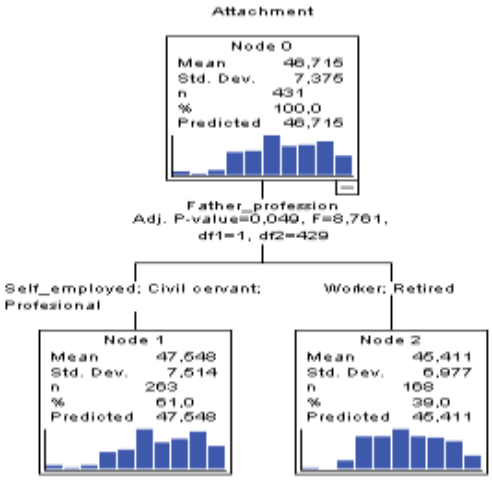

Figure 1. Decision Tree Structure of Students' Secure Attachment to Their Mothers

According to Figure 1, the most important variable affecting children's KSS scores is their father's occupation. Children's attachment scores differ significantly according to their father's profession (F=8.761; p=.049). CHAID analysis divided children into two clusters according to their father's profession.

The attachment score of the children whose fathers are self-employed, civil servants, and the professional occupation group (61%) is 47.548, while the attachment score of the children whose fathers are workers or retired (39%) is 45.411. In summary, children whose fathers are self-employed, civil servants, and professionals have higher secure attachment to their mothers.

What are the variables that affect children self-perception?

A decision tree structure consisting of six nodes at two levels, which explains the children's self-perception, was formed in the decision tree structure and is given in Figure 2.

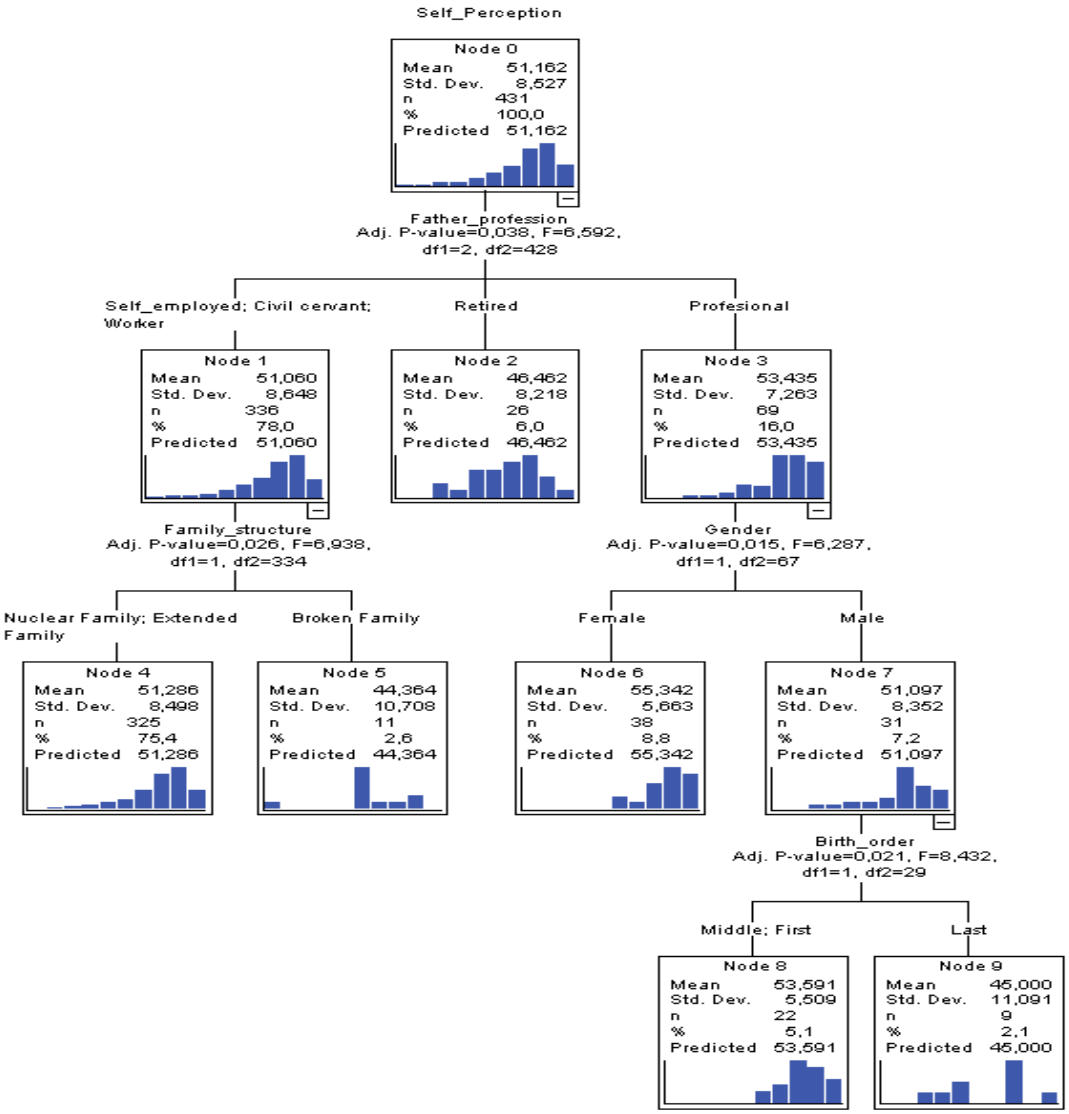

Figure 2. Decision Tree Structure for Students' Self Perceptions

According to Figure 2, the most important variable affecting children's PHCSCS scores is their father's occupation. Children's self-perceptions differ significantly according to their father's occupation (F=6.592; p=.038). CHAID analysis divided children into three clusters according to their father's occupation. Children whose fathers are self-employed, civil servants and workers (78%) have a PHCSCS score of 51.060, those whose fathers are retired (6%) have a score of 46.462, and those whose fathers have a professional occupation (16%) have a score of 53.435. In other words, the positive self-perceptions of children whose fathers are professional occupations are higher.

Family structure is the most important variable affecting the self-perception of children whose fathers are self-employed, civil servants, and workers. Children's self-perception scores differ significantly according to family structure (F=6.938; p=.026). CHAID analysis divided children into two clusters according to family structure. The self-perception scores of children with nuclear or extended families (75.4%) are 51.285, and the self-perception scores of children with broken families (2.6%) are 44.354. In other words, positive self-perceptions of children with nuclear or extended family structures are higher than those with broken families.

The most important variable affecting the self-perception of children whose fathers have a professional occupation is the gender variable. Children's self-perception scores differ significantly according to gender (F=6.287; p=.015). CHAID analysis divided children into two clusters by gender. The self-perception score of females (8.8%) whose fathers have a professional occupation is 55.342, and the score of males whose fathers have a professional occupation (7.2%) is 51.097. In other words, the positive self-perception of females is higher than that of males.

Self-perception scores of males with fathers having professional occupations differ significantly according to birth order (F=8.432; p=.021). CHAID analysis divided males into two clusters according to birth order. The self-perception of males born in the first and middle orders is 53,591 and that of males born in the last order is 45,000. In other words, the self-perception of children born in the first or middle orders is higher than that of children born in the last order.

Does the secure attachment of children to their mothers affect their self-perceptions?

In the decision tree structure, in which the children's attachment score variable was included in the analysis, a decision tree structure with a single-level and five-nodes describing the children's self-perception was formed. The relevant decision tree structure is given in Figure 3.

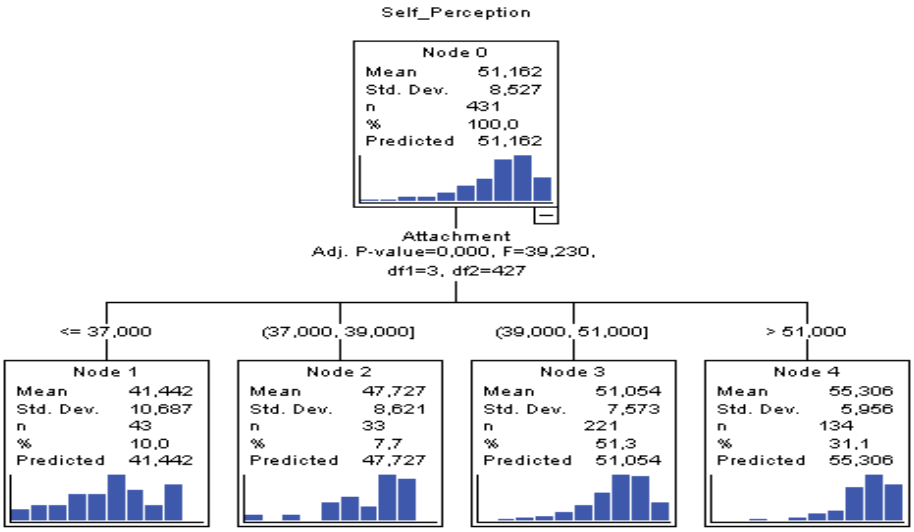

Figure 3. Self-Perception Decision Tree Structure According to Students' Secure Attachment to Their Mothers

As shown in Figure 3, children's PHCSCS scores were significantly different from KSS scores (F=39.230; p=.000). The CHAID analysis divided the children into four clusters according to their KSS scores. As children's attachment to their mothers increases, their self-perceptions also increase at a positive level.

The mean attachment score of children (10%) with a KSS score of 37 and below is 41.442, the mean attachment score of the children (7.7%) who scored between 37-39 is 47.727, the mean attachment score of the children (51.3%) with a score between 39-51 is 51.054 and the mean score of children who score above 51 is 55.306. In summary, children with high attachment levels to their mothers have higher positive self-perceptions.

Is there any significant relationship between children's secure attachment to their mothers and the sub-dimensions of self-perception?

Table 2. The Results of Correlation Analysis of the Sampling Group's KSS and PHCSCS Scores

		PHCSCS						
		Happiness and Satisfaction	Anxiety	Popularity	Behaviour and Conformity	Physical Appearance	Mental and School Status	Total
KSS	r	.361	.280	.270	.346	.236	.268	.416
	p	.000*	.000*	.000*	.000*	.000*	.000*	.000*

According to Table 2, the relationship between the KSS scores of the sample group and all sub-dimensions and total scores of PHCSCS is positive and significant (p<.001). The relationship between KSS scores and PHCSCS Anxiety, Popularity, Physical Appearance, Mental and School Status sub-dimension scores is low. The relationship between Happiness and Satisfaction, Behaviour and Conformity, and scale's total scores is moderate (Büyüköztürk, 2003). As the level of secure attachment to the mother increases, the children in the study group

see themselves more positively about happiness, fame, behavior and compliance, physical shape, mental and school status, and feel less anxious. Generally, there is also an increase in their self-perceptions positively.

Discussion

This paper examines the effect of secure attachment to mothers on children's self-perception in middle childhood. Moreover, other variables affecting children's secure attachment to their mothers and self-esteem were also examined. It is found that the most important variable affecting secure attachment to the mother is the father's occupation, and it was found that children whose fathers are self-employed, civil servants, and the professional occupational group have higher levels of secure attachment to their mothers. Although attachment theory was initially developed to explain the development and importance of the child-mother relationship, all developmental psychology researchers agree that children are attached to their fathers and their mothers (Bacro and Florin 2008). Based on the observed variations between mother-child and father-child communications, some researchers consider fathers to play an essential but several roles in child improvement than mothers (Grossmann et al., 2002). Regarding them, the primary role of the father-child relationship is to inspirit the child to be open to the outside world. Fathers are considered to play an essential role in the development of exploration and autonomy. Consequently, it can be said that those who belong to the group of professionals do not have to worry about taking care of a house due to their sufficient financial resources and that the self-employed can arrange their working hours as they wish, which allows them to devote qualified and regular time to their children

It is acquired that the most critical variable affecting the self-perceptions of children in the middle childhood period is the father's profession, and the self-perceptions of the children whose fathers have a professional profession are higher. In addition, it is determined that children having nuclear or extended families have more positive self-perceptions than children with broken families. Also, girls have more positive self-perceptions than boys, and boys born in the first or middle-order have more positive self-perceptions than those born in the last order. Middle childhood is a period of uncertainty and formation in self-esteem (Robins and Trzesniewski, 2005). In the study by Özyürek et al. (2020), in which the self-concept of primary school children was examined, it was stated that gender, birth order, and father's profession made a difference in children's self-concept. Moreover, it was observed that the satisfaction, behavior and compliance, physical condition, mental and scholastic status of female students are higher than those of male students, and those born in the middle rank have lower anxiety, popularity, mental and scholastic status than those born in the first or last rank. In Harter's (2006) study, it is seen that children develop associated cognitive skills in middle childhood and start to use external comparisons to estimate themselves realistically. Studies focusing on the childhood period suggest that the family environment is crucial in developing the self (Harter, 2015). In the longitudinal study applied by Orth (2018), it has been proposed that the family environment in early childhood has a long-term and probably permanent self-esteem effect that can still be observed in adulthood. The support of a second parent provides more sensitive sources to react to the child's needs with warmth also commitment (Orth, 2018). Bulanda and Majumdar (2009) concluded in their studies that the presence of both parents in their children's lives and they are having a qualified relationship with them positively affect their children's self-esteem. Similarly, Bulut Serin and Öztürk (2007) determined in their study that the self-esteem levels of children having broken families are lower than the level of self-esteem of those of children having complete families. Accordingly, in parallel with the finding obtained from the study, it can be said that there is a relationship between self-esteem and family structure.

Factors affecting self-esteem were reviewed in various sources. It is possible to come across different study results on self-esteem factors. To develop self-esteem, generally, men and women follow basically the same trajectory. Gender does not have a strong influence on the development of self-esteem. In both sexes, self-esteem is relatively high in childhood, but it declines during adolescence, constantly grows throughout adulthood, and declines in old ages. However, in some studies some differences related to gender have also been found. Although males and females report comparable levels of self-esteem during childhood, the finding of some studies about males' tendency for having slightly higher levels of self-esteem than females in adolescence is trustworthy (Orth and Robins, 2014; Robins and Trzesniewski, 2005). Magro et al. (2019) concluded in their study that males have higher self-esteem than females from the age of 8, long before the onset of puberty. Researchers have mentioned multiple factors for the gender gap, from maturation changes linked with puberty to social-contextual factors associated with different treatment to boys and girls in the classroom or gender differences in body image ideals. According to the results of the current study, it can be said that the higher self-perception of women compared to men is due to factors such as realigned attitudes towards gender in the relationship and interaction of parents with their children, data collection in the urban centre, and lower gender discrimination in urban centres than in rural areas.

Çetinkaya et al. (2006) concluded that there is a positive relationship between the self-esteem level of primary school students in different socioeconomic situations and their father's occupation and educational status. On the other hand, Özkan (1994) could not find a relationship between a father's profession and self-esteem in his study.

According to the findings obtained from the study, there is a relationship between a father's profession and self-esteem. It is thought that the different results obtained from the studies are due to the effect of different variables. Secure attachment has been proposed as a descriptive marker regulating one's expectations from others and a determinant of trust-based social interaction in personal relationships (Holmes, 2002). The study determined that children having a high level of secure attachment to their mothers haswith a high secure attachment to their mothers have more positive self-perceptions. It has been determined that as the level of secure attachment to their mothers increases, children see themselves more positively about happiness, popularity, behavior and conformity, physical appearance, mental and school status, they have less anxiety, and their self-perceptions generally increase positively. People who have different attachment styles have different self-perceptions.

Many studies have investigated the relationship between different attachment styles, such as secure and insecure attachment and self-concept. In his study with secondary school students, Toprak (2020) found a secure relationship between children's attachment style to their mothers and their self-esteem. According to attachment theory, secure individuals have higher self-esteem than insecure individuals because of their past experiences with stable and reliable social interactions. For example, securely attached people often receive adequate and timely feedback from their caregivers. This stable and reliable environment allows them to see themselves as lovely and to build a positive self-image. They have more confidence in interacting with others with the help of this positive self-esteem; they create opportunities to get the feedback of others and form a straight self-concept from the feedback received from their positive and stable environment (Wu, 2009). Similar ways are also hypothesized to explain the relationship between attachment security and self-concept in the domains of school competency, physical shape, and physical abilities. For example, the child's school self-concept is determined not only by their success experiences but also by attachment security to the extent that it fosters openness and adaptability to new experiences. Parents with a secure attachment to their children are more likely to support their child's school success. (Doyle et al., 2000). In the study done by Doyle et al. (2000), it was found that child-mother attachment is highly correlated with general self-worth, physical appearance, peer relationships, and positively perceived physical abilities. Verschueren, Doumen, and Buyse (2012) noticed that social self-concept and general self-concept, which affect peer acceptance, are related to the degree of attachment to the mother and concluded that the quality of early mother-child attachment has an indirect effect on the academic dimension of the self. Individuals whose needs for attachment and trust are met during childhood are more advantageous in character development and mental health. The level of empathy and sensitivity will be higher in children who do not experience intense trauma in childhood and have a secure attachment (Öztürk, Türel and Oğur, 2020). The result of the study in question and all these findings from other studies are consistent with attachment theory. Securely attached individuals have higher and stable self-esteem, higher self-awareness about themselves, greater self-certainness, and a better-organized self-build than insecure people.

Conclusion and Recommendations

As a result, secure attachment to mother in middle childhood and self-perception are associated with father's occupation, and family structure, birth order, and gender are important variables in the child's self-perception. In summary, it is found that the mother-child secure attachment pattern in middle childhood affects to development of high self-perception. Longitudinal studies are thought to be needed to confirm and extend these findings. Self-esteem changes systematically throughout life at certain stages. Therefore, it is recommended to investigate individual differences affecting self-esteem. The results obtained from this study have important practical implications because they indicate that individuals may be vulnerable due to their attachment patterns and low self-perception. It can be said that the development of positive attitudes towards school, academic success, and future aspirations in middle childhood influence these attitudes' having significant effects on children's success as adults.

For this reason, for children to acquire a positive self-perception, it can be suggested that the person caring for them from infancy should be a safe base, provide support, protection, and security to the child, should give feedback effectively, and reach the requirements of the child in a timely and stable habit. To increase the adaptation of children to their developmental stages and strengthen their self-perception, supportive mentoring programs can be applied in schools for both families and children. This study examined the effect of secure attachment to the mother on self-perception in middle childhood. This can be considered a limitation of the study. The effect of secure attachment to mothers and fathers on children's self-perception can be studied. Another limitation may be that the data were collected only from children. Accordingly, information about parent-child attachment can be obtained from parents.
Attachment and self-perception can be analyzed according to the variables such as peer relationships, school success, anxiety, loneliness or emotional states, etc., and longitudinal studies which reveal attachment security and self-perception can be conducted. Moreover, the effects of secure attachment on the self-perception of children

having different ages can be examined comparatively. Family-education activities held in educational institutions may provide training on attitudes and behaviors towards increasing secure attachment and self-esteem during childhood.

Author (s) Contribution Rate

The study was conducted and reported with equal collaboration of the researchers.

Conflicts of Interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Ethical Approval

Ethical permission (06/12/2018 – E.29860) was obtained from Karabuk University for this research

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Investigation of the Effectiveness of Augmented Reality and Modeling-based Teaching in "Solar System and Eclipses" Unit

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Abstract

This study was aimed to investigate the effectiveness of augmented reality and modeling-based teaching in the "Solar System and Eclipses" unit. The pretest-posttest quasi-experimental design model was used in this study. For three weeks, the "Solar System and Eclipses" unit of the Science course was taught to the experimental group using modeling-based teaching and augmented reality applications, and, in the control group, the existing science curriculum was followed. The study group consists of 22 students who were in the 6th grade in the 2020-2021 academic year in a secondary school affiliated with the Ministry of National Education. Data collection tools in this study were administered "Academic Achievement Test", "21st-Century Skills Scale", and "Augmented Reality Applications Attitude Scale". The application of augmented reality and modeling-based teaching in covering the "Solar System and Eclipses" unit was positively affected students' learning and increased their levels of success, improved the 21st-century skills and improved attitudes towards augmented reality applications. Studies on augmented reality applications and modeling-based teaching in different Science course units of different secondary school grades that will contribute positively to the literature are recommended.

Keywords: 21st-Century skills, Academic achievement, Augmented reality, Attitude, Modeling-based teaching method.

Introduction

In today's world, technology and innovation form an important balance. This leads to significant changes in the field of education, which is intertwined with technology, and enables the use of various technologies in the classroom. Accordingly, augmented reality technologies used in educational environments for effective learning have attracted a growing number of researchers (Korucu, Usta & Yavuzaslan, 2016). Augmented reality technology, which promises great potential in educational contexts and is becoming more widespread, is one of the augmented reality technologies that leads to successful outcomes by combining content and interactive three-dimensional elements (Azuma, 1997; Çavaş & Çulha, 2020; Luckin & Fraser, 2011).

Compared with conventional teaching methods, education supported by augmented reality has positively affected the learning process (Gecü-Parmaksız, 2017; Kerawalla, Luckin, Seljeflot & Woolard, 2006). The use of augmented reality technology in education contributes to the development of students in both affective and cognitive terms, making learning an efficient and interesting process, and allowing the stakeholders to enjoy themselves throughout (Tomi & Rambli, 2013; Wu, Lee, Chang & Liang, 2013). Learning via augmented reality mobile apps complements face-to-face education as well (Lin et al., 2013). In addition to these advantages, augmented reality positively contributes to learning by facilitating the comprehension and perception of concepts and helping them to be better structured in mind, especially in courses such as astronomy, science, and mathematics (Bujak et al., 2013; Yen, Tsai & Wu, 2013; Wojciechowski & Cellary, 2013). Research on augmented reality applications was found to positively contribute to success and understanding (Abdüsselam & Karal, 2012; Chiang, Yang & Hwang, 2014; Çankaya & Girgin, 2018; Fidan, 2018; Kırıkkaya & Şentürk, 2018; Sırakaya, 2015; Şentürk, 2018; Wang & Chi, 2012), motivation (Chiang et al., 2014; Çakır, Solak & Tan, 2015; Erbaş, 2016; Gül & Şahin, 2017; Ramazanoğlu & Solak, 2020; Sırakaya, 2015; Şentürk, 2018), attitudes toward AR technology applications (Ramazanoğlu & Solak, 2020; Şentürk, 2018), teaching concepts by reducing

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misconceptions (Sırakaya, 2015; Yen, Tsai & Wu, 2013), self-efficacy beliefs (Fidan, 2018), and avoidance of anxiety in learning (Şentürk, 2018).

Görecek-Baybars and Çil (2019) found in their studies that secondary school students do not have a scientific thinking model. Therefore, it was found that the development of students' intellectual activities is a very important priority (Ayvacı, Bebek, Atik, Keleş & Özdemir, 2016). As a result, there is a need to design the learning process in such a way that mental activities are emphasized and appropriate learning methods are used. One of the effective methods that can be used in developing students' mental models is model-based teaching (Gobert & Buckley, 2000; Ünal-Çoban, 2009). The modeling-based teaching method dates to the 1980s (Halloun, 2011) refers to the model using analogical reasoning and achieving structural equality (Gentner & Smith, 2012). Modeling based teaching allows students to understand subjects by making relationships and solving the problems they have. It allows students to understand subjects by making relationships, solving their problems, and developing ideas about these subjects with scientific methods (Lehrer, & Schauble, 2005; Schwarz, & White, 2005; Windschitl, Rose, Stalkfleet, & Smith, 2008). The modeling-based teaching process is a process that allows students to think about the subject using their preliminary knowledge, connect with daily life or apply it to another situation (Ünal-Çoban, 2009). This process improves the student's comprehension level, shortens the learning moment, and strengthens the validity of the mental models created by the student (Güldal & Doğru, 2018). Modeling-based teaching enables students to improve their problem-solving skills (Aztekin & Taşpınar-Şener, 2015), conceptual understanding (Ünal-Çoban, Kocagül-Sağlam & Solmaz, 2016), comprehension levels (Güldal & Doğru, 2018), skills such as thinking and analysis (Ayvacı & Bülbül, 2020; Günbatar & Sarı, 2005), and ability to share ideas and resource utilization (Zorlu & Sezek, 2016). Strengthening the modeling competencies of individuals is necessary to improve the scientific literacy levels of the generation that is growing up in the 21st century.

To keep up with the developing world and its needs, the growing generation is expected to have skills that are known as 21st-century skills. According to Cheng and Tsai (2013) with Tekdal & Saygıner (2016), the augmented reality applications utilized in science education aim to facilitate student development in every aspect of learning evolve day by day, and there is an increasing trend of using such technologies in educational environments. There are relevant studies carried out with students (Ateş, 2018; Demirel, 2019; Sırakaya, 2015; Yıldırım, 2020) and pre-service teachers and active teachers (Timur & Özdemir, 2018) that address the utilization of augmented reality applications within the scope of the science course. It is seen that in these studies, abstract and complex concepts that cannot be observed or applied in daily life were taught using the said technologies and positive results were obtained (Abdüsselam & Karal, 2012; Sırakaya, 2015). In terms of this use, augmented reality applications, just like modeling-based teaching, can be used in covering topics that students need to associate with daily life based on their prior knowledge or apply in the context of another topic. To understand a subject that covers science well, it is important that they correctly configure the basic concepts of that subject in their minds by associating them with each other (Tokatlı, 2010). In their study, Görecek-Baybars and Çil (2019) examined students' mental models in the solar system. They found that middle school students do not have a scientifically mental model. The importance of using effective learning methods using technology and mental processes is becoming increasingly important in astronomy education, including the solar system and solar and lunar eclipses (Bujak et al., 2013; Namdar & Küçük, 2018; Zhang, Sung, Hou & Chang, 2014). Accordingly, the application was made in the unit "Solar System and Eclipses". In cases where it is difficult to develop three-dimensional content and applications for use in teaching, modeling-based teaching applications can be utilized. So, when the relevant studies are examined, it is understood that modeling-based teaching and augmented reality applications complement each other. Accordingly, this study investigated whether the use of augmented reality and modeling-based instructional applications in covering the "Solar System and Eclipses" unit of the 6th- grade Science course has contributed to students' learning, improved their 21st century skills, and influenced their attitudes toward augmented reality.

Method

The quasi-experimental pretest-posttest design model was used in this study. In this model, a pretest and posttest are carried out to the experimental and control groups previously created via the random method (Creswell, 2008; Fraenkel & Wallen, 2000). In this study, an experimental (EG) and a control (CG) group were formed by randomly assigning branches as either the experimental or control groups. Pretests were administered to the experimental and control groups before starting the application. The augmented reality and modeling-based teaching method was applied to the experimental group, and the current learning method was applied to the control group. At the end of the application, posttests were administered to the experimental and control groups. In this study, data collection tools were used Academic Achievement Test (AAT), 21st-Century Skills Scale (21CSS) and Augmented Reality Applications Attitude Scale (ARAAS). In this study, the Academic Achievement Test (AAT) was administered to examine academic achievement, the 21st-Century Skills Scale (21CSS) was administered to examine the effects on the field-specific skill variable (21st century skills) of science education, and the

Augmented Reality Applications Attitude Scale (ARAAS) was administered to examine attitudes toward augmented reality to students. The experimental design of the study is shown in Table 1.

Table 1. The experimental design of this study

Groups	Pre-Tests	Implementation	Post-Tests
Experiment (EG)	AAT 21CSS	Modeling-based Teaching and Augmented Reality (AR) Applications	AAT 21CSS
Control (CG)	ARAAS	The Existing Method of The Science Course Curriculum	ARAAS

The Study Group

The study group consists of students in the 6th grade in the 2020-2021 academic year in a secondary school affiliated with the Ministry of National Education in western Anatolia (Aegean region). Two 6th-grade branches constituted the participant groups, one of which was randomly assigned as the experimental group and the other as the control group. The study was carried out with the participation of 22 students, 11 (8 females and 3 males) of which were in the experimental group and 11 (7 females and 4 males) in the control group. In the study, 20.75% of the target population was taken as the sample. Statistical power analysis was performed using the G*Power program to determine the sample size. According to this power analysis, when the power analysis was analyzed at an 80% confidence interval and p=0.05 significance level, it was calculated that the minimum sample number was 18 students. In this sample consisting of 22 students, the power of the study was calculated as 0.867. In this context, it has been concluded that the sample represents the universe according to the G*Power program.

Data Collection Tools

Academic Achievement Test (AAT)

In the study, the “Academic Achievement Test” (AAT) for the "Solar System and Eclipses" unit of the Science course, which was prepared in a way that is suitable for the 6th-grade students, was utilized. The AAT was developed by Yeşiltepe (2019) and consists of 25 multiple choice questions covering the "Solar System and Eclipses" unit of the Science course. The KR20 reliability coefficient of the AAT was calculated as 0.85 (Yeşiltepe, 2019). In this study, the AAT was taken by 22 students who completed the Solar System and Eclipses unit. The obtained data showed that the KR20 reliability coefficient of the AAT was 0.80.

21st-Century Skills Scale (21CSS)

The “21st-Century Skills Scale” (21CSS) used in the study was developed by Kang, Kim, Kim and You (2012) and it was adapted into Turkish by Karakaş (2015). The original scale consists of 32 items with three main domains (cognitive, affective, and sociocultural) and 21 sub-domains. The scale is a five-point Likert-type scale. Karakaş (2015) calculated the reliability coefficients of the scale as 0.77 for the "Cognitive" domain, 0.70 for the "Affective" domain, and 0.67 for the "Sociocultural" domain. The reliability coefficient (Cronbach's Alpha) of the scale was found to be 0.92 in this study. For the factors of the scale the values 0.80 for the domain "Cognitive", 0.80 for the domain "Affective" and 0.81 for the domain "Sociocultural" were calculated.

Augmented Reality Applications Attitude Scale (ARAAS)

The “Augmented Reality Applications Attitude Scale” (ARAAS) developed by Küçük, Yılmaz, Baydaş and Göktaş (2014) was utilized to examine the attitudes towards augmented reality technology. ARAAS is a five-point Likert scale that consists of three factors (Use Satisfaction, Use Anxiety, and Use Willingness) and 15 items. The internal consistency reliability coefficient of ARAAS was found to be 0.83. The coefficients of the factors, on the other hand, were found to be 0.862 for the "Use Satisfaction" factor, 0.828 for "Use Anxiety", and 0.644 for "Use Willingness" (Küçük et al, 2014). In this study, the internal consistency reliability coefficient of ARAAS was found to be 0.89. This value was found to be 0.79 for the "Use Satisfaction" factor, 0.77 for "Use Anxiety", and 0.67 for the "Will to Use".

Pilot Application

In this study, before starting to work on the effectiveness of augmented reality technology within the scope of science course, interviews were conducted with 18 science teachers working under the Ministry of National Education in the 2019-2020 academic year for the needs analysis. Before the application, brief information about augmented reality technology was given to the science teachers. Interviews with science teachers emphasized that augmented reality applications should be used during the lessons and applied together with active teaching

methods. In addition, the science teachers mainly stated that AR applications should be made in the units of "Solar System and Eclipses", "Solar System and Beyond, Sun", "Earth and Moon", which are the first units related to astronomy in the curriculum. Apart from these units, they also stated the subjects of "Structure of the Cell", "Organelles", "Atomic Models", "Systems in Our Body", "Natural Phenomena", "Living World", "DNA and Genetic Code". Expert views were taken from three science teachers for the activities developed within the scope of the application. The activities were organized for expert views.

Implementation Process in The Experimental and Control Groups

The implementation phase of the study lasted for five weeks. For three weeks, the "Solar System and Eclipses" unit of the Science course was taught to the experimental group using modeling-based teaching and augmented reality applications, and, in the control group, the existing science curriculum was followed. Before implementation, AAT, 21CSS, and ARAAS were administered to the students in the experimental and control groups as pre-tests. To apply the modeling-based teaching method in the experimental group, worksheets for each of the sub-topics in the "Solar System and Eclipses" unit were prepared by the researchers in the light of the modeling-based teaching cycle proposed by Ünal-Çoban (2009). Several resources were used while preparing the working papers (M). AR applications were also carried out with the said working papers. The AR applications with students were carried out using the Space 4D+ and Space AR apps procured by the researchers (In this study, the photos of AR applications are given in the appendix). In addition, the exercises related to the topic in the textbook were given to students as homework. The teaching of the next sub-topic started after reviewing all assignments. The same method was followed in all topics of the unit. On the other hand, the control group was taught the topic using the conventional teaching methods. After implementation, the AAT, the 21CSS, and the ARAAS were administered as posttests. After the post-tests were administered, the augmented reality applications were repeated for two-course hours with the control group.

Data Analysis

The sample size of 30 and above is no longer a prerequisite for normal distribution. Studies have proved the sample that it will provide normal distribution if it is less than 30 or not if it is greater than 30 (Chang et al., 2008; Warner, 2008, as cited in Cevahir, 2020). The skewness and kurtosis values were first looked at for normal distribution control of the scores obtained from the AAT, 21CSS and ARAAS. If the ratio of skewness and kurtosis values to standard errors remains between -1.96 and +1.96, distribution is considered normal (Can, 2014). Skewness and Kurtosis must also be between -1 and +1 (Morgan et al., 2004). The skewness and kurtosis values of the data obtained from the 21CSS and ARAAS are between -1 and +1, the skewness value/skewness standard error ratio is between the standard error, and the kurtosis value/kurtosis standard error ratio is between -1.96 and +1.96. However, it is seen that the skewness and kurtosis values obtained from AAT are not between -1 and +1.

Table 2. Shapiro-Wilk analyze for pre-tests and post-tests

			Shapiro-Wilk		
Tests		Groups	Statistics	df	p
AAT	Pre-test	EG	0.900	11	0.184
		CG	0.856	11	0.050
	Post-test	EG	0.862	11	0.061
		CG	0.919	11	0.308
21CSS	Pre-test	EG	0.952	11	0.667
		CG	0.938	11	0.500
	Post-test	EG	0.929	11	0.400
		CG	0.979	11	0.962
ARAAS	Pre-test	EG	0.979	11	0.959
		CG	0.941	11	0.530
	Post-test	EG	0.946	11	0.594
		CG	0.915	11	0.277

EG: Experiment Group, CG: Control Group

Table 2 shows that the data obtained from the pretests and posttests of the AAT did not have a normal distribution according to the normality analysis ($p<.05$). The Mann-Whitney U test was carried out to analyze the scores obtained from the pretests and posttests of the AAT. It was found that the data obtained from the pretests and posttests of 21CSS and ARAAS did have a normal distribution according to the normality analysis ($p>.05$). Conditions for covariance analysis of the data obtained from 21CSS and ARAAS were examined (Can, 2014). The students in the experimental and control group are all different. The data obtained in 21CSS and ARAAS have a normal distribution. When the interaction of the pretests of experimental and control groups was examined, it was determined that regression accuracy did not differ by groups, and there was no significant difference

between regression slopes (p=0.248 for 21CSS, p=0.366 for ARAAS; p>0.05). It can be said that the data obtained in 21CSS and ARAAS have a normal distribution and provide the conditions for covariance analysis. In light of this finding, an ANCOVA analysis was conducted using the pretest and posttest results of 21CSS and ARAAS.

Results

The descriptive analysis and results of the Mann-Whitney U test performed on the AAT pre-test and post-test applied to the students in the experimental and control groups are given in Table 3.

Table 3. Mann Whitney U test and descriptive analysis of AAT

AAT	Groups	n	X	SD	Mean Rank	Total Rank	U	p
Pre-test	EG	11	15.82	5.19	13.14	144.50	42.500	0.235
	CG	11	12.91	4.04	9.86	108.50		
Post-test	EG	11	20.64	3.67	14.32	157.50	29.500	0.040
	CG	11	16.64	4.01	8.68	95.50		

Table 3 shows that average pre-test and post-test AAT scores are higher for students at EG than for students at CG. To Table 3, determine whether this situation is statistically significant, the Mann-Whitney U test was performed on the scores obtained from the AAT pre-tests and post-tests. When the Mann-Whitney U Test results of the AAT pre-test scores were analyzed, no statistically significant difference was found between the experimental and control groups, U=42.50, p=0.235. As for the Mann-Whitney U test results of the AAT post-test scores, it is seen that there is a statistically significant difference in the AAT post-test scores in favor of the students in the experimental group, U=29.50, p=0.040.

The descriptive statistics regarding the 21CSS pre-test and post-test scores are given in Table 4.

Table 4. Descriptive statistics of 21CSS

	Groups	N	Mean Pre-Test	Mean Post-Test	Mean Corrected Post-Test
21CSS	EG	11	126.91	132.28	134.22
	CG	11	130.36	130.82	128.87
Cognitive	EG	11	46.28	49.18	49.45
	CG	11	47.00	47.55	47.28
Affective	EG	11	42.09	42.91	43.63
	CG	11	43.27	42.09	41.38
Sociocultural	EG	11	38.55	40.18	41.07
	CG	11	40.09	41.18	40.29

To determine Table 4, the effects of the teaching methods used in the experimental and control groups on students' 21st century skills, and to understand whether the difference between the scores obtained in the 21CSS post-tests was statistically significant, an ANCOVA analysis of the corrected means of the 21CSS post-tests was conducted. Accordingly, 21CSS pre-test results were taken as the covariant, method as the independent variable and post-test results as the dependent variable. The data obtained from the ANCOVA analysis are shown in Tables 5 and 6.

Table 5. ANCOVA analysis results of 21CSS

Source	Sum of Squares	df	Mean of Squares	F	p	η2
21CSS(Pre-test)	3711.571	1	3711.571	308.63	0.000	0.942
Method	154.391	1	154.391	12.852	0.002	0.403
Error	228.247	19	12.013			
Total	384644.000	22				

The results of the ANCOVA test in Table 5 show that there is a statistically significant difference between the 21st century skills [$F_{(1-22)}$= 12.852, p<.05]. The statistically significant difference in the ANCOVA analysis is found in favor of the experimental group. The η2 (eta squared), which is the variance ratio explained by the effect

of the independent variables, is 0.403 for the applied experimental variable. This means that approximately 40% of the variance in the study's dependent variable, the post-test scores of the 21CSS, is explained by the independent variable, the applied method.

Table 6. ANCOVA analysis results of factors of 21CSS

Factors	Source	Sum of Squares	df	Mean of Squares	F	p	η2
Cognitive	Pre-test	330.373	1	330.373	84.837	0.000	0.817
	Method	25.771	1	25.771	6.618	0.019	0.258
	Error	73.990	19	3.894			
	Total	51878.000	22				
Affective	Pre-test	497.718	1	497.718	224.621	0.000	0.922
	Method	27.227	1	27.227	12.287	0.002	0.393
	Error	42.100	19	2.216			
	Total	410281.000	22				
Sociocultural	Pre-test	573.938	1	573.938	212.425	0.000	0.918
	Method	3.265	1	3.265	1.208	0.285	0.060
	Error	51.335	19	2.702			
	Total	37041.000	22				

When Table 6 is examined, it can be deduced that there is no statistically significant difference between the scores of the students in the experimental and control groups in terms of the "Sociocultural" factor [$F_{(1-22)}$= 1.208, p>0.05]. On the other hand, it was determined that there were statistically significant differences between the scores of the students in the experimental and control groups in terms of the "Cognitive" and "Affective" factors [Cognitive: $F_{(1-20)}$= 6.618, p<0.05; Affective: $F_{(1-20)}$= 12.287, p<0.05]. It can be observed that statistically significant differences in the ANCOVA analysis results in terms of the "Cognitive" and "Affective" factors are in favor of the experimental group. The η2 (eta square) for the applied experimental variable is 0.258 for the "Cognitive" factor and 0.393 for the "Affective" factor, which are the variance ratios explained by the effect of the independent variables. This means that about 26% of the variance in the post-test scores of the factor "Cognitive", which is the dependent variable, and about 39% of the variance in the post-test scores of the factor "Affective", which is the independent variable, are explained by the teaching method used.
Descriptive analysis results of the ARAAS pre-test and post-test scores of the students in experimental and control groups are given in Table 7.

Table 7. Descriptive statistics of ARAAS

	Groups	n	Mean Pre-Test	Mean Post-Test	Mean Corrected Post-Test
ARAAS	EG	11	53.64	62.91	66.68
	CG	11	58.73	57.27	53.50
Use Satisfaction	EG	11	25.45	29.82	31.66
	CG	11	28.82	26.09	24.25
Use Anxiety	EG	11	20.45	24.64	25.53
	CG	11	22.36	23.00	22.10
Use Willingness	EG	11	7.73	8.45	8.38
	CG	11	7.55	8.18	8.26

Table 7 shows that the ARAAS post-test results were higher than the pre-test results both in the experimental and control groups. To determine the effects of the teaching methods used in the experimental and control groups on students' attitudes toward augmented reality applications and to understand whether the difference between the scores obtained in the AARAS posttests was statistically significant, an ANCOVA analysis of the corrected means of the ARAAS posttests was conducted. Accordingly, ARAAS pre-test results were taken as the covariant, method as the independent variable, and post-test results as the dependent variable. The data obtained from the ANCOVA analysis are shown in Tables 8 and 9.

Table 8. ANCOVA analysis results for ARAAS

Source	Sum of Squares	df	Mean of Squares	F	p	η2
ARAAS(Pre-test)	1202.933	1	1202.933	132.761	0.000	0.875
Method	757.719	1	757.719	83.625	0.000	0.815
Error	172.157	19	9.061			
Total	80990.000	22				

The ANCOVA test results in Table 8 show that there is a statistically significant difference between the ARAAS scores of the students in the experimental and control groups [$F_{(1-22)}$= 83.625, p<.05]. The statistically significant difference in ANCOVA analysis is observed to be in favor of the experimental group. The η2 (eta squared), which is the variance ratio explained by the effect of the independent variables, is 0.815 for the applied experimental variable. This means that about 81% of the variance in ARAAS post-test scores, the dependent variable in this study, is explained by the method used, the independent variable.

Table 9. ANCOVA analysis results for factors of ARAAS

Factors	Source	Sum of Squares	df	Mean of Squares	F	p	η2
Use Satisfaction	Pre-test	199.305	1	199.305	28.000	0.000	0.596
	Method	219.720	1	219.720	30.869	0.000	0.619
	Error	135.240	19	7.118			
	Total	17603.000	22				
Use Anxiety	Pre-test	106.822	1	106.822	14.321	0.001	0.430
	Method	55.467	1	55.467	7.436	0.013	0.281
	Error	141.724	19	7.459			
	Total	12744.000	22				
Use Willingness	Pre-test	26.497	1	26.497	15.799	0.001	0.454
	Method	0.077	1	0.077	0.046	0.833	0.002
	Error	31.867	19	1.677			
	Total	1581.000	22				

Table 9 shows that there is no statistically significant difference between the ARAAS scores of the students in the experimental and control groups in terms of the "Use Willingness" factor [$F_{(1-22)}$= 0.046, p>0.05]. Statistically, significant differences were detected between the ARAAS scores of the students in the experimental and control groups in terms of the "Use Satisfaction" and "Use Anxiety" factors [Use Satisfaction: $F_{(1-22)}$= 30.869, p<0.05; Use Anxiety: $F_{(1-22)}$= 7.436, p<0.05]. It was seen that these statistically significant differences are in favor of the experimental group. The η2 (eta squared), which is the variance ratio explained by the effect of the independent variables, is 0.619 for “Satisfaction with Use” and 0.281 for “Using Anxiety” factors. This means that approximately 62% of the variance in the post-test scores of the "Use Satisfaction" factor and 28% of the variance in the post-test scores in the "Use Anxiety" factor, which are the dependent variables, are explained by the applied teaching method, which is the independent variable.

Conclusions and Discussion

In this study, which investigated the effects of using augmented reality and modeling-based instruction in the treatment of the solar system and eclipses unit in science on student learning, 21st century skills, and attitudes toward augmented reality, the following results were obtained and discussed in comparison to the relevant literature.

The use of augmented reality (AR) and modeling-based teaching in covering the "Solar System and Eclipses" unit of the Science course has positively affected students' learning and increased their success levels. This finding shows parallelism with the findings of studies in which the students in the groups where the topics are taught using the modeling-based learning method are found to be more successful than the students in the other group where conventional teaching methods are used (Bilal, 2010; Çetinkaya 2017; Demirçalı, 2016; Ergün & Sarıkaya, 2019; Gülcü & Taşçi, 2020; Kılıçoğlu, 2019; Tombul, 2019; Ünal-Çoban, 2009; Zorlu, 2016b). However, there are also studies in which the modeling-modeling-based modeling-based teaching method did not significantly impact the academic achievement levels of students in the group to which this method was applied (Arslan, 2013; Çavumirza, 2018).

The relevant studies in the literature conclude that teaching using models supports the construction and development of mental models, improves the ability to visualize concepts in the mind and contributes to the concretization of concepts (Demirhan, 2015; Pekmezci, 2017), positively affects conceptual development and reduces misconceptions (Birinci & Apaydın, 2016; Bozdemir-Yüzbaşıoğlu & Sarıkaya, 2019; Ünal-Çoban, Kocagül-Sağlam & Solmaz, 2016), improves the retention of information (Çavumirza, 2018; Ergün & Sarıkaya, 2019; Gülcü & Taşçi, 2020), and helps to connect scientific concepts to real life (Güldal & Doğru, 2018). Considering that concepts related to the Science course are difficult to perceive, using models in teaching is of great importance (Çevik-Ezberci, 2018). In addition, studies are showing that the use of models positively affects students' ability to create mental models (Clement & Steinberg, 2002; Kurnaz, 2011; Ogan-Bekiroğlu, 2007). In their studies, Arslan (2013) and Kılıçoğlu (2019) concluded that the use of models positively impacted students'

ability to create mental models. Gülcü and Taşçi (2020) also stated in their studies that covering scientific concepts using the modeling-based teaching method positively impacts the cognitive structure of students. Similarly, Taylor, Barker and Jones (2003) revealed that due to the difficulty of comprehending astronomy concepts, the lessons carried out with modeling-based activities ensure the formation and development of mental models and positively contribute to students' academic performance success.

The existence of mixed findings in the literature on the impact of the use of augmented reality technology applications on academic success can be explained by the fact that the studies focused on different courses, units, or grade levels. The findings of the relevant studies that investigated the use of AR applications in education concluded that such applications positively impact the success levels of students in the Science course (Akçayır & Akçayır, 2016; Cai, Chiang & Wang, 2013; Chiang et al., 2014; Chu, Chen, Yang & Lin, 2016; Çakır, Solak & Tan, 2015; Çankaya & Girgin, 2018; Demirel, 2019; Fidan, 2018; Gecü-Parmaksız, 2017; Ibanez, Di Serio, Villaran & Kloos, 2014; Küçük, Kapakin & Göktaş, 2016; Peder-Alagöz, 2020; Shelton & Hedley, 2002; Şentürk 2018; Türksoy, 2019; Yıldırım, 2020). AR applications were also found to reduce misconceptions and contribute positively to the comprehension of concepts (Shelton & Hedley, 2002; Sırakaya, 2015; Yen et al., 2013), as well as and help to concretize concepts (Abdüsselam & Karal, 2012). However, there are also studies thatsome studies found no difference between the experimental and control groups in terms of the impacts of the use of AR applications on students' academic success levels (Cai et al., 2013; Erbaş, 2016). In their study, Yen, Tsai and Wu (2013) used simulation-based augmented reality-assisted teaching in an undergraduate lecture on the phases of the Moon and did not observe any positive changes in the academic success levels of students.

AR used for educational purposes facilitates access to practical information and provides students with an interesting and enjoyable learning experience (Lin et al., 2013). The use of AR in teaching science enables presenting important points and concepts visually, multidimensional, and in association with real life, and therefore helps to comprehend information immediately and retain it easily (Klopfer & Sheldon, 2010; Klopfer & Squire, 2008). Also, the modeling-based teaching method used in this study enables following a sequence that improves the students' effective comprehension levels by improving their ability to create mental models (Güldal & Doğru, 2018). Students ' mental activity is stimulated by switching from mental schemas to a given state. Therefore, students must make strong connections between existing information and new concepts (Krathwohl & Anderson, 2010). Aydoğan-Yenmez (2017) reinforced the modeling-based teaching method with technology in her study and obtained positive results, which are also consistent with the results of our study.

Findings obtained from the 21CSS showed that the students in the experimental group were better achievers than those in the control group. This result can be considered as evidence that the use of AR and the modeling-based teaching method in the experimental group improves the 21st century skills of the students in the said group. The relevant studies in the literature also show that the use of the model-based teaching method improves the 21st century skills of the students, scientific process skills, critical thinking skills, and understanding of scientific methods (Batı, 2014; Nelson & Davis, 2012; Ünal-Çoban, 2009; Zorlu, 2016b; Zorlu & Sezek, 2020). A literature review also manifests that AR applications for educational purposes improve students' 21st-century skills and scientific process skills (Papanastasiou, Drigas, Skianis, Lytras & Papanastasiou, 2019; Sanabria & Arámburo-Lizárraga, 2017). The AR applications and -based modeling-based teaching method used in our study invoked a positive change in the students' skill levels. This finding is similar to the finding of Sanabria and Arámburo-Lizárraga (2017) that such applications provide students with multiple sensory learning opportunities, thus positively contributing to the development of problem-solving and creative thinking skills, as well as creativity, with the help of technology. It is established that with the integration of the modeling-based teaching method and AR applications in education, improvements have been observed in terms of concept comprehension, abstract expression perceptibility, and class enjoyment. In fact, when reviewing the literature, it appears that one of the main reasons for adopting the adoption of the modeling-based teaching method is that students can easily grasp the concepts through various process flows related to their daily lives, which enhances their cognitive development (Ünal-Çoban, 2009). The innovative AR technology was utilized to create a simultaneous and dynamic relationship between the real world and the virtual world and comprehend the concepts in a multi-dimensional manner, which ultimately helps to obtain 21-st century skills.

Findings related to the “Cognitive” and “Affective” factors of the 21CSS revealed that the students in the experimental group were better achievers than those in the control group. Based on this finding, it is possible to claim that the AR applications and the modeling-based teaching method utilized in the experimental group improved the 21st-century skills of the students in this group in cognitive and affective terms. The cognitive domain consists of the "knowledge management", "knowledge structuring", "information use", and "problem-solving" sub-domains. In contrast, the affective domain consists of “self-identity”, “self-worth”, “self-direction”, “self-responsibility”, and “social membership” sub-domains (Karakaş, 2015). The motivation and attitude of a

person to a given situation are important in helping students gain affective characteristics, which are sub-domains of 21st-century skills (Ersoy, 2012). It was found that the increase in student desire and willingness, invoked by modeling-based teaching, has reflected positively to the AR attitude scale. It is safe to say that this positively impacts students' affective characteristics as well. Dunleavy, Dede and Mitchell (2009) claim that augmented reality-based tools help to increase students' motivation and willingness to learn. Thus, students can manage their own learning processes and play an active role in them, which contributes to improving students' affective domain skills. In such cases, improvement is observed especially in the "self-management" and "self-responsibility" sub-domains. These tools are also an effective tool in students' learning processes with relatively low levels of success (Cai et al., 2013).

Cognitive skills play an important role in the students' learning. Metacognitive strategies come to the fore within the context of 21st-century skills, along with cognitive schemas and arrangements (Veenman, Van Hout-Wolters, & Afflerbach, 2006). The modeling-based teaching method helps students use their existing mental schemas to form new mental schemas that are appropriate for the new situation (Gobert & Pallant, 2004). With -based modeling-based science teaching, the scientific method is explained based on scientific process skills (Develaki, 2007), and the students' scientific process skills are strengthened (Ünal-Çoban, 2009). The fact that our study was reinforced with AR applications made the learning environment and students' motivation more significant for the study, consequently positively impacting students' cognitive skills. In the light of this information, it can be clearly seen that mentioned methods contribute positively to developing students' cognitive skills. The inclusion of applications that can contribute to and improve the students' cognitive skills in curricula will help to maintain the critical thinking disposition throughout generations (Aybek, 2007). Utilizing tools such as project development, model building, and experiments positively affect the cognitive development of students (Aygün, 2019).

Findings showed no difference between the students in the experimental and control groups regarding the Sociocultural factor of the 21SCC. The sub-domains of the "socio-cultural" domain of the 21st-century skills are "Social Membership", "Social Sensitivity", "Socialization Ability", and "Social Performance (fulfillment)" (Karakaş, 2015). It is thought that there were no positive changes in the experimental group in terms of the socio-cultural domain as there was no situation in which students could act as a group or one of the students could step up as the leader and because of the fact that the intra-team communication was weak and, cooperative learning could not be achieved effectively. Consequently, it can be said that the students did not show any significant improvement in the social domain as the group members did not work in cooperation. Individuals must interact with other people to develop their social skills. During learning, students' interactions with each other affect their success levels; so, it can be said that they are bound to learn from each other (Karataş, Cengiz & Çalışkan, 2018; Özünal, 2017). The collaborative learning model can be actively utilized to develop the students to develop the students' socio-cultural skills in the experimental group. In the cooperative learning model, it is important for the students to be active within the group. In this model, individuals commit to each other and aim to learn together; by providing a socially active environment, students are expected to improve their social behaviors on an individual level (Johnson, Johnson, & Holubec, 1994). Accordingly, the dynamics of the relationships between the students in the group should be stimulated by using the cooperative learning model. Thanks to the positive impacts of this model on the attitudes towards the Science course, the students' collaborative skills can be strengthened (Zorlu, 2016a; Zorlu, 2016b).

ARAAS findings show that the students in the experimental group were better achievers than those in the control group. Based on this finding, it is possible to claim that the AR applications and the modeling-based teaching method utilized in the experimental group improved students' attitudes towards AR applications. The positive or negative attitude of an individual towards an object, situation, or an escalating situation is called attitude (Türker & Turanlı, 2008). Student academic success is a phenomenon that can be explained based on affective characteristics. It is important to elaborate on these characteristics in examining student success (Kan & Akbaş, 2005). Affective characteristics are one of the important factors that have an impact on students' learning. In examining students' affective characteristics, attitudes and anxiety levels can be scrutinized. Positive affective behavior is of significant importance for permanent learning to take place and individuals to be successful (Etlioğlu & Tekin, 2020). Studies have shown that there is a significant relationship between the academic success levels of students and their affective attitudes (Coşkun, 2018; Fidan, 2018; Şentürk, 2018). The affective attitudes of the students towards the Science course after the utilization of AR applications in teaching were examined, and the positive findings were examined vis-à-vis the relevant studies in the literature (Akkiren, 2019; Demirel, 2017; Erbaş 2016; Onbaşılı, 2018; Sırakaya, 2015; Sırakaya & Alsancak-Sırakaya, 2018). Relevant studies concluded that the integration of AR applications in the learning process helped decrease students' use anxiety and increase use satisfaction and use willingness.

Recommendations

- We believe that further studies on the use of augmented reality applications and modeling-based teaching in different Science course units of different secondary school grades will positively contribute to the literature. It is also thought that carrying out different studies on modeling-based teaching supported with technologies other than augmented reality will positively contribute to the literature.
- Since the application of modeling-based teaching methods and augmented reality contributes positively to student success and 21st century skills, these teaching methods can be incorporated into the process, and their contributions can be benefited in the science teaching process.
- The study concluded that the desire to use augmented reality was at a high level of students in the experimental and control group. From this point of view, it is thought that the use of augmented reality and similar application at all class levels of science courses will contribute to the attitudes of the students to the courses.
- There has been no development of 21st-century skills in the socio-cultural dimension in our work. The general characteristics of the cooperative learning model are not included, even if heterogeneous cooperative groups are made that apply modeling-based teaching methods with increased reality. It is thought that the general characteristics of the cooperative learning model with heterogeneous cooperative groups in these and similar applications will be included in the process and will enable the development of socio-cultural skills. It is recommended that future studies be carried out with heterogeneous cooperative groups instead of individuals or groups.
- Finally, student textbooks can be used to prepare activities to be used in augmented reality-supported modeling-based teaching, which would be compatible with the curriculum.

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There aren't any potential conflicts of interest.

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Appendix-Photos of AR applications

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The Examination of the Relationship Between Teacher Autonomy and Teacher Leadership through Structural Equation Modeling

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The Examination of the Relationship Between Teacher Autonomy and Teacher Leadership through Structural Equation Modeling

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Abstract

The purpose of this study was to investigate the relationship between teacher autonomy and teacher leadership. For this purpose, a predictive correlational research method was used. The study was conducted with 571 teachers who were determined through a simple random sampling technique among those working in Turkey during the 2020-2021 academic year. The *Teacher Autonomy Scale* was used to determine teachers' perception of teacher autonomy, and the *Teacher Leadership Scale* was exploited for their perception of teacher leadership. Descriptive analyses such as mean and standard deviation were estimated to determine teachers' perceptions of autonomy and leadership. Pearson product-moment correlation coefficient and structural equation modeling (SEM) was employed to control the relationship between teacher autonomy and teacher leadership. As a result of the study, the participants' teacher autonomy and teacher leadership perceptions were at higher levels. Moreover, it was established that there was a positive and significant relationship between teacher autonomy and teacher leadership. Teacher autonomy was found to be among the factors explaining teacher leadership. Therefore, it can be alleged that teacher autonomy should be promoted to reveal teachers' leadership skills.

Keywords: Teacher autonomy, Teacher leadership, Structural equation modelling.

Introduction

Educational organizations have constantly changed and transformed in line with social requirements and expectations throughout history. Therefore, the expectations from teachers, who are the practitioners of education, have both increased and diversified. The concept of teacher autonomy has been recently emphasized more and more as teachers' level of authority and freedom affects organizational success (Eurydice, 2008). Teachers will have autonomy if they develop their professional potential and skills and their authority (Bustingorry, 2008). They can demonstrate these skills and potentials through their leadership skills (Altınkurt & Yılmaz, 2011). Thus, teacher leadership emerges as a vital concept. The implementation of effective teaching methods, collaboration with colleagues, and increasing the educational milieu's quality are all associated with teacher leadership (Katzenmeyer & Moller, 2009). One of the most crucial bases of social power for leadership is the power of expertise (Raven, 1993). Öztürk (2011) emphasizes that expertise, that is professionalization, is possible by increasing autonomy. It is believed that teacher autonomy should be encouraged and teachers' self-expression should be reinforced for teacher leadership to develop (Emira, 2010). Teacher leaders can be given autonomy and responsibility to contribute to organizational change (Andrew, 1974). It is essential to reveal the relationship between teachers' leadership skills and their autonomy.

In this part of the study, the conceptual framework for teacher autonomy, teacher leadership, and the relationship between these two would be given.

Teacher Autonomy

A milieu where teachers make decisions and assume responsibilities is a prerequisite for educational organizations to achieve their goals, increase the quality of teachers, support professional development, and enable teachers to demonstrate their leadership skills (Webb, 2002). It is hoped that education and training activities will be of higher quality if teachers' authority is extended within the framework of their roles and responsibilities, and they are provided with an independent working environment (Friedman, 1999; Ingersoll, 2007). It is reported that

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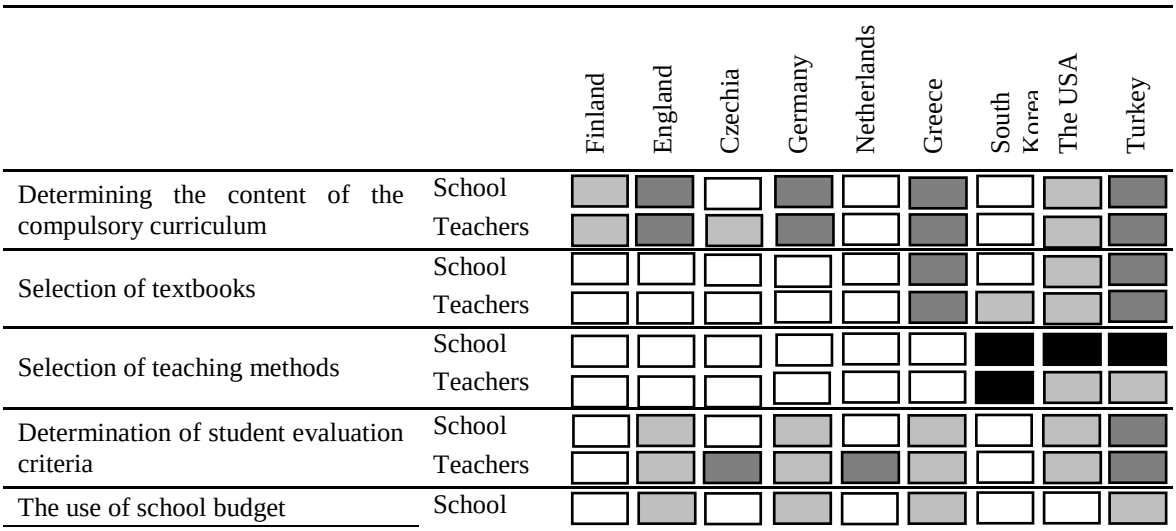
professionalization is among the determinant factors for teacher quality and student achievement, and it is based on teacher autonomy (OECD, 2016). Thus, teachers' level of autonomy in taking initiative is highly remarkable.

It is not possible to make a common definition of teacher autonomy depending on the studies in the literature (Castle, 2004). According to Garvin (2007), autonomy is the flexibility, power, and authority of the teacher's influence on teaching, assessment, and school administration. Ramos (2006) defines teacher autonomy as the ability of teachers to make decisions within the framework of their professional competence in cooperation with the stakeholders of education and to take responsibility for their decisions. Teacher autonomy means that the teacher is willing, well-equipped, and free to evaluate educational activities (Huang, 2007). Çolak and Altınkurt (2017) indicated that teacher autonomy has a comprehensive meaning. The definitions have included power, authority, decision-making, freedom, willingness, cooperation, responsibility, decision-making competence, power, and freedom in related issues to the teacher's school, education, and students.

It is possible to encounter different classifications and dimensions as in the definition of teacher autonomy. While Pearson and Hall (1993) dealt with two dimensions as, curriculum autonomy and overall teaching autonomy, Friedman (1999) classified four dimensions as teaching and assessment autonomy, autonomy in participating in decisions, professional development, and curriculum. Öztürk (2011) listed the dimensions of planning and implementation of teaching, participation in administrative processes, and professional development. Çolak and Altınkurt (2017), on the other hand, addressed four dimensions, namely the teaching process, the curriculum, professional development, and professional communication as adopted in this study. During the teaching process, teachers should be given full authority in the circumstances such as arranging classroom practices according to the needs of students, planning, preparation, and using materials (Eurydice, 2008). For professional development, teachers need to be provided with autonomy not only within their authority but also in developing their professional skills (Çolak & Altınkurt, 2017). Can (2009) highlights the importance of teachers' taking responsibility in program development according to the school's needs and students beyond the predetermined curriculum.

Öztürk (2011) claims that teachers may become lonely, avoid cooperation, and resist change in cases where they have fallen short of autonomy. On the other hand, professional communication autonomy is defined as the ability of teachers to express their opinions easily without fear and anxiety in their communication with their colleagues, administrators, and parents (Çolak & Altınkurt, 2017). Therefore, it is necessary to embrace teacher autonomy under the dimensions of planning the educational process, curriculum development, professional development, and cooperation, as in the present study.

Teacher autonomy has started to be a remarkable area of interest for educational politicians, administrators, and practitioners during the educational reform process since the middle of the 20th century (Eurydice, 2008). It has been argued that teacher autonomy is limited in Turkey and that educational reforms are overcentralized (Osgood, 2006), that teacher autonomy is constrained by institutional services (Wermke & Höstfält, 2014), and that centralized decisions are supervised by school administrators rather than teachers (Ingersoll & Collins, 2017). It can be asserted that this very situation leads to the inability of teachers to reveal their professional potential and to a decrease in their self-esteem (Özaslan, 2015). Figure 1 presents information about the autonomy levels of schools and teachers in Turkey and different countries.



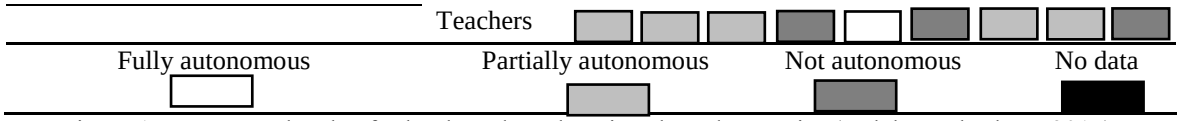


Figure 1. Autonomy levels of schools and teachers in selected countries (Çolak & Altınkurt, 2017).

Based on Figure 1, it can be argued that teachers in Turkey are not autonomous in determining the content of the curriculum, selecting textbooks, determining the criteria for evaluating students, and determining the school budge. Still, they have partial autonomy in selecting the teaching method.

Teacher Leadership

It is a well-known fact that teachers are among the most important elements of the educational process at schools. However, it is now widely accepted that effective leadership is critical for the development of schools (Bellibaş et al., 2020). In the traditional understanding of education, the leadership role in schools is assigned to school administrators due to their official authority. On the other hand, teachers have been appreciated in terms of their educational roles within the classroom. However, like many other organizations, today's schools experience rapid change, and all the stakeholders at school must contribute to the efforts to adapt to this very process. One of the common findings in recent studies on effective leadership is that the authority to lead should not be assumed as unique to the school administrator and should be distributed among the stakeholders within the school (Harris & Muijs, 2003). Today, the concept of school leadership goes beyond traditional organizational management and includes individuals who improve the quality of education in classrooms and change the school culture, as well as school administrators (Beycioğlu & Aslan, 2012) and is reconsidered with a collective approach (Katzenmeyer & Moller, 2009). Therefore, the concept of distributed leadership argues that all individuals at school should be allowed to lead and take responsibility (Lambert, 2003), and the notions of collaborative work and responsibility have gained importance (Frost & Harris, 2003). This paradigm shift in the context of school leadership has led to the prominence of the concept of teacher leadership and its elaboration from different aspects (Darling-Hammond et al., 1995; Smylie, 1995; Bishop et al., 1997; Odell, 1997; Leithwood & Jantzi, 2000; Silva et al., 2000; Mayo, 2002; Frost & Harris, 2003; Harris & Muijs, 2003; Harris, 2003, 2005; Muijs & Harris, 2003, 2006, 2007; Lambert, 2003; Anderson, 2004; Scribner & Bradley-Levine, 2010; Nguyen et al., 2019; Sawalhi & Chaaban, 2019).

Although there are many definitions for the concept of teacher leadership, there is no consensus on the definition as the concept is believed to be handled uniquely for each school context (Wasley, 1991; Sergiovanni & Starratt, 2001; Muijs & Harris, 2003; York-Barr & Duke, 2004; Katzenmeyer & Moller, 2009). In addition to the traditional (formal) roles for teachers, it is observed that divergent (informal) roles have also been included in the definitions of teacher leadership. According to Ward and Parr (2006), teacher leadership, in which all teachers are considered as having the potential to be a leader, is not just about official duties such as group leader, team leader, formateur teacher, expert teacher, etc. Still, it is a further phenomenon covering those official titles. As the main purpose of the educational process at schools is to improve students' learning outcomes, teacher leadership has focused on developing the influential factors on this issue. In this regard, teacher leadership is defined by York-Barr and Duke (2004) as "establishing effective relationships within the school, eliminating the barriers and organizing resources to improve students' educational experiences and outcomes". This definition gives clues that teachers should go out of their classrooms and positively affect other people and processes at school. Danielson (2006), on the other hand, emphasized the skills that teacher leaders should have by describing the concept of teacher leadership as "the set of skills that enable the teacher to influence the outside of the classroom to increase school success while continuing to teach the students". In addition to the teachers' skills, it is also essential to develop the relationships between stakeholders at schools, share information and build a promotive culture for teacher leadership. Therefore, Childs-Bowen et al. (2000) explained teacher leadership as "teachers' contribution to the creation of a learning-based culture at school, their cooperation with their colleagues and support of each other, their leadership behaviours outside the classroom as well as during the teaching process, their development and execution of effective instructional practices for the students". In light of the above definitions, it is clear that a teacher's leadership role prioritizes improving student learning outcomes by implementing and sharing high-quality instructional practices in the classroom, contributing to the professional development of other teachers through good relationships and collaboration, and thus leading the creation of a "learning" based culture in the school.

Harris (2005) stated that the teacher leadership movement is an approach that provides significant benefits to the school, teachers, and students. Teacher leaders contribute to forming a professional working culture at school thanks to their experience and expertise (Kardos & Johnson, 2007). While teaching in their classrooms, they motivate their colleagues (Kılınç & Recepoğlu, 2013) and lead them (Demir, 2020) to ensure that the school achieves its goals. Their colleagues and school administrators respect teacher leaders with successful teaching

backgrounds, and they pass on their knowledge and skills to others in the school community (York-Barr & Duke, 2004), create opportunities for professional learning (Harris & Muijs, 2003), and enhance human capacity. (Harris & Lambert, 2003). Teacher leaders who are the representatives of change at schools (Harris & Muijs, 2005) are also very knowledgeable about the curriculum (Miles et al., 1988) and assist the development of the curriculum (Harris & Muijs, 2003). Teacher leaders with continuous professional development contribute more to school decision-making processes with the knowledge and skills they gain (Katzenmeyer & Moller, 2009). Thus they dedicate themselves more to the development of the school (Gül, 2017). On the other hand, teacher leaders promote student achievement directly or indirectly through their contributions to the school and their colleagues (Leithwood & Jantzi, 2000; Harris, 2005).

As adopted by the present study, the concept of teacher leadership was found to have three dimensions by Beycioğlu & Aslan (2010). Accordingly, *institutional development* is the dimension that changes the structure of the leadership responsibilities that mostly belong to the principal and refers to the participation of teachers in various administrative activities. These include such practices as coordinating some of the decisions taken and auditing the processes. According to the *professional development* dimension, the teacher leader creates an impact on their students and colleagues by exhibiting pioneering and exemplary behaviours while developing professionally. The dimension of *collaboration with colleagues* is based on teachers' assistance and support to their colleagues. The teacher leader attempts to increase educational effectiveness by guiding the newly appointed teachers, leading the formation of cooperative working groups, and in line with the emerging professional and institutional needs.

The Relationship Between Teacher Autonomy and Teacher Leadership

It can be argued that teachers occupy a relatively important position in terms of their duties and responsibilities among the actors that influence the educational and teaching process and have different roles in schools, as the systematic and organized structures that have emerged to meet the educational needs of societies. Due to the changes in various fields in recent years, expectations regarding education stakeholders have also altered, and new roles and responsibilities have been imposed on teachers both inside and outside the school. Teachers' participation in decisions has become vital for schools to reach their curriculum-related goals and to establish an effective decision-making mechanism (York-Barr & Duke, 2004). Furthermore, as stated above, the concept of "teacher leadership" has found a place in the educational administration literature, based on the idea that the authority to lead should not be considered unique to the school administrator and should be distributed among the stakeholders within the school (Harris & Muijs, 2003). Therefore, creating the environment, conditions, and culture that will allow teachers to lead at schools has gained importance. Katzenmeyer and Moller (2009) listed the characteristics of promotive school culture for teacher leadership as focusing on professional development, respecting teachers for their contribution to the organization, removing barriers to autonomy, encouraging professional cooperation, participation in decision-making processes, effective communication, and creating a satisfactory work environment for teachers. Leithwood et al. (1996) pointed out that one of the ways to offer teachers opportunities to lead school improvement is to provide teachers with autonomy by school leaders.

Similarly, Wenner and Campbell (2017) voiced that teacher autonomy can be effective in developing teacher leadership, and school administration that grants an appropriate level of autonomy to teacher leaders is of key importance to achieve this. Teacher leadership necessitates an autonomous job description at school and in the classroom (Barth, 1990). That's why, autonomy liberates teachers from traditional bureaucratic teaching processes and encourages them to use their innovative ideas and decisions for the development of all teaching processes (Jumani & Malik, 2017). Teachers need autonomy to provide the best opportunities for students in terms of education and training, exhibit leadership qualities in the face of immediate problems (Blanchard, 2007), and overcome stubborn obstacles created by school culture (Johnson & Donaldson, 2007). Araşkal and Kılınç (2019) uttered that school administrators are crucial in the emergence of teacher leaders in terms of supporting the autonomy of teacher leaders, and providing teacher leaders with the opportunity to try different teaching methods and techniques, to develop professionally, and to cooperate. Therefore, it is believed that teacher autonomy is influential in the emergence of teacher leadership behaviours and there may be a possible relationship between these two concepts.

Purpose of the Study

The present study aimed to examine the relationship between teacher autonomy and teacher leadership. The characteristics such as teachers' taking decisions on matters related to their profession, displaying professionalism, being aware of their authority and roles, using their professional capacity and skills for the development of

students, and organizing the working environment are related to teacher autonomy. The ability of teachers to exhibit these skills and behaviours and to influence the stakeholders of education is about leadership skills. The examination of relevant literature yielded that no specific study has directly examined the relationship between teacher autonomy and teacher leadership except those on the relationship between leadership and autonomy. In this regard, it is expected that the present study will contribute to the literature and give an idea about the practices of practitioners and policymakers in the relevant field. It is also hoped that the study may form the basis for new research. In line with this main purpose, answers to the following questions were sought.

1. What is the level of teacher autonomy perception of the participating teachers?
2. What is the level of teacher leadership perception of the participating teachers?
3. Is there a significant relationship between teacher autonomy and teacher leadership?
4. Does teacher autonomy significantly predict teacher leadership?

Method

Research Model

The predictive correlational research method, among correlational research designs, was adopted in the study. In predictive correlational studies, the relationships between variables are examined and one of the variables is attempted to be predicted based on the other(s) (Frankel & Wallen, 2006). The relationship between teacher autonomy and teacher leadership was tested through Structural Equation Modeling (SEM). SEM is a powerful statistical method based on developing a theory by examining the relationships between variables (Byrne, 2010). In this regard, the study aimed to reveal the predictive relationship between teacher autonomy and teacher leadership.

Population and Sample

The research population consisted of teachers working at public primary schools in the central districts of Gaziantep, one of the metropolitan cities in southeast Turkey. The study was carried out with 571 teachers who were determined through a simple random sampling technique among those working in the central districts of Gaziantep during the 2020-2021 academic year. Bryman and Cramer (2005) claim that reaching five times the number of items used in the study would be sufficient for the sample size. The sample size was considered adequate as the total number of items in the scales used in this study is 42. Information on the demographics of the participating teachers was presented in Table 1.

Table 1. Demographics of participating teachers

Variable	**Sub-group**	**N**	**%**
Gender	Male	262	45.9
	Female	309	54.1
Age	Between 20-30	208	36.4
	Between 31-40	233	40.8
	Between 41-50	105	18.4
	51 and over	25	4.4
Level of education	Undergraduate	498	87.2
	Graduate	73	12.8
Professional seniority	Between 1-10 years	305	53.4
	Between 11-20 years	184	32.2
	Between 21-30 years	74	13.0
	30 years and over	8	1.4
Working years at school	Between 1-5 years	398	69.7
	Between 6-10 years	132	23.1
	11 years and over	41	7.2
Type of school	Primary school	264	46.2
	Secondary school	307	53.8
Teaching field	Pre-school teacher	35	6.1
	Primary school teacher	221	38.7
	Subject matter teacher	315	55.2
	Total	571	100

As seen in Table 1, 262 (45.9%) of the participating teachers were male, 309 (54.1%) were female, 208 (36.4%) were between the ages of 20-30, 233 (40.8%) were between the ages of 31-40, 105 (18.4%) were between the ages of 41-50, 25 (4.4%) were 51 years old and over. According to the level of education, 498 (87.2%) of them were undergraduates and 73 (12.8%) were graduates. Based on the variable of professional seniority, 305 (53.4%) had between 1-10 years, 184 (32.2%) had between 11-20 years, 74 (13%) had between 21-30 years, 8 (1.4%) had 31 and more years of seniority. For working years at school, 398 (69.7%) have been working at the same school for 1-5 years, 132 (23.1%) for 6-10 years, 41 (7.2%) for 11 years, and more. According to the type of school, 264 (46.2%) worked at primary schools and 307 (53.8%) of them worked at secondary schools. Based on the variable of the teaching field, 35 (6.1%) were pre-school teachers, 221 (38.7%) were primary school teachers and 315 (55.2%) were subject-matter teachers.

Data Collection Instruments

The research data were collected through the scales chosen following the purpose of the study and the demographic survey form developed by the researchers. The purpose of the study was submitted to the participants with the data collection instrument. It was emphasized that the research data would only be used for scientific purposes, the participation was voluntary, and there was no need to include private information. The items were asked to be answered sincerely to obtain valid and reliable results. The study used the Teacher Autonomy Scale and the Teacher Leadership Scale as data collection instruments and collected information on demographics. The scales and the validity and reliability results are presented below.

Teacher Autonomy Scale

Within the scope of the study, the "Teacher Autonomy Scale" developed by Çolak and Altınkurt (2017) and consisting of four sub-dimensions and a total of 17 items was used to determine teachers' perception of autonomy. The sub-dimensions were teaching process autonomy (6 items), curriculum autonomy (5 items), professional development autonomy (3 items), and professional communication autonomy (3 items). Each item in the scale was graded with "strongly disagree" (1), "disagree" (2), "moderately agree" (3), "agree" (4), "strongly agree" (5) on a Likert-type five-point scale. Within the scope of this study, it was concluded that the goodness of fit indices, x^2/Df= 4.17, RMR= .046, RMSEA= .075, GFI= .91, AGFI= .87, CFI= .91, IFI= .91, was acceptable based on the confirmatory factor analysis performed to test the construct validity of the scale (Cokluk et al., 2012).

Teacher Leadership Scale

Within the scope of the study, the "Teacher Leadership Scale" developed by Beycioğlu and Aslan (2010) and consisting of three sub-dimensions and a total of 25 items was used to measure the teacher leadership perception of the participants. The sub-dimensions were institutional development (9 items), professional development (11 items), and collaboration with colleagues (5 items). Each item in the scale was scored as "Never" (1), "Rarely" (2), "Sometimes" (3), "Often" (4), "Always" (5) on a Likert-type five-point scale. Within the scope of this study, it was concluded that the goodness of fit indices, x^2/Df= 4.21, RMR= .051, RMSEA= .076, GFI= .85, CFI= .90, IFI= .90, was acceptable based on the confirmatory factor analysis performed to test the construct validity of the scale (Çokluk et al., 2012).

Table 2 demonstrated the Cronbach's alpha internal consistency coefficients (reliability coefficients) estimated in the original and present studies.

Table 2. Cronbach's Alpha internal consistency coefficients

			Internal Consistency Coefficients	
Scales	**Sub-dimensions**	**Number of Items**	**Original study**	**Present study**
Teacher Autonomy Scale	Teacher Autonomy	17	0.91	0.88
	Teaching process	6	0.82	0.77
	Curriculum	5	0.82	0.80
	Professional development	3	0.85	0.83
	Professional communication	3	0.78	0.73
Teacher Leadership Scale	Teacher Leadership	25	0.91	0.94
	Institutional development	9	0.79	0.90
	Professional development	11	0.85	0.91
	Collaboration with Colleagues	5	0.73	0.86

According to Table 2, the Cronbach's alpha reliability coefficients in this study ranged from .73 to .94. Cronbach alpha reliability coefficients above .70 are assumed to be satisfactory for an ideal scale (Pallant, 2020). Accordingly, it can be asserted that the reliability coefficients of the Teacher Autonomy Scale with its sub-dimensions and the Teacher Leadership Scale with its sub-dimensions were decent.

Data Analysis

This study used descriptive statistics such as mean and standard deviation to determine the participants' perceptions of teacher autonomy and teacher leadership. The relationship between teacher autonomy and teacher leadership was examined through Pearson product-moment correlation. The correlation coefficients between 0.70-1.00 were found to be high, those between 0.70-0.30 were found to be moderate, and those between 0.30-0.00 were found to be low (Büyüköztürk, 2012). On the other hand, structural equation modeling (SEM) was conducted to determine the common variance between teacher autonomy and teacher leadership. Several fit indices were used to decide whether the model predicted by structural equation modeling was supported by the research data. Regarding the goodness criteria for the fit indices in the structural equation modeling with observed and latent variables, it is considered to be a perfect fit when the x^2/Df index is less than two, and an acceptable fit if it is less than five while the RMSEA between .08 and .05 is acceptable, and less than .05 is regarded to be a perfect fit (Meydan & Şeşen, 2014). IFI, NFI, and NNFI (TLI) fit indices between .90 and .95 are acceptable fit, and the values of .95 and over indicate a perfect fit; GFI and AGFI indices between .85 and .90 are acceptable fit, and .90 and over illustrate a perfect fit; SRMR index of less than .08 is acceptable fit, and a value of .05 and below suggests a perfect fit; CFI index of .95 and over is acceptable fit, and .97 and over means perfect fit (Byrne, 2010; Kline, 2011).

Kurtosis and skewness values were examined to determine whether the obtained data were normally distributed. The obtained data were analysed using SPSS 22.0 and AMOS 21 software packages. According to Tabachnick and Fidel (2007), kurtosis and skewness values between -1.5 and +1.5 point out that the data are normally distributed. This study observed that the kurtosis and skewness values for the variables ranged between -1 and +1 and it was decided that the research data had a normal distribution.

Findings

This section initially submitted descriptive statistics and correlation coefficients regarding teacher autonomy with its sub-dimensions and teacher leadership with sub-dimensions. Then, the findings related to the structural equation modeling for determining the common variance between teacher autonomy and teacher leadership were included.

Descriptive Statistics and Correlation Coefficients Between the Variables

Descriptive statistics and correlation coefficients related to teacher autonomy and teacher leadership with their sub-dimensions, in line with the first three research questions to be answered for the study's main purpose, were given in Table 3.

Table 3. Descriptive statistics and correlation coefficients between the variables

	X	**Df**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
1. Teacher autonomy	4.10	0.54	1.00								
2. Teaching process	4.26	0.54	.85**	1.00							
3. Curriculum	4.10	0.67	.83**	.66**	1.00						
4. Professional development	3.84	0.91	.76**	.49**	.48**	1.00					
5. Professional communication	4.04	0.75	.64**	.40**	.33**	.44**	1.00				
6. Teacher leadership	4.05	0.58	.50**	.37**	.42**	.39**	.39**	1.00			
7. Collaboration with colleagues	4.10	0.70	.46**	.37**	.41**	.32**	.35**	.83**	1.00		
8. Institutional development	3.61	0.79	.44**	.29**	.38**	.40**	.33**	.91**	.66**	1.00	
9. Professional development	4.38	0.52	.43**	.36**	.35**	.29**	.35**	.87**	.66**	.64**	1.00

**p< 0.01

The examination of the perception levels of the participants regarding teacher autonomy with its sub-dimensions in Table 3 yielded that the teaching process sub-dimension was at the level of "strongly agree" (X= 4.26) while teacher autonomy, curriculum, professional development, and professional communication were at the level of

"agree" (X= 3.84 – 4.10). When the perception levels of teacher leadership with its sub-dimensions were examined, it was observed that the professional development sub-dimension was at the level of "strongly agree" (X=4.38) while teacher leadership, institutional development, and collaboration with colleagues were at the level of "agree" (X=3.61 – 4.10). It was concluded that the correlation coefficients between the variables indicated a significant positive relationship. It was determined that there was a moderately positive and significant relationship (r=.50; p<0.01) between teacher autonomy and teacher leadership.

Structural equation modeling was used to determine the common variance between teacher autonomy and teacher leadership, in line with the 4th research question to be answered for the study's main purpose. The goodness of fit indices obtained from the analysis and the acceptable and perfect fit limits were given in Table 4.

Table 4. The goodness of fit indices in the study and acceptable and perfect fit limits

Fit Index	Perfect fit limit	Acceptable fit limit	The values obtained in this study	Result
χ^2/Df	≤3	≤5	4.53	Acceptable fit
GFI	≥.90	≥.85	.97	Perfect fit
AGFI	≥.90	≥.85	.93	Perfect fit
RMSEA	≤.05	0.06-0.08	.07	Acceptable fit
SRMR	≤.05	0.06-0.08	.03	Perfect fit
CFI	≥.97	≥.95	.97	Perfect fit
NFI	≥.95	≥.90	.97	Perfect fit
NNFI(TLI)	≥.95	≥.90	.95	Perfect fit
IFI	≥.95	≥.90	.97	Perfect fit

According to Table 4, it was found that the fit indices obtained in this study indicated acceptable and perfect fit when compared with the perfect and acceptable fit limits (Schumacker & Lomax, 2004). The proposed model through the structural equation modeling is shown in Figure 2.

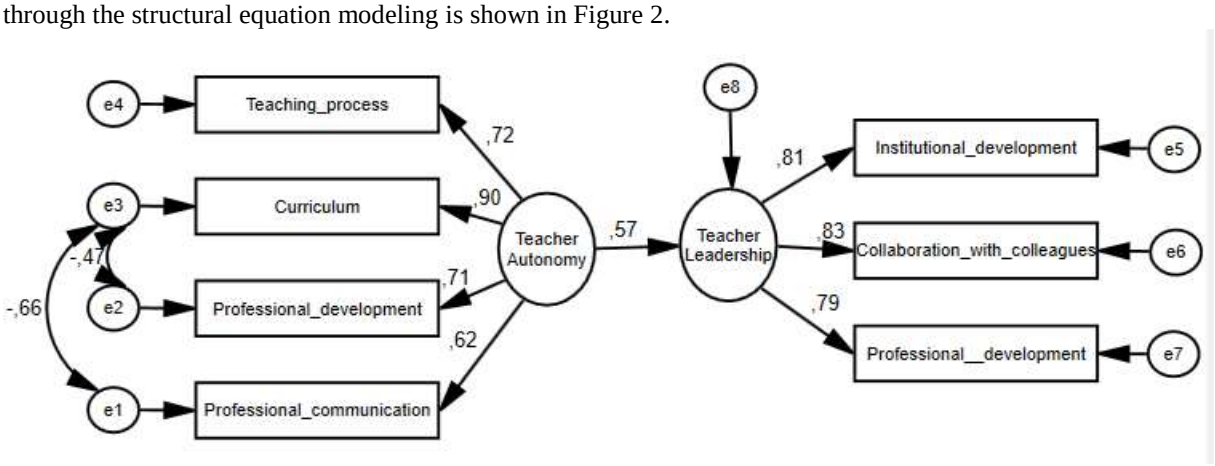


Figure 2. Structural equation modeling between teacher autonomy and teacher leadership

The standardized and non-standardized path coefficients for the common variance between teacher autonomy and teacher leadership were submitted in Table 5.

Table 5. Standardized (B_0) and non-standardized (B_1) path coefficients in structural equation modeling for the relationship between teacher autonomy and teacher leadership

			B_0	B_1	S.E.	C.R.	p
Teacher autonomy	⟶	Teacher leadership	0.57	0.79	0.08	9.61	<0.001
Teacher autonomy	⟶	Institutional development	0.81	1			
Teacher autonomy	⟶	Collaboration with colleagues	0.83	0.90	0.04	20.03	<0.001
Teacher autonomy	⟶	Professional development	0.79	0.64	0.03	19.29	<0.001

According to Table 5, it was established that the acceptable and perfect goodness-of-fit indices obtained as a result of the analyses confirmed the proposed model. Path coefficients between observed and unobserved variables were statistically significant (p<0.001). In addition, it was determined that there was a significant relationship between teacher autonomy and teacher leadership (β_0=.57, p<0.001), and the common variance between the two latent variables was 32% (R^2= 32).

Discussion and Conclusion

The relationship between teacher autonomy and teacher leadership was examined in this study. For this purpose, the perception levels of the participants regarding teacher autonomy were primarily discussed. The research results suggest that teachers have a high level of autonomy perception to a certain extent. This finding suggests that teachers in Turkey feel relatively free to take responsibility for decision-making processes regarding teaching practices, methods and techniques to be used, assessment and evaluation practices, and their communication with education stakeholders, although they have limited autonomy (Eurydice, 2008; OECD, 2013). Prichard and Moore (2016) pointed out that the autonomy-limiting effects of the stakeholders of education and governments may impress teachers' perception of autonomy. It can be asserted that teachers have a high sense of autonomy even when they experience frustration from different sources (Einolf, 2002; Rudolf, 2006). While some studies on teacher autonomy yielded that the teachers had a moderate level of autonomy perception (Çolak & Altınkurt 2017; Dampson et al., 2019), some others reported a high level of autonomy perception (Salokangas et al., 2020; Yorulmaz et al., 2018). The divergent results of the studies may be related to the factors such as school climate, school culture, administrative approach, the processes of teacher training and development. Based on the sub-dimensions of teacher autonomy, it was concluded that teachers had a high level of autonomy perception in the teaching process sub-dimension, they, on the other hand, had a high level of autonomy perception in the curriculum, professional communication, and professional development sub-dimensions to a certain extent. Some studies in the literature also demonstrated that the teachers acted more autonomously in the teaching sub-dimension of teacher autonomy (Archbald & Porter, 1994; Lacoe, 2006; Garvin, 2007; Karabacak, 2014). It can be argued that the teacher's freedom to make decisions in the classroom and determine the methods and techniques to be used while lecturing support their autonomy in teaching despite the limiting factors regarding autonomy.

Consistent with the purpose of the study, participants' perceptions of teacher leadership were examined. The research findings indicated that participants' perceptions of teacher leadership with its sub-dimensions, namely collaboration with colleagues, institutional development, and professional development, were somewhat high. This seems to be supported by various research findings (Beycioğlu & Aslan, 2012; Kılınç & Recepoğlu, 2013; Kılınç et al., 2015; Öntaş & Okut, 2017; Öztürk & Şahin, 2017; Cansoy & Parlar, 2018; Aslan et al., 2019) in the related literature. These results reveal that teachers contribute to the quality of teaching and the institutional development of the school by taking actions and exhibiting behaviours that go beyond their formal and traditional roles. In addition, it points out that teachers consider themselves as professionals who facilitate the educational process of students and share their in-class activities, practices, and skills with other teachers. Moreover, it can be inferred that teachers believe that they are effective in improving the teaching activities and professional development of their colleagues. Wenner and Campbell (2017) voiced that teacher leaders are teachers who assume leadership responsibilities outside the classroom as well as their classroom practices. Studies, carried out especially during the Covid-19 pandemic, have revealed that teachers' communication and problem-solving skills become more of an issue for the period of "new normal" (Yıldız Şal & Göçen, 2022). Therefore, teacher leaders are individuals who are hardworking, open to innovations, motivate the students with their various knowledge and skills, and are ready to help other teachers (Katzenmeyer & Moller, 2009). It can be claimed that the participating teachers are role models and influence their colleagues with their professional knowledge and competencies and personal characteristics. What's more, it can be deduced that they support other teachers by sharing their experience and skills in solving their professional problems and encouraging them in professional development.

As for the relationship between teacher autonomy and teacher leadership, it was concluded that there is a moderate, positive, and significant relationship. Additionally, a positive, moderate, and significant relationship was observed between teacher autonomy and the sub-dimensions of teacher leadership, namely institutional development, collaboration with colleagues, and professional development. These results pinpoint that teachers' leadership behaviours will increase together with the rise in autonomy behaviours. In that vein, teachers' leadership behaviours will also be limited if their autonomy behaviours are restricted. Bredeson (2000) highlights that school administrators motivate teachers about teacher autonomy in effective schools. Webb (2002) indicates that teachers are negatively affected and do not feel free due to not taking a decent place in decision-making and administrative processes. Ingersoll (2007), on the other hand, asserts that teachers should be given authority and power along with responsibilities. According to Öztürk (2011), the teacher should be equipped with autonomy and decision-making power. Therefore, it is necessary to provide teachers with an environment where they can exhibit their leadership skills along with the autonomy to increase effectiveness and efficiency in educational organizations.

Finally, the extent to which teacher autonomy predicts teacher leadership was examined in line with the study's main purpose. According to the structural equation modeling result, it was yielded that teacher autonomy explained 32% of teacher leadership. This result suggests that teacher autonomy and teacher leadership are not independent structures and that teacher autonomy is one of the significant factors affecting teacher leadership. Teachers' leadership skills should be revealed by taking responsibility not only during the teaching processes but also inside and outside the classroom (Cemaloğlu & Duran, 2018). Therefore, it is necessary to develop teachers' collaborative decision-making processes at school, encourage teachers to exhibit leadership behaviours, and create opportunities for increasing their performance (Yılmaz et al., 2017). Thus, it can be alleged that teachers should be autonomous during the teaching process and the practices for boosting their professional development and communication capacities should be carried out to improve the quality of teachers and strengthen their professional professionalism (Buyruk & Akbaş, 2021). However, it is possible to say that different factors explain teacher leadership as well as teacher autonomy. Katzenmeyer and Moller (2009) listed the significant factors for teacher leadership such as respecting teachers for their contributions to the institution, encouraging professional cooperation, participation in decision-making processes, and creating a positive school climate and professional autonomy. On the other hand, various studies concluded that factors such as organizational culture (Öztürk & Şahin, 2017), school principal's leadership (Araşkal & Kılınç, 2019), and personal characteristics (Sawalhi & Sellami, 2021) are effective on teacher leadership.

As a result, it was revealed that the participants perceived teacher autonomy and teacher leadership at higher levels. It was determined that there is a positive and significant relationship between teacher autonomy and teacher leadership. Furthermore, it was found that teacher autonomy is among the factors explaining teacher leadership.

Limitations and Recommendations

Teachers working in elementary schools were only included in the sample during the development of the teacher leadership scale. Therefore, it may be considered a limitation that the sample of this study consisted only of teachers working in elementary schools. While national and international studies conducted in this area indicate limited teacher autonomy in Turkey, the high perception of teacher autonomy in this study implies that it should be explored in more detail. An in-depth (interpretive) qualitative research can be conducted to uncover the reasons behind it. Based on the research findings, it can be asserted that school administrators who expect teachers to engage in leadership behaviours should adopt practises that support teacher autonomy and develop a favourable school structure. Practises such as involving teachers in decision-making, supporting professional development, giving teachers the authority to design curriculum according to students' needs, and developing intra-school communication channels can help ensure teacher autonomy. On the other hand, it is recommended to conduct quantitative, qualitative, and mixed-method studies to identify the different factors that influence teacher leadership.

Author(s) Contribution Rate

The authors contributed equally to the study.

Conflicts of Interest

The authors declare that they have no conflict of interest.

Ethical Approval

Ethical permission (08.04.2021-33736) was obtained from Gaziantep University's Social and Humanities Sciences Ethics Committee for this research.

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Polemic and Cynicism: A Study in Educational Organizations

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Polemic and Cynicism: A Study in Educational Organizations

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Abstract
In this research, the case study method was used to uncover the relationships and commonalities between polemics and cynicism in the context of educational organizations. The research study group consists of five teachers who were selected through criterion sampling. These teachers worked for public schools and they were experienced in various case studies. The data was obtained through semi-structured interview questions, subjected to descriptive analysis, coded, and brought together under various categories and themes. The results obtained show that polemicist attitudes that come to life in the leader or administrator in educational organizations cause the development of cynical tendencies in the eyes of teachers and other personnel. Considering the findings obtained in line with the opinions of the teachers who are the subject of the cases, the polemicist attitude was determined to consist of conservative, otherizing, subject, and toxic sub-themes and the cynical attitude to consist of passive, being seen as the other and criticizing sub-themes. At the same time, observations revealed that polemicist and cynical tendencies are common in the codes of seeing oneself/the other one as capable, mutual distrust, and resistant.

Keywords: Hierarchical attitude, Conflict, Resistance, Favoritism, Ideology, Personalizing

Introduction

Polemic, which appears as an eccentric type of discussion in everyday language, is defined as the often-harsh arguments that organizations or individuals engage in over various actions or views (Lemaitre & Noriega, 2015). The word polemic, which came into English from the French word "polémique" in the 17th century, means a hostile attack on one's ideas. An examination of the etymological origin of the word reveals that it was derived from the Greek word "polemikós" (πολεμικός), meaning "warrior or hostile". The word polemos which is the root of this word means "war" (Merriam-Webster, 2020).

A review of the historical processes of development shows that the existence of polemics can be observed on three different lines (Foucault, 1998): (1) In religious polemics, the other who is accused of not following religious norms is declared guilty on the basis of subjective and difficult-to-argue personal claims of weakness.The polemicist, who represents dogma like a judge, accuses the other of being harmful and threatening based on a moral deficiency (Şarfi, 2011). (2) In the legal polemic, the person deemed guilty is the person who was determined to be sentenced in the beginning. As in the case of other polemical reasons, also in the case of legal polemics, in which an equal relation is rejected, the judgement is announced from the beginning in the direction of condemnation.Evidence collection operations and processes exist because they serve this purpose. Truth is a preconceived, unalterable prejudgment accepted by the polemicist. Conviction is inevitable. (3) In political polemic (Corbett, 2020), which is one of today's most visible polemic areas, a polemicist who supports an ideology, a party, or a structure positions the other as the enemy. On the opposite side, the other one is regarded as a threatening element that must be fought and surrendered.

As organizations aiming to contribute to social progress, academia is a state of institutionalization consisting of individuals who are experts in their fields. At this point, the way for academics to reveal their academic practices is possible with academic freedom, which includes speaking up (Keser, 2020). In other words, academic freedom constitutes the substance of the academician's professional existence. At this point, the academician may not always be able to find the field he needs while practising their profession. They may encounter obstacles in administrative and educational processes (Bozdağ, 2009). One of these obstacles is the organizational processes that generate polemic.

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Polemic, which can have a bad reputation, especially in academia, is seen as a type of discussion that can be called hostile, which interrupts cooperation efforts and is applied to stop possible professional losses (Crewe, 2004). This discussion type is fed by verbal aggression and narcissism that hinder knowledge production and career development processes.

A polemic individual rejects a horizontal form of relationship between himself and the other; the purpose of polemic is not to reach consensus or to take advantage of the other's views. In any case, defeating the other is a premise, consensus or resolution is not intended (Siega & Sponholz, 2014). Therefore, polemic creates a negative communication environment.

Foucault (2014), who explains polemic through its differences with debate, states that there is a horizontal relationship in debate and the purpose of debate is to eliminate possible misconceptions and obtain more information by focusing on the problematics and grounding on an in-depth analysis process with questions and answers. The debate is an analytical process and involves reasoning within a logical framework, not dominating or defeating (Smelko & Smelko, 2013). As a situational state, the debate itself appears as a contextual interaction, as the phrase is, with both parties and without personal reference. The debate itself is the only fact that determines the rights and responsibilities of both parties regarding the interaction that is established at that moment and dwelling on contradictions, reasoning, and information inquiries remain within the limits determined by this fact. As an obstacle to the effort to reach the truth, a polemic against debate develops on a hierarchical plane between the polemicist and the other, while the polemicist sees himself in a privileged position as the sole holder of the right to question (Foucault, 2014). In the debate, the individual is aware of their responsibility towards the other while expressing their thoughts. When evaluated in this context, there is a horizontal relationship in the debate (Luckett, 2006). The space of discussion is a battleground; as a "holy" warlord, he is there to correct the other person in polemic. There is no consensus-seeking with the other person while he sees the other person as a potential criminal on a hostile basis, and the person, who poses a threat with his existence, is an enemy. The essence of dealing with the other is the desire to exclude him. The polemicist, moving by the motivation to bring his deserving cause to victory, aims to impose his truth, not his quest for truth (Foucault, 2014). The relationship he establishes with the other is not dialogue, which is essential, but a monologue.

The polemicist acts in a situation that creates a paradox in itself. The other is "known" to the polemicist. He has the "knowledge" of the other. The dangerousness, hostility, and threats of him are fixed and real. The polemicist is interacting with what he knows. The other party is not a stranger. Derrida (2020) mentions the paradox of being a stranger and being known while revealing the reason for Socrates' persistent desire to be considered a stranger in court. Judges and Athenian citizens represent polemicists who positioned themselves hierarchically with Socrates. It is possible to mention that Socrates wishes to alienate himself. In Tolan's (1996) words, alienation is when the individual pushes himself out of the culture, social area, and daily life of society. Socrates insists on being considered a stranger; a stranger is the one whose discourses are unfamiliar, there will be a neutral process deemed appropriate for the stranger in the inquiry, and being a stranger is something situational that creates the possibility of conducting an inquiry, questioning and analyzing in order to eliminate possible errors (Derrida, 2020). On the other hand, the Judges are polemicists who prefer not to know Socrates. Socrates is the "known, recognized" person who has been judged from the beginning, poses a threat, and needs to be overthrown.

Classical cynicism is a philosophical movement that existed from the beginning of the 4thcentury BC until the end of the Roman period. Like every philosophical movement, cynicism arose out of people's dissatisfaction with their world. The wars experienced at that time and the great turmoil that arose caused the social institutions to become dysfunctional and led people to think for their salvation (Türkeri, 2019). Although there are many members of the aforementioned philosophical movement, one of the most well-known is the Diogenes of Sinop (Navia, 1996). Diogenes' observation and the assumption being that philosophers did not and could not follow the advice they gave to live a good life. Diogenes considers all these a curtain for political privilege and comfortable conditions (Chaloupka, 1999). Therefore, cynicism advises that all the products of civilization (government, private property, marriage, religion, caste system, luxury, and all artificial pleasures related to the senses, etc.) are worthless and one should reject all these for personal salvation and simple life. While Diogenes lived within the framework of the values he believed in, his thoughts as a colorful provocateur has found an area of use beyond what he probably imagined (Chaloupka, 1999). Although the real Diogeneses were ambiguous in the late ancient age and the Middle Ages, methods such as cynic teaching methods, satire, irony, and word games reveal the existence of cynics in many areas (Laursen, 2009). It is said that one of the assumptions about the transfer of cynicism from the ancient teachings to the contemporary meaning is that while the early cynics lived a life compatible with the aforementioned philosophy, their successors reduced the classical teaching of cynicism to not caring about their duties, such as borrowing money and not returning it (Türkeri, 2019).Unlike the Ancient Greek cynics, today's cynics are individuals who, in a sense, have ended their search, not for understanding life.

Contrary to classical cynicism, modern cynicism is often described as immoral, selfish, manipulative, and hypocritical (Larursen, 2009). Sloterdijk et al. (1984) state that false forms of consciousness such as lies, mistakes, and ideology reveal modern cynicism. Cynical individuals believe that what they do is not "good" but still do

what they do and feel themselves both as victims and altruists. Therefore, modern cynics imitate the ongoing and collectivist ideals but do not live by considering them in the modern era (Chaloupka, 1999).

However, the perception of classical cynicism and that of contemporary cynicism differ. For example, while the basic indicator in classical cynicism is to tell the truth, contemporary cynicism is fueled by negative emotions. This situation can also be observed in organizational contexts (Dean et al., 1998; Hodgins, 2014; Kart, 2015).Increasing cynicism among employees makes it necessary to understand this concept in an organizational context. Karfakis and Kokkinidis (2011) state that organizational cynicism is a reflection of the organizational resistance of the employees towards the changing organizations with the post-industrial transformation. According to the authors, the labor-capital contradiction, which was evident in the Fordist period, changed form and became ambiguous in the post-Fordist period. Therefore, cynicism becomes an indicator of the existence of silent resistance of employees. Some of the ways employees resist are irony and humor. (Sloterdijk et al., 1984), the modern cynic is more interested in not approving the order and not trusting it using humor and pastiche rather than building a new order (Mikkonen et al., 2011). Jones et al. (2005) explain this by indicating that they both laugh at the world in a certain way, but it is only the cynic (classic cynic) whose laughter is loud and transformative. In other words, the classical cynic does not take the burden of the world.

In the literature, it is possible to observe efforts to conceptualize organizational cynicism through some contexts. Studies reveal that there are attempts to explain organizational cynicism by focusing on personality, society, profession, employee, and organizational change (Abraham, 2000; Dean et al., 1998). Personality cynicism refers to an innate negative thought about human behavior (Kahn, 2014, p. 31). In his discussion of cynicism and postmodernism, Bewes (1997) noteshat the cynical personality is a postmodern character alienated from both society and its subjectivity, while the postmodern character feels disbelief, disappointment, and distrust in relation to a metanarrative, big promises, or big projects. Social cynicism results from the violation of the psychological contract between society and the individual (Dean et al., 1998). Occupational cynicism emerges as a result of the difficulty experienced by the employee in complying with the affective norms required by profession (Abraham, 2000). Employee cynicism is defined as a non-constructive organizational behavior that jeopardizes the efficiency of the organization, as well as a contemporary form of individualism as a result of post-industrial structuring (Kosmola & Richards, 2009). Organizational change cynicism is defined as a negative attitude towards the organisation's future success resulting from the belief that change leaders are inadequate in response to unsuccessful change attempts in the past (Abraham, 2000).

Organizational cynicism generally emerges as "a relatively common mentality characterized by hopelessness, frustration, and disappointment associated with contempt, disgust, and suspicion among employees" (Dhar, 2009). Dean et al. (1998) defined organizational cynicism as negative attitudes of employees towards the organization in which they are employed, consisting of cognitive, affective, and behavioral dimensions. The cognitive dimension consists of employees' negative beliefs about the basic values that constitute the integrity of an organization, such as the soundness of moral principles, fair behavior, and honesty in their organizations. The affective dimension refers to the affective experience of the beliefs that employees acquire through cognition. On the other hand, the behavioural dimension refers to the negative and contemptuous behaviors of employees, especially using humor to show their critical attitude towards the organization (Dean et al., 1998).

In organizations where the hierarchical structure is dominant, the rewards and power provided increase as one moves to the higher levels (İnandı & Tunç, 2012). According to Sing et al. (2018), this increase in power causes managers to blame, exclude, and ignore the organisation's decision-making processes by increasing their aggressive tendencies over the right to speak. This situation causes the school administrators, who dominate the discourse as a result of power pollution in educational organizations, to show arrogance. This arrogant behavior causes all kinds of success to cost the school administrator who exhibits polemical attitudes, and failures to the employees of the organization (Babatunde & Olalekan, 2020). Therefore, the manager, who is positioned as a subject in the organization, tries to dominate the employees of the organization by using the legal power given (Dean, 1998). This situation creates a basis for cynical tendencies such as poor communication, avoidance of self-expression, rude behavior, role conflicts, and indifference to work among teachers (Levent & Keser, 2016). Therefore, the polemicist attitude of the administrator leads to the emergence of a cynical culture in school organizations.

Although there are studies in the field of cynicism in educational organizations (Akpolat & Oğuz, 2021; Altınkurt et al., 2014; James, 2005; Levent & Keser, 2016), observations reveal that there are no studies on cynicism at the level of discourse. For this reason, the need has arisen to examine what discourse, including polemics, means in the context of cynicism.This study aims to examine the relationship between polemic and cynicism in educational organizations. Educational organizations, where stakeholders such as teachers, administrators, students, and parents are interconnected with complex networks of relations, are places where polemical attitudes and cynical tendencies can be observed. This study also aims to examine the relations between polemic attitudes and cynical tendencies in the context of organizational processes through the relationships that teachers establish with others (managers, colleagues, parents) based on this reality.

Method

Research Pattern and Model

Polemic is a phenomenon that is experienced in-depth on individual events. Therefore, it was deemed necessary to conduct detailed studies on the case studies experienced by individuals to trace the polemic. For this reason, the relationship between this situation and cynicism is discussed through the case study. The case study method, which is one of the qualitative research patterns, was used in the research. Case studies aim to reveal and discover facts and patterns in the eyes of the individual and the group, analyze the variables, structures, schemas, and the relationships between them at the level of individuals and cases based on events and facts (Flyvbjerg, 2011). At the individual level, case study is a qualitative research pattern that allows a detailed examination of actions, special needs, living conditions, past experiences, group-level departments, informal and formal groups. At the institutional level, it provides a detailed examination of problems, processes, and institutional structure (Sagadin, 1991).

Multiple case study, which is one of the types of case study method, was used in the research. In multiple case studies, each case is handled one by one, and these events are compared within the framework of literature and facts through the relationships and common points between them (Mesec, 1998 as cited in Starman, 2013).

Study Group

In the research, the criterion sampling method, which is one of the purposeful sampling methods, was used to determine the study group. The criterion sampling method is a widely used technique in selecting and determining effective events and situations within limited resources (Patton, 2002). In this method, individuals and situations that have special information about the experienced facts and meet the criteria suitable for the purpose of the research are selected (Cresswell & Plano Clark, 2011). At the same time, rich in content cases are the subject of the research, and the research is enriched through a standardized questionnaire (Patton, 2002).

Since the experiences of teachers who have cynicism as a result of polemic are considered as a criterion, this study examines examples that can be reached adequately under the specified criterion. According to Gustafsson (2017), the research context should be taken into account in the selection of single or multiple case studies.

In this direction, in the research, case studies that (1) included the facts cynicism and polemic, (2) experienced in state-owned educational organizations (schools), and (3) generally based on teacher-administrative relations and conflicts were accepted as criteria, and five case studies that experienced and included these phenomena, which took place in public schools located on the Asian side of the city of Istanbul, Turkey, were determined as criteria. Within this framework, the demographic variables of the teachers who experienced the case studies that met the criteria and with whom the interviews were conducted, as well as a summary of the cases, are presented in Table 1 below;

Table 1. Demographic Variables and Case Summaries of Teachers who Experienced the Case Studies that Met the Criteria and with whom the Interviews were Conducted

Case Code	Gender	Branch	Years of Seniority	Case Summary
V1	Female	Preschool Teacher	10	The teacher’s search for rights is due to the unearned gain of the school principal and the pressure on the teacher by various stakeholders, especially the school principal, at different levels and positions, and the resulting cynicism and polemic-based situations.
V2	Female	Guidance Teacher	9	A teacher who was appointed due to her life safety starts to claim her rights in the face of the nepotistic attitudes she sees in her new school, the teacher’s personal situation is abused and suppressed in the face of her claim of her rights, and the teacher is exposed to polemical situations and becomes cynical with the involvement of officials at different levels.
V3	Female	Preschool Teacher	16	With the appointment of a new principal at the school where the teacher works, conflict situations arise based on personal animosities, the teacher's demand for her rights in the face of these situations, the polemical and oppressive attitudes of the officials who confront her at the upper levels in demanding her rights, and the teacher's tendency toward cynicism in the face of these attitudes.
V4	Female	Classroom Teacher		As a result of the principal constantly looking for deficiencies in the teachers, exerting pressure, using intimidation methods, displaying ideological attitudes,

				and fomenting personal animosities, the teacher and her friends have turned to cynicism and have asked to be transferred to other schools after the teacher and her friends have had various polemics with the administration.
V5	Female	English Teacher	15	A personal attitude has been developed towards the teacher by the administration and staff from the first day in the school where she is appointed, later on, the teacher's claim for her rights against unfair practices in the school, as a result, she is dragged into loneliness, and the teacher's tendency to cynicism with the ill-founded investigations and similar situations involving the upper levels.

Data Collection Tools

In the research, an interview form consisting of semi-structured questions containing the concepts that form the basis of polemic and cynicism was used as a data collection tool. Semi-structured interviews allow access to in-depth and contextual data on the facts and relationships that form the research framework and analysis of unpredictable situations by addressing open-ended questions to the interviewee (Adams, 2015). As part of the research, semi-structured questions were asked to the participating teachers to reveal the details of the facts that constitute the subject of the research in the relevant cases by interviewing the teachers who experienced the relevant cases. To ensure the validity and reliability of the interview form, which consists of semi-structured questions, which is the data collection tool of the research, interview questions were sent to three faculty members who are experts in their fields, and the questions were revised based on expert feedback. However, to test the effectiveness of the questions in implementation, a pilot interview was conducted with one participant and the final form of the questions was determined.Some of the questions posed to the participating teachers are as follows;

Questions	When you evaluate the behavior and attitudes of the people you are dealing with in the relevant case, what can you say about the following situations?
	• Acting in line with the ideological perspective of the oppressors in the case you describe, • The pressure elements in the case you are describing act and resist in line with dogma and settled thought, • Disbelief and distrust that change will take place in the change processes at school, • The pressure practitioners in the case you describe are quite self-confident, • In the case you have described, the oppressors feel distrust of the other party and see the other party as an enemy, • In the case you describe, the oppressors position themselves at the top (powerful) in the hierarchical plane, • In the case you describe, the oppressed person thinks that the other person is superior (able), • The oppressors in the case you describe are constantly attributing responsibility and guilt to people, personalizing the issues discussed, and responding to events and situations in line with their emotional attitudes and feelings, • In the case you describe, the oppressors don't think healthily and logically, displaying a judgmental, critical attitude towards others and adopting an exclusionary attitude, • In the case you describe, the oppressors convey their ideas and thoughts directly in their polemic environment, while the oppressed use indirect expressions.

Table 2. Semi-Structured Questions Asked to the Sampled Teachers

Data Collection and Analysis

In the research, interviews with participating teachers, who experienced the relevant cases, were conducted online due to pandemic conditions. Interviews were recorded using the Zoom program and each interview lasted an average of forty-five minutes. The data obtained were transcribed using a word processing program and then subjected to content analysis using the Maxquda program for qualitative data analysis.Content analysis is used to identify concepts, words, and themes in qualitative data. At the same time, the meanings and relations that exist in the content analysis are analyzed within the framework of certain themes and concepts (Hsieh & Shannon, 2005; Elo et.al., 2014). The data obtained during the analysis of the data were coded in line with the polemic and cynicism literature and conceptual framework and brought together under various categories and themes.

Validity and Reliability

Internal and external validity and reliability dimensions were taken into account to ensure the validity and reliability of the research.

Internal validity is concerned with whether researchers' interpretations of events and phenomena reflect reality (Yıldırım & Şimşek, 2005). To ensure internal validity, the interview form was prepared following the purpose of the research based on the relevant literature (Merriam, 2018). The most important factor in ensuring external validity is the generalizability of the research results. In this context, detailed information is given about the process and analysis of the relevant research results. These results can be tested in other research processes and environments (Tuncel, 2008).

For internal reliability, the researchers coded the data set independently, and the coding was compared to ensure consistency. Once the transcripts of the data obtained from the interviews were prepared, they were sent to the interviewees and their confirmation was obtained. To increase credibility, the views of the participants were included in the study. To ensure external reliability, the experiences of the participants who were the source of data were reported as they were (Yıldırım & Şimşek, 2005).

Findings

All codes related to cynicism and polemic cases obtained by content analysis of the cases are shown in Table 3.

Table 3. Codes Generated After Case Analysis

Codes	**f**	**Observed case(s)**
Avoiding conflict, withdrawal	8	V2, V4, V5
Intimidation	17	V2, V3, V4, V5
Verbal abuse	3	V2, V5
Feeling of exclusion	6	V2, V3, V5
Dogmatic established thought	2	V1, V3
Fear, anxiety	9	V1, V2, V3, V5
Self-confidence	1	V1
Irrationality	1	V1
Ignoring, dropping the subject	3	V1, V3
Judgmental attitude	11	V1, V2, V3, V4, V5
Emotional attitude	1	V1
Resistance	4	V1, V2
Hierarchical attitude	9	V1, V2, V3, V4, V5
Distrust	1	V1
Referring to the situation	1	V1

Regarding as an enemy, nurturing enmity	5	V1, V2, V3, V5
Personalizing	8	V1, V2, V3, V4, V5
Conflict-based relationship	6	V1, V2, V3, V4, V5
Exclusion	5	V1, V2, V3, V5
Ideological attitude	7	V1, V4
Seeing as powerful	8	V1, V2, V3, V4, V5
Favoritism	8	V1, V2, V3

Table 3 reveals that intimidation is the most repeated code among the codes related to cynicism and polemic cases (f= 17). This is followed by the judgmental attitude (f= 11) and the hierarchical attitude (f= 9). The least repeated code is self-confidence, irrationality, emotional attitude, distrust, and referring to the situation (f=1). The codes obtained were first evaluated in the context of the cynic and polemicist and gathered under the main themes. Figure 1 shows the distribution of the codes to the main themes.

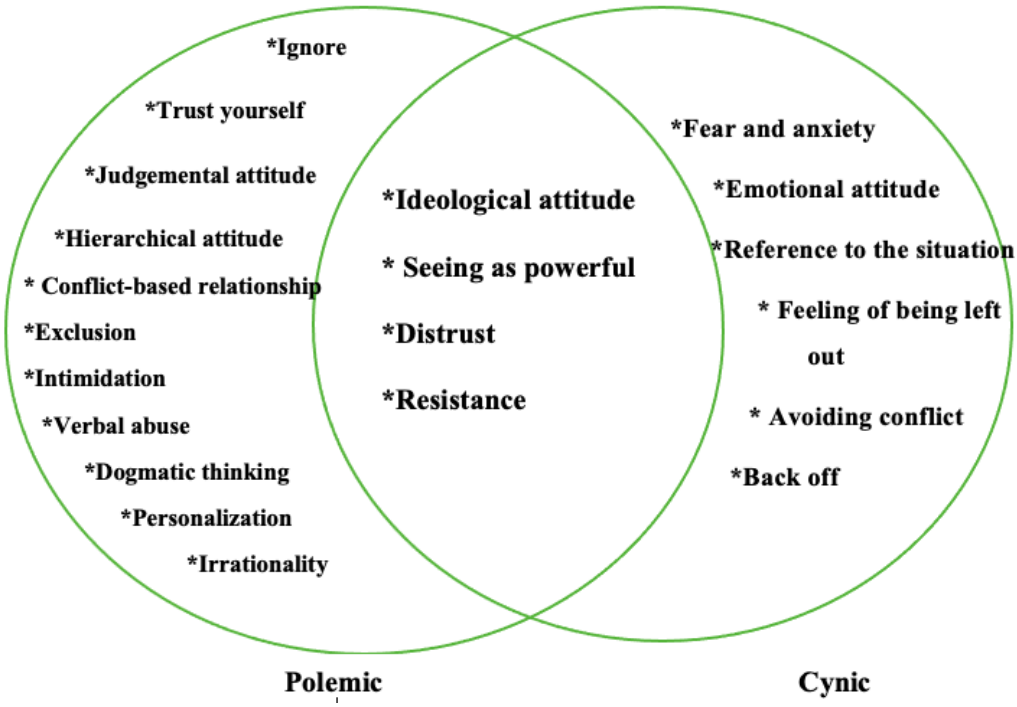

Figure 1. Distribution of Codes by Main Themes

Figure 1 shows the distribution of codes under the main themes of polemicist and cynic. While the codes above the diagonal line are related to the polemicist individual, the codes below are related to the cynic individual. The codes above the diagonal line indicate both polemicist and cynic characteristics.

Among the codes distributed under the main themes, the interrelated ones were grouped under sub-themes to examine the polemicist and the cynic in depth. The sub-themes and categories related to the polemicist main theme are shown in Figure 2.

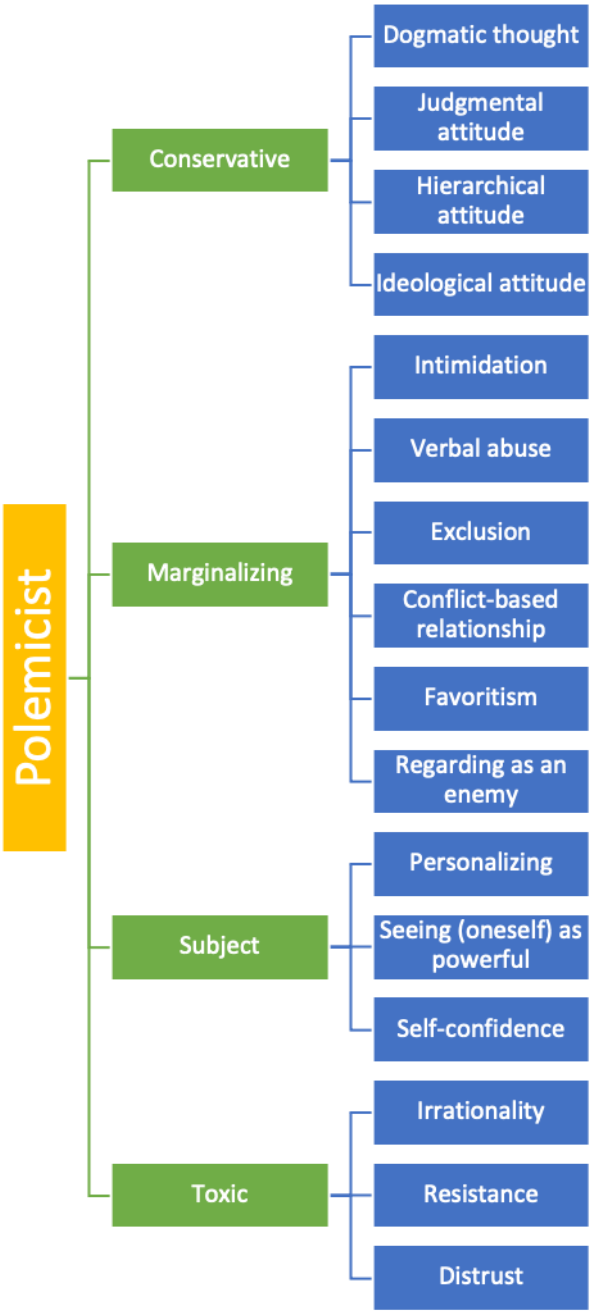

Figure 2. Polemicist Sub-Theme and Code Distribution

Figure 2 exhibits that the codes collected under the main theme of polemicist are collected in 4 sub-themes. These are named conservative, othering, subject, and toxic, considering the meanings expressed by the relevant codes. The explanations for each sub-theme are below.

Polemicist as the Conservative One

The polemicist sees himself as hierarchically superior, andand has a judgmental attitude within the framework of his dogmatic established thoughts in case of discussion or conflict in a relationship based on inequality. Some teachers' views of the polemicist as a conservative are as follows:… while taking my statement, the male inspector said "ma'am, you may have heard something about our bias, but there is no such thing". But there really was. They were biased because when I finished my statement, they told me, 'It's not your duty to save the world, ma'am.' (V1)

> …the first thing he said to the assistant principals on the first day of his arrival… We had administrators who had four years of service. He said 'quit as soon as possible, I will set up my own team'. After they quit, he increased his pressure on us even more. (V4)
>
> I said, '… please review my file; I have been subjected to mobbing for a long time and I want my file to be examined impartially'. He tried to convince me by saying 'let's talk; let's meet'. He continued 'The

> Prince Islands in Istanbul is a small region. Here is a boutique institution. We are working as a family. You know ma'am; we have to tolerate each other'. This is all he said (V3).

The Polemicist as the Marginalizing One

The polemicist is by nature there to win arguments or conflict situations. Therefore, he sees the parties of the discussion or conflict as enemies and engages in conflict-based relationships with behaviors such as intimidation, verbal abuse, and exclusion to overthrow the person he has marginalized. The existence of marginalization means the glorification of one's close friends or relatives, the polemicist also reveals this inequality by favoring his close friends or relatives. The views of the teachers on the polemicist as the marginalizing one are as follows:

> … In the same year, they appointed another teacher who had been working for five years as Deputy Principal, but the reason for his election was that he was acquainted with the district branch manager. (V1)
>
> …. For example, when I wanted to talk, he would say 'come another time, I have work now' when I went to his room. When I go some other day, he also says 'let's talk another time'. In other words, he was applying a sanction on the servant through the deputy director. Then when I went to his room and wanted to say 'this is wrong', he ignored me. Actually, I describe him as a professional torturer. (V3)
>
> …he entered my room by kicking things. He walked up to my fellow advisory teacher, who was working at the same school, using threatening language: 'I will make life unbearable for you; you'll see!'. He also punched the table (V3)
>
> ... I greet them, they do not respond. One or two paid teachers…Especially the others do, but they try not to talk much; frankly, they try not to be contacted. I feel like an unwelcome person, anathematized, and excluded from society. I mean, I was so unhappy that my feet went back, believe me, even when I'm talking about it, I feel so bad. (V5)
>
> …but then when they found out, terrible pressure of the national districteducation authority started on the school teachers, that is, on my friends and me. There were constant inspections on the school; inspectors came over almost every day, they were like 'are you doing your job properly or not?' and we passed the inspections about ten times. (V1)

The Polemicist as the Subject

In case of argument or conflict, the polemicist perceives the problem in terms of his personality, not the current situation, and sees the right to do whatever he wants to achieve his goals and is confident in himself. The views of the teachers on the views on the polemicist as a subject are as follows:

> …it was as if I was a lazy teacher, he was managing my classroom and setting the rules. This was his approach. As these examples increased, I went to his room one day and he did this to me, for instance, he forbade drinking tea at school. His reason for that was 'you are a kindergarten teacher, you have no break time, you cannot drink'. (V3)
>
> … Yes, in general, he would personalize every small thing and hold a grudge after that, frankly, he would not forget it when it was a small thing, he would definitely attack me with some issue and his attitude was very provoking, seriously provoking the other party. (V4)
>
> … the mistress always said, 'I am in the catbird seat; nothing will happen to me', you know, they tried to make sure that nothing much happened while we were going through the process. (V1)

Polemicists as the Toxic One

The polemicist distrusts the other party he marginalizes and resists being the winner with illogical explanations. Their views on the polemicist as the toxic one are as follows:

> The district governor gathered us in front of him and there was no principal in the principal's room. He came to ask, and he lined us up like jugs. Everybody was listening to him. His eyes were twitching (V1).
>
> … he never gave up. I was also being intimidated, and he was following me, taking a statement down for me as I was a minute late, or wanting to use the investigation against me. (V2)

Sub-themes and categories related to the main theme of cynic are shown in Figure 3.

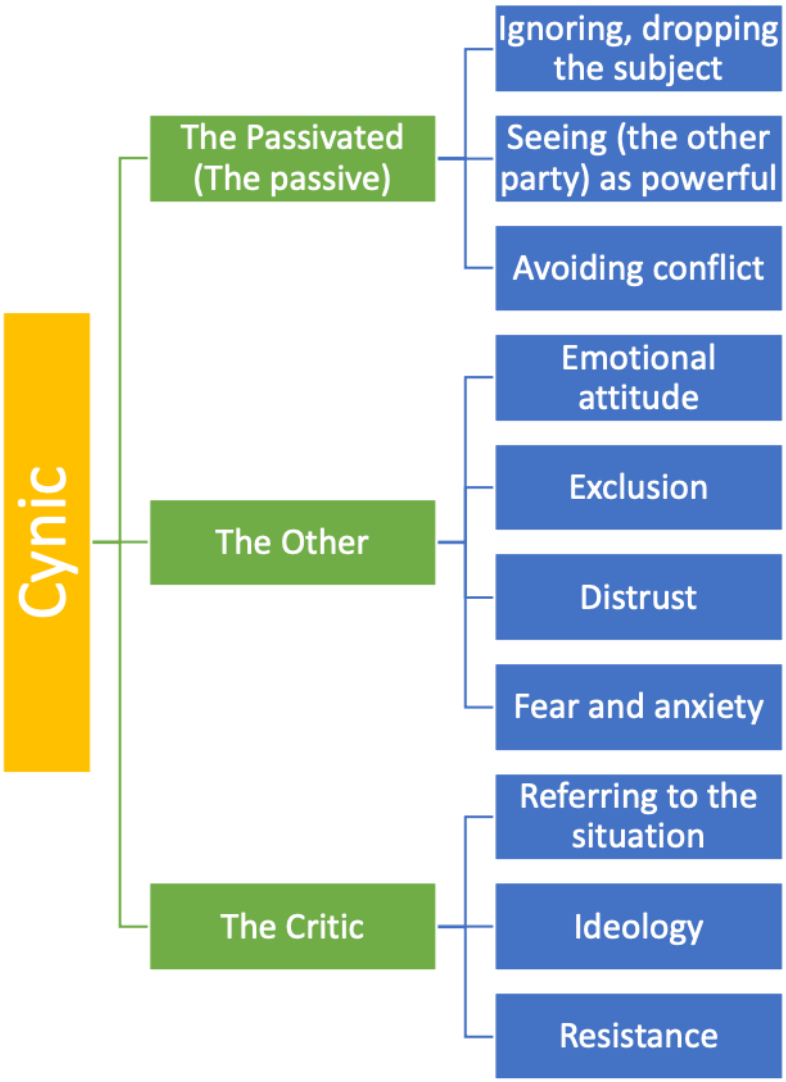

Figure 3. *Cynic Sub-Theme and Code Distribution*

Figure 3 reveals that the codes collected under the main theme of cynic are gathered in three sub-themes. Considering the upper meanings revealed by interrelated codes, sub-themes are named as the passivated (the passive), the other, and the critic. Each sub-theme is presented below.

The Cynic as the Passive One

The suppressed cynic sees the other as capable and engages in ignoring behavior to avoid conflict. The teachers' views on the cynic as passivated (the passive) are as follows:

> … when you enter the teachers' room, you see that everyone has their cell phones and they are buried in their cell phones, there is no conversation, there is no chat, and there is no asking after people. There is silence. I mean there is this mood: let me not see anything, let me not get involved in anything, let me just go to my class, let me not make a sound during breaks, and let me not wander around. There is such a mood of teachers. (V5)
>
> … they were passive. The manager said, 'you will do this, you will do that' but they kept silent. I mean, for example, in the board meetings, he decided on his own. He wouldn't even let us express our ideas. He was making decisions on his own and dogmatizing. He wouldn't even let us express our ideas. The other friends had quailed and kept silent. They were saying 'ok' all the time. (V4)
>
> … Since he had experienced that for 5-6 years, he knew people and told me that they could do something physical at work, they could mob. We've been through too much, including what my friend said, even though they knew me. I mean it was incredible. (V1)

Cynic as the Other One

The cynic feels distrust of the person and the organization and shows emotional attitudes with a sense of exclusion. All of this leads the cynic to perceive himself as the Other. Teachers' views of the cynic as the Other are as follows.:

> …you know, I came with a life safety appointment, which everyone already knows, but they don't ask me; this is a situation I already feel from people's looks. I mean, you feel like a freak, everyone is looking

> at you, there is something that is talked about among themselves, but there is something that is not talked about with you. (V2)
>
> …that is, whoever is close to me will be taken into account to open an investigation against him. If the teachers were brave, maybe this man wouldn't have found this courage, but the teachers are in the 'let sleeping dogs lie' mood. (V5)
>
> …I have experienced a traumatic event, I am very weak, I am full of fear anyway, I am not happy and peaceful in my personal life, I do not even feel safe, and the fact that these are known in the workplace and receiving small threats about this institution has increased my anxiety . (V2)
>
> … I don't feel well, frankly, I don't want to go back there again, I don't want to work, I don't want to be exposed even for a moment, I don't want to hear his voice, I don't want to see his face. (V5)

Cynic as the Critic

The cynic is a critic when he is not satisfied with the current situation. As a result, he has no place but to resist, as he is suppressed. But even while expressing that he is resisting, part of him tends to run away. Like the critics, the teachers' views on cynicism are as follows:

> … There is nothing. He also said that among the cleaning products, he took the smelly garbage bags and the beautiful ones to put in his bag and take it home or give to others. Indeed, this is still in my tone of voice; how can he steal from children? Is a teacher there to teach numbers to 3-year-olds and 4-year-olds? (V1)
>
> Apart from that, of course, there was constant pressure due to disagreements, but on the contrary, while we were in favor of student-centered education, we faced practices that did not benefit students at all (V4)

Discussion

This research examines the effects of polemic manager perceptions experienced by teachers on organizational cynicism attitudes, based on case studies. Exploring the polemical attitude framework is important in revealing new perspectives to better understand how organizational cynicism develops. As a result of the study, the polemicist attitude was examined under 4 headings according to the teachers' opinions who were the subject of the cases. The polemicist attitude can be characterized by the existence of the states of conservatism, marginalizing, seeing oneself as a subject, and creating toxic effects. As a conservative, the polemicist perceives himself/herself as hierarchically superior and exists within the stereotyped belief system with their accepted judgments. Therefore, it is possible to indicate that the polemicist has a dogmatic mindset. Individuals with a dogmatic mindset cannot accept that their beliefs are challenged. Knowledge is necessary for them as long as it confirms their beliefs. Therefore, they show low tolerance for opinions against their uncertainty and beliefs (Gürses, 2002). It is known that school administrators use their legal power to ensure the execution of educational activities (Hassenboehler, 2004). In hierarchically structured organizations, legal power represents the authority and the authority limits the area of the members of the organization by holding the authority (Alamur, 2005).

As a marginalist, the polemicist may tend to exclude the people he is dealing with from the organizational processes in situations that are contrary to his belief and thought systems. In this direction, the behavior of the marginalizing individual tends towards behaviors and attitudes such as verbal abuse and intimidation against the individual and situation he or she opposes. At the same time, conflict-based relationships are intensely present in all of these situations. Thus et al. (2021) state that unethical leadership practices cause organizational cynicism and that the resulting organizational cynicism attitude may cause negative consequences for the entire organization. One of the main axes that form the framework of ethical practices is stated as consistency by Haynes and Kunt (2002). Ethics in the context of consistency emphasizes treating or approaching all people equally (without giving priority to any situation or individual) in making judgments in any situation. In a polemical stance, the preference that occurred in this study can be interpreted as the undermining or absence of one of the main arguments in the ethical context when viewed on the axis of consistency. In other words, inconsistency in the ethical context and favoritism in the polemicist context produce similar situations in terms of the effects they create. For this reason, inconsistency can reveal organizational cynicism as a favored attitude on a polemicist foundation. Polat and Kazak (2014) state that the favoritism and behaviors of school administrators negatively affect teachers' perceptions of organizational justice. On the other hand, Karademir (2016) stated that the favoritism and behaviors of school administrators increase teachers' organizational cynicism. All these results support the research finding.

As a subject, the polemicist can exhibit self-centered attitudes and behaviors in organizational processes and practices. He builds his sensitivity on himself, thus transforming acting in an egocentric context, as opposed to altruism, into a personal norm. In any case, what really matters is himself. Egocentrism as one of the reasons for the separation between individuals in social interaction spheres can be defined as the tendency of the individual to see himself in the center in the relations with others in all circumstances and conditions. Considered on this basis, the individual who is the subject positions himself and others on a hierarchical vertical line, rather than acting on a horizontal level in his relationships with others. Individuals with an egocentric orientation see their

experiences as essential and construct and define others in the context of these experiences (Epley & Caruso, 2004). Morgan (1997) also discussed this situation as individuals imposing their will on others within the framework of domination. Individuals with a polemicist attitude tend to put the distribution of roles within the organization before the organizational goals and the organization's reason for existence. The status he has loses its instrumentality in realising organizational goals and turns into an identity feature of the individual with this status. This situation causes the individual with the status at the top in the hierarchical structure to see himself as powerful and take this tendency to see himself as powerful as a reference point in his practices and behaviors in relation to others. In the words of Morgan (1997), the person who is powerful and sees himself as the power acts with an illusion that causes him to resort to ways and means that he would not use in his interactions with others and to engage in behaviors that he would not engage in. In summary, the individual who has positioned himself as the owner of power tends to see having power as a personal trait and as a feature that is only in his monopoly.

The toxic polemicist tends to exhibit behaviors that will harm the positive climate in the organization with their attitudes. The behaviors they exhibit and the harmful attitudes they display can cause the negative course of the emotional orientation of the others they interact with. Thus, researchers stated that the toxic leadership behaviors of the school administrator in educational organizations negatively affect the school climate (Tepe & Yılmaz, 2020). Toxic-oriented polemicist individuals, who take their personal position as a reference point at the base of their actions, act aggressively towards others. This will negatively affect the loyalty, motivation, health, and happiness of the employees of the organization (Goldman, 2011). The arguments that are fed by the marginalizing consequences of these aggressive attitudes are the irrationality of the powerful polemicist individual. In their study, Sing et al. (2019) found that toxic leaders acted critically and aggressively towards their subordinates, blamed them, tried to defeat their subordinates as individuals whom they regarded as if they were on a battlefield, and at the same time exhibited guiding attitudes by exposing them to their personal interests. Thus, they create a toxic environment and harm their subordinates long-term (Pelltier, 2010). Kırbaç (2013) states that toxicity spreads from the moment it starts in educational organizations and negatively affects the culture of the organization.

The followers of a leader who has personal goals and reveals his personality at all levels believe that the organization cannot achieve its goals in the presence of a leader with this attitude (Sabir et al., 2020). At this point, the person who has taken on a role as a manager tends to view the responsibility they are taking on as an extension of their identity. Narcissism, which emerges as the main orientation of egocentrism in the private and public spheres, paves the way for the emergence of cynicism by focusing on one's own experience and development and positioning others according to this focus. This situation, which leads to an egocentric expression, has the potential to produce organizational cynicism through marginalizing others on a polemicist basis on which one sees himself as a subject (Zagórska, 2019). Saber et al. (2020) emphasized that the attitudes of establishing oneself as a subject, which can also be considered as an element of the polemicist attitude that manifests itself on an egocentric basis, are in a positive relationship with the emergence of organizational cynicism. In this context, according to the findings obtained in this study, it is seen that the cynical individual exhibits a passive, marginalizing, and criticizing character.

In the emergence of avoidance-oriented behaviors, the preferences of individuals to be passive or active are decisive. One of the main determinants of the dilemma of being active or passive is managerial attitudes (Johnson & Klee, 2007). As a passive cynical individual, he sees the power in front of him as capable and avoids the conflict processes in which this person is involved. Seeing oneself as powerful can produce cynicism by directing individuals to be passive through an autocratic management style. The individual who tends to cynicism may tend to withdraw himself by pacifying when he sees that the control is in another individual, in other words, his situation depends on someone else who is in power (Meyerson, 1990). At this point, cynical individuals may face erosion of self-confidence. These individuals, who are faced with losing their motivation to compete, can position themselves below the powerful with the effect of external stimuli (Akman, 2013).

Like the other, the cynical individual loses his confidence in the organization by exhibiting emotional attitudes such as anger and anxiety regarding the feeling of exclusion he faces in any conflict situation. The cynical individual, who is the other against the powerful, can act with a tendency to see otherness as a shield. So much so that otherness has the potential to become a preferred situation rather than a situation to which the cynical individual is exposed (Kart, 2015). The Other, who creates a sphere of influence that encompasses all life practices, can be seen as a factor that relieves the tensions caused by the attitude of standing against the powerful and thus taking risks in the individual, with the armor of invisibility woven by him. Abaslı (2018) states that teachers' excluded feelings will cause organizational cynicism.

The cynical individual as a critic develops a resistance to protect and maintain his position by being exposed to the ideological attitudes of the person he accepts as power. This resistance does not aim to be visible to the powerful but to ensure that the critic is no more visible. At this point, it is possible to indicate that the cynical individual has a critical attitude towards the existing situation but cannot express this attitude directly. Rehan et al. (2017) state that cynical individuals reveal their critical attitudes with silent sarcasm. This silent and cynical criticism may manifest itself as a political practice with little risk in the face of the unethical attitudes of the

powerful (Kennedy, 1999). Organizational cynicism attitudes of teachers cause organizational silence by pushing them not to express their concerns and ideas about organizational problems intentionally (Nartgün & Kartal, 2013).

Conclusion

Consequently, the relationship between individuals exhibiting polemicist and cynical attitudes is more evident in the presence of a hierarchical relationship. The polemicist, constructing himself on the basis of power and not recognizing the right to speak to someone other than himself, positions the other according to himself. For the polemicist who, as the owner of all space, imposes his existence on others, others are only and exclusively others. What they position as others are not those outside the space, but those who have always been there and must continue to exist.. Others are not outsiders or strangers. But they don't own the house either. The owner of the house is the polemicist, who sees himself as a ruler, who speaks, who judges, who gives the verdict and announces it. The other, who is stuck in the space, is the one who is excluded while inside the space. He sees the polemicist as the capable one and therefore he is the one who validates his power by reproducing it in a sense. In a place where he does not feel like the owner, he tries to suppress or postpone his fears and anxieties, preferring invisibility instead of being visible with his presence. The cynic, who becomes sensitive at the point of resistance, ceases to be cynical when he expresses resistance and becomes visible. Resistance is the most sensitive line of the cynic. The choice between resistance or non-resistance brings along the confrontation with the polemicist or freedom from the polemicist's judgment. The cynical, not coming from outside, not alien, being inside, staying within the space (the space of the organization), hopes to ensure his existence by avoiding conflict. Socrates wishes to be a stranger before the Athenian judges. A stranger is an outsider. And it is he who is free not to be subject to the judgment of Athenian judges and citizens. In a sense, he is not in a position to choose to resist or not. The polemicist, the arbiter, the judge, is the one who passes judgment on Socrates because he has the right to position him as the subject of the inner space. For this reason, the powerful, who is the polemicist and the cynical, who is subject to judgment, are in the same space, know each other, act according to each other, and look after each other; at some point, they are the guarantee of each other's existence. While Socrates wishes to be tried as a stranger, he wishes to invalidate the judgment in Derrida's (2020) words. Socrates has no chance of not appearing before the polemicist. For this reason, he has no choice but to wish to be accepted as a "stranger". The cynic is, in a sense, the one who is inside and cannot be a stranger. The only way for the cynic to get rid of their anxieties, fears, and the torment of the powerful is to give up their right to resist and choose to be invisible.

Suggestions

- The number of studies examining the relationship between cynicism and polemics is limited in the literature, and this relationship can be examined qualitatively or quantitatively in different types of organizations.
- According to the research results, cynicism tendencies arise due to the hierarchical nature of the relations and communication of administrators with teachers in educational organizations. In this context, a democratic and sustainable environment and communication process that supports horizontal relations and fosters participation should be supported by school administrators.

Limitations

- The fact that all participants in the study were women creates a limitation based on the gender variable.
- This research is limited to case studies that are considered as criteria.

Author (s) Contribution Rate

All authors contributed equally.

Conflicts of Interest

There is no conflict of interest.

Ethical Approval (only for necessary papers)

For this research, ethical permission (08.06.2021-16591) was obtained from Mimar Sinan Fine Arts University.

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The Mediating Role of Locus of Control in the Effect of Organizational Justice on Organizational Cynicism in School Organizations

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The Mediating Role of Locus of Control in the Effect of Organizational Justice on Organizational Cynicism in School Organizations[1]

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Abstract

This study aims to examine the mediating role of locus of control in the relationship between organizational justice and organizational cynicism. This study examined the mediating role of the locus of control in the effect of organizational justice on organizational cynicism in school organizations, in a way that includes all personnel who have a direct effect on education and training in schools. This study used the relational survey model, which is one of the quantitative research methods. This study was conducted with 385 participants identified through simple random sampling among teachers working in public schools. Confirmatory Factor Analysis (CFA) and Structural Equation Modeling (SEM) analyzes of the obtained data were performed using SPSS and AMOS statistical package programs. As a result of the analysis, it was determined that there is a negative relationship between organizational justice and organizational cynicism and that locus of control plays a mediating variable in the relationship between organizational justice and organizational cynicism.

Keywords: School Administration, Organizational Justice, Organizational Cynicism, Locus of Control, Mediation Analysis.

Introduction

The events and situations experienced by the employees in the organization can be effective in their attitudes towards the organization (Robbins & Judge, 2013). When employees believe that they are maltreated in the workplace, they react negatively to this situation (Greenberg, 2011) and act to eliminate injustice within the framework of their understanding of justice (Stroh, Northcraft & Neale, 2002). The belief in the employees that the organization is not fair can lead to feelings of anger, hatred and anxiety, and depending on this feeling, the employees can criticize, humiliate and vilify the organization (Dean, Brandes & Dharwadkar, 1998). In this context, organizational justice may emerge as an important reason for the formation of organizational cynicism (Folger & Konovsky, 1989; Greenberg, 1990).

While the relationship between organizational justice and organizational cynicism constitutes the main problem of this study, there may also be factors that may affect the relationship between the two variables. One of these factors is the locus of control. Locus of control is related to what individuals attribute their reinforcements and rewards as a result of their behavior, or their success or failure (Basım & Şeşen, 2006). In line with these explanations, it can be said that the level of cynical attitudes developed by school personnel towards school management with the effect of organizational justice may vary depending on whether school personnel has control or not (James, 2005).

Organizational Justice

Social scientists recognize that the idea of justice is a fundamental need for the functioning of social life (Greenberg, 1990). The concept of organizational justice is a framework that explains employees' perceptions of trust and justice (Saunders & Thornhill, 2003) and their personal evaluations of the ethical and moral structure of

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the organizational structure (Cropanzano, Bowen & Gilliland, 2007). For this reason, in evaluating the justice in the organization, it is important not how fair the organization is towards the employee but how fair the employees perceive the practices of the organization (Choi, 2011). Perceptual comments of the employee turn into attitudes over time, and these attitudes are one of the most important determinants of their behavior (Lindsay & Norman, 1977).

The concept of organizational justice is based on Adams' Equity Theory. Equity theory includes the benefits that the employee provides to the organization and their gains from the organization. For example, employees transfer the training, effort, and experience they have received to the organization they work for. In return, they want to obtain returns such as wages, bonuses, special awards, organizational recognition, and justice (Lambert, 2003). Based on this theory Greenberg (1990) defined organizational justice as a concept that specifies how employees perceive justice in the work environment and how it affects results.

There is no consensus in the literature on the number of dimensions of organizational justice. Basically, the issue of organizational justice focuses on the fairness of the consequences for the distribution of pay, reward, punishment, and promotion (distributive justice) and the fairness of decision-making procedures used to determine distributional outcomes (procedural justice) (Colquitt, Conlon, Wesson, Porter & Yee, 2001) and the fairness of self-directed behavior that employees encounter during organizational processes (interactive justice) (Bosora, 2014).

Organizational Cynicism

While cynicism was used to tell the truth, reality and the correct in ancient times, today the concept is used with negative meanings (Dean, Brandes & Dharwadkar, 1998). Cynicism is explained as a cynical criticism of culture (Hodgins, 2014), an attitude of disappointment and doubt accompanied by negative emotions (Kart, 2015), a belief that justice, honesty and tolerance are sacrificed for individual interests (Abraham, 2000), a current of thought that describes people as being choosy, dissatisfied and full of negative thoughts (Yangil, Baş & Aygün, 2014), disbelief in the possibility of others' well-being (Berman, 1997), distrust towards people, institutions and values (Vice, 2011).

Negative practices that employees perceive or experience regarding the manager and the organization may cause employees to develop the belief that the manager and the organization are ignoring company values for their success and benefits (Abraham, 2000). The difference in perception and conflict of interest (Evans, Goodman & Davis, 2010) between the manager and the employee may lead to the development of cynical attitudes towards the organization as a result of the personal and organizational experiences of the employee (James, 2005). Organizational cynicism is thus learned and develops as a function of negative experiences in the organization (Johnson & O'Leary-Kelly, 2003). It can encompass all organizational elements (Wanous, Reichers & Austin, 2000) and generalize from one target to another (Yildiz, Akgun & Yildiz, 2013). In this direction, the concept of organizational cynicism is defined by James (2005) as “the attitude of the employee towards the organization in which he/she works in relation to negative beliefs, emotions and behaviors related to these negative beliefs and emotions; and as a reaction to the past of social and personal experiences that are open to change with environmental factors.”

When organizational cynicism is examined as negative attitude, it consists of three dimensions (Dean, Brandes & Dharwadkar, 1998). In the cognitive dimension, employees think that the organization does not behave fairly and transparently towards them. The cognitive dimension includes all kinds of experiences, beliefs and thoughts about the person, event, situation and object around the individual (Brandes, 1997). In this respect, cynicism is the tendency to disbelief about the goodness and sincerity of actions and human motives (Mazella, 2007). The affective dimension of cynicism is how the individual experiences intense cynical feelings (Brandes, Castro, James, Martinez, Matherly, Ferris & Hochwarter, 2007). The affective dimension causes reactions such as irritability, anger, feeling tension, and worrying after the perception in the cognitive dimension (Abraham, 2000). In terms of behavioral dimension, cynics in the organization engage in negative behaviors such as humiliating behaviors about the organization or its employees, making pessimistic predictions, making critical statements, cynical glances and laughing, and complaints (Dean, Brandes & Dharwadkar, 1998).

Locus of Control

Locus of control is the way of perceiving events that affect the individual. People have different ways of thinking about how much control they have over the situations they encounter (Wong-McDonald & Gorsuch, 2004), and these thoughts affect how they behave. While some individuals believe that the events they experience can change

the results, others think that the results of the events are influenced by factors such as luck and fate (Robbins & Judge, 2013).

In addition to being a conscious being with the power to influence their behavior, external stimuli and reinforcers also affect their behavior (Rotter, Change & Phares, 1972). The reinforcer is an event, situation, or factor that tends to maintain stimulus-response connection effectiveness or increase the strength of the response (Hulse, Egeth & Deese, 1980). Individuals differ from each other in terms of perceiving the causes of events that they experience (Forte, 2005). Therefore, people perceive reinforcers in two ways: internal control and external control (Rotter, Change & Phares, 1972).

These two tendencies, which are defined as two different orientations as internal locus of control and external locus of control, are present in everyone. However, individuals tend to choose either of two (Latham, 2007). Individuals with a high internal locus of control tend to believe that they have full control over reinforcers (Wallston, 1997). This means that individuals perceive a reinforcement or output due to their abilities. People with an internal locus of control people attribute the events they encounter to the results of their behavior (Haybattollahi & Gyekye, 2014). People with an internal locus of control expect a more participatory approach from their managers, and they also rely more on personal persuasion in their dealings with subordinates. While people with an internal locus of control are less socially oriented, they are more task-oriented (Spector, 1982). The most suitable environments for individuals prone to an internal locus of control are those in which they have control over events (Byrne, 2011).

Individuals with an external locus of control believe that there is nothing they can do in the face of external forces. Believing that their abilities and behaviors do not affect the reinforcers they encounter causes them to consider their efforts to improve their situation as unimportant. They do not need to make an effort because they have no expectations that they can control current or future events (Schultz & Schultz, 2015). While individuals with an external audit focus prefer managers who direct and give clear instructions and orders, they also adopt an oppressive management style. However, individuals with an external locus of control are more concerned with the social aspect of the job than the task (Spector, 1982). The most suitable environments for individuals prone to an external locus of control are those in which the consequences of events depend on external forces (Byrne, 2011).

Relationship between Organizational Justice, Organizational Cynicism, and Locus of Control

Organizational justice studies focus on how people perceive justice in the work environment and how these perceptions affect their attitudes and behaviors (Colquitt, 2001). Suppose employees have a fair perception of the various practices of the organization they work for and the work done. In that case, they will exhibit behaviors that will enable the organization to achieve positive results and develop relationships based on trust with their friends and managers. On the other hand, if the employee has a perception of injustice, they exhibit negative attitudes and behaviors that make it difficult for the organization to achieve its goals (Folger & Konovsky, 1989), reacts negatively (Greenberg, 2011) and acts to eliminate injustice within the framework of their perception of justice (Stroh, Northcraft & Neale, 2002). According to Dean, Brandes and Dharwadkar (1998), unfair practices bring negative perceptions and attitudes on cognitive, affective and behavioral planes against the organization in employees. Bedeian (2007), on the other hand, argues that organizational cynicism is a concept related to organizational injustice, defining it as the belief of employees that their organizations engage in practices and activities that are far from honesty, justice, sincerity, and accuracy.

The theoretical basis of the relationship between organizational justice and organizational cynicism is based on Social Exchange Theory (Blau, 1964). According to this theory, mutual obligations and expectations between employees and their organizations are not clearly expressed but produce negative results if they are not complied with (Turunç & Çelik, 2010). Suppose employees perceive an inequality between their contributions and earnings (education, experience, performance, etc.) and the results they receive in return (salary and promotion decisions, etc.). In that case, they think that the reward they receive is not fair. Likewise, employees compare the outputs they have achieved with those of another employee doing the same job as them. When they perceive that the other employee, whom they think is putting in the same amount of effort, is getting more positive outputs from them, they consider this situation as unfair. In this context, when employees perceive that there is prejudice and injustice in organizational decisions and managerial activities (James, 2005; Fitzgerald, 2002), they may feel negative emotions such as anger, resentment and hatred towards the organization and management and develop cynical attitudes (Gerald, 2002).

In several studies examining the relationship between organizational justice and organizational cynicism in the literature, Fitzgerald (2002) found that individuals with high perceptions of distributive and procedural injustice have more cynical attitudes toward their organizations. Bernerth, Armenakis, Feild, and Walker (2007) found that distributive and interactional injustice; Köybaşı, Uğurlu & Öncel (2017) found that distributive and procedural injustice cause organizational cynicism. James (2005) found that there is a positive relationship between organizational injustice and organizational cynicism. Andersson (1996) argued that adopting a cynical attitude is a reaction that helps employees cope with a perception that the organizations they work for are unfair in terms of the outputs they get for their work, the processes used to determine these outputs, and the behavior directed at them.

Locus of control is the general expectations that individuals have about the degree of controlling their own behavior, and it is an important personality trait that affects organizational behavior (Kaya, 2016). Spector (1982) argued that locus of control affects many attitudes and behaviors related to work. People have different ways of thinking about how much control they have over their situations (Wong-McDonald & Gorsuch, 2004). Individuals with a high internal locus of control tend to see the results of the events they encounter in their lives as a direct result of their efforts and behaviors (Di Fabio & Saklofske, 2019). Individuals with a dominant external locus of control believe that their actions depend on factors beyond their control (Martin, Thomas, Charles, Epitropaki & McNamara, 2005). In other words, the attribution of the locus of control to internal and external factors differs in terms of the perception of the causes of events that happen to employees (Forte, 2005). Therefore, it can be said that locus of control has a mediating role in the difference in the organizational justice perceptions of the employees in the level of influencing organizational cynicism.

Purpose and Hypotheses of the Study

In educational organizations where human relations are intense, one of the factors affecting the organizational justice and organizational cynicism perceptions of school personnel is personality traits. Locus of control is also among the important personality traits (Türkoğlu, 2007). When the literature is examined, it is seen that some studies are revealing that the relationship between organizational justice and organizational cynicism is negative (Fitzgerald, 2002; James, 2005; Bernerth, Armenakis, Feild & Walker, 2007). However, there has not been enough research that deals with the relationship between organizational justice, organizational cynicism, and locus of control and examines the level and direction of the relationship between these variables and implicit variables. It has been observed that few studies have been carried out in organizations in different sectors other than school organizations. In addition, the studies were generally carried out to cover a part of the employees working in the organization. This study aims to examine the mediating role of locus of control in the relationship between organizational justice and organizational cynicism. With this research, the mediating role of the locus of control in the effect of organizational justice on organizational cynicism in school organizations was examined in a way to cover all personnel who have a direct effect on education and training in schools.

One of the reasons underlying the cynical attitudes of school personnel is how the school personnel perceives the practices made by the school administration (James, 2005; Naus, Iterson & Roe, 2007). In the literature, studies are showing that organizational justice is among the most obvious organizational reasons leading to cynicism (Fitzgerald, 2002; James, 2005; Bernerth vd. 2007; Chiaburu et al., 2013; Naus, Iterson & Roe, 2007; Biswas & Kapil, 2017; Kwantes & Bond, 2019; Akar & Çelik, 2019; Moule Jr. et al., 2019). With this research, the mediating role of locus of control in the effect of organizational justice on organizational cynicism in school organizations was examined in a way to cover all personnel who have a direct effect on education and training in schools. For this purpose, the following hypotheses were formed, and answers were sought for these hypotheses:

H_1: There is a negative relationship between organizational justice and organizational cynicism.

H_2: With the indirect effect of organizational justice, the change in organizational cynicism sub-dimensions becomes inconsistent.

H_3: There is a positive relationship between organizational justice and locus of control.

H_4: The level of relationship between the indirect effect of organizational justice and the sub-dimensions of locus of control differs.

H_5: There is a positive relationship between organizational cynicism and locus of control.

H_6: The level of relationship between the indirect effect of organizational cynicism and the sub-dimensions of locus of control differs.

H_7: The locus of control has a mediating role in the effect of organizational justice on organizational cynicism.

Method

Research Model

In this study, the relational survey model, which is one of the quantitative research methods, was used to examine the mediating role of locus of control in the effect of organizational justice on organizational cynicism. Descriptive survey models involve obtaining information about attitudes, experiences and characteristics among one or more groups of people through questions and answers (Leedy & Ormrod, 2015). The relational design of this research consists of a model determined by the researchers and testing this proposed model by means of latent variables with Structural Equation Modeling (SEM) analysis (Stein, Morris & Nock, 2012). The model developed and tested within the scope of this research is presented in Figure 1.

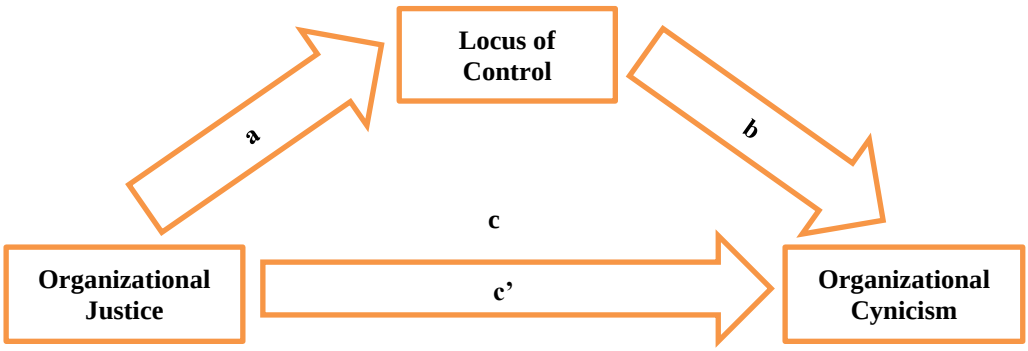


Figure 1: Research Model

According to the research model in Figure 1, organizational justice was examined as the leading variable of organizational cynicism, and locus of control as the mediator variable between organizational justice and organizational cynicism. The path coefficient of organizational justice and locus of control beliefs was determined as "a", the path coefficient of locus of control beliefs and organizational cynicism as "b", the path coefficient of the direct effect of organizational justice on organizational cynicism as "c", the path coefficient of the total effect of organizational justice on organizational cynicism as "c' ". "a x b" indicates the indirect effect of organizational justice on organizational cynicism.

Study Group

The population of the research is 2800, consisting of 207 administrators (66 school principals and 141 assistant principals), 2603 teachers, and 70 civil servants working in 4 official kindergartens, 20 primary schools, 19 secondary schools, and 17 high schools in the Beylikdüzü district of Istanbul in the 2018-2019 academic year. The participants of the research were determined by a simple random sampling method. In the simple random sampling method, each person in the universe has an equal probability of being selected for sampling. Each person in the universe is independent and unaffected by other people (Onwuegbuzie & Collins, 2007). A total of 1000 questionnaire forms were distributed to the sample representing the universe. 583 of the distributed forms were answered by the participating school personnel. One hundred sixty-four questionnaires were excluded from the study due to incomplete answers, being left unfinished, marking more than one answer option, and inconsistent answering of all items to give the same answer. Box plots were examined to detect extreme values in 419 questionnaires evaluated. As a result of this examination, it was determined that 34 of the questionnaires had extreme values. These questionnaires were also excluded from the study and analyses were made with the remaining 385 questionnaires. Accordingly, the sample size of the study was determined as 385. In SEM, which is a technique that requires a large sample size, an ideal sample size (N) and parameter (q) ratio (N/q) for each latent variable should be 20/1. Among the latent variables used in this study, the organizational cynicism implicit variable contains the most parameters (q=14). Organizational cynicism parameters require a total of q=14 statistical estimations. This estimation's ideal minimum sample size should be 20x14, i.e., N=280 (Kline, 2011). Accordingly, the sample size of 385 of the research seems to be sufficient for the use of statistical analyzes in SEM.

Information on the demographic characteristics of the participants (school personnel) in the research sample is given in Table 1.

Table 1. Demographic characteristics of the participants

Gender	**N**	**%**	**Seniority**	**N**	**%**
Female	234	60.8	0-4 years	27	7.0
Male	151	39.2	5-9 years	68	17.7
Total	385	100.0	10-14 years	72	18.7
Job Selection Status	**N**	**%**	15-19 years	104	27.0
Willingly	339	88.1	20-24 years	68	17.7
Unwillingly	46	11.9	25 years or more	46	11.9
Total	385	100.0	Total	385	100.0
Education	**N**	**%**	**Branch**	**N**	**%**
Undergraduate	319	82,9	Pre-School teacher	15	3,9
Master's (without Thesis)	36	9.4	Classroom teacher	82	21,3
Master's (with Thesis)	27	7.0	Branch teacher	283	73.5
PhD	3	8	Civil servant	5	1.3
Total	385	100.0	**School Type**	**N**	**%**
Position	**N**	**%**	Primary school	104	27.0
Teacher	350	90.9	Middle school	135	35.1
Principal	9	2.3	High school	146	37.9
Vice principal	26	6.8	Total	385	100.0
Total	385	100.0			

Data Collection Tools

In order to measure organizational justice, organizational cynicism and locus of control, new scales were developed by the researchers by blending the scales used in the literature within the scope of this study. The scale used to determine the organizational cynicism attitudes of school personnel was shaped in three dimensions as cognitive, affective, and behavioral cynicism consisting of 14 statements and was graded as a 5-point Likert. The KMO analysis result of the Organizational Cynicism Scale was determined as .890 and the Barlett test as significant (p=.000). As a result of factor analysis, it was determined that the data were compatible with the three-factor structure of the scale. The goodness-of-fit values of the first and second level Confirmatory Factor Analysis (CFA) conducted to determine the construct validity of the Organizational Cynicism Scale were determined as $X^2(62, N=385)=136.664$; $X^2/df=2.204$; CFI=.950; RMSEA=.056; SRMR=.045. According to the goodness of fit values, the CFA values of the Organizational Cynicism Scale are within acceptable limits. According to the second level CFA results, it was confirmed that the items in the Organizational Cynicism Scale, which was proposed theoretically, represented all three dimensions. The Cronbach Alpha reliability coefficient of the scale was determined as .864 with the reliability analyzes performed.

The scale used to determine the organizational justice perceptions of school personnel was shaped in a single dimension consisting of 12 items and was graded as a 5-point Likert. The KMO analysis result of the Organizational Justice Scale was determined as .959 and the Barlett test as significant (p=.000). As a result of factor analysis, it was determined that the data were compatible with the one-dimensional structure of the scale. Goodness-of-fit values of the first level Confirmatory Factor Analysis (CFA), which was conducted to determine the construct validity of the Organizational Justice Scale, were determined as $X^2(35, N=385)=105.751$; $X^2/df=1.958$; CFI=.979; RMSEA=.050; SRMR=.028. According to the goodness of fit values, the CFA values of the Organizational Justice Scale are within acceptable limits. According to the first level CFA results, it was confirmed that the items in the Organizational Justice Scale, which were theoretically suggested, also represent a single dimension. The Cronbach Alpha reliability coefficient of the scale was determined as .931 with the reliability analyzes performed.

The scale used to determine the type and level of locus of control possessed by school personnel, on the other hand, was shaped in two dimensions as internal and external locus of control, consisting of 11 items, and was graded as a 5-point Likert. The KMO analysis result of the Locus of Control Scale was determined as .776 and the Barlett test as significant (p=.000). As a result of the factor analysis, it was determined that the data were compatible with the two-dimensional structure of the scale. Goodness-of-fit values of the first and second level Confirmatory Factor Analysis (CFA) conducted to determine the construct validity of the Locus of Control Scale

were determined as $X^2(43, N=385)=72.860$; $X^2/df=1.694$; CFI=.942; RMSEA=.043; SRMR=.048. According to the goodness-of-fit values, the DFA values of the Locus of Control Scale are within acceptable limits. According to the second level CFA results, it was confirmed that the items in the Locus of Control Scale, which was proposed theoretically, represented both dimensions. The Cronbach Alpha reliability coefficient of the scale was determined as .675 with the reliability analyzes performed.

Data Analysis

The data obtained in this study, which aims to examine the mediating role of the locus of control in the relationship between organizational trust and organizational cynicism in school organizations, were obtained using the SPSS 24 and AMOS 24 programs; validity and reliability analysis, confirmatory factor analysis (CFA), and structural equation modeling (SEM) were conducted.Confirmatory factor analysis is a factor analysis used to test the suitability of the factors determined by explanatory factor analysis to the factor structures determined by the hypothesis. On the other hand, structural equation modeling can be explained as a combination of factor analysis and regression analysis. It uses the estimated covariance matrix created according to the theoretical model to test the compliance of the observed data with the covariance matrix (Hox & Bechger, 1998).

Results

Measurement Model Test

In the research, the measurement model consisting of the latent variables of organizational justice, organizational cynicism, and locus of control was tested. Due to the normal distribution of the data, the covariance matrix was created by using the maximum probability calculation method. The fact that the goodness of fit values obtained as a result of the analysis is within the acceptable threshold values in the literature indicates that the model is compatible with the data and is acceptable ($X^2[586, N=385]=1085.244$; $X^2/df=1.852$; CFI=.903; RMSEA=.048; SRMR=.060). The correlation relations and coefficients between the latent variables in the measurement model are shown in Figure 2.

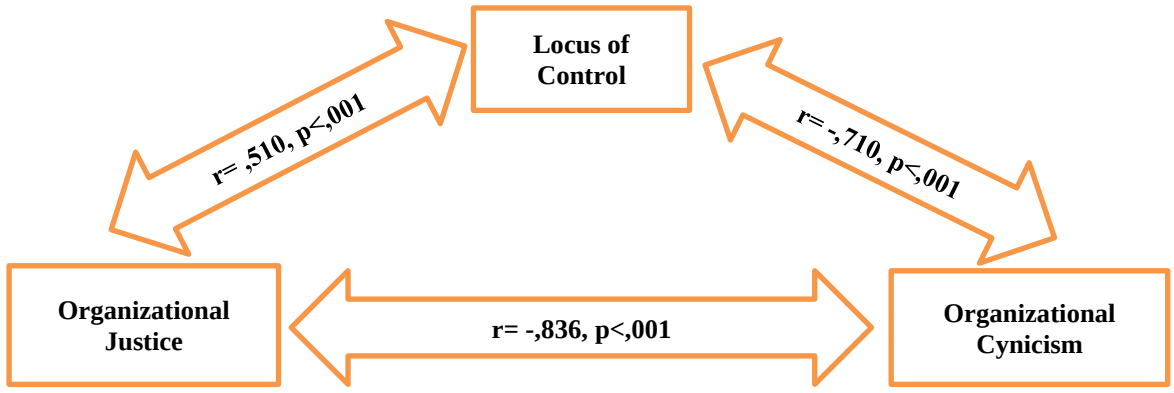


Figure 2. Measurement Model Correlations Relationships and Coefficients

As seen in Figure 2, it was found that organizational justice has a negative and significant relationship with organizational cynicism (r= -.836, p<.001), and positive and significant relationship with the locus of control (r=.510, p<.001), organizational cynicism has significant and negative relationship with the locus of control (r=-.710, p<.001). After the measurement model was verified, the research hypotheses were tested on the implicit variable structural model.

The model created to test the hypotheses *"There is a negative relationship between organizational justice and organizational cynicism, and the change between the indirect effect of organizational justice and the subdimensions of organizational cynicism becomes inconsistent"* was estimated using the maximum likelihood method (ML) because the data were normally distributed. The fact that the goodness of fit values obtained as a result of the path analysis is within the acceptable threshold values in the literature indicates that the model is compatible with the data and is acceptable ($X^2[295, N=385]=598.152$; $X^2/df=2.028$; CFI=. 931; RMSEA=.053; SRMR=.051). The standardized regression weights (β) of this established model are shown in Figure 3.

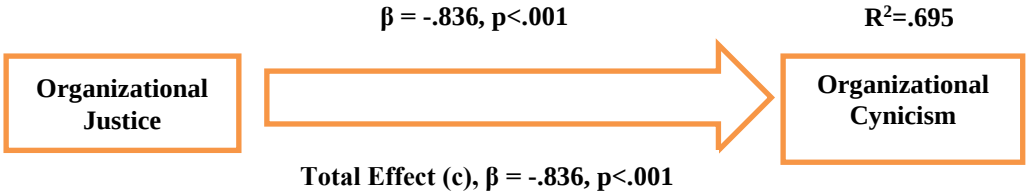


Figure 3. Path analysis model of the relationship between organizational trust and organizational cynicism

As seen in Figure 3, there is a significant negative relationship between organizational justice and organizational cynicism (β=-.836, p<.001). According to this result, a one-unit increase in organizational justice causes an .836-unit decrease in organizational cynicism or a one-unit decrease in organizational justice causes an .836-unit increase in organizational cynicism. In addition, organizational justice explains 695% of the variance in organizational cynicism. According to this result, Hypothesis 1 was accepted.

The standardized regression weights (β) in the model confirmed in Figure 3 regarding the indirect effect of organizational justice on the sub-dimensions of organizational cynicism through organizational cynicism are given in Table 2.

Table 2. Standardized regression weights for the indirect effect of organizational justice and the sub-dimensions of organizational cynicism in the organizational cynicism path analysis model

	Organizational Justice		
	Direct Effects	Indirect Effects	Total Effects
Cognitive Cynicism	.000	-.807	-.807
Affective Cynicism	.000	-.617	-.617
Behavioral Cynicism	.000	-.541	-.541
Organizational Cynicism	-.836	.000	-.836

p<.001

According to Table 2, it is seen that organizational justice has a negative and significant relationship with the sub-dimensions of organizational cynicism through organizational cynicism. The indirect effect of organizational justice on cognitive cynicism (β=-.807, p<.001)-.807, indirect effect on behavioral cynicism (β=-.541, p<.001)-.541 and indirect effect on affective cynicism (β=-.617, p<.001)-.617. It can be said that the change in organizational cynicism sub-dimensions is becoming inconsistent with the effect of organizational justice. According to this result, Hypothesis 2 was accepted.

The model created to test the hypotheses *"There is a positive relationship between organizational justice and locus of control beliefs, and the magnitude of the relationship between the indirect effect of organizational justice and the subdimensions of locus of control beliefs is different"* was estimated using the maximum likelihood method (ML) because the data were normally distributed. The fact that the goodness of fit values obtained as a result of the path analysis are within the acceptable threshold values in the literature indicates that the model is compatible with the data and is acceptable (X^2[206, N=385]=331.611; X^2/df=1.688; CFI=.957; RMSEA=.041; SRMR=.049). The standardized regression weights (β) of this established model are shown in Figure 4.

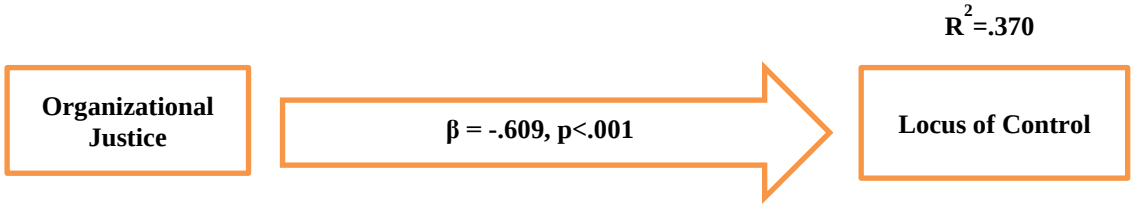


Figure 4. Path analysis model of the relationship between organizational trust and locus of control

As seen in Figure 4, there is a positive and significant (β=-.609, p<.001) relationship between organizational justice and locus of control. In addition, organizational justice explains 37% of the variation (variance) in the locus of control. According to this result, Hypothesis 3 was accepted.

The standardized regression weights (β) in the model confirmed in Figure 4 regarding the indirect effect of organizational justice on the sub-dimensions of the locus of control over the locus of control are given in Table 3.

Table 3. Standardized regression weights for the indirect effect of locus of control on the sub-dimensions of organizational justice and the locus of control path analysis model

	Organizational Justice		
	Direct Effects	Indirect Effects	Total Effects
External Locus of Control	.000	-.429	-.429
Internal Locus of Control	.000	.427	.427
Locus of Control	.609	.000	.609

p<.001

According to Table 3, organizational justice has a positive and significant relationship with internal locus of control (β=.427, p<.001) and a negative significant relationship with external locus of control (β= -.429, p<.001). It can be said that the level of the relationship between the effect of organizational justice and the sub-dimensions of locus of control differs. In other words, it can be said that internal locus of control tendencies of school personnel increases in the presence of organizational justice, and external locus of control tendencies increase in the absence of organizational justice. According to this result, Hypothesis 4 was accepted.

The model created to test the hypotheses "*There is a positive relationship between organizational cynicism and locus of control, and the level of relationship between the indirect effect of organizational cynicism and the sub-dimensions of locus of control differs."* was estimated by the Maximum Likelihood (ML) method. The paths related to the factors and the standardized regression weights of this model are shown in Figure 5. The fact that the goodness of fit values obtained as a result of the path analysis are within the acceptable threshold values in the literature indicates that the model is compatible with the data and is acceptable (X^2[246, N=385]=435.365; X^2/df=1.770; CFI=.913; RMSEA=.045; SRMR=.054).

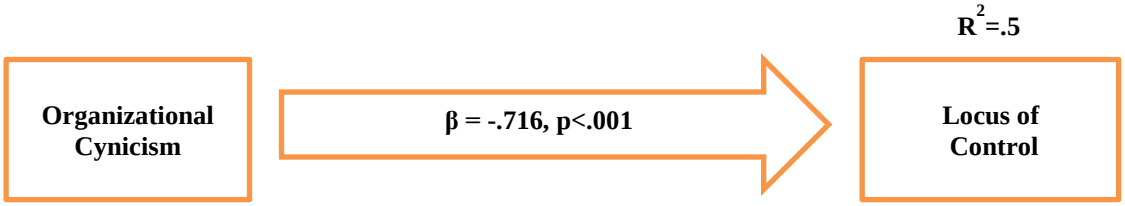


Figure 5. Path analysis model of the relationship between organizational cynicism and locus of control

As seen in Figure 5, there is a significant negative relationship (β=-.716, p<.001) between organizational cynicism and locus of control. In addition, organizational cynicism explains 51% of the variance in locus of control. According to this result, Hypothesis 5 was accepted.

The standardized regression weights (β) in the model confirmed in Figure 5 regarding the indirect effect of organizational cynicism on the sub-dimensions of the locus of control over the locus of control are given in Table 4.

Table 4. Standardized regression weights for the indirect effect of organizational cynicism and the indirect effect of locus of control on the locus of control path analysis model

	Organizational Cynicism		
	Direct Effects	Indirect Effects	Total Effects
External Locus of Control	.000	.685	.685
Internal Locus of Control	.000	-.354	-.355
Locus of Control	-.716	.000	-.716

In Table 4, organizational cynicism has a significant negative relationship with internal locus of control (β=-.354, p<.001) and a positive significant relationship with external locus of control (β=.685, p<.001) from among the sub-dimensions of locus of control, over locus of control. Accordingly, it can be said that the level of relationship between the effect of organizational cynicism and the sub-dimensions of locus of control differs. In other words, it can be said that as the external locus of control of school personnel increases, their cynical perceptions towards their schools increase. According to this result, Hypothesis 6 was accepted.

In the model created for the hypothesis *"Locus of control has a mediating role in the effect of organizational justice on organizational cynicism"* path analysis was performed for relationships with the implicit variables. To test this situation, a relationship model of the mediator locus of control was created on the effect of organizational justice on organizational cynicism. Path analysis was performed on the created model using the Maximum Likelihood (ML) method. The fact that the goodness of fit values obtained as a result of the path analysis is within the acceptable threshold values in the literature indicates that the model is compatible with the data and is acceptable (X^2[586, N=385]=1085.244; X^2/df=1.852; CFI=.903; RMSEA=.048; SRMR=.060). The indirect effect of organizational justice on organizational cynicism through the locus of control was significant through the Sobel test (β=.195, p=.004<.05). The paths related to the factors and the non-standardized regression weights (R.W) and standardized regression weights (S.R.W) of this model are shown in Table 5.

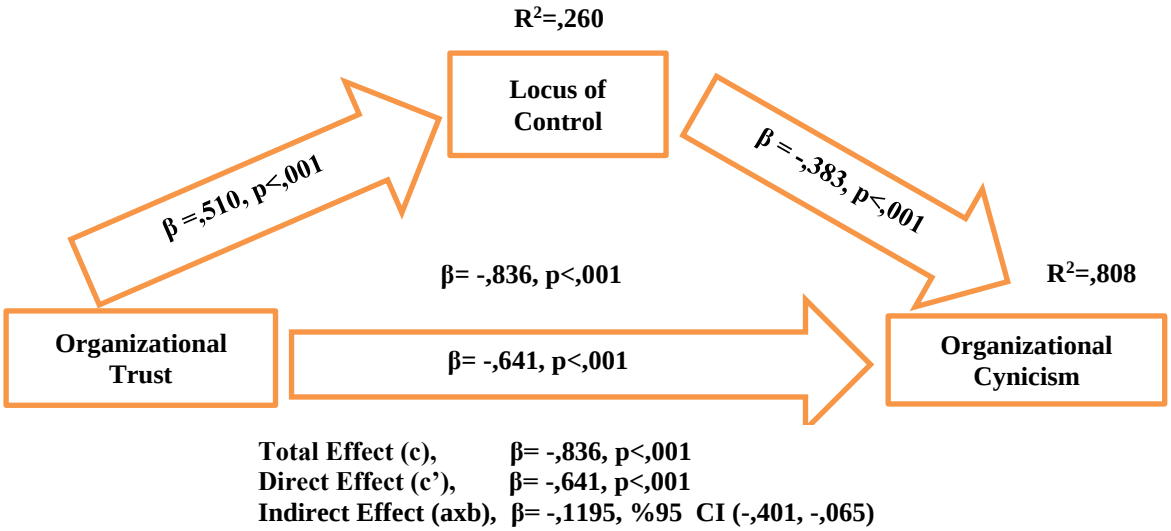
Table 5. The significance levels and results of organizational justice, organizational cynicism and mediator locus of control variable relationships

			R. W Estimate	S.R.W Estimate	S.E.	C.R.	P	Label	Result
Locus of Control	←	Organizational Justice	.157	.510	.036	4.79	***	a	Significant
Organizational Cynicism	←	Locus of Control	-1.147	-.383	.295	-3.884	***	b	Significant
Organizational Cynicism	←	Organizational Justice	-.589	-.641	.082	-7.217	***	c'	Significant

p<0.001, Three stars (***) notation indicates p values are much less than .001 .

According to Baron and Kenny's (1986) mediation theory, it is stated that there is a partial mediation effect when the effect of organizational justice (independent variable) on organizational cynicism (dependent variable) decreases, but does not completely disappear and becomes significant (β=-.641, p<0.001). In Figure 3, the standardized regression weight of the effect of organizational justice on organizational cynicism is (β=-.836, p<0.001)-.836. However, according to the model in Figure 6, which was created by adding the locus of control mediator variable to the model in Figure 3, the standardized regression weight between organizational justice and organizational cynicism decreased to (β=-.641, p<0.001)-.641.

In order to test whether the locus of control variable has a mediating role in the relationship between organizational justice and organizational cynicism according to the modern mediation theory, a path analysis was performed again based on the Bootstrap method. It is claimed that the Bootstrap method gives more reliable results than the traditional method of Baron and Kenny (1986) and the Sobel test (Hayes, 2018). According to Preacher and Hayes (2004), in the mediation effect analyzes performed with the bootstrap technique, the 95% confidence interval (CI) values obtained as a result of the analysis should not include the zero value in order to support the research hypothesis. Analysis results are presented in Figure 6.



CI: Confidence Interval

Figure 6. Path analysis model of organizational justice, organizational cynicism, and mediator locus of control variable relationships

According to the Bootstrap analysis results in Figure 6, the indirect effect of organizational justice on organizational cynicism through the locus of control is significant (β= -.195, 95% CI[-.401,-.065]). Because the values of the lower and upper bootstrap confidence intervals obtained by the percentile method do not contain the value 0 (zero). Moreover, organizational justice, together with the locus of control beliefs, explains 81% of the variation (variance) in organizational cynicism. These results show that the locus of control variable has a mediating effect on the relationship between organizational justice and organizational cynicism. According to this result, Hypothesis 7 was accepted.

Discussion

People make causal attributions based on their perception of the event after an event (Heider, 1958). According to Weiner's (1980) attribution theory, the fact that school personnel holds the school administrator responsible for the injustices they experience at school is very effective in the emergence of organizational cynicism. In this case, school personnel are accused of unfair treatment by the school administration. School personnel's blaming their school may reveal cynical attitudes toward the school (Eaton, 2000).

This study concluded that there is a negative significant relationship between organizational justice and organizational cynicism. Considering the studies examining the relationship between organizational justice and organizational cynicism; it is observed that as organizational justice levels increase, the level of organizational cynicism decreases (James, 2005; Bernerth, Armenakis, Feild & Walker, 2007; Levent & Keser, 2016; Fitzgerald, 2002; Kutanis & Çetinel, 2009). These research findings showed that there is a negative relationship between school personnel's perceptions of organizational justice and organizational cynicism in all dimensions. According to Sağır and Oğuz (2012), school administrators should consider that school personnel who do not believe in the work done at school are pessimistic about their performance, make negative statements about their school, and avoid cooperating with the administration may have cynical attitudes.

Justice shapes the behavior of human beings and keeps society and organization together in the light of concepts such as rights, law, and equality (Taylor, 2003). Dehaghani and Mirhadi (2013) stated in their study that the foundation of justice is based on Adams' (1965) theory of equality. Karagöz (2002) stated in his study that the concepts of justice, rights, and freedom cannot be considered independently of each other. In his research, Fischer (2008) stated that fairness is the basis of justice. Bernerth, Armenakis, Feild and Walker (2007) argued that organizational cynicism occurs when the organization continues its activities without regard to employees' rights, equity, and equality. Fleming and Spicer (2003) argued that organizational cynicism arises due to employees' feeling of being ignored by the organization and not being taken seriously. According to this, it can be said that the injustice that occurs as a result of the school administrators' iniquity can create cynical attitudes in the school personnel.

Organizational justice is considered a subjective concept (Cropanzano, Bowen & Gilliland, 2007; Folger & Cropanzano, 2001). Greenberg (1990) defined organizational justice as a concept that indicates how employees perceive justice in the work environment and how it affects outcomes. In his study, Öztürk (2020) found in his study that teachers perceive equity in school primarily in the context of the behavior of school leadership, as a result of their experiences in school. According to Greenberg (1987), organizational justice has three components: Fairness, Equity, and Need. According to Greenberg (1987), organizational justice has three components: fairness, equality and need. According to the fairness component, achievements should match employee performance. The equality component states that everyone should have an equal opportunity to win. According to the fairness component, the acquirements should be in parallel with the performance of the employees. According to the equality component, everyone should have an equal chance of winning. The employee tends to show certain behaviors according to the importance of the result he will achieve in return for his action. According to the expectation theory on which organizational cynicism is based, the individual puts his behavior on a rational basis. Whichever behavior will meet the expectations, the individual tends to that behavior (Dean, Brandes & Dharwadkar, 1998; Abraham, 2000; James, 2005). In addition, the expectation theory is based on self-interest (selfishness) (Robbins & Judge, 2013). In this sense, it can be said that organizational cynicism is related to the expression of selfishness (Brandes, 1997; Mirvis & Kanter, 1989) in the expectation theory. Accordingly, the fact that the needs of the school personnel are not taken into account in schools, and there is a conflict between the expectations of the school personnel and the expectations of the school they work in can make the school personnel more prone to "cynicism" (Eaton, 2000).

Reward distribution is one of the areas where the sense of justice is measured in the organization (Fischer, 2008). Deutsch (1975) and Leventhal (1976) stated that organizational justice is a normative concept that directs an individual's rewards and punishments depending on her contributions to the organization. When all living things are rewarded, they tend not to do the punished behaviors while repeating the rewarded behaviors (Sakallı, 2001). The financial reward that school administrators can give to school personnel is very limited. Köybaşı, Uğurlu and Öncel (2017) stated that teachers did not think that they were rewarded fairly, while Tan (2006) found that teachers thought that school administrators acted unfairly in rewarding the most. Bozbayındır and Kayabaşı (2014) stated in their study that when teachers complete a task, the administrators even withhold words such as "well done, congratulations". Crozby's (1976) "Relative Deprivation Theory" argues that certain reward distribution patterns lead to feelings of deprivation and anger in humans (Greenberg, 1987). Within the framework of expectancy theory, employees constantly compare their performance with the performance of others and conclude what kind of reward their performance should be. Suppose the internal or external reward actually received by the school staff is less than the expected reward as a result of this comparison. In that case, the school staffs think that the school lacks justice and equality. Since this situation coincides with the belief that the school and the administration lack equality and justice (Kanter & Mirvis, 1989; Abraham, 2000), cynical attitudes may develop among school personnel. Considering this situation, school administrators should apply the criteria regarding the distribution of material and moral rewards in an objective and transparent way. Otherwise, school personnel may develop a cynical attitude that is initially cognitive, then turns to negative emotions, and finally leads to destructive behavior.

According to Folger and Cropanzano (1998), organizational justice is concerned with the set of rules and social norms about the distribution of organizational resources, and the procedures used to determine these distribution decisions, and the interpersonal communication and behaviors that occur during the execution of these procedures. Employees give importance to the procedures used in making decisions. In some cases, it may even consider the processes that determine the decisions as more important than the decisions themselves (Greenberg, 2011). According to the Justice Motive Theory, the inclusion of the employees in the decision-making process in the organization enables them to perceive the implementation and decision-making processes in the organization they work for as being fairer (Ertürk, 2014). Cohen-Charash and Spector (2001) stated in their study that including the employee in the decision is the determinant of justice. Van den Bos, Vermunt, and Wilke (1997) concluded in their study that the fairer the procedures applied in determining the decisions, the fairer the results of the decisions made. To do this, it is necessary to establish some objective and rational rules and criteria to determine the compensation that people deserve (Robbins & Judge, 2013). Şamdan and Başkan (2019) stated that according to the results of their study, teachers generally complain that there are no objective criteria regarding the distribution of duties and resources in their schools and that a democratic and participatory approach is not displayed in making decisions. Polat and Kazak (2014) stated that the favoritism and behaviors of school administrators negatively affect teachers' perceptions of organizational justice. Managers should make employees feel valued by including them in business processes and studies and by getting their opinions because organizational cynicism is a reaction arising from indifference and being ignored. Johnson and O'Leary-Kelly (2003) stated that cynicism in organizations is a reaction caused by indifference, while Wanous, Reichers, and Austin (2000) stated that it results from a lack of real participation in decision-making processes. Şenses (2018) stated that if the school administrator

takes sides, exhibits nepotistic attitudes and behaviors, and does not care about the teachers' opinions, the teachers reveal cynical attitudes such as anger and hatred towards the school and the administration. Considering that unfair attitudes such as selfishness (Andersson, 1996), favoritism, hypocritical policies toward employees (Mirvis & Kanter, 1989), and the belief that the organization and managers disregard corporate values for their success and benefits (Abraham, 2000) are associated with cynicism. School administrators who exhibit unfair procedures in decision-making processes may cause cynical attitudes among school personnel.

Kaplan, Reneau, and Whitecotton (2001) stated in their study examining the relationship between locus of control and decision-making ability that individuals with an external locus of control tend to make decisions by being influenced by the opinions of others. Kaygusuz (1995) reports that individuals with the locus of control react more to the restriction of their freedom, perceive themselves as more effective and productive in all areas, and have a positive self-concept. According to Spector (1982), internal audit-oriented people expect a more participatory approach from their managers. According to the findings obtained in this study, it was found that the locus of control is the "mediating variable" in the relationship between organizational justice and organizational cynicism. In addition, the findings obtained in the study revealed a moderate positive relationship between organizational justice and internal locus of control, and a low negative relationship between organizational cynicism and internal locus of control. Accordingly, it can be said that the perception of organizational justice can be negatively affected by school personnel whose internal locus of control dominates and who are not involved in the decision-making processes, and that their cynical attitude increases. Therefore, it can be said that the locus of control has a role in the relationship between organizational justice and organizational cynicism.

In Öztürk's (2020) study, participating teachers stated that they did not take legal action against the injustice they experienced or witnessed at school. People with external control tendencies, who experience learned helplessness over time, do not need to make an effort because they do not expect that they can control events now or in the future (Schultz & Schultz, 2015). Studies have emphasized that those with external locus of control tend to blame others for their misfortune (Keltner, Ellsworth & Edwards, 1993). When these individuals attribute negative events to external, intentional, and controllable causes, they tend to experience and express more anger (Aquino, Douglas & Martinko, 2004). According to the findings obtained in this study, a moderate negative relationship was found between organizational justice and external locus of control, and a positive high-level relationship was found between organizational cynicism and external locus of control. These individuals may develop cynical attitudes of school personnel who experience learned helplessness due to not considering their thoughts and the inconclusive efforts to correct the injustices they experience. Therefore, it can be said that the locus of control has a role in the relationship between organizational justice and organizational cynicism.

This study determined that the change in the sub-dimensions of organizational cynicism became inconsistent with the effect of organizational justice. It could be said that this inconsistency is caused by such factors such as the subjective perceptions of justice of school personnel (Cropanzano & Mitchell, 2005), locus of control tendencies and personality traits. In the study of Cohen-Charash and Spector (2001), it was concluded that, when an individual perceives an unfair situation, this negatively affects that individual's cognitions, emotions, and behaviors. Cynics believe in the lack of principles such as justice, honesty, and sincerity in their organizations (Mazella, 2007). Reactive justice theories are united around the view that people respond to unfair relationships with negative feelings and try to avoid being treated unfairly by behaving in a way that corrects unfair practices (Greenberg, 1987). Öztürk (2020) found that teachers do not express the unfair situations they face because of the concern of disrupting the positive organizational climate of the school, but they criticize these injustices among their group of friends.

According to the cognitive dissonance theory, people tend to have their cognitions consistent with each other. If there is any inconsistency or a contradiction, the individual wants to make somehow them consistent and eliminate the contradiction (Kruglanski, 1989). According to the balance theory, school personnel wants to keep the three components of organizational cynicism in balance. In case of a change in one of the three components of organizational cynicism, school personnel is expected to change the other components (Levent & Keser, 2016). According to the cognitive dissonance and balance theory, there should be consistent affective and behavioral cynicism changes in the school personnel with the effect of changing cognitive cynicism. However, this study determined that the change in the sub-dimensions of organizational cynicism became inconsistent with the effect of organizational justice.

In line with the findings obtained from this research, to prevent organizational cynicism caused by organizational injustices towards the school and school administrators, the following could be recommended: organizing the working environments of school personnel in a way that increases organizational justice; complying with the procedures and laws in practices such as rewarding, responsibility and punishment, creating a democratic school

climate; participation of school personnel in decision-making processes, managers performing all their work openly and transparently, and that they show ethical leadership behavior instead of managerial behavior. In addition, since the locus of control is effective in the relationship between organizational justice and organizational cynicism, school personnel can be equipped with functional skills of exhibiting internal locus of control behaviors instead of external locus of control behaviors.

Acknowledgments or Notes

The datasets used and analyzed during the current study are available in the article.

Author (s) Contribution Rate

The authors contributed equally to the study.

Conflicts of Interest

No potential conflict of interest was reported by the authors.

Ethical Approval

During the research process, the necessary permissions were first obtained from the Istanbul Provincial Directorate of National Education. In this study, all the rules established under the Higher Education Institutions Scientific Research and Publication Ethics Directive were followed. None of the measures listed under the title "Measures against Scientific Research and Publication Ethics", the second part of the directive, were not taken.

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The Mediating Role of Leader-Member Exchange on the Relationship between Organizational Commitment and Organizational Cynicism among School Counselors*

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Abstract

The study aims to examine the mediatory role of leader-member exchange in the relationship between organizational commitment and Organizational cynicism among school counselors. The research group consists of 171 school counselors (109 females and 62 males). The scales used are organizational commitment scale, organizational cynicism scale, leader-member exchange scale. For the mediation analysis, AMOS 26 was used. We used Pearson correlation to evaluate relationship between variables in data analysis. The model has been accepted that ıt is significant and the model is statistically confirmed. Bootstrapping procedures were applied to analyze the significance of indirect effects. The result of this research revealed that leader-member exchange was found to be partially mediated in the relationship between organizational commitment and organizational cynicism in school counselors.

Keywords: Organizational cynicism, Organizational commitment, Leader-member exchange, School counselors

Introduction

Some of the most challenging problems for school counselors in the literature are ; that school staff doesn't cooperate with school counselors or do not know their responsibilities and job descriptions. School counsellors quit their jobs because of facing multıple and competing demands(Maslach, 2003; Mullen & Crowe, 2016; Stebnicki, 2008). School administration gives extra duties to school counselors and they are leftschool counselors extra duties, leaving them alone while performing these duties (Parmaksız & Gök, 2018).

According to McInerney, Ganotice, King, Marsh and Morin (2015), employees with organizational commitment put extra effort into their work, identify with the institution's goals they work for and strive to achieve them, and desire them to stay in their institutions. For this reason, organizations often try to increase the commitment of their employees to maintain stability and be successful. In other words, employees' adopting the organizations' goals and taking the responsibility of fulfilling the expectations help us understand the organizational commitment(McInerney et al., 2015).

According to Memari, Mahdieh and Marnani (2013), organizational commitment is an important topic of employee engagement. Employees with a high level of commitment in organizations will enjoy their work more, and the employee will be less likely to quit. Organizational commitment is a multidimensional relationship. This relationship encompasses employees' commitment to the organization, their desire to work, their purpose, and their desire to remain in the organization (Bateman & Strasser, 1984). Organizational commitment, then, is a state that expresses the strength of the attachment that employees feel toward their organizations. Determining the goals of organizational commitment is important for understanding and developing the intentions and behaviors of organizational members (Becker, Randall & Riegel, 1995). Organizational commitment is one of the most important issues of human resource management. Because the employees will work more eagerly, they will satısfy in their performance(Mathews & Shepherd, 2002). In this study, the three-component model developed by Meyer and Allen (1997) was used to examine employees' commitment to the institution they work for. This three-

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component model consisting of emotional commitment, continuance commitment, and normative commitment, which has been reconceptualized from many definitions, is widely used in the academic field (Arslan & Önce, 2014).

Emotional commitment means that employees feel emotionally attached to and identify with the institution they work for. Employees with strong emotional commitment continue to work because they want to stay in their organizations and strive to achieve the goals and objectives of the organization. Continuance commitment is defined as the employee's awareness of the costs of leaving the organization. Normative commitment is the commitment employees feel because of their sense of moral responsibility. Employees who believe they should stay in the organization have strong normative commitment (Meyer & Allen, 1997). The common aspect of emotional, continuance and normative commitment is that the individual forms a tight bond with the organization by reducing the possibility of leaving the organization (Yücel & Çetinkaya, 2016). The literature has found that there are implications for the relationships of organizational commitment with concepts such as quitting, intention to leave, continuing to work, performance, effort, showing up for work on time, organizational citizenship (Arnold & Feldman, 1982; Day, 1987; Mathieu & Kohler, 1990; Randall, 1990; Meyer & Allen, 1997).Studies have shown that while organizational commitment of individuals decreases, their intention to leave their jobs increases (Sturges, Conway, Guest & Liefooghe, 2002). Another study found that while organizational commitment increases, employee performance increases (Arnald & Feldmen,1982). According to Arnald and Feldman (1982), it is stated that individuals with high organizational commitment come to work on time.

It is known that factors such as the management's attention to the employees, evaluating their differences in related fields, supporting them, and crowning their work with appreciation are important in ensuring individuals' commitment to the organization (Kılıç, 2020). Considering these factors, it is expected that there is a significant relationship between organizational cynicism and organizational commitment (Abraham, 2000; Dean, Brandes & Dharwadkar, 1998; Eaton, 2000; Fındık & Eryeşil, 2012; Turner & Valentine, 2004). Studies find that organizational cynicism has negative effects on organizational understanding, turnover intention, and job performance (Polat & Meydan, 2010; Türköz, Polat & Coşar, 2013). Cynicism can be considered a negative attitude, expressed by explaining the events based on disappointment (Eryeşil & Fındık, 2011). This negative attitude can be exhibited against a person, group, ideology, or social order, and against an institution or organization (Andersson, 1996). Dean, Brandes, and Dharwadkar (1998) provided a comprehensive definition of organizational cynicism: it states that the individual has a negative attitude toward the employer's organization consisting of three dimensions: first, the belief that the organization lacks integrity; second, the negative impact on the institution; and finally, derogatory and critical behaviors toward the organization that are associated with negative impact on the organization. According to Abraham (2000), cynical employees think that the organization they belong to has betrayed them because feelings such as justice and sincerity are missing. Organizational cynicism is associated with the concept of injustice. Individuals feel frustrated with the practices developed by the management in organizations (O'Leary, 2003).

Employee cynicism has been conceptualized to have several negative consequences, including low performance levels, job satisfaction and organizational commitment, and increased levels of turnover intention (Dean, Brandes & Dharwadkar, 1998). According to Şimşek, 2020, Employees who feel organizational cynicism feel worthless in organizations and their pleasure from work decreases. When cynical attitudes toward the organization increase, work performance, organizational members' behavior, and trust in the organization decrease (Rehan, Iqbal, Fatima & Nawab, 2017; Yüksel & Şahin, 2017). Organizational cynicism should be associated with low levels of commitment to the organization, as a certain level of trust, or a belief that the organization will attract employees, is critical for organizational members to form a deep emotional bond with the organization. Individuals with high organizational cynicism are characterized by a distrustful attitude and negative influence towards the organization. Negativity in the work environment leads employees to experience burnout and, as a result, the desire to leave the workplace increases (Staelens, Desiere, Louche & D'Haes, 2018). Individuals who have an extremely negative attitude towards their organizations generally reduce their job satisfaction, and their commitment to their organizations decreases (Nagar, 2012).

Many studies that examined the relationship between organizational cynicism and organizational commitment concluded that organizational cynicism causes a decrease in organizational commitment (Ahmadi, 2014; Shaharruddin, Ahmad & Musa, 2016). According to Tuna, Bacaksız and Seren (2018), organizational commitment results from the harmony and unity between the organization and the employee. Also they see organizational commitment as a result of the exchange relationship between the organization and the employee. Accordingly, employees show their skills in their workplaces and use their knowledge. In return, various needs are met by the organization. However, if individuals are not allowed to use their talents within the organization and are prevented, employees will develop cynical attitudes and begin to feel less committed to the organization

(Fındık & Eryeşil, 2012; Nafei & Kaifi, 2013; Ulusoy & Kılıç, 2019). Cynical employees who are skeptical of the success of change movements will disagree wholeheartedly with the changes made and be deeply suspicious about future change efforts. For this reason, studies are stating that there is a negative relationship between organizational change cynicism and organizational commitment (Mouse, 2017; Özgan, Külekçi & Özkan, 2012; Yüksel & Şahin, 2017).

The concept of organizational commitment also concerns the people who lead the employees in the direction of the organization's employees to demonstrate their skills in the workplace. This points to leader-member exchange as a concept that influences organizational commitment. Leader-member exchange (LMX) takes into account the fact that supervisors do not have the same relationship with every member, but establish a specific relationship with each subordinate (Graen & Uhl-Bien, 1995). These relationships can differ from "out-group" relationships (strictly contractually) from "in-group" relationships that can lead to a relationship based on trust, liking, reciprocity, or friendship (Liden & Maslyn, 1998). According to social exchange theory, these interrelationships can predict many organizational outcomes, such as organizational citizenship behaviour, job performance, or turnover intentions (Cropanzano & Mitchell, 2005).

While many conceptualizations of leader-member exchanges are one-dimensional and dimensionless, leaders and members can take on multiple roles, allowing for different types of leader-member exchanges to emerge.Liden and Maslyn (1998) present a four-dimensional model of leader-member exchange and the exchange between leaders and members in the following structure: Contribution: Subordinates can accept a leader's invitation to outstanding performance, and in change, leaders mutually support their subordinates (budget, equipment, or supplies) to provide valuable resources. Leaders, defined as supervisors, have an important role in leader-member exchange in providing social cues that shape employees' perceptions of an organization (Salancik & Pfeffer, 1978). They act as Loyalty: leaders and followers can develop a relationship of mutual loyalty. In exchange for loyalty offered by the subordinate, the leader may reciprocate by offering tasks that require higher judgment or responsibility. Influence: Some relationships between leader and follower can be governed by emotions simply because they love each other and form mutual friendships. Professional respect: Organization members may be interested in developing mutual relationships with people with high expert power, as they can acquire relevant professional skills and have access to influential individuals inside and outside the organization.

In the literature, the results have shown that organizational commıtment has a positive influence on employee performance, leader-member exchange, and job satisfaction (Duneghan, Duchon &Uhl-Bien, 1992; Göksel & Aydıntan, 2012; Kacmar, Carlson & Brymer, 1999; Stepina et al., 1991). Also, some other researches have shown that organizational commitment has a negative influence on organizational cynisim and intention to leave their job (Elanain, 2014, Harris, Li & Kirkman, 2014; Kim, Lee & Carlson, 2010; Qian & Daniels, 2008). Within an organisation, leaders may build close relationships with only a few employees due to limited time and resources, or they may provide high-performing members with additional tangible and intangible resources such as information, opportunities, trust, respect, and commitment (Li & Liao, 2014; Liao, Liu & Loi, 2010; Nie & Lämsä, 2015). This situation leads to negative emotions and attitudes among employees and shapes their attitudes and behaviours toward work (Kim, Ok & Lee, 2009).

We can thus conclude that an increase in organizational commitment helps to reduce employees' organizational cynicism and that leader-manager-member exchange play a central role in employee relations. In this context, it is considered important to examine leader-member exchange as the mechanism underlying the relationship between organizational commitment and organizational cynicism of school counselors.Although there are organizational studies on the stress, burnout, and job satisfaction of school counselors in the literature, no study examining the role of leader-member exchange tools in the relationship between organizational commitment and organizational cynicism has been found. This study examined the mediating effect of leader-member exchange on the relationship between organizational commitment and organizational cynicism. In summary, this research aims to examine the mediating role of leader-member exchange in the relationship between organizational commitment and organizational cynicism of school counselors. For this purpose, hypothesis was established in light of the relevant literature. Leader-member exchange has a mediating role between organizational commitment and organizational cynicism.

Method

This section describes the research design, study sample, measures, and data collection and analysis procedures.

Research Design

Structural equation modeling (SEM) helps support research and theories by extending standard multivariate analysis methods, including regression, factor analysis, correlation, and analysis of variance (Bryne, 2000).This descriptive correlational study was conducted to examine the mediating role of leader-member exchange in the relationship between organizational commitment and organizational cynicism among school counselors.

Sample

In this research, we collected data from school counselors working in Turkey. The sample consisted of 171 school counselors (109 women; 62 men). Considering the sample size, it is enough since there are fewer than five constructs in our model with more than three items that require a minimum of 100 participants (Hair, et al., 2014). 6 participants (3.5%) were preschool counselors, 75 (43.9%) primary school counselors 22 (12.9%) secondary school counselors, 51 (29.8%) high school counselors, and 60 (35,1) guidance and research center's school counselors.. Twenty-five participants (14.6%) had 1 to 3 years, 19 (11.1%) had 4 to 6 years, 67 (39.2%) had 7 to 9 years, and 60 (35.1%) had ≥10 years of experience.

Data Collection Tools

Data were collected using three different measures. Detailed information can be found below.

Organizational Commitment Scale

In this study, the scale made by the Turkish adaptation of the "Organizational Commitment Scale" (Dağlı, Elçiçek & Han, 2018) developed by Meyer, Allen and Smith (1993) was used. The organizational commitment scale is a 5-point Likert type. It consists of "1: strongly disagree, 2: disagree, 3: undecided, 4: agree, 5: strongly agree". The scale consists of 18 items and three sub-dimensions, affective commitment consists of 6 items (1, 2, 3, 4, 5, 6), the second factor, continuance commitment, consists of 6 items (7, 8, 9, 10, 11, 12), and the third factor is The normative commitment, on the other hand, consists of 6 items (13, 14, 15, 16, 17, 18). Items 3, 4, 5, and 13 of the scale are reverse. The KMO value of the scale is .889 and the overall reliability coefficient of the scale is .88. For the purpose of this study, the reliability coefficient of the internal consistency of the scale was calculated by Cronbach Alpha to be .90.

Organizational Cynicism Scale

Brandes, Dharwadkar and Dean (1999) developed the organizational cynicism scale and adapted into Turkish by Kalağan (2009). It has three sub-dimensions: cognitive, affective, and behavioural. The sub-dimensions of the scale have Cronbach's alpha coefficient between 0.86-0.91. In the organizational cynicism scale adapted into Turkish by Kalağan (2009), the sub-dimensions are cognitive (5 items), affective (4 items), and behavioural (4 items). The scale is also in 5-point Likert type. According to the results of the analysis of the reliability of the subdimensions of the scale; they calculated the Cronbach Alpha value of the cognitive subdimension as .86, the Cronbach Alpha value of the affective subdimension as .80, and the Cronbach Alpha value of the behavioural subdimension as .78. In the context of this research, the reliability coefficient of the internal consistency of the scale of Cronbach Alpha was calculated as .93.

Leader-Member Exchange Scale

The leader-member exchange scale consisting of twelve items and four sub-dimensions developed by Liden and Maslyn (1998) was translated into Turkish by Baş, Keskin and Mert (2010). The first dimension of the scale is 'impact' (items 1, 2 and 3), the second dimension is 'loyalty' (items 4, 5 and 6), the third dimension is 'contribution' (items 7, 8 and 9), and the fourth dimension is 'professional respect' (items 10, 11, and 12) aspects (leader-member exchange). The leader-member exchange scale is evaluated in a 5-point Likert type between 'strongly disagree' (1) and 'strongly agree' (5). There is no reverse loading item on the scale. All items are positive. The Cronbach's Alpha Reliability Coefficient was.93 for the effect sub-dimension, .90 for the commitment sub-dimension, .90 for the contribution sub-dimension, .93 for the professional respect sub-dimension, and .95 for the total. Within the

scope of this research, the Cronbach Alpha internal consistency reliability coefficient of the scale was calculated as .93.

We also calculated the goodness of fit indices and Cronbach's alpha to establish the validity and reliability of the scales within this study. Table 1 presents the findings.

Table 1. The goodness of fit indices and internal consistency coefficients

Scale	$\bar{x}$	df	x^2/df	RMSEA	CFI	SRMR	α
OC1	84.35	31	2.67	.08	.97	.03	.90
OC2	20.67	10	2.3	.06	.99	.01	.93
LMX	4.241	2	2.12	.08	.99	.01	.93

Note: OC1: Organizational Commitment; OC2: Organizational Cynicism; LMX: Leader-Member Exchange

As the findings in Table 1 indicates the scales have validity (Hair et. al. 2014) and internal consistency (Singh, 2007) within the scope of the current study.

Data Collection

The study was approved by the Ethics Committee of Çukurova University. Data were collected online via Google Forms. The researchers sent an electronic link to school counsellors in different provinces in seven geographic regions of Turkey that they knew and asked them to share the link in WhatsApp and Facebook groups.

Data Analysis

Before performing statistical analyses, we checked whether the data met the assumptions required for structural equation modelling. First, outliers in the data were checked. Data with z values not between -3 and +3 were excluded from the data set. These values were found to be between -1.5 and + 1.5. Thus, it can be said that the data had a normal distribution (Tabachnick & Fidell, 2013). Research data was analyzed through Pearson Product Moment Correlation Mediation Analysis through Structural Equation Modeling. Bootstrapping with 1000 times was applied for this research as well and thus, bootstrap coefficient, and confidence intervals were obtained. To determine whether the indirect effect is significant, the upper and lower bounds of the confidence interval in the trial should be non-zero (Preacher & Hayes, 2008). Descriptive statistics were calculated in the SPSS 24 program and structural equation modeling was performed in the AMOS 26 software for the present study.The goodness of model fit was assessed the following fit indices: chi-square, $\chi 2/sd$, Goodness of Fit Index (GFI), Goodness of Fit Index (AGFI), Root Mean Square Error of Approximation (RMSEA), the Comparative Fit Index (CFI), Standardized Root Mean Square Residual (SRMR) and Tucker Lewis Index (TLI) in this study. As for the evaluation of values references, when values of $\chi 2/sd$ are 2 or lower are accepted to be a good model fit, while values up to 5 are accepted as an adequate model fit. GFI indices above .90 are considered good when it is between .85 and .90 is considered acceptable. CFI indices between .95 and 1.00 are seen as a good fit, while between .90 and .95 are recognized as an indicator of acceptable fit (Kline, 2011). On the other hand, RMSEA and SRMR indices below .05 indicate a very good fit of the model to the data; models up to .08 indicate an acceptable fit, while models that are $\geq .10$ indicate a weak fit to the data (Browne & Cudeck, 1993). Finally, TLI indices between .95 and 1.00 are accepted as a good fit, and if it is between .90 and .95, it is considered an acceptable fit (Baumgartner & Homburg, 1996).

Findings

This section presents findings of descriptive analysis and structural equation modeling.

Descriptive Findings

Table 2 shows the descriptive statistics and correlations.

Table 2. Descriptive statistics and correlations

	Descriptive				Correlations		
Variable	Skewness	Kurtosis	$\bar{x}$	Sd	1	2	3
(1)OC1	-.18	1.03	32.02	8.46	1		
(2)OC2	.61	.28	31.08	10.80	-.35**	1	
(3)LMX	-.41	-.17	38.65	10.43	.38**	-.54**	1

**p<.001; N=171; (Note: OC1: Organizational Commitment; OC2: Organizational Cynicism LMX: Leader-Member Exchange)

In the research, pearson product moments correlation analysis was performed to examine the relationships between the variables. In addition, descriptive statistics of the variables were also calculated. Analysis results are given in Table 2. All variables considered in the study concerning skewness and kurtosis meet the normality assumptions. Organizational commitment was found to be positively correlated with organizational cynicism (r= -.35, p<.01). In this study, there is a negative relationship between organizational cynicism and leader-member exchange (r= -.54, p<.01). Also, organizational commitment and leader-member are significant positive correlations(r=.38, p<.01).

Findings on Structural Equation Modeling

Structural equation modeling was used to determine the mediating role of leader-member exchange on the relationship between organizational commitment and organizational cynicism. The fit indices of the model is as follows: (χ^2 =76.162, χ^2/sd= 2.380, GFI= .917, RMSEA=.090, CFI= .957, SRMR= .0515, TLI= .94). Table 3 presents the findings.

Table 3. Regression, standardized direct, indirect and total effects

				Bootstrap 5000 times 95%CI			
Variables	β	SE	C.R	Lower Bound	Upper Bound	p	Total Effect
OC1→LMX	.629	0.49	8.051			.000	.391
LMX→OC2	-.332	-.135	-3.603			.000	-.468
OC1→OC2	-.518	-.085	-5.557			.000	-.663
OC1→LMX→OC2	-0,246			-.488	-.066	.000	-.488

Explained variance values	R^2
LMX	.395
OC	.595

Organizational commitment significantly predicts leader-member exchange (β=.629; p=.000) and organizational cynicism (β=-.518; p=.000). On the other hand, leader-member exchange significantly predicts organizational cynicism (β=-.332; p=.000). Finally, LMX is mediating in the relationships between organizational commitment and cynicism (β=-.246; p=.000; 95% CI, LB=-.488, UB=-.066). After the mediator effect was revealed, the bootstrap confidence interval has been examined to determine how effective the mediation role of leader-member exchange. As shown in Table 3, the lower and upper limits for bootstrap are above zero and thus, the leader-member exchange has a partial mediator effect (Preacher & Hayes, 2008). The figure shows the structural relations between the variables.

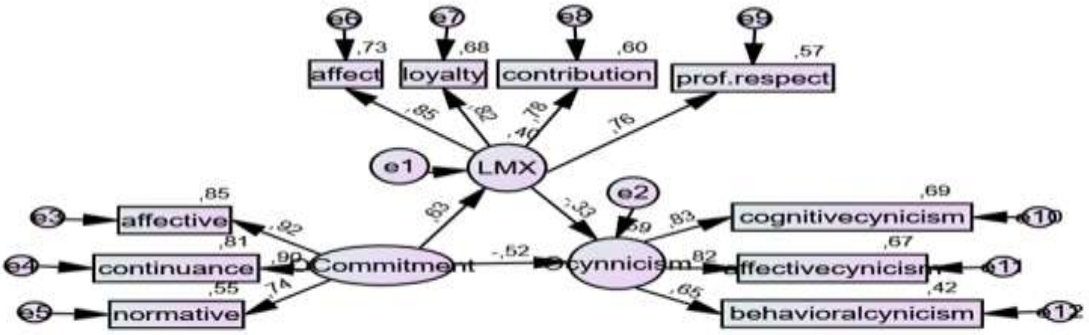

Figure 1. Structural Equation Model

Discussion

In this study, the mediating effect of leader-member exchange on the relationship between organizational commitment and organizational cynicism was examined, and it was determined that both leader-member exchanges had a partial mediator role between organizational commitment and organizational cynicism. The study first examined the relationships between the variables. The correlation results of the study show that organizational cynicism, organizational commitment, and leader-member exchange are negatively related, while organizational commitment and leader-member exchange are positively related.These results are consistent with the results of research on the relationships between organizational commitment and organizational cynicism (Çınar, 2019; Han et al., 2013; Kaygın et al., 2017; Mouso, 2017; Özdem & Sezer, 2019; Şeker, 2020, Şimşek, 2020), and leader-member exchange (Graen & Scandura, 1987; Leow & Khong, 2009; Gomez, 2020).

This study determined that leader-member exchange played a partial mediation role in the relationship between organizational commitment and organizational cynicism. In other words, the increase in organizational commitment of employees increases the level of exchange between leader and member, which decreases organizational cynicism.Referring to the relationship between organizational commitment and leader-member exchange, Lee (2005) stated that the increase in the quality of leader-member exchange will affect the organizational commitment by positively affecting the leader-member commitment, and the organizational commitment of the employees will increase. Leaders' positive effects on their members have an important role in influencing both leader-member commitment and organizational commitment. Leader-member leadership qualities are necessary to improve members' performance. For this reason, the importance of leader-member exchange is seen in the selection and placement of leader-members in organizations. These can be achieved with tighter negotiations and adequate leadership training (Lee, 2005).

Theoretically, LMX has demonstrated that the strength of leader-member exchange relationships can predict institutionally important outcomes, including performance-related and attitude-related variables (Gerstner & Day, 1997). Brown, Paz-Aparicio, and Revilla (2019) found that there is a positive and significant relationship between organizational commitment and leader-member exchange. It is noted that the way a leader communicates affects the leader-member relationship and thus an employee's emotional commitment to the organization. The transition of the impact of communication on organizational commitment is embodied through the construction of the superior-subordinate relationship, which is consistent with the LMX theory (Brown, Paz-Aparicio & Revilla, 2019).

The relationship between superior and subordinate is created and maintained through communicative behaviours during daily exchanges. The leader-member exchangeable nature implies that the qualities of the leader's communication with his members (significance, precision, verbal aggression, and questioning) are interpreted by the employees as the organization's qualities (Dansereau, Graen & Haga, 1975). Leaders should be aware that their communication strengthens the workplace in this context. Studies conducted to increase organizational commitment have revealed that studies are effective in increasing leader-member quality (Duchon, Green &

Taber, 1986; Liden, Wayne & Sparrowe, 2000). In summary, the research finding that "increased organizational commitment leads to an increase in the level of leader-member interaction" is also supported by the relevant literature. Regarding the relationship between leader-member exchanges and cynicism in organizations: In the literature, some studies find that leader-member exchange negatively affects cynicism in organizations (Çetin & Kaptangil, 2016; Davis & Gardner, 2004; Kanbur & Kanbur, 2015).

It is argued that this is a useful cue for organizations to control or prevent the emergence of organizational cynicism (Kanbur & Kanbur, 2015).In recent years, problems with organizational cynicism have often been found to be associated with exchanges between leader-member exchange (Çetin & Kaptangil, 2016; Kanbur & Kanbur, 2015; Mumcu, 2021; Scott & Zweg, 2020). According to Davis and Gardner (2004), leader-member exchange occurs at low levels in organizations where behaviours that deviate from basic principles such as honesty, fairness, justice and sincerity are exhibited, and this situation causes organizational cynicism. In the study, he draws attention to the relationship between organizational cynicism and leader-member exchange and states that the exchange with the leader of the employee and the positive outcomes it provides affects and negatively reduce the perception of cynicism in terms of belief, emotion and behaviour (Mumcu, 2021).

It can be seen that this relationship between leader-member exchange and organizational cynicism, which emerged in the research findings, is supported by several studies in the literature (Audenaert et al., 2021; Mumcu, 2021; Pfrombeck et al., 2020; Scott & Zweg, 2021). It can be said that the finding of this study that "the decrease in the level of leader-member exchange causes an increase in organizational cynicism" is consistent with the relevant literature.The result about the mediating role of leader-member exchange in the relationship between organizational commitment and organizational cynicism, although not found in the literature, will guide us in understanding the relationship between organizational commitment and organizational cynicism. This result suggests that it is also valid in different occupational groups than school psychological counsellors. A review of the literature confirms that no studies have been conducted in Turkey to improve organizational commitment of school counselors and that these studies include leader-member interaction in their content. We believe that this study can be a valuable guide for improving counse commitment, adopting strategies, educational leaders, school principals, and inspectors.

Conclusion and Suggestions

As a result, it can be said that the organizational commitment of school counselors significantly affects organizational cynicism both directly and through the leader-member exchange.

This is an important finding for organizational research in the field of school counseling because there is a notable lack of experience of school counselors working in public schools in the organizational context. One way to reduce organizational cynicism while increasing organizational commitment by mediating leader-member exchange might be through shared decision making. Joint decision-making in the principal-school counselor relationship is the sharing of decisions. Decision sharing can take multiple forms. For example, a school counselor might consult with her principal on how best to support a teacher struggling with classroom management. Another example is that the psychological counselor, who has information about the parent they interviewed before, may report that he had a difficult conversation with the parent before calling the parent manager. Sharing decisions improves the working relationship with the manager because it helps them participate in the guidance and counselling programme (Dollarhide, Smith & Lemberger, 2007). Identifying aspects of organizational commitment, organizational cynicism, and leader-member exchange in theory and research applicable to school counseling provides a basis for designing future studies.

Considering that organizational commitment effectively reduces organizational cynicism both directly and through the leader-member exchange, it is recommended to prepare organizational commitment development training programs for school counselors and conduct experimental studies on how these programs affect the leader-member exchange and organizational cynicism. However, it should be noted that the mediating effect of leader-member exchange is partial. In this case, examining other variables (self-efficacy beliefs, self-leadership…) that may play a mediating role in other studies will make important contributions to understanding the relationship between organizational commitment and cynicism.

Limitations

One of the limitations of this study is that it was conducted only with school counselors. Future research on this topic may be conducted with other sample groups, such as teachers, engineers, and nurses. In addition, it is

anticipated that using other variables in other studies or conducting analyses with other statistical methods will lead to different findings and results.

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The Effect of Problem-Based Learning on Students' Entrepreneurship Level in Social Studies Course*

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Abstract

This research aimed at examining the effect of problem-based learning (PBL) on students' entrepreneurship level in the Social Studies course. The research used an embedded design, which is a type of mixed-methods study. The participants were the 6th-grade students studying in a state secondary school in Ağrı during the spring semester of the 2020-2021 academic year and their Social Studies teacher. Data collect†ion tools were Entrepreneurship Scale for Secondary School Students, semi-structured interviews, unstructured observation, anecdote, research diary, and checklists. For the statistical data, t-test and mixed model ANOVA (split plot) were utilized for independent samples, and an inductive analysis technique was used when analyzing qualitative data. It was found that problem-based learning had a statistically significant impact on students' entrepreneurship level. Besides, participants saw problem-based learning as an approach that contributed to their entrepreneurship level. Based on the findings, the use of problem-based learning in the Social Studies course was suggested, which aims to provide entrepreneurship to the students.

Keywords: Social Studies, Problem-Based Learning, Entrepreneurship

Introduction

The Social Studies course examines the interactions of human beings, who are social beings, with themselves and the society, and aggregates social sciences in accordance with the readiness level of primary and secondary school students (Barr et al., 1998, p.16). Social Studies also aims to educate qualified individuals equipped with a wide range of skills such as problem solving, research, cooperation, and entrepreneurship (Seefelt et al., 2015, p.2). Problem-based learning (PBL) is one of the learning methods used to raise citizens with these qualifications. PBL is an approach in which students' skills such as questioning, research, decision-making, and initiative are activated. PBL also attempts to apply various problem situations in order to reach new information and utilise that information through experiences (Kek and Huijser, 2017, p.15). Entrepreneurship is one of the common skills that Social Studies courses and PBL aim to gain for students. Entrepreneurship is a skill that today's people should have, given the developments in the economic, social, and political fields in multidimensional living conditions.
The Social Studies course aims to educate qualified and entrepreneurial citizens who are harmonious, successful in social and economic fields, knowledgeable about their own history and world history, can contribute to individual and social development, and take an active role in solving problems. PBL, as one of the approaches employed in Social Studies education, includes the practices of producing logical ways to cope with problems, doing research, and collaborative works and initiatives. In this context, one of the common principles of Social Studies courses and PBL is to introduce entrepreneurship to students.
The literature provides many scientific studies regarding PBL and entrepreneurship. Various studies claim that Social Studies courses, in which the PBL approach was applied, are effective in improving the academic success and the communication skills of the students, the level of recall, and gaining a critical perspective (Deveci, 2002; Alagöz, 2009; Sockalingam et al., 2011; Taylor Nelms et al., 2013; Tetik, 2013; Karaca, 2014; Wynn Sr and Okie, 2017). Entrepreneurial studies have focused on topics such as the relationship between entrepreneurship and

* This article is derived from Hüseyin Bayram's PhD dissertation entitled "The Impact of Problem-Based Learning on Students' Entrepreneurship Level in 6th Grade Social Studies Course", conducted under the supervision of Handan Deveci.

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critical thinking skills (Ateş, 2018; Karakuş, 2019), the level of entrepreneurship in the context of various variables (Pereira, 2014), the relationship of autonomy with motivation, entrepreneurship, and creativity (Polat et al., 2015; Arcagök, 2016), the effect of entrepreneurship on cognitive and affective skills (Rosendahl Huber et al., 2014), and the effect of entrepreneurship education on collaboration and creative thinking skills (Leffler and Svedberg, 2005).
Relevant research indicates that entrepreneurship is one of the skills required to be acquired by students all over the world, and PBL is a suitable learning approach for the development of entrepreneurship skills since it directly confronts the individual with life problems. However, no research has identified the effect of the PBL approach on the level of entrepreneurship in the Social Studies course. The current study aims to fill this gap by examining the impact of PBL on the development of entrepreneurship skills in Social Studies courses. Besides, it aims to raise awareness about the use of PBL by Social Studies teachers in gaining entrepreneurship skills for students.

Goal

The main purpose of the research is to examine the effect of PBL on the entrepreneurship level of students in the Social Studies course. To achieve this goal, the following hypothesis was developed and tested, and an answer was sought for the following question.

- There is a significant difference in the experimental group's entrepreneurship levels compared to the control group's, favoring the experimental group.
- Regarding the effect of PBL on students' entrepreneurship levels,
    - What are the perspectives and experiences of students?
    - What are the perspectives and experiences of the Social Studies teacher?

Method

This section includes research design, participants, collection and analysis of the data, and credibility.

Design

An embedded mixed design was used. In the embedded mixed design, qualitative data collection can be performed at any point. Qualitative data can be collected before, during, or after the experimental process, or at all three stages in line with the goal of the research (Creswell, 2015, p.42–43). The flowchart of the embedded mixed pattern based on this study is shown in Figure 1:

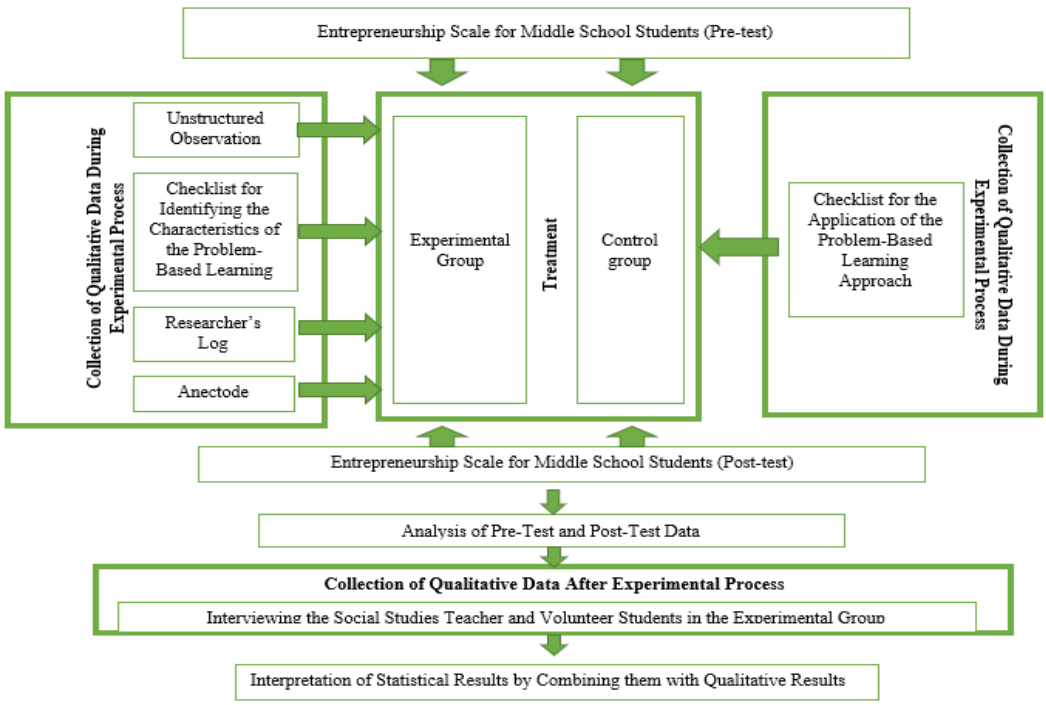

Figure 1. Stages Followed in the Research

As shown in Figure 1, the pre-test was applied first, followed by the collection of the first statistical data. Then, the experimental process began. During the experiment, primary qualitative data were collected through unstructured observations, researcher log, anecdotes, and checklists. Afterwards, the posttest was applied, and the final statistical data was collected. Then, final qualitative data was collected by interviewing the participants. Data from both statistical and qualitative sources were combined and interpreted.

Participants

Participants were 6th-grade students. This is because the outcomes of the 6th-grade social studies course are appropriate for entrepreneurship. A multi-stage mixed sampling method was used. The stages followed within the scope of the multi-stage mixed sampling method are shown in Figure 2.

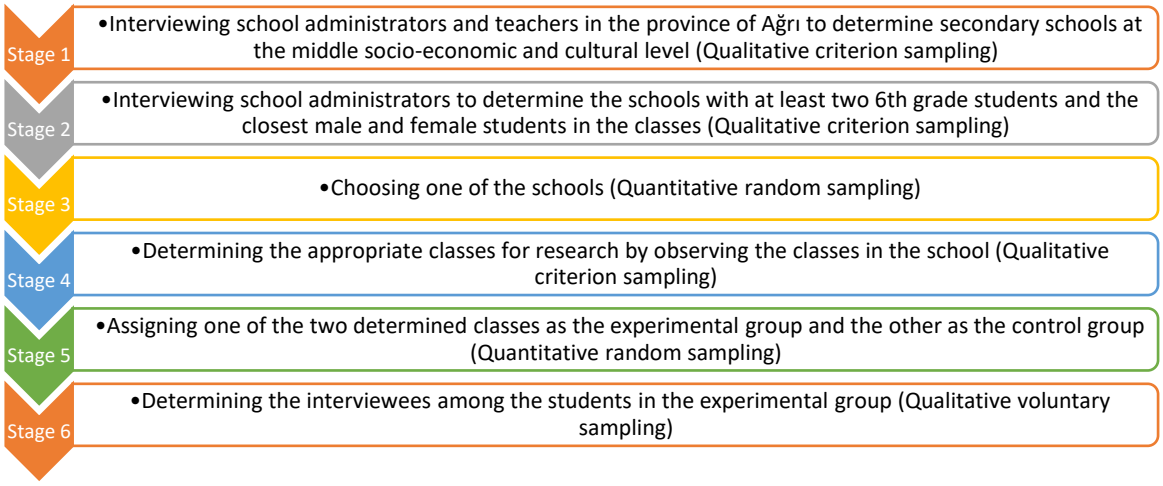

Figure 2. Stages of Determining the Participant Group

As can be seen in Figure 2, while determining the participant group of the research, a total of six stages, four qualitative and two quantitative, were applied. There is an experimental and a control group in the research.

Table 1 shows the personal information of the students in the experimental and control groups as a percentage and frequency.

Table 1. Information about the Experimental and Control Groups

Information		**Experimental group**		**Control group**	
		f	%	f	%
Gender	Female	11	52.4	9	45.0
	Male	10	47.6	11	55.0
	Total	**21**	**100**	**20**	**100**

As seen in Table 1, the experimental group included 21 students (11 girls and 10 boys), and the control group had 20 students (9 girls and 11 boys).

The interview data of the research was collected from 10 students. Due to ethical concerns, the names of the students are not given. In this context, each student took part in the research with a nickname they chose. The code names of the interviewed students are as follows: Ayşe, Nesrin, Mehmet, Hakan, Mustafa, Sema, Sude, Elif, Gökalp and Şahin.

A Social Studies teacher also took part in the research. The teacher taught the Social Studies course to both experimental and control groups. The teacher graduated from the Social Studies Teaching program of a state university in 2014.

Data Collection

Both statistical and qualitative data was gathered. Entrepreneurship scale, unstructured observation, semi-structured interviews, researcher's log, anecdote, and checklists were utilized as data collection tools.

The entrepreneurship scale for secondary school students developed by Eroğlu et al. (2020) was used for pre-test and post-test data. The scale, which is a four-point Likert-type scale, consists of 31 items and three sub-dimensions. The researchers who developed the scale found the Cronbach Alpha coefficient to be.90 after the process that they carried out to determine the reliability level of the scale. The Cronbach Alpha coefficient was determined as.83 in order to establish the scale's reliability in terms of the current study, and it was decided that the scale was a reliable data collection tool for this study.

Based on the expert's opinion, the student and teacher interview forms were finalized. To ensure validity, a pilot interview was conducted, and the understanding of the questions was tested.

The experimental process was recorded with unstructured observation. Anecdotal records were kept by the students in the experimental group. A checklist was used to determine the features of the PBL process. A diary was kept by the researcher throughout the research process. Prior to the experimental process of the research, a pilot application was carried out to determine the missing aspects of the application and to reveal the defective aspects of the lesson plans. The pilot application, which covered a two-week period, was carried out with the students who were subjected to the study's experimental process for six lesson hours. The pilot implementation of the research was carried out between 15.02.2021 and 24.02.2021. The lessons taught in the experimental group were carried out by the teacher using the activities and materials developed by the researcher within the scope of the PBL method. The experimental process of the study lasted for a total of 10 weeks.

The research was carried out in two 6th-grade classes at a state secondary school in the spring term of the 2020 – 2021 academic year. The implementation phase was carried out partly face-to-face and partly remotely, depending on the conditions caused by the COVID-19 epidemic. In this context, some of the lessons were taught in the classroom environment, and some were taught online. Before the experimental process, a pilot study was conducted for six-lesson hours (2 weeks). The lessons taught in the experimental group were carried out by the teacher for 10 weeks, using the activities and materials prepared by the researcher within the framework of the PBL approach.

Data Analysis

Normality distributions were investigated to determine whether there was a significant difference between the pre-test scores. According to the skewness-kurtosis and Shapiro-Wilk tests, the data had a normal distribution. The homogeneous distribution of the data was determined by the Levene homogeneity test. The p value was found to be.284 (that is, greater than.05). Thus, the pre-test scores of the groups were evenly distributed. As a result of the obtained values, the t-test was used for independent samples in the analysis of the pre-test data.

After the end of the experimental process, the effect of the experimental process was examined by applying the post-test to the experimental and control groups. At this stage, normality and homogeneity tests were performed. The post-test scores of the experimental and control groups were normal and evenly distributed. Since repeated measurements were applied to unrelated experimental and control groups in the study, mixed model ANOVA (Split plot) was used as an analysis technique.

Qualitative data was collected during and after the experimental procedure. Inductive analysis was used to analyse the collected data.

Credibility

To ensure credibility, the researcher was in the research environment for a total of 12 weeks. Regarding transferability, the qualitative data was described thoroughly. For consistency, 25% of the codes and themes were presented to expert opinion and reformulated based on the feedback received. The researcher documented all the data directly and avoided commenting during the data gathering process.

Permissions were obtained from Anadolu University Social and Human Sciences Scientific Research and Publication Ethics Committee and Ağrı National Education Directorate. Students, parents, and the Social Studies teacher signed the consent form. Participants were given pseudonyms, and the name of the school was kept private.

Findings

This section presents findings of the research.

Findings of the Pre-Test-Post-Test Scores Obtained from the Entrepreneurship Scale for Secondary School Students

Before the experimental process, a pre-test was applied to the experimental and control groups. The findings of the pre-test were given in Table 2:

Table 2. The T-Test Results for the Independent Samples Applied between the Pre-Test Scores of the Experimental and Control Groups

Group	*N*	$\bar{X}$	*ss*	*sd*	*t*	*p*
Experimental	21	98.95	9.43	39	.75	.45
Control	20	101.45	11.62			

As seen in Table 2, there was no significant difference between the pre-test results of the experimental and control groups ($t_{(39)}$=.75; p =.45 >.05). The results of the experimental and control groups were identical, and in this context, the entrepreneurship levels of the groups were similar. As a result, it can be interpreted that the entrepreneurship levels of the groups did not differ before the PBL application.

Findings of the Mixed Model Anova Test Applied to the Pre-Test-Post-Test Scores Obtained from the Entrepreneurship Scale for Secondary School Students

Following the experimental process, the mixed model ANOVA test was applied to test the hypothesis "There is a significant difference between the experimental and control groups' entrepreneurship levels, favoring the experimental group." The results were shown in Table 3:

Table 3. Mixed Model ANOVA Test Results for the Pretest-Posttest Scores of the Experimental and Control Groups

Source of variance	Sum of squares	*sd*	Mean squares	*F*	*p*	*η2*	Observed power
Between groups	3866.51	40					
Group (Experiment/control)	14.81	1	14.81	.15	.70	.00	.67
Error	3851.70	39	98.76				
Within Groups	1123.99	41					
Measurement (Pretest-Posttest)	223.11	1	223.11	14.02	.00	.26	.95
Group* Measurement	280.47	1	280.47	17.63	.00	.31	.98
Error	620.40	39	15.90				
Total	4990.50	81					

As shown in Table 3, the group effect on the pretest-posttest total scores of the experimental and control groups was insignificant ($F_{(1;\ 39)}$ =.70; p =.0 >.05). In this context, it was found that the difference between the pre-test and post-test mean scores of the experimental and control groups was statistically insignificant, regardless of measurement. As a result, there was a significant difference between the experimental and control groups' pretest and posttest scores ($F_{(1;\ 39)}$ =14.02; p = <.05). It can be concluded that the measurement scores of the students change depending on the PBL approach applied, without any group distinctions. There was a statistically significant difference between the mean scores of the experimental and control groups before and after the experimental procedure ($F_{(1;\ 39)}$ =17.63; p = <.05). In other words, the common impact of the group and the measurement variables on pretest-posttest scores were significant. Regarding the results of the mixed model ANOVA test, the PBL method was effective in raising students' entrepreneurship level.

Table 3 presents the partial eta square (η2) results, which express the effect size. As shown in Table 3, being in different treatment groups (experimental-control) explained 31% of the difference between pretest and posttest scores. In other words, the experimental procedure had a significant effect size.

Table 3 also includes the power of the experimental procedure. The power of the experimental procedure was.98, so the H_0 hypothesis was rejected at a rate of 98%. In this context, it has been concluded that the experimental process of this research, which examined the impact of PBL on the entrepreneurship levels of students, was quite powerful. In other words, PBL applied in the Social Studies course increased students' entrepreneurship levels.

To explain the statistical results in a multidimensional manner, the qualitative data obtained during and after the experimental processes were analyzed. The results are detailed in the following sections.

Student Views and Experiences Regarding the Effect of PBL on Entrepreneurship in Social Studies Course

Students' perspectives and experiences regarding the impact of PBL on entrepreneurship in Social Studies courses were gathered under sub-themes such as raising awareness in students; directing students to take risks; encouraging students to take advantage of opportunities; directing students to evaluate; providing students with various skills; providing students with various values; providing students with effective characteristics; and improving the quality of daily life of students. The obtained findings are shown in Figure 3.

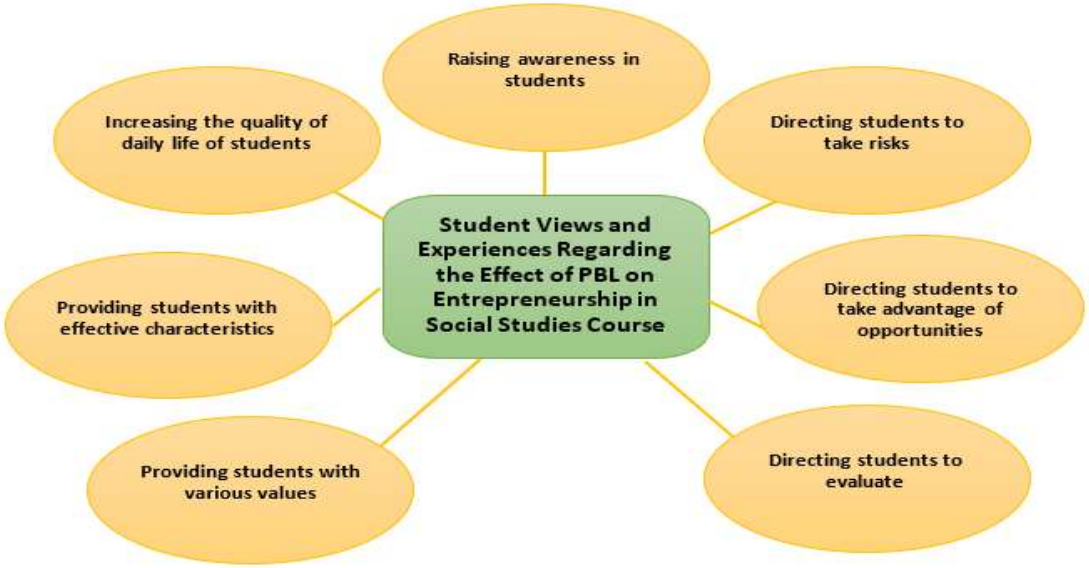

Figure 3. Student Views and Experiences Regarding the Effect of PBL on Entrepreneurship in Social Studies Course

PBL was found to contribute to students' in raising awareness, which is one of the dimensions of entrepreneurship. The Social Studies courses performed with the PBL approach contributed to the development of students' self-confidence. For example, realizing that the entrepreneurial individual should have confidence in himself/herself, Ayşe said, "*From the problems shown to us, I understood that one should trust himself. If we are going to start an enterprise, we must trust ourselves. Otherwise, we will not be able to start an enterprise*."

According to some students, PBL helped them to realize their qualities and power, in other words, to get to know themselves. For example, Nesrin stated that PBL revealed her leadership potential by saying, "*I realized that I could be a leader in groups thanks to PBL. If they had told me to do something like this before, I wouldn't have done it. But I also became the group leader in PBL. I saw that I could do this*." It was also observed that students' awareness of their qualifications increased as they worked in groups.

PBL was considered a useful approach for students to learn through experience. As Şahin said, "*We usually did most of the things ourselves. I still remember what I learned. Since we learn by ourselves and by understanding, I think we will not forget very quickly*."

It was found that PBL could guide students about *taking risks*, which is another dimension of entrepreneurship. Students benefited from PBL by implementing plans, trying different solutions, benefiting from their intuition, benefiting from innovations, and using their imagination. Some students stated that PBL guided them in putting their goals into action. For example, Mustafa expressed that PBL helped him realize his plans: "*I have realized that if we have a plan, we must implement it. We should not be frightened to realize our plans.*"

Some students believed PBL gave them the awareness to try different solutions to problems. One of these students, Hakan, said, "*I used to create a solution for myself to tackle a job. I was following that solution. However, a job could provide a variety of options. For example, I could come up with at least two or three solutions each time*."

Some students developed a mindset of not avoiding risky situations by using their intuition thanks to PBL. For instance, Ayşe emphasized that we should trust our intuitions in risky situations: "*Life itself is a risk. We don't know what will happen if we go out. We have no idea what happens when we attempt something. We should listen to our hearts in unfamiliar circumstances*." The anecdotal record provided similar statements: "*We should not hesitate to take risks. We must look at what is in our hearts. Our hearts assist us when we take risks*" (Student Anecdote Record, 16.03.2021).

Some students thought that the Social Studies courses conducted with the PBL approach gave them a perspective that they should *benefit from innovations*. Elif stated that innovations carry some risks, but innovations should be used in order to be beneficial: "*We don't always tend toward something new. We say maybe this will not turn out as we thought. Maybe we'll get hurt. Maybe it's harmful, but we won't know until we try it. Maybe it will be helpful*."

Many students believed that PBL helped them use their imagination. One of these students, Şahin, said, "*As far as I understand, it is necessary to put yourself in another's place when solving problems. If you can imagine this, you will solve the problem*."

During the observations, the majority of the students were observed to use their imagination in determining the problem situations and creating solution proposals. The expressions such as "*I would have done that if I were you*" show that the students imagined themselves in a problem situation many times while reading the solution proposals.

PBL, on the other hand, contributed to directing students to *take advantage of opportunities*, which is another aspect of entrepreneurship. The findings indicated that PBL guided students within the scope of noticing and benefiting from the beneficial aspects of events and being ready for opportunities.

Some students stated that they learned how to see the beneficial side of a situation they encountered and turn them into opportunities thanks to the Social Studies lessons conducted with the PBL approach. For example, Nesrin, said, "*There is such a thing as looking on the bright side. I don't think it's about seeing the good in everything. I think there is an opportunity in everything. While solving problems, I realized that we could turn any situation into a benefit*."

Some students believed PBL gave them the awareness that they should be ready for new opportunities. Mehmet said, "*Opportunities do not wait for pleasure. Where we see it, we should use it immediately. I think the biggest mistake of the people in the stories was that they didn't know how to take advantage of the opportunity. That's why they had problems*." Thus, he knew that the problem situations presented in the lessons were due to his not being ready for the opportunities encountered.

The findings showed that PBL *directed students to make evaluations*, which is one of the characteristics of entrepreneurship. Students in Social Studies courses conducted with the PBL approach were led to assess themselves, peers, teachers, and make a general assessment.

PBL was useful to some participants because of its multidimensional evaluation feature. Gökalp mentioned the contribution of PBL to self-assessment by saying, "*I think it is very important for a person to evaluate himself/herself to identify his/her strengths or weaknesses. What I see in PBL is that people can do it*."

During the observations, it was noticed that a student evaluated the teacher. The student compared the teacher's past and present teaching: "*Sir, this PBL worked for you as well. In the beginning, you were struggling like us.*" (Unstructured Observation Record, 13.04.2021).

This research discovered that Social Studies courses conducted with the PBL method *provided students with a variety of abilities.* PBL provided students with various skills such as communication, planning, research, collaboration, problem solving, thinking, time management, decision making, coping with difficulties, analysis, and synthesis.

Ayşe, who believed that PBL contributed to their communication skills, said, *"The group work allowed me to get to know my friends with whom I was not good. It drew us closer together. It has improved the communication among us."*

Some students stated that PBL also contributed to the improvement of communication between students and teachers. For example, Mustafa said, *"Our teacher is a very good person. We all love him very much, but we did not have very good communication. We got along very well since we always asked him questions in the current lessons. We loved him even more and improved our communication."*

A few students said that PBL taught them another skill that an entrepreneurial individual should have: *being planned*. One of these students, Ayşe, said, "*We had to pay attention to certain levels while solving problems in the lessons. We had to plan each level. At first, we did not plan, but then we learned to plan*."

PBL also provided students with research skills. Sema uttered the following statements during the interview: "*Once we understood the problem, we were getting information from many sources. For example, we were researching on the Internet. We were asking the teacher questions. We were also asked questions by the group. We were also looking at the books we brought*."

PBL encouraged students to gain cooperation and problem-solving skills. Expressions strikingly similar to those of Sude were found in a student's anecdotal recording: "*PBL is very useful. Some benefits are as follows: PBL showed how to work together by collaborating, and taught problem solving through logical research*." (Student Anecdote Record, 20.04.2021).

In the research, it was found that PBL improved students' thinking skills. Here is a statement by Şahin:

''We have been working with PBL for so long. I developed my critical skills. In the class, the teacher constantly told us to think critically. When solving problems, I thought about the positive and negative aspects of everything. I now consider myself as a problem solver.''

On the other hand, in an anecdotal record, a student underlined the improvement in his creative thinking skills thanks to PBL: "*PBL developed my creative thinking. Now I can come up with creative ways when a difficulty arises.*" (Student Anecdote Record, 06.04.2021).

A few students claimed that they gained time management skills in Social Studies courses conducted with PBL. For example, Ayşe said, "*The topics were sometimes long, and the lecture hours were short. We had to use our time well. We had some difficulties at first, but then we learned how to fix it*."

Another skill was decision making. Mehmet emphasized the importance of decision-making skills with these words: "*During the lessons, our teacher always said: 'Act reasonably while making decisions'. He was right. Even at home, when we make a bad decision, the result can be disastrous. Our decisions are very important. We learned well*."

Some students said that their determination to succeed increased and they learned not to give up in the face of difficulties thanks to PBL. Gökalp said, "*The topics we examined encouraged us not to give up. The characters in the stories we read never gave up. This has been a lesson to me. I have also learned not to give up. It is necessary to be determined in life*."

Some students cited analysis and synthesis as other abilities gained thanks to PBL. Hakan mentioned that he analyzed the information he had and then synthesized the new information with the preliminary information with the following words: "*In the first lessons, we were trying to solve problems with the knowledge we had learned in the past. Then we realized that we also needed new information. After that, we started to learn new information. But we didn't throw away our old knowledge. We combined it.*"

Also, PBL provided students with the *values* of responsibility, solidarity, respect, fairness, and honesty that an entrepreneurial individual should have. Some students advocated that Social Studies courses conducted with the

PBL approach gave them the value of responsibility. Gökalp said, "*It is not difficult to take responsibility anymore. It even sounds fun because I am not afraid of problems. I say I can fix it. That's why I take responsibilities*."

Some students stated that they gained the value of solidarity thanks to the outcomes of PBL. Expressing that PBL provided her with the value of solidarity, Sude said, "*When doing group work, it is necessary to act together. That is, to collaborate. Everyone supports each other. We were always doing this. We were finding good solutions by cooperating.*" This statement implies that, thanks to PBL's group work, the students engaged in solidarity with their peers and were able to come up with effective solutions.

The observations showed that most of the students gained the values of respect and fairness. The teacher wanted different students to read the solutions for each lesson to prevent dissatisfaction in the students and to ensure that each student actively participates in the lesson. However, the teacher sometimes did not follow this way and asked the same students to read the solution path in two consecutive lessons. On the other hand, the students respected the rights of their friends, acted fairly, and stated that it was not their turn.

The data showed that PBL helped students gain the value of honesty. The teacher often asked the students, "*Did you do the homework yourself? Or did you get help?*" In the first lessons, it was observed that the students gave answers such as "*I did it myself*" or "*I didn't get any help*".

PBL provided students with *various affective characteristics* such as pleasure, happiness, excitement, willingness, self-appreciation, curiosity, motivation, calmness, and self-disclosure. These findings are related to some of the qualities that an entrepreneurial individual should have.

Some participants expressed their enjoyment of Social Studies lessons taught with the PBL approach. Şahin stated that he enjoyed the lessons conducted with the PBL approach: "*Before this approach, our teacher usually used narration, and we, as students, were only listening to him. During this period, we both studied and enjoyed ourselves. Thanks to problem solving, I had a lot of fun in the lessons*."

The lessons conducted with PBL were considered pleasing. An anecdotal record reflected this view: "*PBL courses make me happy. Classes are not what they used to be. In the past, the lessons were boring. I would not be happy at all*." (Student Anecdotal Record, 17.03.2021).

A few students experienced exciting moments during the application of PBL. In the anecdotal record form kept by a student, the following statements were found: "*Lessons are extremely engaging with PBL. I always try to make my group the most successful. I am very excited*." (Student Anecdote Record, 06.04.2021).

Some students were observed to appreciate themselves thanks to PBL. For example, Elif stated, "*I work in groups to create a solution. We are dealing with friends. We are trying. We are trying to find a solution. This is how I consider myself to be valuable.*"

It was found that the PBL process aroused a sense of curiosity in some students. They used the following expression regarding the affective situations they experienced during the PBL process: "*something different*". For example, Elif stated, "*Our lessons were very different. We were not used to teaching lessons like this. We used to first figure out what the problem was and then solve it. It was a different feeling. We were always curious. We were all waiting to see what would happen next."*

Some students believed that PBL motivated them to participate in the lessons. Ayşe stated that she attended the lessons more thanks to PBL: "*PBL made us enjoy lessons. That's why there was so much participation in the classes. I didn't attend the classes much before, but now I do. I enjoy the lessons*".

According to some students, PBL motivates them to learn and study new information. Mustafa remarked, "*Our knowledge was often insufficient to find solutions to problems. That's why we couldn't solve problems well. However, thanks to PBL, we learned new information, so we could solve the problems. That's why we wanted to expand our knowledge."*

Some of the students underlined the contributions of PBL to their calmness in daily events and situations. In other words, it helped them behave calmly. One of these students, Ayşe, explained the contribution of PBL by saying, "*The most important thing is to be calm when solving problems. If there is excitement, one's knees knock together. He or she can't do anything. The problem-solving method has taught me to be calm*."

Some students stated that PBL gave students the quality of self-disclosure. One of the students expressed this contribution in an anecdotal record as follows: *''The best thing about PBL is that it makes us comfortable. We form groups. Thus, we are at ease (Anecdotal Registration Form, 22.03.2021).''*

It was found that PBL helped students to make life easier, participate actively in life, show assertiveness, and increase their daily life quality. Besides, PBL facilitated the daily lives of students and increased their levels of achievement. The interview demonstrated that Hakan could transfer the outcomes of PBL to daily life: "*What we have learned at school helps us a lot, both at home and on the street. The problem is the same in school and in normal life. We can use what we have learned at school, on the street and at home*."

Mustafa stated that he could get more involved in life thanks to PBL. Mustafa stated that Social Studies lessons conducted with the PBL approach led him to be more active in daily life and at the same time reduce his shyness: "*I'm getting more involved in life as I'm starting to get good at problem solving. I also attend events without reluctance. Because if I have a problem, I say to myself, I will solve it*."

It was observed that some students believed that they showed assertiveness in daily life thanks to PBL. Ayşe stated that she became an assertive individual thanks to the group work of PBL: "*I was a very shy person in classes. But we did group work in these lessons. I just got rid of my shyness. I think I have become more assertive*."

The findings revealed that PBL is a useful learning approach in improving the level of entrepreneurship by increasing the quality of students' daily lives. As a matter of fact, it was found that PBL facilitated the lives of students and contributed to their active participation in life and showed assertiveness.

Teacher's Views and Experiences on the Effect of PBL on Entrepreneurship in Social Studies Course

Findings displayed seven sub-themes: raising awareness in students; encouraging students to take risks; guiding students to evaluate opportunities; providing students with various skills; ensuring active participation in the lessons; performing effective teaching; and difficulties arising from PBL in the process of gaining entrepreneurship skills for students. The obtained findings are shown in Figure 4.

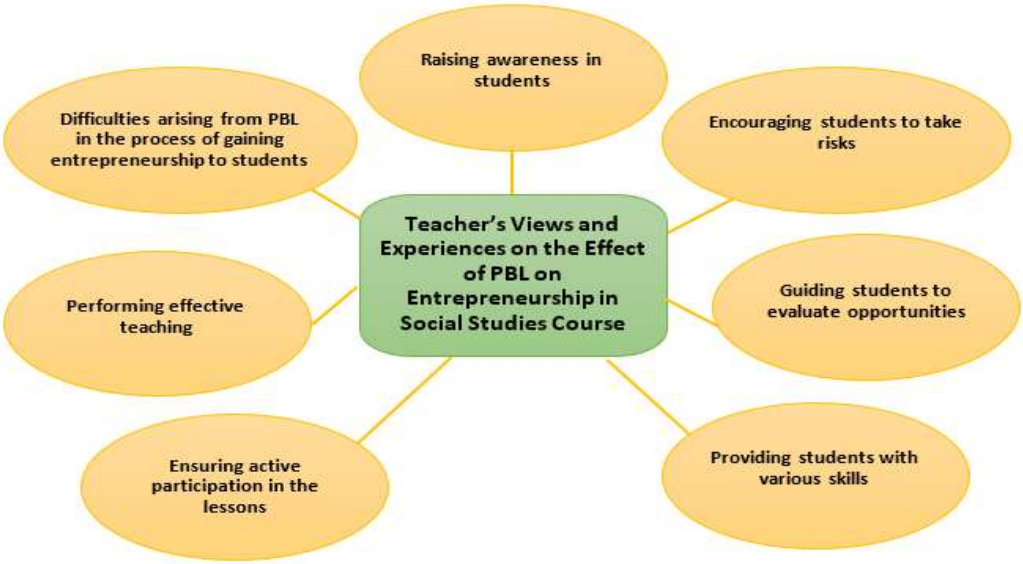

Figure 4. Teacher's Views and Experiences on the Effect of PBL on Entrepreneurship in Social Studies Course

A Social Studies teacher considered PBL as a learning approach that contributes to the level of awareness, which is one of the dimensions of entrepreneurship in students. According to the teacher, PBL is a method that helps students develop self-confidence, self-knowledge, and leadership skills. Here is a representative statement:

"Some of my students had naturally shy personalities. I had a hard time getting people to talk in class. Shyness hinders entrepreneurship. Since we started using the PBL method, I see that the shyness of the students has decreased.''

The teacher stated that PBL contributed to the students' getting to know themselves. The teacher said that thanks to PBL, the students became aware of their qualities: "*We have learned that even shy students have great potential. You have witnessed it, too. We followed a useful way for students to become aware of themselves.*"

According to the teacher, PBL is a learning method that enables students with leadership characteristics to realize and utilize this feature. The teacher said, "*Some students are born leaders, but they cannot find the environment to use it. In PBL, the student can direct the group. Thus, she or he can make use of the feature.*"

The teacher saw PBL as a learning method that encourages students to take risks, not be afraid of making mistakes, and contributes to action. In this context, the teacher said, "*I think PBL ensures that students are not afraid to express their thoughts. Students overcome their fear of embarrassment. They dare to be embarrassed*."

PBL is seen as a learning approach that guides students to evaluate opportunities, which is another dimension of entrepreneurship. The teacher believed PBL guided the students within the scope of searching for the positive side of situations and recognizing opportunities.

According to the teacher, PBL is a learning approach that directs students to look for the beneficial aspects of the events they encounter in accordance with entrepreneurship. The teacher's view was as follows: "*PBL encourages students to look for the beneficial side of situations. So, even what appears to be harmful can have beneficial parts. It makes the student realize this*."

The teacher, who considered PBL as a learning approach that allows students to see the opportunities they face, said: "*The awareness of the students who are constantly solving problems also increases. They gain awareness. Therefore, they can notice the opportunities they face. In this aspect, I think PBL provides great benefits."*

According to the Social Studies teacher, PBL is a learning approach that enables students to develop various skills that an entrepreneurial individual should have. The teacher believed that PBL gave students the skills of research, cooperation, communication, problem solving, and self-expression. These skills are among the qualities that an entrepreneurial individual should have. The teacher, who thinks that the students have gained research skills thanks to PBL, explained his views as follows: *''I know my students very well. They generally memorize it. There was a great improvement in students' research skills after PBL. These skills normally improve as research is done in each lesson.''*

PBL is viewed as a method that gives students the ability to cooperate. The teacher commented, "*The students also learned how to cooperate. Dividing students into groups is a good tactic. Students help each other in groups. They cooperate. In this way, they learn to work together*."

The teacher explained that the students gained communication skills with the following words:

''I think that in such studies, children's communication with each other also improves. I know many students who did not communicate much with each other before. Now I witness students communicating more closely. This is a valuable advance on the subject of your research.''

PBL was believed to provide students with problem-solving skills: *''The method we use is already called PBL. One of the main purposes of the method is to provide students with problem-solving skills. If you ask me… I think students have developed this skill. I notice this even when I'm just reviewing students' homework.''*

According to the teacher, PBL gives students the ability to express themselves. The teacher stated that the group work of PBL is useful in helping students gain self-expression skills. The teacher said, "*The group work of PBL is very useful. We ensure that students explain their opinions. Even shy students gradually started to say what was on their minds.*"

The Social Studies teacher believed that PBL enabled students to participate actively in the lesson. According to the teacher, PBL contributes to students' participating in group work, expressing their views, and generating ideas. The teacher explained his view as follows: "*Group studies boosted students' participation in the lesson.*"

Also, the teacher saw PBL as an approach that increased the level of participation in the lessons by directing the students to explain their opinions. The following are the teacher's perspectives on the subject:

''While the children were working among themselves, I was always walking between the groups. All of them were expressing their thoughts on the solution that was acceptable to them. When doing group work, the student automatically declares his or her opinion. This is one of the benefits of PBL.''

The teacher argued that the Social Studies lessons conducted with the PBL method led the students to generate new perspectives and participate in the lesson in this context by saying, "*Children develop new perspectives while seeking solutions to problems. They develop critical thinking. They are tempted to convey the ideas they have developed to their friends and me. In this way, they participate in the lessons more*."

PBL was considered as an approach that enables effective teaching development. The Social Studies teacher saw PBL as a learning approach that contributes to effective teaching within the scope of enabling the use of different activities, increasing academic success, ensuring permanence in learning, increasing participation, putting the student in the center, allowing fun, and attracting the attention of the student.

The teacher thinks that PBL is a learning approach that allows the use of different activities. The following is an example of a representative statement: "*We were able to use many activities at the same time. PBL enables this*."

The teacher sees PBL as a method that increases the academic success of students. The teacher said, "*Thanks to your research, the academic success of the students has also increased. When learning is permanent, academic success increases, of course*."

The teacher thinks that PBL is a learning approach that enables students to learn permanently. The teacher said, "*The students researched and learned everything themselves. Naturally, their learning was permanent. They were still able to answer the questions I asked weeks later*."

According to the teacher, PBL directs students to attend the lesson. The teacher, who thinks that PBL enables students to participate in the lesson willingly thanks to its qualifications, said, "*The process we applied together encouraged students to participate in the lesson. You and I have both seen this clearly*."

For the teacher, PBL provides an effective teaching process as a student-centered learning approach. For example, the teacher said, "*In constructivist education, education is student-centered. Since we use a type of constructivist education, we see the student at the center of education. This lets us have a qualified education.*"

PBL, according to the Social Studies teacher, allows students to learn while having fun. The teacher said, "*My students liked PBL a lot. It was evident in every way. They had a lot of fun in the lesson. It is a fun method for students*."

The teacher also sees PBL as a learning approach that attracts students' attention. The teacher, who stated that the students were able to get their attention thanks to PBL, said, "*Everything we did created a situation of interest in students. They were also paying attentive since they attracted the attention of the students.*"

Findings showed that some difficulties were encountered in the Social Studies lessons conducted with the PBL approach. The teacher cited the inadequacy of course time as one of the difficulties experienced in the implementation process of PBL. Regarding this issue, the teacher uttered, "*I spent a lot of effort to complete the activities you prepared. I was afraid of running out of time."*

Another difficulty of PBL is that it requires intense communication with students. The teacher's perspective was that "*The student is at the center of PBL. Intensive communication with students is required. It is necessary to communicate with each student. It's a tiring job. It is also a bit wearisome for the teacher*."

The teacher believed that the multidimensional measurement-evaluation requirement of PBL, was also problematic. The teacher expressed the difficulties experienced in the measurement-evaluation process by saying, "*Such an evaluation system requires expertise. Otherwise, it's a huge hassle. I had a hard time*."

PBL was considered a learning approach that requires patience: "*The learning method we used was very rich in all aspects but required patience. Taking care of each student individually, guiding the students, motivating them… Not every teacher has these responsibilities.*"

The teacher considers that the courses conducted with PBL require intensive preparation due to the difficulties of PBL. The teacher said, "*We did a lot of preparation before the lessons. Doing this for a year makes the teacher tired*."

It was determined that PBL caused various difficulties in the process of making learners gain entrepreneurship skills. So, depending on the teacher's experience in the application process, it has been determined that entrepreneurship can be fostered among learners by having a broad time frame, managing time effectively, being in intense communication with the learners, being able to make multidimensional measurement-evaluation, being patient, and making intensive preparations before the lessons.

Conclusion and Discussion

It was found that the Social Studies courses conducted with the PBL approach improved students' entrepreneurship levels. Oganisjana and Laizans (2015) argued that the courses conducted with PBL significantly affected university students' entrepreneurship levels. In their research, Morselli (2019) examined the effects of PBL on students' initiative and entrepreneurship skills. At the end of the research in which PBL applications were used, PBL was found to be an effective method for gaining entrepreneurship skills. Santateresa (2015), who examined the effect of PBL on students' successful initiatives, introduced PBL as an effective learning approach that enabled students to become entrepreneurs.

According to the findings, PBL contributes to awareness, which is one of the dimensions of entrepreneurship, within the scope of self-confidence, self-knowledge, leadership and learning to learn. Hendriana et al. (2018) concluded that PBL contributed to students' developing self-confidence. Similarly, Song (2014) found that PBL was an effective learning method that provides students with gains in developing self-confidence and acting boldly. According to the findings of O'Sullivan et al. (2018), PBL contributes to the leadership development of students. Self-confidence, self-knowledge, and learning to learn are the essentials of the awareness that entrepreneurial individuals should have to be able to take successful initiatives. An entrepreneur needs to be self-confident, aware of what she/he can do, and know how to learn.

The findings showed that PBL contributed to students' risk-taking, which is another dimension of entrepreneurship. In their study, Awang and Ramly (2008) found that the participants made progress in realizing their plans and did not avoid risky situations. According to Ersoy and Başer (2014), PBL could contribute to risk-taking by providing students with qualities such as using their imagination, finding new ideas, and trying solutions. Jdaitawi (2020) argued that PBL could enable students to benefit from their intuition. Khoiriyah and Husamah (2018) concluded that PBL could provide students with the awareness of researching and benefiting from innovations. LaForce et al. (2017) found that students who received training with PBL started to believe in themselves more and were less fearful of making mistakes. Kassem (2018) underlined that PBL could mobilize students against risks.

According to the findings, PBL contributes to students' making use of opportunities, which is another dimension of entrepreneurship. Similarly, Oganisjana and Laizans (2015) concluded that PBL could enable students to evaluate the opportunities they encounter. Cui (2016) observed that students first experienced problems in the education process carried out with the PBL approach, but then they saw the positive aspects of the process and benefited from it. Entrepreneurship is based on noticing the opportunities encountered and taking advantage of them. It cannot be said that individuals who cannot seize opportunities make successful initiatives.

PBL was found to encourage students to make assessments. Ribeiro (2014) stated that teachers made progress in assessment at the end of the training process carried out with PBL. Alias et al. (2015) concluded that PBL improved students in terms of self-evaluation, peer assessment, and teacher assessment. Kritikos et al. (2011) showed that PBL contributed to students both in terms of peer assessment and general assessment.

Participants of this study stated that PBL provided students with various skills. According to Severiens and Schmidt (2009), PBL could provide students with communication and problem-solving skills. Lufri et al. (2021) introduced PBL as a learning approach that contributes to the development of communication skills in students. According to Simamora et al. (2017), thanks to PBL, students learned to act in a planned manner. Maskur (2020) found that PBL helped students with research skills by enabling them to benefit from different sources of information. Similarly, Bai et al. (2017) and Naimnule et al. (2020) considered PBL as a method that provides students with research skills. Kardipah and Wibawa (2020) emphasized that students learned to use time effectively, in other words, they gained time management skills, depending on the multi-stage structure of PBL.

In their study in which they investigated the effect of PBL on decision-making skills, Thabet et al. (2017) found that PBL could contribute to decision-making skills. Serevina (2018) argued that PBL gave students the ability to analyze and synthesize. Since entrepreneurship is a multidimensional structure, individuals who make successful initiatives need to have a diverse set of skills. In this context, it is important to provide individuals with skills in the process of raising entrepreneurial individuals.

This study indicated that PBL gave students various values. Alagöz (2009) concluded that PBL taught students with the value of sensitivity and enabled them to take responsibility for environmental problems. Similarly, Akın (2008) found that PBL had a positive effect on students' attitudes towards environmental problems and instilled a sense of responsibility in them. Karaca (2020) informed that education based on real-life problems created positive changes in the helpfulness attitude of students. Nasution et al. (2018) also argued that PBL provided various values. Values must be observed in individual and social initiatives. Entrepreneurship is about providing both individual and social benefits. In this context, the entrepreneur should have various values. On the other hand, the Social Studies course aims to add value to students.

Based on the findings, PBL provided students with affective characteristics. According to Tatlısu (2020), students favored PBL, and most of the students enjoyed PBL applications. Jamiat (2018) found that the participants enjoyed the educational process thanks to PBL. Tavakol et al. (2009) found that the majority of educators were excited about PBL processes. According to Asyari et al. (2016), PBL increased students' motivation, and, thus, students appreciated themselves. Utomo et al. (2020) similarly concluded that PBL made students feel valued. Similar results were reported by Millanzi and Kibusi (2021), who introduced PBL as an effective learning approach for students to feel important. Matlala (2021) concluded that PBL arouses a sense of curiosity in students. On the other hand, Moutinho et al. (2015), found in their study that PBL motivated students about the lesson. Taking effective initiatives is proportional to having various affective characteristics. The affective characteristics of the individual are among the important factors in achieving success or not.

In this study, students believed the Social Studies courses conducted with the PBL approach increased the quality of their daily lives. According to Akınoğlu and Tandoğan (2007), students were more successful when they applied what they learned in PBL processes to their daily lives, making their lives easier. Dochy et al. (2005) investigated student views on PBL and found that students saw PBL as an approach that contributed to their active participation in daily life. Klegeris and Hurren (2011) stated that students overcame their shyness thanks to PBL and participated in lessons more. This may be because one of the goals of the entrepreneurial individual is to improve the quality of life.

According to the views of the Social Studies teacher, PBL enabled students to actively participate in lessons. According to Pastirik (2006), PBL positively affected the students' level of participation in lessons by providing environments where students could express their views. Active participation is one of the important factors in achieving the objectives of the lesson. In this respect, it is essential to use teaching approaches that enable students to actively participate in the lessons.
The findings showed that PBL was a useful method in achieving effective teaching. Similarly, Wirkala and Kuhn (2011) reported that PBL provided effective teaching by allowing the simultaneous use of different activities. Like this research, Deveci (2002) concluded that PBL increases academic achievement in the Social Studies course. Examining the effect of PBL on students' academic success, Tunç (2015) observed that PBL increased students' academic success and class participation rates. For Srinivasan et al. (2007), PBL ensured effective teaching thanks to its student-centered education approach. In Reynolds (2003), students considered PBL as an approach that could provide a fun learning environment and effective teaching. Galukande et al. (2015) concluded that the PBL process drew the attention of the students and enabled them to concentrate on the lesson. Given that PBL is a useful method in achieving effective teaching, it can be interpreted that PBL is beneficial in Social Studies courses, which aim to bring entrepreneurship to students.

The Social Studies teacher brought out various difficulties regarding PBL. According to Aybek (2019), being able to benefit from PBL effectively depends on the quality of the teacher, but the fact that the teacher is not competent in PBL causes difficulties. For Taylor Nelms et al. (2013), PBL is a useful approach, but it is far from being beneficial when the implementation of PBL lacks sufficient time and preliminary preparation. Regarding De Chambeau and Ramlo (2016), PBL requires patience and intense communication. According to Lydia Wen et al. (2006), PBL can cause various difficulties as it uses a multidimensional measurement-evaluation method.

Examining the effect of PBL on the entrepreneurship level of students in the Social Studies course, the present study argued that PBL contributed to students' regarding awareness, risk-taking and benefiting from opportunities. Therefore, PBL was considered an effective learning method for raising entrepreneurial individuals. The

entrepreneurial individual should have a high level of awareness, be able to take risks and take advantage of opportunities when necessary. The findings displayed the contributions of PBL in providing students with various skills, values, and affective characteristics that an entrepreneurial individual should have. It can be said that PBL directs students to make assessments and improve their daily life quality. Based on the research findings, PBL is a useful learning approach for developing students' entrepreneurship levels. However, PBL includes some difficulties in the process of gaining entrepreneurship for students.

Recommendations

According to the results of the research, the following recommendations were presented:

- PBL can be used in Social Studies courses to enable students to develop self-confidence, self-knowledge, and the ability to learn, take risks, recognize opportunities, evaluate opportunities, make general and specific evaluations, and improve their awareness levels.
- In the Social Studies course, PBL can be used to provide students with various values, skills, and affective characteristics that an entrepreneurial individual should have.
- PBL can be used in the Social Studies course to provide students with the imagination that an entrepreneur should have and to enable students to follow innovations in accordance with entrepreneurship.
- In Social Studies courses, PBL can be used in designing teaching processes in which students can learn by having fun, by doing-experiencing, and through permanent learning.
- The PBL method can be applied in social studies courses to bring entrepreneurship to students.
- Further studies can investigate the effect of PBL on students' various skills, values, and affective characteristics that an entrepreneurial individual should have.
- PBL can be used in action research on how to gain entrepreneurship skills for students in the Social Studies course.
- In the Social Studies course, future studies can investigate the effect of PBL on gaining students the ability to assess themselves, their peers, and teachers and make general assessments, which should be in an entrepreneurial individual.

Author (s) Contribution Rate

Both researchers contributed at every stage of the research.

Conflicts of Interest

There is no conflicts of interest

Ethical Approval

Ethical permission (25/11/2020 – Protocol No: 66593) was obtained from Anadolu University, Educational Sciences Institute for this research.

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An Artistic Approach to Secondary School Students' Process of Discovering Scientists: Theater and Science

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An Artistic Approach to Secondary School Students' Process of Discovering Scientists: Theater and Science*

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Abstract

The aim of this study was to examine the effects of science theater plays on secondary school students' attitudes towards the subject of science and their views on scientists. The study was conducted with 38 seventh-grade secondary school students over a six-month period. The "Scale of Attitudes Towards the Subject of Science" and the "Opinion Survey About Scientists" were used to collect the quantitative data, and the Wilcoxon signed-rank test was used for the analysis of the obtained data. For the collection of the qualitative data, the compositions written by the students and the researcher's observation notes were used, and the obtained data were subjected to inductive content analysis. In the study, it was concluded that the science theater plays were highly effective in changing secondary school students' attitudes towards the subject of science. On the other hand, it was determined that the activities had no effect on the students' views of scientists. The results obtained from the qualitative data reveal the advantages of science theater plays for students, as well as their contribution to students' personal development. The findings were discussed in the light of the literature and recommendations were made for further research in line with the results.

Keywords: Science, Scientists, Theater, Interdisciplinary Approach

Introduction

Students' attitudes towards science and scientists, which are shaped by the social environment and the education they receive, affect their future career choices by playing a decisive role in their academic achievement and learning motivation (Fung, 2002; Maltese & Tai, 2010; Özel, 2012). Students who have inaccurate and stereotypical ideas about science and scientists may become alienated from science and dislike related courses (Güler & Akman, 2006; Özkan et al., 2017). Dagher and Erduran (2016) stress that scientific activities in schools do not include enough social and cognitive dimensions.

The biographies of scientists, which are among the factors that play a role in the formation of a change-resistant model of scientists in students' minds (Akgün, 2016; Ambusaidi et al., 2015; Karaçam et al., 2014; Zhai et al., 2014), reveal the importance of learning the history of science. Moreover, it is stated that by learning the history of science through experiences, students increase their interest in science positively by acquiring a researcher's perspective (Guerra et al., 2013; McGregor, 2012) and developing a positive attitude towards science lessons (Bennet & Hogharth, 2009; Dawson et al., 2009; Kruse, 2010; Sepel et al., 2009). The history of science also aids comprehension of concepts about the nature of science by demonstrating how scientists endeavour to access information, what stages the knowledge has gone through to reach its current state, and the methods, tools, and materials that they use (Brodie, 2010; Odegaard, 2003). However, in some studies, it has been concluded that the history of science is not sufficiently included in the courses conducted during the teaching process, or that it is used only to enrich the lecture (Laçin Şimşek, 2011; Şeker & Güney, 2012; Wang & Cox-Peterson, 2002; Wang & Marsh, 2002). Besides, Kaya et al. (2008) emphasise that students cannot distance themselves from stereotypes due to the lack of information support related to scientists in science classes. In this context, it is evident that in order to eliminate students' negative attitudes towards science and scientists in their in-school and out-of-school learning experiences, there is a need for studies that give importance to the life stories of scientists, their working styles, how they evaluate the data they obtain, and the conditions of the time period in which they live.

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In order to educate individuals who know the history of science and the nature of science in educational environments, learner-focused and interactive methods should be used (Teke et al., 2015). In addition, in science education, activities enriched with the use of different disciplines, methods, and techniques will also ensure the realization of permanent learning (Dhanapal et al., 2014; Idin & Aydoğdu, 2016). Although science and art, which develop by being directly or indirectly influenced by each other in the integrity of the cultures they belong to, appear to be independent from each other, they are in fact disciplines that complement one another. In this context, in science education, a creative and innovative strategy such as theater, where students are motivated by active participation (Segedin, 2017) and reinforce the knowledge they have organised in their minds (Gemtou, 2014), can be mentioned.

The art of theater, which has been one of the channels of communication with society from the past to the present, has been used for many purposes, such as entertaining, enlightening, and informing the audience (Sloman, 2011). Researchers also use the theater, which reflects social change in the environment (Neelands, 2007) and supports individuals' life skills (Fulton & Simpson-Steele, 2016), as a method of conducting their studies and conveying their results to large audiences (White & Belliveau, 2010). The art of theater, which focuses on character and plot, has a story-centred structure. With these features, as well as involving the audience in the process of building knowledge, it can also bring clarity to a complex or abstract issue (Segedin, 2017). Furthermore, theater also offers alternative solutions for making the symbolic language of science more understandable and accessible in terms of cognitive and affective results (Braund, 2015; Dorion, 2009; Hendrix et al., 2012). The collaboration of science with theater has been called "science theater plays" (Amaral et al., 2017). According to the research, students gain experience in science and scientific process skills through theater (Borrow & Russo, 2015; Peleg & Baram-Tsabari, 2011), and science theater plays can be used as an effective communication tool in disseminating scientific culture to large groups of people (Amaral et al., 2017; Lanza et al., 2014).

As a result of the literature reviews, it has been observed that besides the scarcity of systemic studies evaluating theater activities in education (Belliveau & Lea, 2011), there are very few studies aimed at the art of theater, which provides an interactive learning environment, and science and scientists. The effect of examining the lives and works of scientists through the art of theater on students' attitudes towards the subject of science in the light of their previous knowledge is also a matter of curiosity. In our study, important sections of the lives and works of *Al-Khwarizmi, Alpharabius, Avicenna, Al-Biruni, Ali Qushji, Akshamsaddin, Marie Curie, Eratosthenes, Isaac Newton, Albert Einstein,* and *Aziz Sancar* were realistically scripted and staged with the students in the form of short plays. With the students' animations of the scenarios related to the lives and works of the abovementioned scientists and their empathy towards them, a student-centered, social, interactive, imaginative, entertaining, and powerful learning environment was created. Moreover, it was intended that the students would increase their curiosity towards scientists and their work and concretise science in their minds by assuming the roles of scientists in the short theater play animation activities, in which they actively participated in collaboration. Our study differs from this related literature in terms of being a short play and dramatization study about the lives of scientists. Based on all of these situations, the aim of this study is to (1) determine the effects of science theater plays on 7th grade secondary school students' attitudes towards the subject of science and their views on scientists; and (2) examine students' thoughts about the process of teaching about scientists and their works through theater activities. In this context, the main problem of the research was determined as: "What is the effect of science theater plays, in which 7th grade secondary school students actively participate, on their attitudes towards the subject of science and their views about scientists?" In accordance with this main problem, the following sub-problems:

1. Do theater activities involving scientists make a significant difference to secondary school students' attitudes towards the subject of science?
2. Do theater activities related to scientists make a significant difference to secondary school students' views about scientists?
3. What are the thoughts of secondary school students on the process of teaching about scientists and their work through theater activities?
4. What are the recommendations of secondary school students for future studies on scientists and their works with theater activities?

Method

Research Design

This study, which examines the effects of science theater plays on secondary school 7th grade students' attitudes towards science and their views about scientists, was designed as an exploratory sequential mixed method design. The procedure in this design is gathering quantitative data first, and then supporting the quantitative results with qualitative data (Clark & Ivankova, 2016; Creswell & Plano Clark, 2014). In the quantitative part of the study, a single group pretest-posttest experimental design, which is used in studies aimed at raising public awareness (Gliner et al., 2015), was used. In the qualitative part of the study, a phenomenological design, which is based on the expression of world views about the relevant phenomenon, was given priority (Merriam, 2015).

In the study, 7th grade secondary school students enacted the play scenarios about scientists prepared by the researcher on the stage after the theater rehearsals. In the first stage of the research, it was quantitatively tested whether this program had an effect on students' attitudes towards the subject of science and their views about scientists. In the second stage, in order to investigate in depth the effects of the implemented programme, the participants' opinions and experiences were obtained through the compositions they wrote. These data were included in the research together with the data obtained from the on-the-spot field notes and video recordings kept by the researcher throughout the process. In the final stage, the data obtained in the quantitative and qualitative processes were combined in a meaningful way and compared, and consistent results were conveyed to the reader.

Participants

The study group of the research consists of 38 seventh grade secondary school students (20 girls, 18 boys) studying in 5 different secondary schools affiliated to the Ministry of National Education in the central district of Muş. The participants were selected using the criterion-based sampling method, one of the purposive sampling types. In this method, participants are selected according to appropriate preset criteria depending on the purposes of the research (Merriam, 2015). In order to inform the participants about the science camp where the activities were to be conducted and to enable them to apply, posters were displayed in the schools and announcements were made. Among the 92 secondary school students who applied, the participants were determined by considering six criteria. The specified criteria were: 1) the student had completed the 6th grade and moved to the 7th grade, 2) the student was a volunteer, 3) the numbers of male and female students in the participant group were similar to each other, 4) they were students from different schools, 5) they were students who had not participated in a similar study before, and 6) the family approval form regarding participation in the camp had been completed.

Data Collection Tools

In collecting the quantitative data for the research, the "Scale of Attitudes Towards the Subject of Science" and the "Opinion Survey About Scientists" were used, while the compositions written by the students were used to collect the qualitative data. The data obtained from the compositions was supported by the researcher's observation notes.

Scale of Attitudes Towards the Subject of Science

In order to determine the impact of the science theater plays applied in the research on the attitudes of the participants towards the subject of science, the Scale of Attitudes Towards the Subject of Science developed by Öcal (2014) for secondary school students was utilized.

The scale, which consists of 21 items and 3 sub-dimensions, namely "Interest, love, hate and fear" (11 items), "Trust" (5 items) and "Importance" (5 items), is scored as "I completely disagree", "I disagree", "I am undecided", "I agree" and "I completely agree". The lowest score that can be obtained from the scale, in which 10 items are reverse-scored, is 21, while the highest score is 105, and it can be interpreted that participants who obtain high scores have a more positive attitude towards the subject of science. In the reliability study that was conducted, the Cronbach alpha reliability coefficient for the whole scale was calculated as.88. For the sub-dimensions, the reliability coefficients were calculated as.90 for "Interest, love, hate, and fear" (11 items),.78 for "Trust" (5 items) and.67 for "Importance" (5 items) (Öcal, 2014). As stated by Thorndike and Thorndike-Christ (2010), based on these reliability coefficients, it can be said that the whole scale is reliable at a good level, while in two of the sub-dimensions, reliability is low due to the small number of items (5 items each).

Opinion Survey About Scientists

In order to determine the effect of science theater plays on students' perceptions about scientists, the "Opinion Survey About Scientists", which was created by Öcal (2007) with the data he obtained from the literature and which was prepared for secondary school students, was used. In the reliability study that was conducted, the

Cronbach alpha reliability coefficient for the opinion survey about scientists, consisting of 47 items, was calculated as.86 (Öcal, 2007). This 5-point Likert-type scale, in which 27 items are reverse scored, ranges from 1 ("I completely disagree") to 5 ("I completely agree"), and consists of 5 sub-dimensions. The sub-dimensions of the scale are: thoughts about scientists' work (11 items), thoughts about scientists' social lives and social activities (7 items), thoughts about scientists' characters, feelings, characteristics, and working life (17 items), thoughts about scientists' place in society (6 items), and thoughts about scientists' relationships with other scientists (6 items). The highest score that can be obtained from the scale is 235, while the lowest score is 47. It can be concluded that participants with high scores have more positive views on the characteristics, works, and social lives of scientists.

Compositions

Following the theater activities, the students were asked to write compositions in order to understand in depth their views about the process of teaching about scientists and their works through theater activities and their perspectives on further studies to be conducted on this subject. Two open-ended instructions were given to the students in order to create space for them to write their compositions and to facilitate their writing. These instructions were determined as: (1) Relate your positive and negative views about examining the lives and works of scientists through theater activities. What did you feel? What did you experience? (2) What suggestions do you have for further studies on the lives and works of scientists through the art of theater? The data obtained from the compositions was also supported by field observations and video recordings made during the process. By enabling data triangulation with the compositions, on-the-spot field observation notes, and video recordings, the internal validity of the study was also strengthened (Fraenkel & Wallen, 2008).

Researcher's Observation Notes

Observation assists in obtaining comprehensive data spread over time about behaviour and phenomena in specified environments (Yıldırım & Şimşek, 2016). Throughout the study, natural and unstructured observations were made in order to evaluate the emotional and behavioral changes in the students during the activities. In the observations, students' reactions, emotions, thoughts, and emerging patterns regarding the science theater activities were taken into account. Moreover, interesting and different situations were observed during the activities, and each observation was recorded with on-the-spot field notes. All implementations were recorded on camera with the permission of the parents and students, accompanied by an assistant. Each recording was examined repeatedly in order to enrich the field notes. The use of camera recordings during the activities allowed the students' behaviors, emotions, and reactions during the activities to be observed again at any time and increased the validity and reliability of the study in terms of interpretation of the findings. With the observations that were made, the participants' perspectives and experiences regarding the implementation process were understood, and their feelings and thoughts about the theater activities and the examination of the scientists' lives and works were revealed in detail.

Implementation process

The study was conducted with 38 seventh grade secondary school students (20 girls and 18 boys) using the technical equipment and locations of Muş Alparslan University.

The implementation process was carried out as shown in Table 1:

Table 1. Implementation process

Date	Theme	Activities
12.02.2018 - 04.05.2018	Preparing scenarios about scientists	*Literature review *Writing scripts *Final revisions
07.05.2018 - 25.06.2018	Summer science camp announcement Determining participants	*Examining applications *Selecting participants *Announcing selected participants *Receiving volunteer participation forms *Obtaining family permission forms
10.07.2018	Implementation of pretests	Pretest-implementations of * Scale of attitudes towards the subject of science and

		*Opinion survey about scientists
11.07.2018 - 12.08.2018	Al-Khwarizmi, Alpharabius, Avicenna, Al-Biruni, Ali Qushji, Akshamsaddin, Marie Curie, Eratosthenes, Newton, Einstein, Aziz Sancar	*10 hours of rehearsal for each scientist theatre play *Staging of plays (2 hours) *Researcher's observation notes *Video recordings
13.08.2018	Implementation of posttests	Posttest implementations of * Scale of attitudes towards the subject of science and * Opinion survey about scientists *Compositions

The researcher, who was directly involved in the process of writing and staging the scenarios, has 16 years of professional experience in writing, directing, drama teaching, and acting in a city theater. In the study, the scenarios of the science theater plays acted on stage were prepared by the researcher before the implementation phase. The first step taken into consideration in the preparation of these scenarios was to ensure that they were realistic. For this purpose, in the first stage, a literature review was carried out regarding the important sections of the lives and works of the scientists (*Al-Khwarizmi, Alpharabius, Avicenna, Al-Biruni, Ali Qushji, Akshamsaddin, Marie Curie, Eratosthenes, Isaac Newton, Albert Einstein, and Aziz Sancar*) examined in the study, and the relevant documents were collected. Other points taken into consideration during the writing phase were: during the staging process, scenes in which there may have been problems in terms of decor, costume, and technique were not written, the scenarios were suitable for the age and developmental level of the 7th grade of secondary school; and the lines in the scripts were written in a simple and understandable language. By observing these criteria, important sections of the lives and works of the scientists were examined and scripted. The views of two playwrights and two science education experts were obtained regarding the scripts of the short plays that were written. Interviews were held with the writers and experts under the headings of the duration of the scenarios; the adequacy of the contents related to the relevant scientists; and how the history of science and science subjects are related. The necessary revisions were made in line with the interviews and feedback, and the play scripts to be used in the study were given their final form (Table 1).

Within the scope of the quantitative section of the study, which was planned according to a single-group pretest-posttest design, the pretest measurements were carried out by applying the "Attitude Scale Towards the Subject of Science" and the "Opinion Survey About Scientists" before the implementation (Table 1). Afterwards, the students were briefed about the art of theater, the scientists, and our study. Then, the scenarios prepared about the scientists and their works were animated with the active participation of the students. During the implementation process, the participants were divided into 2 groups, and the rehearsals were carried out by the distribution of roles in both groups. The 2 groups acted out the same scenario on the staging day. While the play of the first group was being performed on the stage, the second group was the audience; while the second group was performing the animation, the first group was the audience. Thus, by ensuring that the students were both the actors and the audience, the message-transmitting and message-receiving quality of theater was exploited. In order to determine whether these activities had an effect on students' attitudes towards the subject of science and their views about scientists, the two scales administered in the pretest were also administered as a posttest after the implementation (Table 1).

During the implementation, observations were made and on-the-spot field notes were kept in order to investigate the effects of the programme in depth. In this context, field notes were kept between the dates of 11.07.2018-12.08.2018, during the period of implementation. Video recordings were made in order to make the data obtained through observation more detailed and to examine the reactions occurring in the observed environment more deeply and repeatedly. Each recording was examined repeatedly in order to enrich the field notes. Following the implementations, the students wrote compositions in which they wrote their thoughts on the process of teaching about scientists through science theater plays and on future studies to be conducted on this subject (Table 1). The results obtained from the qualitative data were compared with the data obtained from the quantitative data and were integrated in the results of the study.

The implementation stage of the study, which was carried out over a total of 24 weeks, continued every day for 4 weeks. During the implementation stage, the play performed for each scientist was rehearsed for 2 days. On the following third day, the play was staged in the form of two separate groups. In this context, it can be said that the theater activities for one scientist took 3 days in total. An average of 5 hours of work was carried out on each rehearsal day and an average of 2 hours on the staging day. The implementation period of the study, which included 22 days of rehearsals and 11 days of staging, lasted 132 hours over a total of 33 days (Table 1).

Data analysis

Quantitative Analysis

To test whether there is a significant difference between the means of two repeated measurements (pretest-posttest) taken on the same group, the t-test for dependent (related) samples or the Wilcoxon signed-rank test can be used (Pallant, 2015). In the study, skewness and kurtosis values were examined to determine whether or not the data showed a normal distribution. The mean, skewness, and kurtosis values for the pretest and posttest data of the "Attitude Scale Towards the Subject of Science" (ASTSS) and the "Opinion Survey About Scientists" (OSAS) are presented.

Table 2. Mean, skewness, and kurtosis values of the data (ASTSS and OSAS)

	ASTSS Pretest	**ASTSS Posttest**	**OSAS Pretest**	**OSAS Posttest**
Mean ($\bar{X}$)	91.16	96.16	172.87	172.97
Skewness	-1.23	-2.12	-.61	-.32
Kurtosis	1.22	4.85	-.64	-.92

The fact that skewness and kurtosis coefficients range between the (+1,-1) limits indicates that the distribution does not deviate excessively from the normal (Büyüköztürk, 2008; Çokluk, Şekercioğlu & Büyüköztürk, 2012). When analytical findings were analyzed, it is seen that the skewness and kurtosis values of the pretests and posttests of the ASTSS and OSAS scales were not between the (+1,-1) limits (Table 2). In addition to the skewness and kurtosis values, the Shapiro-Wilk test values were examined to determine whether or not the data met the normality assumption. The Shapiro-Wilk test is the normality test recommended to be applied in cases where the sample size is less than 50 (Büyüköztürk, 2008).

Table 3. Shapiro-Wilk test results for the data (ASTSS and OSAS)

	ASTSS Pretest	**ASTSS Posttest**	**OSAS Pretest**	**OSAS Posttest**
Statistic	.88	.74	.94	.96
N	38	38	38	38
P	.001	.000	.036	.165

As a result of the analyses, it is understood that all scales showed a heterogeneous distribution, except for the OSAS post-test data. Accordingly, since the data set obtained from the ASTSS and OSAS scales used in our study did not provide normality, the Wilcoxon signed-rank test, which is one of the nonparametric techniques, was used in the analysis of the quantitative data (McKillup, 2012; Mertler & Vannatta, 2005). The Wilcoxon signed-rank test is a non-parametric alternative to the repeated measures t-test (Pallant, 2015) and is used in cases where the obtained data do not have a normal distribution (Büyüköztürk, 2008). For all statistical analyses conducted within the scope of the research, the significance level was considered to be.05. The data analysis was carried out using the SPSS 26.00 statistical software tool.

Quantitative Analysis

Data from the compositions, observations and video recordings were analysed in depth in order to reveal the students' experiences in the science theater activities and their effects on the integration of interactive theater art with science. The inductive content analysis technique was utilised in the analysis of the research data. Inductive content analysis involves coding, categorizing, determining the relationships between these categories, and creating themes (Patton, 2014; Saldana, 2019). Interpretations made by the researcher include associating the emerging themes, making sense of them, and forming future inferences (Yıldırım & Şimşek, 2016).

For the coding of the data, to give the researcher a general idea, firstly, all the compositions and field observation notes were read several times, and the video recordings were examined repeatedly. All opinions and recordings determined to be relevant to the research questions were combined under the same code. By working on the

categories that emerged as a result of the coding, themes that were appropriate for the purpose of the research and that constituted a meaningful whole were determined. The researcher read all the data several times at different times and checked for coding and themes.

To ensure reliability, two academicians, who are experts in qualitative research , independently coded the data according to the created codes and created themes. In order to verify the themes and categories that were formed independently of each other and to remove them from subjective judgements, new themes and categories were created by discussing the codes with the experts whose opinions were sought. The most frequently repeated and most important codes were chosen, and some codes were revised. According to the final situation, the codes created by the researcher and two experts were compared, and a 90% level of agreement was achieved. In this respect, 80% agreement in coding is considered sufficient (Miles & Huberman, 1994). The final forms of the analyses of the obtained data were organized under research questions by determining the relations between the themes. The findings were defined by reaching consensus, and they were transformed into tables and presented by interpretation. For each theme and code, direct quotations from composition data or field observations have been provided to assure internal dependability.

Credibility and Ethics

The study process was enriched by using a series of data collection techniques. In this process, the science theater activities that were carried out, the scenarios that were used, and the implementation method and reporting of the study were evaluated by expert academicians at every stage. In order to ensure the credibility of the study, various measures were taken in four dimensions: reliability, transferability, consistency, and confirmability (Yıldırım & Şimşek, 2016).

In the reliability dimension of the study, it is noteworthy that the researcher has professional experience in the field of theater and drama as well as being an expert in science education. He carried out long-term interaction with the students in the study, and he made in-depth observations by taking field notes and video recordings. In the dimension of transferability, it was observed that the whole study process and the obtained findings were given in detail and that the participants were determined by the criterion-based sampling method, which is one of the possible types of sampling. In the consistency dimension, the data analysis was carried out with consensus reached by comparing the codes and themes obtained in the data analysis with the coding of two qualitative research experts with doctoral degrees and by giving direct quotations regarding the codes from the researcher's observation notes and compositions. In the dimension of confirmability, internal validity was increased by diversifying the data sources and data collection methods (triangulation) through composition, observation, and video recording analysis (Merriam, 2015). The goal was to eliminate any potential flaws in the data collection tools by confirming whether or not the data matched.

Legal permission to conduct the study was obtained from Muş Alparslan University Ethics Committee and Muş Provincial Directorate of National Education. Within the scope of the study, cooperation was made with the 7th grade secondary school students and their parents and teachers. The principle of voluntariness was adhered to in the selection of the participating students. At this point, students were asked to fill in the voluntary participation form that was prepared. The reason for the study, its duration, what kind of data would be obtained, and where and for what purpose it would be used were clearly explained to the students, their teachers, and their families. A parental consent form was developed for the students' participation in the study, and the parents of the selected participant students were asked to fill it out. In this way, written consent was obtained from the students and their parents regarding participation in the study and taking video recordings in the study. To ensure the confidentiality of the participants' identities, codes (S1, S2, S3,…S38) were used instead of their real names.

Findings

The findings of the study, in which scientists and their works are analyzed through theatrical activities, are presented in two sections as quantitative and qualitative findings, with sub-problems considered.

Quantitative Findings

In line with the research objectives stated, findings regarding the effect of the implemented programme on the attitudes of the secondary school students towards the subject of science and the views of the same students regarding scientists are presented.

Impact of the implemented programme on students' attitudes towards the subject of science

In the first sub-problem of the quantitative part of the research, the effects of theatrical activities related to scientists and their works on the attitudes of secondary school students towards the subject of science were investigated. To analyse whether there was a statistically significant difference between the pretest and posttest mean scores of the secondary school students regarding the scale of attitudes towards the subject of science with the implementations that were made, the Wilcoxon signed-rank test was used, and the results are provided in Table 4:

Table 4. Wilcoxon Signed-Rank Test Results for Scale of Attitudes Towards the Subject of Science

Attitude Scale	Ranks	N	Mean Rank	Rank Sum	Z	p
Posttest - Pretest	Negative Ranks	8	13.13	105.00	-3.293	.001
	Positive Ranks	26	18.85	490.00		
	Equal Ranks	4				
	Total	38				

The difference between the students' total scores on the scale of attitudes towards the subject of science before and after the implementations shows that there was a statistically significant increase ($Z = -3.293$, $p<.05$). This finding shows that the experimental study's program was highly effective in improving secondary school students' attitudes toward science.

Effect of the implemented programme on students' opinions about scientists

In the second sub-problem of the quantitative part of the research, the effect of theater activities related to scientists and their works on the views of secondary school students about scientists was investigated. The Wilcoxon signed-rank test was used to analyse whether there was a statistically significant difference between the pretest and posttest mean scores of the secondary school students regarding their opinions about scientists with the implementations that were made. The findings are presented in Table 5:

Table 5. Wilcoxon Signed-Rank Test Results for the Opinion Survey About Scientists

Attitude Scale	Ranks	N	Mean Rank	Rank Sum	Z	p
Posttest - Pretest	Negative Ranks	19	18.92	359.50	-.160	.873
	Positive Ranks	19	20.08	381.50		
	Equal Ranks	0				
	Total	38				

It was determined that the difference between the students' total scores for their opinions about scientists before and after the implementations was not statistically significant ($Z=-.160$, $p>.05$). This finding shows that the research program had no significant impact on secondary school students' perceptions of scientists.

Qualitative Findings

In the qualitative part of the study, the themes, codes, and sample opinions obtained from the analyses of the researcher's observation notes and the composition data are presented in the form of tables. In addition, the details of the researcher's observation notes are also included in the comments section. It is thought that this will make it easier for readers to interpret the tables by making use of the data.

Secondary school students' thoughts on the process of teaching about scientists and their works through theater activities

In the first sub-problem of the qualitative part of the research, the aim was to examine the students' thoughts on the process of teaching about scientists and their works through theater activities. Accordingly, the participating

students were asked to answer the question, "Relate your positive and negative views about examining the lives and works of scientists through theater activities. What did you feel? What did you experience?" in the compositions that they wrote. The results were examined under the themes of "positive thoughts" and "negative thoughts". Tables 6 and 7 show the results of coding the researcher's observation notes and the students' responses in their compositions:

Table 6. Positive thoughts of secondary school students regarding the process of teaching about scientists and their works through theater

Category	Code	Repeating Students	Sample Opinions
Personal Development	**Getting to know oneself through theatre**	1,8,15,17,22,25,27, 30,31,37	***S15:*** *"…While playing the roles of the scientists on the stage, we learned how to move, how to act, how to use our gestures and facial expressions. We got to know ourselves better. I wish it had never ended…"* ***S27:*** *"…Of course, there were things I could and couldn't do while working on the scenarios about the scientists. In this way, I got to know myself better. I feel like I can act on stage now.*
	Increasing self-confidence	1,3,18,19,20,30	***S20:*** *"…When I was in kindergarten, some of my friends laughed at me and some of them cried because I cried on stage while reading the poem I wrote to my mother on mother's day. I have been afraid ever since. But this study made me overcome my fear and trepidation. Therefore, I am very happy."*
	Acquiring theatre skills	4,8,9,16,19	***S4:*** *"…Our acquaintance with the scientists through theatre not only gave us drama skills, but also entertained and instructed us."* ***S9:*** *"…I personally did not think that I had any theatrical skills, be it an animation or a voice change. But when we act out the scenario and I see my success, I think that maybe I can advance in this field. So I think I will be able to participate in various activities."*
	Developing imagination/creativity	16,32,34	***S16:*** *"…While we were acting in the theatre activities about scientists, it seemed to us like a theatre play watched by a thousand people. We use our intelligence and imagination in the scenarios. The activities were lots of fun. Our creativity has also improved."*
	Gaining different perspectives	2,33	***S2:*** *"…I felt as if I was inside the lives of all the scientists. Thanks to the theatre, people look at life through not one but thousands of windows. So the area we call perspective is changing."*
	Socialisation	21	***S21:*** *"…Here, you get to know the scientists and learn about them through theatre, and this is more memorable because in such an activity, you can meet people you don't know and do drama. This can enable you both to learn about scientists and to socialise. There were also some shy friends among us. We were able to establish social relationships with them as well."*
Learning	**Learning by having fun**	1,2,3,4,5,7,8,9,11,12, 13,14,15,16,17,19, 20,21,22,24, 25,26,28,29,36	***S8:*** *"…Time passed so quickly and so beautifully during my time on the stage that I didn't even realise that I was learning something. But then I realised that theatre has encoded many things and even many people into my memory. It is a truly indescribable feeling, emotion and pleasure at the same time. I am glad that this activity was organised with theatre and art."*

		S17: *"…What contributed more than anything to my acquaintance with the scientists was that the students went out and did drama. I had a lot of fun during this summer vacation."* ***S22:*** *"…It was very, very entertaining to play and watch the scientists through theatre in this study. I will talk about this place always and everywhere."*
Retention of learning	2,3,5,8,9,10,11,12,13, 14,15,16,17,18,19,20, 21,26,28,30,32,33,35, 38	***S3:*** *"It was very instructive to get to know the scientists through theatre. We learned by having fun and this benefited us a lot. If you had just made do with narrating or writing, maybe we would have forgotten it after a few days. But like this, it was so permanent."* ***S35:*** *"It was a nice activity in general. I am against the rote system. When we come across this, it is easier for me to remember the theatre play we performed instead of just memorising."*
Learning about scientists	2,17,23,26	***S17:*** *"…Also, theatre helped me get to know scientists more."* ***S23:*** *"…In this way, we brought science and art together and learned about scientists whose names we would not have heard of even once in our lifetime."*
Learning by assuming a role	19,30	***S19:*** *"…While we are learning, we explore our talents together with the teachers. We can draw inspiration from that scientist. When I act, it's almost as if I'm not me. If I'm Aziz Sancar, say, I feel like Aziz Sancar, not like Ahmet or Ömer… So if I'm Aziz Sancar, it's as if I'm saying 'it's enough, I'm learning by myself.' "* ***S30****: "…Animating scientists through theatre enables people to remember a scientist they can take as an example and enables retention. Whatever role we play, we get to know that scientist closely and take him as an example."*
Visual learning	25,28	***S28:*** *"…We learn visually through drama and theatre."*
Learning by experiencing	10	***S10:*** *"…When theatre and science are combined, it becomes more permanent. If we wanted, could we learn about these scientists with long slides and ongoing conversations? Would two days be enough for us to learn the information? Definitely not. Because we learn by experiencing. We remember everything we experienced in the theatre, because we experienced it and transmitted it."*

The students' positive thoughts about the implementation process were grouped under the categories of "Personal Development" and "Learning". Under the category of Personal Development, the codes "Getting to know oneself through theater" (n=10), "Increasing self-confidence" (n=6), "Acquiring theater skills" (n=5), "Developing Imagination/Creativity" (n=3), "Gaining different perspectives" (n=2) and "Socialisation" (n=1) were formed (Table 6). The researcher's observation notes also support these codes:

"Day by day, the students can express themselves more easily on stage. This gives strength to their play. They have begun to enjoy themselves while playing the roles of scientists. It is observed that the daily increase in their friendship relations and getting to know each other better increases their sense of ease on the stage. This has also enabled them to generate comfort. They make additions to the scripts. They make improvisations. I don't interfere with these improvisations as long as they don't break the lines of the scripts. The fact that they produce and have fun on stage contributes to their success. Even students who approach the theater with prejudice want to act. I can say that their energy has increased. Perhaps they have also discovered themselves and gotten to know themselves, and this is reflected on the stage." (Researcher's notes: 19.07.2018)

Under the learning category, the codes "Learning by having fun" (n=25), "Retention of learning" (n=24), "Learning about scientists" (n=4), "Learning by assuming a role" (n=2), "Visual learning" (n=2) and "Learning by experiencing" (n=1) were formed (Table 6). It is seen that the students who studied the lives and works of scientists through theater especially learned by having fun and emphasised the permanence of what was learned. The findings obtained from the researcher's observation notes also contribute to the learning process by providing a fun code:

"Today, I observed that the students felt happy and were motivated when they were applauded at the end of their play. They are working more willingly. They loved the theatrical texts and animations about scientists. They state that they had a lot of fun. At the end of the play, I thanked them for their performances. They also thanked me. They are very happy to be part of the project. It's so obvious that they're having fun... They never get distracted." (Researcher's notes: 24.07.2018)

It is seen that the students not only had fun in the science theater activities, but that they also learned more permanently.

Table 7. Negative thoughts of secondary school students regarding the process of teaching about scientists and their works through theater

Category	Code	Repeating Students	Sample Opinions
Technical	**Food**	4,20,35	***S4:*** *"…The subject of food is not very pleasant. The same breakfast, lunch in the dining hall, dinner again in the dining hall every day. The food was terrible, always the same dishes appeared. This was rather boring."*
	Obligation to act collectively	11,33	***S11:*** *"…Our teachers are excellent. The only problem is, they say that when we want to get some air, we have to act together."*
Content	**The leading roles are males**	11	***S11:*** *"…Men were always in the leading roles. Only once was there a female lead."*

The students' negative thoughts about the implementation process were grouped under the categories of "Technical" and "Content". Under the technical category, the codes "Food" (n=3) and "Obligation to act collectively" (n=2) were formed. Under the content category, the code "The leading roles are males" (n=1) was formed (Table 7).

Suggestions of secondary school students for further studies on using theater activities to teach about scientists and their works

In the second sub-problem of the qualitative part of the research, the goal was to receive the students' suggestions for future studies on scientists and their works with theater activities. Accordingly, the participating students were asked to answer the question "What are your suggestions for future studies on the lives and works of scientists with the art of theater?" in the compositions that they wrote. The researcher's observation notes and the students' answers in their compositions were coded, and the results are presented in Table 8:

Table 8. Suggestions of secondary school students for future studies on teaching about the lives and works of scientists with theater activities

Category	Code	Repeating Students	Sample Opinions
Technical	**The activity should be repeated next year**	4,5,9,11,13,15,16, 22,25,27,29,30	***S11:*** *"...I want this project to take place next year as well."* ***S13:*** *"...Please let this activity be held next year as well. Let's learn about scientists by having fun again."*
	It should be an overnight activity	11,13,27	***S11:*** *"...This study should be an overnight activity next year. Let it be like a camp."*
	More people should take part	13, 37	***S37:*** *"...Let's do it again next year. It should be held in primary schools as well, and there should be 80 of our friends. Not just us, let our friends come and see it, too. Let others join in, let them learn, have fun, act and teach those who don't know how to have fun."*
	It should be held in different cities as well	25	***S25:*** *"...It was a lot of fun to learn about scientists through theatre. We are very lucky. This activity should be held in other cities as well, and it should spread all over our country."*
Content	**Sporting activities should be added**	36	***S36:*** *"...I loved the activity very much. I learned about scientists through art. Next year I want there to be sports like swimming football, basketball, etc., too."*
	Energy-expending activities should be added	12	***S12:*** *"...There should be a programme that will release energy when it is held next year. There wasn't this year. We wanted to travel in order to discharge, but the teachers did not allow it."*

The categories "Technical" and "Content" were used to group students' suggestions for future studies on scientists and their work with theater activities. Under the technical category, the codes "The activity should be repeated every year" (n=12), "It should be an overnight activity" (n=3), "More people should take part" (n=2) and "It should be held in different cities as well" (n=1) were formed. Under the content category, the codes "Sporting activities should be added" (n=1) and "Energy-expending activities should be added" (n=1) were formed (Table 8). In the data obtained by examining the camera recordings, too, it is seen that during the activities, the participants made inquiries and had discussions among themselves about the scientists' lives and works. In addition, it is observed in these recordings that the students were active and willing to act out the roles given to them, and that they were generally happy, excited, and entertained during the activities. The researcher's observation notes also support these data:

"The children's energy is a little low today. The fact that it was the last activity day and that they were going to leave their friends and trainers and the theater made everyone feel sad. The best way to motivate them is to say that they will be doing the activity next year and that they will be invited again. When I say this, they all embrace the activity happily and do their best." (Researcher's notes: 02.08.2018)

It can be said that the parents also thought that the activity was beneficial for the students. The researcher's observation note for this interpretation is as follows:

"Today, we held a meeting with the parents of the participating students before the activity. We listened to their ideas and suggestions about our study. In general, they all thanked me and my team for conducting such an activity. One of the parents said that their child came home very happy and energetic from this activity and enthusiastically told them about all the activities they had done. I was very happy to receive positive feedback from all the parents. We are on the right track." (Researcher's notes: 07.08.2018)

Conclusion and Discussion

Important conclusions have been reached in this study, which aims to examine in depth the effects of science theater plays on 7th grade secondary school students' attitudes towards the subject of science, their views about scientists and their works, and their thoughts about the implemented programme.

When the results were examined, it was revealed that there was a significant positive difference in the students' attitudes towards the subject of science before and after the theater activities related to scientists. Studies show that when science is integrated with art, attitudes towards science increase positively (Danckwardt-Lilliestrom et al., 2020; Ong et al., 2020). In other conducted studies, it was concluded that students had an active and intellectual learning experience with interactive role-playing activities in science education and that this situation had a positive effect on students' attitudes towards science (Bennet & Hogharth, 2009; Braund, 2015; Dawson et al., 2009; Mc Gregor, 2012; Odegaard, 2003). Learning about the history of science, the lives of scientists, and how they accomplish their work increases the positive interest of students who are not interested in science (Kruse, 2010). Moreover, looking at the qualitative findings of the study, it was observed that the students were able to comprehend science subjects more easily by concretising them through theater. It is thought that this situation will lead to an increase in motivation and facilitate learning in students. In addition, it is seen that the students stated that they learned science subjects by having fun with drama and that this knowledge was maintained. Parallel to these results, Sepel et al. (2009), in their study in which students played the roles of scientists and animated the discovery of the microscope, concluded that the students were able to look at science from a historical perspective and that the animation activities positively motivated students to acquire scientific knowledge. In other conducted studies, the importance of different disciplines and methods in realising permanent and meaningful learning in science education is emphasised (Dhanapal et al., 2014; Idin & Aydoğdu, 2016). It is also stated that in science education, integration and enrichment of learning will be enabled by establishing connections between different disciplines (Tripp & Shortlidge, 2019; Shen & Wang, 2020). In this context, it can be said that the findings regarding learning by having fun and easy and permanent learning, which were obtained by the interdisciplinary integration of science and art, support the previous studies conducted on the subject.

In the quantitative results of the study, it was found that in the opinion survey about scientists, there was no significant difference before and after the implemented programme. The fact that the students obtained the highest scores that they could from this survey before the implementation may have prevented the creation of a significant difference. Moreover, in the qualitative results of the study, it was observed that the students created discussion environments among themselves about the lives and work of the scientists. In addition, in the analysis of the composition documents written by the students, the codes of "*learning about scientists*" and "*learning by assuming a role*" were formed. In the analysis of the observation and document data, it was seen that the students also supported the idea that "*this activity should reach more students*", since they learned about the works of scientists by having fun, and by doing and experiencing, and they found the activity useful. Based on these findings obtained from the qualitative data, it can be said that the students' views towards scientists were positively affected by the implemented programme. Brodie (2010) stated that the nature of science and the working styles of scientists can be understood by recreating the life stories of scientists. Students who experience the animation of scientists and develop an idea about their lives through role play build a critical interaction with the past in their minds and perceive scientific processes more easily by empathizing with scientists, according to other conducted studies (Amaral et al., 2017; Borrow & Russo, 2015; Dorion, 2009; Hendrix et al., 2012; Odegaard, 2003).

The results obtained from the qualitative data of the study not only reveal the advantages of science theater plays but also demonstrate their contributions to students' personal development. It is understood that the participating students especially had the opportunity to discover themselves during the application process. In addition, the students stated that their self-confidence increased, their imagination and creativity developed, they gained different perspectives by exchanging ideas during the implementation process, during which their cooperation and collaboration increased, and they socialised by establishing communication with the group. Artistic activities in science education not only ensure the concretisation of abstract concepts by enabling the active use of examination, observation, discovery, and communication skills (McGregor, 2012), they also support daily life skills (Fulton & Simpson-Steele, 2016). It is stated that students improve their communication skills through science theater activities and that these activities also contribute to body control (Amaral et al., 2017; Borrow & Russo, 2015). Moreover, it is stated that science theater plays are creative and innovative activities that have the ability to motivate and to convey messages (Segedin, 2017), and that through science theater plays, participants experience a socialization process (Braund, 2015) and gain different perspectives (Dawson et al., 2009; Braund, 2015).

When the qualitative findings were examined, students suggested that the activity should be repeated; that it should be an overnight activity; that more students should participate; and that the activity should be held in different cities. Considering the contributions to students' personal development and their suggestions regarding the implementation process, it is seen that the science theater activities made students love science, provided an opportunity for them to learn by having fun with their peers, and provided them with effective and meaningful instruction, especially in science subjects. It was determined that the students tried to understand the steps in scientific studies by empathising with scientists and that they made progress in this regard. Previous research has revealed that science theater plays are an effective teaching tool in conveying what science is (Amaral et al., 2017), that students have a powerful experience of science with theater (Lanza et al., 2014), and that scientific concepts are understood more deeply and clearly through theater activities in science by associating ideas with prior knowledge (Hendrix et al., 2012).

Based on these results, it can be said that science theater plays are an effective communication tool that demonstrates a meaningful relationship with science through roles that focus on interpersonal interactions and that enables a permanent understanding of the history of science by establishing empathy with scientists. In our study, the science theater plays had a positive and decisive effect in increasing secondary school students' motivation towards science by providing an entertaining and educational environment. Furthermore, the results of our study show that science theater plays are a supportive and effective resource that facilitates educators in drawing attention to scientists and their works.

Limitations and Recommendations

In this study, it was concluded that theater activities created with the life stories of scientists enabled students to concretise knowledge, learn meaningfully, easily and by having fun, and had an increased effect on their attitudes towards the subject of science. The study has some limitations. Based on the results and limitations of the study, some suggestions for further studies are offered.

The research is limited to a participant group of 38 students (20 girls and 18 boys) selected from 7th grade secondary school students studying in the province of Muş, Turkey. Discussions can be conducted by comparing the obtained findings with the current research findings by conducting similar studies on science theater activities at different educational levels and with larger study groups. In addition, new studies can also examine students' socio-economic status, their parents' educational level and economic status, whether students have received education in theater or dramatic arts before, and cultural dimensions. In new studies, interviews can be conducted with students during or at the end of the implementation. By analyzing these interviews, more detailed information about students' perceptions can be obtained. Another important point is that although it is seen in the study that theater has a positive potential in science education, a follow-up study and research on the long-term effects of the implemented programme have not been conducted. Besides, the students' experiences of science theater activities over a four-week period may also have turned out to be insufficient for the desired effect on their views of scientists to occur. Plans can be prepared aimed at conducting experimental studies on the long-term effects of science theater activities on students' attitudes towards science, scientists, and science education, and on the permanence of the obtained results.

Another limitation of the study is that only one of the 11 scientists whose lives and inventions were examined through theater activities was a female scientist. In future studies, the life stories of female scientists should also be included, with an interdisciplinary perspective that brings science and art together. In addition, implementations can be made by using different artistic tools related to the lives of different scientists.

The third limitation of the study is the short implementation period. Accordingly, only important sections of the lives and works of the scientists examined in the study could be dealt with in the theater activities. This period may have been insufficient to create the desired effect. A similar study can be planned with a longer-term experimental study with a control group during the formal education period, and the obtained results can be compared with the results of the current study.

Interdisciplinary projects can be created in schools for students to learn about scientists, their lives, and their works. In these projects, the discussion of science-related issues among students can open new horizons. Students can acquaint themselves with science and scientists more easily with discussions such as these. Important sections of the life stories of scientists can be converted into science theater scenarios and transferred to textbooks. With these scenarios, which students will enjoy reading and can be animated in classroom or out-of-class activities,

more effective and permanent learning can be achieved. In order to create a positive perception and attitude towards scientists and an interest in these careers, trips to various institutions, organisations, and study areas can be organised so that students can become acquainted with science and scientists at a concrete level.

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Examining the Relationship Between Prospective Teachers' Listening Skills, Reading Habits, Effective Speech Self-Efficacy, Writing Dispositions, and Communication Skills: A SEM Approach

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Examining the Relationship Between Prospective Teachers' Listening Skills, Reading Habits, Effective Speech Self-Efficacy, Writing Dispositions and Communication Skills: A SEM Approach

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Abstract

Conceptually, although the effectiveness of communication is generally associated with the development of language skills, studies that model this relationship comprehensively are limited. Based on this, the current study examines the relationship between different linguistic variables (listening skills, attitude towards reading habits, speech self-efficacy, and writing disposition) and their own and communication skills. The study data was collected from 566 prospective teachers in Turkey. As a result of the study, the theoretical structure between linguistic variables and communication skills has been statistically proven. In the model, it was seen that the model-data fit was at a good level (χ^2/df=4.46, *CFI*=.955, *RMSEA*=.078, *SRMR*=.033). The proposed model indicates that listening skills affect communication skills at a medium level and speech self-efficacy at a high level. In addition, writing disposition affects communication skills indirectly through speech self-efficacy, and reading habits affect communication skills indirectly through both listening skills and speech self-efficacy. The highest relationship is between listening skills and speech self-efficacy. Also, the relationships between all the variables are significant. The study supports existing hypotheses about the role language plays in communication skills.

Keywords: Listening skill, Attitude towards reading habits, Effective speech self-efficacy, Writing disposition, Communication skills

Introduction

Communication is not a linear or one-dimensional process. Rather, it is a complex process that includes elements such as observing, listening, revealing critical information, interpreting information, and communicating the information to others (National Research Council [NRC], 2011, p. 9). This process is carried out by "social actors" and community members who undertake linguistic to and communicative tasks in specific settings and areas of action (Council of Europe, 2001). These actors communicate by listening and understanding different types of verbal messages; speaking briefly and clearly; following the process of writing; writing different types of texts for various purposes; and being able to read and understand different texts by adopting strategies suitable for different reading purposes and various text types (Binkley et al., 2012). Therefore, communication is closely related to language skills. Basically, language, which is a communication system, consists of four important skill areas: listening, speaking, reading, and writing. The development of communication skills is both a cause and a natural consequence of the development of these complex interrelated language skill areas with various cognitive, affective, psychosocial, and behavioral dimensions. Coordination and positive transfers between language skill areas contribute to the competence to communicate effectively, which is the ultimate goal of language teaching (Nan, 2018). Considering the opposite, language-based cognitive and affective problems of individuals will have a detrimental impact on their ability to communicate effectively.

Deficiencies in individuals' communication skills have been reported in research conducted in various fields, such as education (Durukan & Maden, 2010; Gökçe & Atanur Başkan, 2012), health (Kumcağız, Yılmaz, Balcı Çelik, & Aydın Avcı, 2011), tourism (Ceylan, 2015), and sports (Özbey & Doğu, 2020); however, the reasons of this problem stemming from language skills have not been sufficiently focused. Although the relationship between

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communication skills of prospective teachers' and affective variables such as empathic tendency (Günönü Kurt, 2019), self-esteem (Derici Cevap, 2017), self-efficacy perception (Küpeli, 2019), attitude (Çakmak, 2019), cognitive and skill-based skills such as problem solving (Koser, 2019), behavioral factors such as the frequency of using technological tools (Kadakal Dölek, 2015) has been investigated, there remains a gap in the literature regarding studies on the relationship between communication skills and all areas of language learning. However, communication is among the critical competencies that teachers use in the classroom. Speaking, listening, reading, writing, and nonverbal communication skills such as sign language are all included in this resource (Güneş, 2007, p. 72).

It is theoretically stated that the development of a language skill will contribute to the development of other language skills, and the ultimate goal of developing these skills is to establish correct and effective communication (Ministry of National Education, 2019). However, there are no comprehensive studies that reveal the extent to which these language skills or affective or behavioral competencies in learning domains are interrelated and support each other's development as a whole. In the literature, there are correlational studies (Bozorgian, 2012; Demir, 2017; Nelson, Benner, Neill, & Stage, 2006) that investigate the relationships within language skill. Studies revealing the relationship of more than one language skills with communication or sub-categories of communication are quite limited in terms of their findings. In this respect, the current study will contribute to the relevant literature on issues such as investigating the linguistic causes of deficiency in prospective teachers' communication skills; developing a deeper understanding of cognitive and affective factors that affect the formation of the multidimensional structure of communication; and revealing the different mechanisms that direct communication and the relationships between these mechanisms.

The current study is more comprehensive than previous studies in the literature in that it includes four learning areas of language (listening, speaking, reading, and writing) and examines different variables such as habits and attitudes, disposition, self-efficacy, and skills towards these learning areas. Additionally, the proposed comprehensive model will benefit the relevant literature, especially theoretically. In this direction, the variables of listening skill, effective speech self-efficacy, attitude towards reading habits, and writing disposition are included in the study, and the relationships between these variables and their relationships with communication skills are modeled.

Conceptual Framework

Communication Skills: Communication skills (CS) explored in this study, are discussed in four sub-dimensions: communication principles and basic skills, self-expression, active listening, non-verbal communication, and willingness to communicate.

The communication principles and basic skills dimension include principles such as being a purposeful and process-based activity, including interconnected elements, realizing within the framework of certain rules, and being influenced by cultural factors. In addition, communication includes many sub-skill areas such as transparency, providing feedback, sending the message in effective ways, empathy, listening, persuasion, leadership, and self-confidence (Bambacas & Patrickson, 2008). Another sub-dimension is self-expression, which is defined as "the free expression of one's feelings, thoughts, talents, attitudes, or impulses" (VandenBos, 2015, p. 955). Non-verbal communication is a type of communication based on coding non-verbal symbols and signs and decoding messages encoded by others (Eaves & Leather, 2018). These elements include facial expression, eye behaviour, bodily communication (postures), proxemics, gaze, tactile / haptics, personal appearance, and vocalic communication (Eaves & Leather, 2018; Matsumoto, Hwang, & Frank, 2016).

"Willingness to communicate" (WTC), which was first conceptualized by McCroskey and Baer (1985) in mother tongue teaching, is "personality-based, character-like predisposition" (p. 1) as well as being sensitive to situational conditions and restrictions (McCroskey & Baer, 1985). Moving the concept to the field of second language teaching, MacIntyre, Clement, Dornyei, and Noels (1998) defined the willingness to communicate as "readiness to enter into discourse at a particular time with a specific person or persons" (p. 547). This element affects people's initiation and maintenance of a communication (Cao & Philp, 2006). This dominant personality structure, which permeates every aspect of an individual's life, has an important effect on "social, educational and organizational achievements" (Richmond & Roach, 1992, p. 104).

Listening Skill: Listening skills (LS) are "one of the basic ways of communicating and learning, which includes understanding, interpreting, and evaluating the message correctly" (Ministry of National Education, 2006). The fact that it is seen as one of the receptive language skills in the literature causes it to be labeled as a passive process. Listening mainly focuses on actively building information rather than receiving and storing information passively

(Rost, 2020). Listening is a special interpretation process that focuses on understanding and contextualizing what is heard as the deliberate communicative expressions of others (Burleson, 2011). This active skill area includes cognitive, affective, behavioral/verbal, behavioral/non-verbal, and behavioral/interactive dimensions (Halone, Cunconan, Coakley, & Wolvin, 1998). Among these, especially the interaction dimension, makes listening an important communication activity. Because the meaning in listening is formed by both the speaker and the listener in communicative contexts (Rost, 2020, pp. 265-266). In this context, effective listening is defined as "the dynamic, interactive process of integrating appropriate listening attitudes, knowledge, and behaviors to achieve the selected goals of a listening event" (Thompson, Leintz, Nevers, & Witkowski, 2004, p. 240). In this context, paying close attention to what is said, asking the other party to explain exactly what you mean, and demanding repetition of ambiguous ideas or statements are among the characteristics of effective listening, which is an interpersonal skill (Klein, DeRouin, & Salas, 2006). According to research, good listening skills lead to greater academic and professional success, as well as increased interaction and relational pleasure (Bodie & Fitch-Hauser, 2010).

Effective Speech Self-Efficacy: Self-efficacy is conceptualized in the social cognitive theory of Bandura (1997), which accepts that people's thoughts and actions arise as a result of dynamic interaction between personal, behavioral, and environmental effects (Schunk & Pajares, 2010, p.668). In this theory, it is argued that the things that individuals think, feel, and believe affect their choices and behaviors; that they can make inferences about the results by examining the adequacy of their behavior themselves; and that they can mentally keep the belief that they have developed in terms of their ability to guide their next behavior (Bandura, 1997). Self-efficacy is a central motivational variable that can affect task preference, attempt, patience, purposefulness, flexibility, and accomplishment (Schunk, 1995; Schunk & Pajares, 2010). This motivational variable has been defined by Bandura (1997) as "beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments" (p. 3). Based on this definition, speech self-efficacy can also be defined as the belief in one's own knowledge, skill, and competence level in order to organize, execute, and control a series of operations necessary for the success of the speech act.

People with low self-efficacy beliefs in a certain field "perceive difficult tasks as personal threats and tend to lose faith in their abilities easily because they focus on their own personal deficiencies and the obstacles, they face rather than how they can successfully perform the task" (Dörnyei & Ushioda, 2011, p.16). People with high self-efficacy approach difficult tasks not as threats to be avoided, but as challenges to be overcome (Schunk & Pajares, 2010, p.670). These individuals also tend to have lower anxiety levels, use more flexible learning strategies, and show higher interest in academic tasks (Mills, 2014, p.9). However, they have more control over their own learning processes (Pintrich, 1999; Zimmerman, Bonner, & Kovach, 1996). In terms of speaking, people with high self-efficacy have better speaking skills (Leeming, 2017) and people with low speech self-efficacy have higher speaking anxiety (Gürsoy & Karaca, 2018).

Attitude towards Reading Habit: Attitude is "the way a person consistently thinks or feels about something or is disposed to react to it; often used with reference to how a person values something, i.e., how far he is for or against it" (Sutherland, 1995, p. 40). "Attitudes can be influenced by and can influence beliefs, affect, and behavior in relation to the attitude object" (Matsumoto, 2009, p. 59). Reading attitude is defined as "a set of acquired feelings about reading that consistently predispose an individual to engage in or avoid reading" (Conradi, Jang, & McKenna, 2014, p. 154) and is accepted as one of the main factors affecting an individual's reading intention (Mathewson, 1994). Developing an attitude toward reading habit (RH) allows an individual to continue reading activity permanently and frequently throughout their lives (Odabaş, Odabaş, & Polat, 2008).

Writing disposition: Disposition is "a recurrent behavioral, cognitive, or affective tendency that distinguishes an individual from others" (VandenBos, 2015, p. 323). These repetitive tendencies, which direct the person's activities such as thinking, feeling, acting, and reacting (Matsumoto, 2009, p. 167), are related to internal factors rather than external factors (Sutherland, 1995, p. 129). Driscoll and Wells (2012) conceptualized these personal internal qualities as "habits of mind." In this context, they consider disposition in relation to factors such as context, the process and time of learning as well as personal characteristics, and draw attention to the fact that tendencies are a concept that determines how these characteristics are used or applied rather than intellectual characteristics such as knowledge or skills. Within this theoretical framework, writing disposition (WD) is a comprehensive term that encompasses emotional qualities such as writing "self-discipline, perseverance in the face of difficulties, tolerance of ambiguity, autonomy, willingness to take risks, motivation, self-efficacy, and interest" (Piazza & Siebert, 2008, p. 275).

Piazza and Siebert (2008) listed the critical affective dimensions, which constitute the dispositional aspect of writing, as confidence, persistence, and passion. Of these elements, confidence refers to an individual's belief in

his writing ability and does not doubt his effectiveness as a writer. Persistence reflects the willingness of the author to devote time to writing and to continuous effort. Passion can be conceptualized as an intense urge or desire to write, a strong commitment to writing, and the pleasure of writing over and over again (Piazza & Siebert, 2008).

In this conceptual framework, the current study aims to determine the link between linguistic variables and the effects of these variables on CS. In this context, the hypotheses of the study and the theoretical and empirical background supporting these hypotheses are expressed in the following section:

Hypothesis 1: There are positive relationships between the RH with LS and ESS.

Listening and reading, sharing similar decoding processes, are important tools for acquiring linguistic knowledge and developing linguistic understanding (Hoover & Gough, 1990). The mental skills required to understand and interpret what is heard can be developed through reading or thinking about what is read. Competencies gained through reading can be expanded by listening studies. In this respect, reading and listening skills are complementary to each other (Göçer, 2019). This link between reading and listening, both receptive skills, has been reported in several studies (Diakidoy, Stylianou, Karefillidou, & Papageorgiou, 2005; Hoover & Gough, 1990; Powell, 1999; Wolf, Muijselaar, Boonstra, & Bree, 2019).
Reading, which is a graphical system, and speaking, which is a phonological system, are interrelated (Arıcı, 2012; Gibson, 1972). When a person who brings grammatical information to reading can decode graphic elements and know the punctuation marks, he can automatically transfer this information to speech (Gibson, 1972, pp. 9-12). Speaking is one of the tools people use to share the information they have acquired through reading with others. Reading affects speaking positively in terms of both pronunciation and content. Therefore, being a good reader is a necessity for successful speaking (Arıcı, 2012, p. 12).

There are correlational studies in the literature that prove these theoretical relationships (Demir & Börekçi, 2021; Tekşan & Çinpolat, 2018; Oğuz, 2009). In one of these, Demir and Börekçi (2021) determined that the number of books at home and the amount of daily reading of secondary school students were related to their perceptions of verbal expression self-efficacy. In another study, Oğuz (2009) found that one of the reasons for the prospective teachers' inadequacy in verbal expression skills was that their reading habits were not sufficiently developed. Tekşan and Çinpolat (2018) revealed that there is a positive and significant relationship between prospective teachers' attitudes towards speaking self-efficacy and reading habits.

Hypothesis 2: There is a positive relationship between WD and ESS.

There is a reciprocal relationship between speaking and writing, which are productive skills (Kantor & Rubin, 1981; Kroll, 1981; Moxley, 1990; Nan, 2018). Both skills are based on a common cognitive skill set that includes working memory, linguistic cohesion, and morphological knowledge (Shanahan, 2006, p. 180). The mechanisms of speaking and writing, which enable the construction of grammar forms, are related. Although the outcomes of both skills are different, they use similar syntactic representations (Cleland & Pickering, 2006). Speaking helps a person become familiar with language material, make language production a fluent process, and use language skills. This, in turn, contributes to the person's ability to think quickly and express himself in a logical way, which has a positive effect on his writing skills (Nan, 2018). Especially during social conversations, many skills, such as giving information about a subject chosen by the speaker or shaping a message according to a certain audience, are strategies that he can later use in explanatory and persuasive writing (Weissberg, 2006).

Studies in the literature (Carlisle, 1996; Dockrell & Connelly, 2016; Motallebzadeh, Ahmadi, & Hosseinnia, 2018) also support this relationship. Motallebzadeh et al. (2018) found that EFL learners' speaking and writing skills are highly correlated. The study conducted by Dockrell & Connelly (2016) with primary school students revealed a significant relationship between students' forming oral and written sentences. Carlisle (1996), in his study in which students with learning difficulties were included in the sample, revealed "there was a moderately strong relationship between the ability of children to produce morphologically complex words in a verbal task and the accuracy of using morphological forms in their stories" (p. 69). This study was noteworthy as it showed the relationship between speaking and writing, and that students' verbal language errors explained many of their morphemic errors in writing.

Hypothesis 3: There are positive relationships between LS, ESS, and CS.

Listening is a key skill in acquiring other language skills (Doğan, 2012). By listening, individuals learn how to behave, distinguish between appropriate and inappropriate behavior patterns, and tailor their actions to a specific communication context (Brownell, 2010, p. 142). Therefore, listening is a prerequisite for communication. As a

matter of fact, the findings that the failure to acquire the right listening habit is one of the challenges faced in daily communication in daily life supports this thesis (Yalçın, 2002). "Educational research has consistently shown that many students lag behind in verbal communication and literacy development due to a lack of LS" (Rost, 2020, p. 265). It is pointed out in studies in the literature that listening is an important component of communication (Brownell, 2010; Cooper, 1997; Davenport Sypher, Bostrom, & Hart Seibert, 1989; Doğan, 2012; Kline, 1996; Villaume & Bodie, 2007). People reach the competence of listening by communicating, and they achieve their communication goals by listening (Cooper, 1997).

Speaking has two basic functions. The first function is expressed as transactional (transferring information and exchanging services) and the second is interpersonal (establishing and maintaining social relationships) (Thornbury, 2005). We can assume there is a theoretical relationship between ESS and communication, especially since the social cognitive theory, in which the concept of self-efficacy is shaped, emphasizes the interaction of personal, behavioral, and environmental dimensions; and the motivation, effort, and continuity elements of self-efficacy are also important in initiating and maintaining communication.

This theoretical relationship has also been proven by correlational studies (Bria & Jouybar, 2016; Demir, 2017). In one of them, Bria & Jouybar (2016) found in their study that there was a statistically significant relationship between EFL students' desire to communicate, language competence, and verbal competence. In another study, Demir (2017) found that listening accounts for 57% of speaking self-efficacy.

Hypothesis 4: There are positive indirect relationships between RH and WD and CS.

Reading is a purposeful activity that has a social and an individual aspect (Schwab & Hughes, 2010). Its being a social activity makes it one of the more important communication skills. As a matter of fact, Russell (1951) states that reading is not only the acquisition or absorption of ideas, but also communicating with others. Thus, developing reading skills affects both the attitude towards communication and CS. He points out that reading is a skill that is more related to communication situations in the social environment and contributes to socialization (Russell, 1951). Reading is also a communication activity in terms of rhetoric. During this process, both sending and receiving readers gain insights into how communication works (Tierney & Shanahan, 1991). Phillips (1978) states that "reading is communication when the materials reflect reality, and the reader develops skills and strategies parallel to the decoding process used in real life" (p. 284). For this reason, he argues that reading skills and verbal activities should be integrated (Phillips, 1978).

There is a purpose-to-tool relationship between writing and communication. While effective communication is one of the most important purposes of writing, writing has always been one of the most powerful tools of communication (Kansızoğlu, 2019). In addition, factors such as confidence, self-efficacy, self-regulation, motivation, and persistence in WD suggest there may be a theoretical relationship between CS and WD (Piazza & Siebert, 2008).

It is accepted that reading and writing are two skill areas that have common, similar, or overlapping operations, processes, and sub-skills (Abbott, Berninger, & Fayol, 2010; Grabe, 2003; Schoonen, 2019; Shanahan & Lomax, 1986; Tierney & Pearson, 1983; Tierney & Shanahan, 1991). These two skills, which are a constellation of cognitive processes at various language levels (phonemic, orthographic, semantic, syntactic, pragmatic), depend on the same information representations, cognitive processes, contexts, and contextual constraints, so their development processes are parallel to each other (Fitzgerald & Shanahan, 2000). Both skills are acts of composition. People who read and write perform repetitive processes involving self-respect and perceptions of each other's goals (Tierney & Pearson, 1983).

In the literature, there are studies showing the relationship between RH, WD and CS (Eroğlu, 2013; Lee, 2005; Saracaloğlu, Yenice, & Karasakaloğlu, 2009; Ünal, 2019). For example, Ünal (2019) determined that there is a significant, positive and weak relationship between the attitudes towards reading habits and writing dispositions of gifted students at the secondary school level. In another study, Eroğlu (2013) concluded that there are some deficiencies and inaccuracies in the writings of prospective teachers who do not have reading habits in terms of intellectual and conceptual richness, use of language, spelling, and punctuation. Lee (2005), as a result of his study with Taiwanese university students learning English as a foreign language, revealed that voluntary reading is a significant predictor of writing performance and writing quality. In a study conducted by Saracaloğlu et al. (2009) with prospective classroom teachers, it was found that there was a positive and low-level significant relationship between teacher candidates' reading interests and communication skills in the competence sub-dimension.

Method

Research Design

The aim of the study was to reveal the level of explanation of the CS of the linguistic variables (LS, ESS, RH, WD) that were thought to affect the CS and the relationships between these skills. Fraenkel, Wallen, & Hyun (2012) described studies conducted to determine the relationships between two or more variables and explore their cause-effect effects as relational research. Therefore, the current study was a relational screening model. In this context, structural equation modeling, which reveals the causality between observed and latent variables, was used in the study to test a theoretical model (Schumacker & Lomax, 2015).

Participants

The participants of the study were prospective teachers studying at a state university in Turkey. Within the scope of the research, data was collected from 618 participants using the convenience sampling method. This number was reduced to 566 after the data was cleaned due to missing data and outlier values. Descriptive statistics for the participants are included in Table 1:

Table 1. Demographic/statistical information about the participants

Variables	n	%
Gender		
Female	411	72.6
Male	155	27.4

Note. N=566

Data Collection Process and Tools

Before starting the data collection process in the study, necessary permissions were obtained from the researchers who developed the measurement tools used and from the relevant institution to collect data. The data collection tools were delivered by the researchers as a paper-pencil test and were carried out face-to-face, which took approximately 75-90 minutes to complete. Information about the measurement tools used in the study is presented below.

Communication Skills Scale: The Communication Skills Scale was developed by Korkut-Owen and Bugay (2014) to determine the extent to which individuals possess qualities that enrich communication. For this purpose, item samples in the measurement tool were presented as *"When I talk to someone, I check if I understand them correctly before I answer them", "I keep in mind that the words chosen are also important when texting"* The measurement tool was developed by the researchers with four dimensions, measured by 25 five-point Likert type items. The four dimensions were "principles of communication and basic skills," "self-expression," "active listening and non-verbal communication," and "willingness to communicate." Researchers conducted exploratory and confirmatory factor analyses to establish measurement tool's the construct validity. They concluded from the exploratory factor analysis (EFA) that the four-factor solution explained 45.95% of the variance and that this variance ratio was sufficient. They confirmed structure with the fit indices ($\chi^2/df = 1.40$; CFI = .91, IFI = 0.91, TLI = .90, RMSEA = .046, SRMR = .068) obtained from the confirmatory factor analysis (CFA) for the four-factor structure. The reliability of the scale was demonstrated by examining the relationship of the scale with similar scales, the differences between the groups of the scores obtained from the sub-dimensions, test-retest correlations, and Cronbach's alpha values.

Listening Skill Scale: The Listening Skill Scale developed by Kuzgun and Cihangir (2000) was revised by Cihangir Çankaya (2012). Cihangir Çankaya (2012) noted that LS, which are defined as the skills of asking open or closed questions, observing the speaker, encouraging, reflecting content, summarizing, and reflecting emotion, can be measured with the scale. Sample items to measure LS include:*"I can understand the feelings and thoughts of the other person while listening and convey that I understood to him/her through my words and/or nonverbal actions," and "I have difficulty in making eye contact with the other person while listening."* The measurement tool was revised by the researcher as two dimensions with 15 items on a five-point Likert scale, namely "effective listening behaviors" and "ineffective listening behaviors." By exploratory and confirmatory factor analysis, Cihangir Çankaya (2012) obtained evidence of the construct validity of the measurement tool. The researchers concluded from EFA that the two-factor structure explains 44.65% of the total variance, and that the structure has

two factors. They stated that the model data fit was at a good level according to the fit indexes (χ^2/df = 1.59; CFI =.98, NFI= 0.96, AGFI =.97, RMSEA =.04) they had obtained from CFA. The reliability of the scale was demonstrated with Cronbach's alpha values obtained as.82 for the effective listening behaviors sub-dimension,.76 for the ineffective listening behaviors sub-dimension, and.83 for the whole scale.

Effective Speech Self-Efficacy Scale: In order to be used in the study, it was aimed to choose the appropriate measurement tool by examining the items and validity-reliability results of the measurement tools available in the literature. Although the "Effective Speech Scale" developed by Çintaş Yıldız and Yavuz (2012) was deemed appropriate, the fact that its items were prepared as a checklist led the researchers of this study to develop a new measurement tool. In order to measure ESS, the items and dimensions of the "Effective Speech Scale" were taken as a basis, and a 36-item Likert-type draft scale was prepared by literature review. In the scale development study, 553 individuals studying at the education faculty of a state university were included in the sample using the convenience sampling method. First, data for EFA (n = 351) were obtained. According to the results obtained from EFA, a scale implementation (n = 202) was carried out for CFA. In the development of the measurement tool, the analyses were carried out using the "haven" (Wickham & Miller, 2020), "psych" (Revelle, 2020), "REdaS" (Maier, 2015), "MVN" (Korkmaz, Goksuluk, & Zararsiz, 2014), "lavaan" (Rosseel, 2012), "semPlot" (Epskamp, & Stuber, 2014), and "sirt" (Robitzsch, 2020) packages in the R software (R Core Team, 2020). The adequacy of the sample size for EFA was tested by the Kaiser-Meyer-Olkin test (KMO). The analysis was continued as the KMO was obtained as.93 indicated that the sample was sufficient (Tabachnick & Fidell, 2013). Variance-covariance matrices obtained as a result of Bartlett's test ($\chi 2$=3364.102; sd=210; p<0.001) were found to be suitable for factor extraction (Çokluk, Şekercioğlu, & Büyüköztürk, 2010). EFA, the results of which are given in Appendix A, was carried out using the principal factor solution method and promax, which is an oblique rotation method. It is seen that all of the items on the scale except M2 (*"I can clear my speech from unnecessary details"*) have a factor load above the.30 limit. Although the M2 item has a low factor load (.29), it was not removed from the item set because it was considered theoretically important by the researchers and was not far below the limit value.

It was observed that the four-factor structure, which explains 49% of the total variance, is also suitable for theoretical foundations. First, in order to verify the four-factor structure, we tested the normality assumption using Mardia's univariate and multivariate normality tests. The skewness and kurtosis values in both univariate and multivariate normality were statistically significant (p <.001) and normality was not achieved. For this reason, CFA was continued with the WLSMV method. In the CFA model, see Appendix B, there are path coefficients and errors related to observed variables, and correlations between latent variables. When the fit indices obtained from the model are examined ($\chi 2$= 233.532, df=183, p=0.007, $\chi 2$/df=1.27; CFI=.958; TLI=.951; RMSEA=.037; SRMR=.049), it can be said that the model-data fit is at a perfect level.
In order to determine the reliability of the scale, Cronbach's alpha internal consistency coefficients were estimated. It was obtained as.80 for the presentation self-efficacy dimension,.82 for the vocal self-efficacy dimension,.75 for the style and expression self-efficacy dimension, and.86 for the audience consideration dimension. A stratified alpha of.92 was calculated for the whole scale. According to these values, it can be said that a valid and reliable "Effective Speech Self-Efficacy Scale" has been developed.

Attitude Scale Towards Reading Habits: Susar Kırmızı (2012) determined the attitude levels of pre-service teachers towards reading with the Attitude Scale Towards Reading Habits. For this purpose, the items in the measurement tool can be exemplified as "*I have a guilty conscience the day I sleep without reading*," "*Instead of seeing reading as a leisure activity, I make time to read books*." The researcher developed 34 items in three dimensions as "*attitudes towards meeting the learning needs and having fun*," "*attitudes towards the meaning and indispensability of the habit of reading books*," and "*attitudes towards the development of book reading habits*" using a five-point Likert type measurement tool. As a result of the EFA the researcher conducted to determine the structure of the measurement tool, she estimated the variance explained by the scale three dimensions as 57.92 and stated that the three dimensions were appropriate. The Cronbach alpha reliability coefficients calculated to determine the reliability of the measuring tool were found to be.78 for the first dimension,.88 for the second dimension, and.72 for the third dimension.

Writing Disposition Scale: The "Writing Disposition Scale" developed by Piazza and Siebert (2008) was adapted into Turkish by İşeri and Ünal (2010). "*I have the skills I need to write well*" and "*Writing gives me great pleasure*" are examples of items on the scale developed to measure individuals' writing skills. The measurement tool was adapted by the researchers as in the original, consisting of three dimensions: "trust", "continuity", and "passion" with 21 five-point Likert type items. Concerning the construct validity of the measuring tool, researchers carried out EFA and CFA. They concluded from EFA that the three-factor structure explained 46.26% of the variance and that this variance rate was sufficient. They verified the structure with the fit indices they obtained from CFA

for the three-factor structure (χ^2/df= 1.243; CFI = .998, GFI= 0.996, AGFI= 0.992, NFI =.992, RMSEA =.008). The researchers found the Cronbach Alpha coefficients for reliability at.874 for the whole scale,.882 for the passion dimension,.734 for the confidence dimension, and.639 for the continuity dimension. Since the validity and reliability study of the measurement tool was carried out with primary school students, CFA was applied to the structure specified by İşeri and Ünal (2010) with the study group data to use the measurement tool in this study. For the analysis, the "haven" (Wickham & Miller, 2020), "MVN" (Korkmaz et al., 2014), and "lavaan" (Rosseel, 2012) packages were used in the R software. The Mardia test was used to validate the normality assumption, and it revealed that univariate and multivariate normality were not achieved (p.001). For this reason, the WLSMV estimation method was used for CFA. As in the adaptation study for the three-factor structure, when the modification suggestions (four modifications with estimated parameter changes above.10) presented by the analysis regarding the error values of the items within the same dimensions were made, it was observed that the fit indices indicated the acceptable level for model-data fit (χ^2/df = 3,202; CFI =.911, RMSEA =.062, SRMR=.047). In addition, the standardized path coefficients of the observed variables are between.49 and.96, and the absence of error values greater than.76 indicates that the structure is verified. For this reason, it can be said that the data obtained from the measurement tool are suitable for use in this research.

Data Analysis

In the analysis of the data, the "stats" (R Core Team, 2020), "haven" (Wickham & Miller, 2020), "MVN" (Korkmaz et al., 2014), "Hmisc" (Frank & Harrell, 2020), "lavaan" (Rosseel, 2012), and "semPlot" (Epskamp & Stuber, 2014) packages were used in the R software. Before the analysis of the data obtained, 21 individuals who left the whole scale blank in one or more of the measurement tools given in the application and had missing data in their demographic information were excluded from the data set. In addition, considering the Mahalanobis distance coefficients in terms of variables used in the model, the versatile extreme values (n = 31) were removed from the data set because they do not belong to any group systematically. Whether the data met the assumption of normality was examined by Mardia's test of normality. It was found that both univariate and multivariate normality were not provided (p <.001). Since a normal distribution was not provided to determine the relationships between variables, the Spearman rank difference correlation was examined. Since the WLSMV method is recommended to be used when the data does not show a normal distribution (Finney & DiStefano, 2006), the structural equation model (SEM) established in this study to reveal the relationships between variables was established with the WLSMV method.

Results

Before the structural equation modeling, the Spearman rank difference correlation was examined in order to obtain preliminary information about the relationships between variables and to form a basis for modeling. The results obtained are given in Table 2.

Table 2 shows the Spearman rank difference correlation coefficients for variables

Variables	M	SD	1	2	3	4	5	6	7	8
CS1	4.11	0.48	1.00							
CS2	4.10	0.63	.43*	1.00						
CS3	4.16	0.54	.33*	.65*	1.00					
CS4	3.92	0.61	.28*	.66*	.63*	1.00				
RH	3.68	0.56	.58*	.19*	.26*	.25*	1.00			
WD	2.98	0.76	.66*	.24*	.27*	.29*	.16*	1.00		
LS	3.93	0.52	.63*	.44*	.52*	.51*	.25*	.06	1.00	
ESS	3.93	0.50	.59*	.63*	.66*	.58*	.28*	.33*	.43*	1.00

Note. *N*=566; **p*<.001; *CS1 = communication principles and basic skills; CS2 = self-expression; CS3 = active listening and nonverbal communication; CS4 = communication willingness.*

The variables in Table 2 were obtained with the average scores of the relevant measurement tools and dimensions (for CS). When the correlation coefficients were examined, there was a positive relationship among all variables. If the coefficients are smaller than.30, it is at a low level; when they are between.30 and.49, it is at a medium level; and when they are.50 and larger, there is a high level of correlation (Cohen, 1988). All coefficients were statistically significant except for the correlation coefficient between listening and writing variables. For this reason, no relationship was established between listening and writing variables in SEM.

A structural equation model, which is assumed to predict the CS of LS, ESS, RH, and WD, was established under the name of Model 1. On a suggestion by the program, two modifications were made regarding the established model, which were also theoretically related. One of the modifications was the covariance between the error values of ESS and LS. In the model, it was seen that the endogenous variables of ESS and LS were explained only by the exogenous variables of WD and RH. However, it is known that many environmental factors can affect both speaking and listening. Listening and speaking are two interrelated and complementary language skills (Göçer, 2019; Nan, 2018). A person learns to speak by listening; speaking improves the acquisition and internalization of new information and provides a creative use of language. It provides a large number of language materials to be used in listening and speaking (Nan, 2018). For this reason, new exogenous variables were added to the model in order to reduce the unexplained part (error) of the speaking and listening endogenous variables.

For the purposes of this study, different variables were not focused on. Therefore, the proposed modification between the errors of the two variables is included in the model. Another modification suggestion is among the errors of the second (self-expression) and fourth (willingness to communicate) dimensions of the CS scale. Given that both errors belong to dimensions for measuring the same skill, adding the modification to the model was considered suitable. Studies revealing the relationship between self-expression and willingness to communicate variables (Baki, 2018; Karadağ, 2019) constitute the rationale for the proposed modification. Model 2: The full latent variable model created with the suggested corrections is presented in Figure 1. The fit coefficients of Models 1 and 2 and the cut-off values that were acceptable in the literature and indicate good fit are given in Table 3.

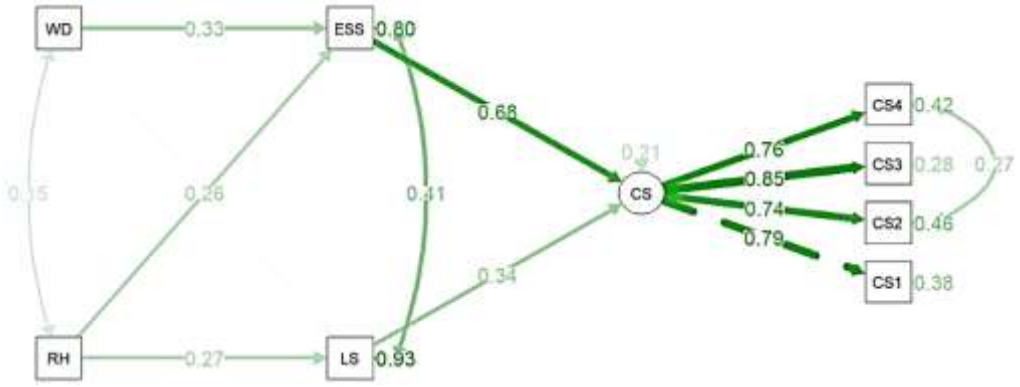

Figure 1. Model 2 full latent variable model

*Note. *WD = Writing disposition; RH = Reading habit attitude; ESS = Effective speech self-efficacy; LS = Listening skill; CS = Communication skill; CS1 = communication principles and basic skills; CS2 = self-expression; CS3 = active listening and nonverbal communication; CS4 = communication willingness*

Table 3 contains information on cut-off values and model differences for comparison of full latent variable models. Model 2 was chosen as the full latent variable model, confirming the theoretical structure due to the significant differentiation of Model 2 as a result of the difference tests ($\Delta\chi 2(2) = 154.65, p < 0.01; \Delta CFI > 0.01$).

Table 3. SEM fit indices and cut-off values

	χ^2	df	χ^2/df	CFI	RMSEA [90% CI]	SRMR	$\Delta\ \chi^2$	Δdf	ΔCFI
Good fit			-	≥.95	≤.06 [≤.10]	≤.06			
Acceptable fit			-	≥.90	≤.08 [≤.10]	≤.08			
Model 1	221.60	17	13.03*	.823	.146 [.129-.163]	.068	-	-	-
Model 2	66.95	15	4.46*	.955	.078 [.060-.098]	.033	154.65	2	-.132

Note. *p<.001 (Browne & Cudeck, 1993; Hu & Bentler, 1995; Kline, 2015)

When Model 2 fit indices are compared with cut-off values in the literature, it is seen that CFI and SRMR values indicate perfect fit, while RMSEA values show acceptable fit. The value of χ^2 / df was statistically significant (p <.001). This value showed that there was a significant difference between the theoretical model and the established model. However, as the sample size increased, the significance increased, so it rarely points out that there was no difference (Weston & Gore Jr, 2006). For this reason, it was accepted that the model fits the data. The direct and indirect effects of Model 2 are included in Table 4.

Table 4. Path coefficients, error variances, and covariances for the Model 2 latent variable model

Parameters	Unstandardized	SE	Standardized
Direct effects			
WD → ESS	.211	.028	.328*
RH → LS	.248	.039	.267*
RH → ESS	.229	.040	.263*
ESS → CS	.527	.033	.682*
LS → CS	.247	.029	.341*
CS → Communication principles and basic skills	.376	.046	.788*
CS → Self-expression	.465	.070	.736*
CS → Active listening and non-verbal communication	.457	.050	.850*
CS → Willingness to communicate	.464	.066	.765*
Indirect effects			
WD → ESS → CS	.295	.016	.224*
RH → ESS → CS	.321	.023	.180*
RH → LS → CS	.151	.012	.090*
Residual variances			
LS	.248	.012	.926*
ESS	.189	.014	.798*
CS	.030	.005	.212*
Communication principles and basic skills	.086	.007	.379*
Self-expression	.183	.016	.459*
Active listening and non-verbal communication	.080	.007	.278*
Willingness to communicate	.153	.013	.415*
Covariances			
RH ↔ WD	.063	.018	.149*
ESS ↔ LS	.088	.011	.408*
Self-expression ↔ Willingness to communicate	.044	.010	.266*

Note. *p<.001

When Table 4 was examined, it was seen that all path coefficients, error variances, and covariances between variables were significant. There are low level positive and significant relationships between RH, LS, and ESS, at.267 and.263, respectively. These results showed that the first hypothesis of the research was confirmed. The second hypothesis, which stated that there was a positive relationship between WD and ESS, was confirmed by the moderately positive (.328) relationship between the variables. There was a moderate and highly positive relationship between LS and ESS, which was thought to directly affect CS, as.341 and.682, respectively. This relationship revealed that the third hypothesis of the research was also confirmed. Finally, when the indirect relationships between the RH and WD and CS were examined, it was found that WD affected CS through the effective speech variable, while the RH affected CS through both ESS and LS. These effects were found to be low-level positive, at.224,.180 and.090, respectively, and it was determined that the fourth hypothesis was also accepted.

Discussion

In this study, it is aimed to investigate the connections between the four language systems that are stated to be related to each other and developed as "overlapping and parallel waves rather than in discrete, sequential stages" (Berninger, 2000, p. 66) and to reveal the relationship of these linguistic variables with communication. The results of the study, in which the relationship expressed conceptually in the literature was tested with a comprehensive model, are as follows:

The Effect of RH on LS & ESS

The Model 2 established in the study showed that the RH had a weak direct significant ($r = .267$, $p < .05$) effect on the LS. Studies revealing the relationship between LS and reading (Demir, 2017; Diakidoy et al., 2005; Wolf et al., 2019) also support this finding. In one of these studies, Demir (2017) revealed that the habit of reading books and the time allocated for reading books have a significant effect on the development of LS. In another study, Diakidoy et al. (2005) found that listening and reading scores were significantly correlated at all four different grade levels in primary and secondary school, and the relationship between the two variables was

stronger as competence in decoding processes improved. In another study, Wolf et al. (2019) concluded that "reading comprehension explained 34% of the variance in listening comprehension, and listening comprehension explained 40% of the variance in reading comprehension" (p. 1747). Studies show that vocabulary was an especially important factor that improved this relationship. Because vocabulary is an important element, which contributes to understanding what is both read and heard (Wolf et al., 2019; Wolfgramm, Suter, & Göksel, 2016). Exposing themselves to practical and contextual words through listening improves their vocabulary in reading, which positively affects reading comprehension (Nan, 2018).

In Model 2, one of the variables in which the RH has a positive direct effect was speech self-efficacy. This effect was weak but significant, according to the established model ($r = .263$, $p < .05$). It was seen in studies conducted on similar samples that obtained findings that matched the current study. Among these, the study by Tekşan and Çinpolat (2018) reported that there was a positive and significant relationship ($r = .515$) between prospective teachers' reading habits and their perceptions of speech self-efficacy. The significant relationships between variables, such as the time allocated for reading (Demir, 2017), the frequency and amount of reading (Hayran, 2020), and the self-efficacy of speech were determined. The studies in which it was conducted also support the results of the current research.

The Relationship Between WD and ESS

WD was found to have a moderate effect ($r = .328$) on ESS in Model 2. The results of some studies (Carlisle, 1996; Dockrell & Connelly, 2016; Hubert, 2008; Motallebzadeh et al., 2018) in which the relationship between speaking and writing was reported, support these findings. Although these studies reveal the relationship between the skill dimension, not the writing disposition, and speaking, their findings are remarkable. In one of these studies, Motallebzadeh et al. (2018) found that there is a high level of correlation between the speaking and writing skills of EFL students. Hubert (2008), in his study with university students learning Spanish as a foreign language, revealed that this correlation is weak at the beginner level and much stronger at intermediate and advanced levels. Similar findings showing the relationship between speaking and writing were found in studies conducted by Carlisle (1996) with students with learning difficulties, and with primary school students by Dockrell & Connely (2016). This is also important in terms of showing that the relationship between speaking and writing is not limited to the results obtained from a particular sample group.

The Relationship Between LS, ESS, & CS

Model 2 demonstrates that LS has a moderate effect ($r = .341$) on CS. This finding coincides with the results of some studies in the literature (Davenport Sypher et al., 1989; Şimşek, 2019). In their study, Davenport Sypher et al. (1989) found that various aspects of listening (selective listening, short-term listening, short-term listening with rehearsal, lecture listening, interpretive listening) and each of the skills related to communication (cognitive differantiation, persuasive arguments, self-monitoring, perspective-taking) revealed medium and high positive correlations. Similarly, Şimşek (2019) found a significant positive correlation between effective listening and mental and behavioral communication levels, and ineffective listening and mental, affective, and behavioral communication levels. Considering these results, it can be said that one of the factors determining the quality of communication is effective LS.

According to Model 2, ESS has a strong influence on CS ($r = .682$). This result is similar to the findings of studies in the literature (Baki, 2018; Bria & Jouybar, 2016; Motallebzadeh et al., 2018) that reveal the relationship between speech as a whole and CS. Baki (2018) found in his study that there was a significant positive correlation between speech self-efficacy and CS of Turkish prospective teachers. Similar findings were obtained in the study of Bria and Jouybar (2016). In this study conducted with EFL students, a statistically highly significant relationship ($r = .786$) was found between the willingness to communicate and the students' oral fluency. Accordingly, it was determined that those who have a higher level of willingness to communicate express themselves more fluently. Finally, Motallebzadeh et al. (2018) determined that the relationship of speech with communication is higher ($r = .68$) than its relationship with other 21st century skills (critical thinking, interpersonal skills, technology literacy, and leadership skills).

Model 2 found a moderately significant ($r = .408$; $p < .05$) relationship between ESS and LS. In the study, Demir (2017) revealed that there was a high level of relationship between ESS and LS.

Indirect Relationships Between RH, WD, and CS

The Model 2 showed that WD affects CS with the effective speaking mediator variable and the effect was weak (r = .224). Motallebzadeh et al. (2018) found that communication affects writing scores moderately (r = .35) in the model they put forward as a result of their study. Gücükkılınç (2017) revealed that primary school students who have difficulty with written expression show lower performance in dimensions such as communicating, socializing, and taking part in activities. These two studies showed the effect of writing activity on CS.

In Model 2, it was determined that the RH affects CS at a weak level positively and significantly (r =.18; r =.09, respectively) on ESS and LS. In the study conducted by Saracaloğlu et al. (2009), it was found that there is a positive and weakly significant relationship between prospective teachers' reading interests and the competence sub-dimensions of their CS. Kaynar (2007) found in his study with high school students that the effect of reading habits on improving vocabulary was positively reflected in communication and improved students' CS. Attitude can affect the reading skill level that a person will ultimately acquire through its effect on factors such as participation and practice (McKenna, Kear, & Ellsworth, 1995). Communication was also a skill area that required a certain level of participation and practice. Therefore, a person who reads books regularly and has a positive attitude towards reading can find the opportunity to put it into action through listening and speaking in communication environments. The fact that the RH was a significant predictor of CS can be associated with this situation.

A remarkable point the Model 2 was that ESS functioned as a mediator variable in the relationship between both reading habit and WD and CS. Other studies that investigated the relationship between speaking and communication (Baki, 2018; Bria & Jouybar, 2016) found the role of this mediator variable and the critical function of speech in communication became more understandable.

The model also found a low-level significant relationship (r =.149; p <.05) between RH and WD, which was related to CS. These findings were consistent with the findings of Ünal (2019) and Baş & Şahin (2013). In addition, the results obtained in the present study support the findings of studies (Bolat, 2019; Eroğlu, 2013; Lee, 2005) in which the relationship between dimensions such as writing self-efficacy and writing skills and reading habits was reported. It would be appropriate to discuss the possible reasons for this relationship on the basis of the theoretical connection between reading and writing, which was the umbrella concept of two variables. Both skills are developmental, mostly based on similar knowledge and communicative processes in which there is a transfer of knowledge and skills (Shanahan, 2020).

All these findings reveal the importance of linguistic skills in improving prospective teachers' communication skills. Therefore, a teacher education isolated from language skills will have a negative impact on teachers' communication activities in and out of the classroom.

Limitations and Future Directions

In this study, a model that reveals the relationship between language and CS was tested. Since there are many linguistic variables that can affect communication processes, future research may focus on variables that are not tested in this model. These include various dimensions of listening, speaking, reading, and writing, such as metacognition, motivation, anxiety, and self-regulation. The effects of these factors alone or as synergistic effects on CS or communication-related sub-skill areas can be investigated. Bodie & Fitch-Hauser (2010) stated that if listening is a critical component of communication, it is necessary to discover how the structures that affect communication affect listening, and thus the role and function of listening in the communication process should be further defined. This recommendation can also be generalized to other language skill areas. In this context, the effects of various factors such as personality structure (Sims, 2017), culture (Collier, 1986), and gender (Marsnik, 1993) on language skills can be analyzed comparatively.

The participants of this study were prospective teachers. In future studies, the generalizability of the model tested in this research to different samples can be investigated. Since it was not included among the hypotheses, the role of participants' demographic and socioeconomic differences in different CS levels was not emphasized in the study. Gender is one of these variables. The correlation coefficients in the model established in this study, where the study participants were mostly women, and the coefficients in the model established in a study where male participants are predominant or both genders are equivalent may differ. This situation may be subject to investigation.

In addition, age-dependent change in the relationship between language skills can be determined by longitudinal studies. Two or more models tested in the same study can be analyzed comparatively. In the study, the relationship between variables was discussed in a theoretical and research-based manner, and the mediator variables that were

effective in the emergence of this relationship were not focused on much. In future studies, the mediating role of variables such as vocabulary, phonological awareness, and declarative knowledge can be tested. In addition, the research was carried out with participants whose native language is Turkish. A similar study can be conducted on participants who are learning Turkish or another language as a second language, and the relationships between variables can be investigated.

Considering that one of the basic competencies that a teacher should have is communication skills, it is clear that determining the relationship between this skill and which linguistic variables and at what level will have various practical benefits. First of all, this gives an idea to education administrators and experts on which elements should be given priority in the development of prospective teachers' and teachers' communication skills. This situation has a potential benefit, especially in shaping the content and general structure of pre-service and in-service training. These trainings can be organized on topics such as effective listening strategies, factors that facilitate the acquisition of reading habits, applied activities that will improve speaking self-efficacy, and practices that can positively affect affective orientations towards writing. In addition, in the current study, a high level of relationship was found between listening skills and speaking self-efficacy. This finding is an important argument for many curricula where these two linguistic outcomes are combined under the name of "verbal interaction skills." The relationship between affective, cognitive, and behavioral variables of language and communication skills can be tested on a larger sample in more comprehensive studies. The results of such studies can be shared with various stakeholders, including pre-service teachers, teachers, and experts through an authorized institution.

Conclusion

From the model established by this study, it is possible to draw a series of conclusions regarding the structure of communication and its relationship with language skill areas. In the model, LS and ESS are variables that directly affect CS, while WD affects CS indirectly through ESS and reading habits indirectly through both LS and ESS. The variable that affects CS at the highest level is ESS, and ESS is in a higher relationship with LS compared to other variables. However, the relationships between all the variables are significant. This network of relationships demonstrates that the development of language skills will have a positive effect on CS. However, the findings also support the assumption that language skills are a whole and that practices aimed at developing a skill area reflect positively on other language skills. This positive transfer can occur not only among cognitive factors such as skills but also among variables with different qualities such as self-efficacy, attitude, and disposition. As a result, the theoretical framework was supported by structural equation modeling in the study conducted to reveal the relationships between language skills and the effects of these skills on CS. The network of relationships between language skills and CS has been proven on a statistical basis.

Author(s) Contribution Rate
The authors contributed equally to the paper. The authors contributed to all aspects of the study in collaboration.

Conflicts of Interest
Authors declare that they have no conflict of interest.

Ethical Approval
Ethical permission (2021-SBB-0309) was obtained from the Bartın University Social and Human Sciences Ethics Committee for this research.

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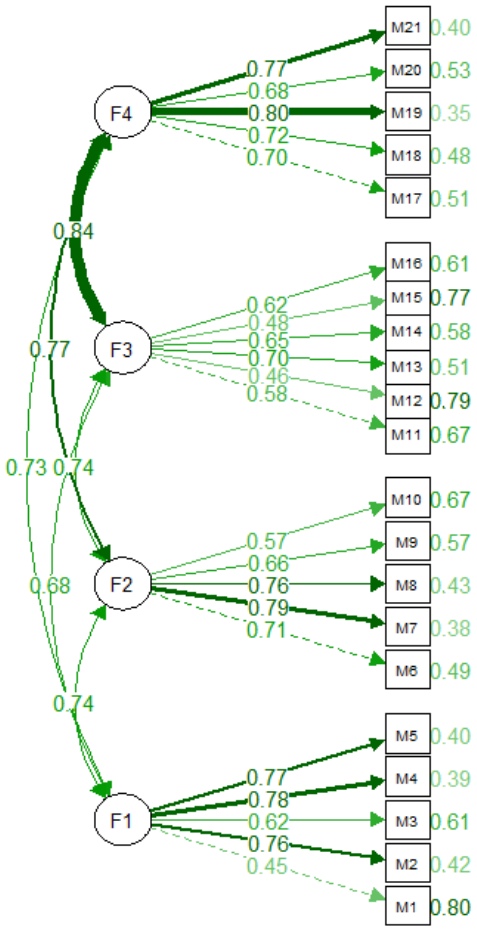
Appendix A. EFA results of Effective Speech Self-Efficacy Scale*

**The items are given in their osriginal language (in Turkish).*

Factor	Item no	Item	Factor load	h^2	u^2
Sunum Özyeterliği	M2	Konuşmamı gereksiz detaylardan arındırabilirim.	.29	.28	.72
	M3	Süreyi dikkate alarak konuşmamı yapabilirim.	.59	.45	.55
	M6	Konuşurken dikkatimi toplayabilirim.	.50	.37	.63
	M7	Konuşma süremi doğru şekilde planlayabilirim.	.99	.82	.18
	M8	Konuşmamın içeriğinin bütünlüğünü sağlamada zorlanırım.	.84	.65	.35
		Açıklanan varyans	%14		
Ses Özyeterliği	M16	Dinleyicileri rahatsız etmeyecek bir ses tonuyla konuşabilirim.	.81	.51	.49
	M17	Sesleri ve heceleri yutmadan konuşma yapabilirim.	.51	.47	.53
	M19	Sesimi fiziki ortama göre düzenleyebilirim.	.86	.64	.36
	M20	Gereken yerlerde sesimi yükseltip alçaltarak konuşmamı etkili kılabilirim.	.68	.53	.47
	M21	Anlaşılacak hızda konuşabilirim.	.46	.26	.54
		Açıklanan varyans	%12		
Üslup ve İfade Özyeterliği	M24	Gergin bir ortamda yapıcı bir üslup kullanabilirim.	.32	.25	.74
	M25	Konuşmamda atasözü, deyim, ikileme gibi söz varlığı unsurlarından yararlanırım.	.33	.63	.75
	M26	Konuşurken kelimeleri doğru telaffuz ederim.	.79	.37	.37
	M27	Zengin bir kelime hazinesiyle konuşabilirim.	.49	.36	.63
	M28	Konuşurken standart Türkçeyi (İstanbul Türkçesi) kullanabilirim.	.72	.25	.64
	M29	Nezaket kuralları çerçevesinde cümleler kullanırım.	.69	.46	.54
		Açıklanan varyans	%12		
Dinleyicileri Dikkate Alma	M32	Konuşmamı yaparken dinleyenlerin yüz ifadelerini ve beden dilini dikkate alırım.	.63	.48	.52
	M33	Konuşmamda dinleyicilere değerli olduklarını hissettirebilirim.	.84	.67	.33
	M34	Anlattıklarımla dinleyicilerde güven duygusu oluşturabilirim.	.89	.72	.28
	M35	Dinleyicilerin düzeylerini (sosyal durum, cinsiyet, yaş vb.) dikkate alarak konuşabilirim.	.54	.44	.56
	M36	Konuşmamı yaparken dinleyicilerle etkileşim kurabilirim.	.54	.57	.43
		Açıklanan varyans	%11		
		Açıklanan toplam varyans	%49		

Appendix B. Effective Speech Self-Efficacy CFA Model and Predictions



Note. *F1: Presentation SE, F2: Vocal SE, F3: Style and Expression SE, F4: Audience consideration SE

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Investigation of Science Textbooks in terms of Science Process Skills

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Abstract

The purpose of this study is to investigate the extent to which science process skills are represented in the texts and activities in 3rd, 4th, 5th, 6th, 7th, and 8th-grade science textbooks according to the learning areas of the science curriculum. The document analysis method is adopted in the current study. Course contents and activities in science textbooks are analyzed using descriptive analysis. The results show that there are 899 science process skills defined throughout 42 units in the 3rd, 4th, 5th, 6th, 7th, and 8th-grade science textbooks. Moreover, it is found that science process skills are mainly focused on the 6th grade science textbook (n=215) and the least on the 3rd grade science textbook (n=112). Furthermore, when the averages of science process skills used in science textbooks are examined, it has been determined that the use of science process skills in 6th (%23.9) and 7th (%18.8) grade textbooks are above the average. While science process skills in science textbooks increase from the 3rd grade to the 4th grade at the primary education level, a similar increase is not determined in the use of science process skills in secondary school science textbooks. When science textbooks are examined according to grade levels in terms of science process skills, it is discovered that *observing* is the most commonly utilized science process skill, while *using data and modeling* is the least used.

Keywords: Science process skills, Science textbook, Primary school, Secondary school

Introduction

In this age in which we live, the expectations and needs of the individuals and the society we live in change over time with the rapid developments in the field of technology. Science education has great importance in raising individuals and in the features that individuals want to gain, and therefore science education should be organized effectively (Yıldırım & Selvi, 2017). Science education has grown in importance over time, and one of the primary goals of education is to produce productive individuals who can understand and inquire about information, produce solutions to problems they encounter, and use technological applications effectively and efficiently (Hançer et al., 2003).

With the development of technology, traditional educational theories have begun to give way to constructivist education. In the constructivist approach developed by Vygotsky (1978), the learner makes sense of the learning action in their mind through the experiences s/he encounters in real life. To conceptualize a meaning, it must be grounded in experience. For this reason, in the constructivist approach, the student should be at the center of the learning experience, and the role of the teacher should be to guide the student's learning (Matthews, 2002). In other words, in the constructivist approach, scientific knowledge is not directly transferred to the student, but by providing appropriate educational environments, the student is provided to construct the knowledge himself (Büyüktaşkapu, 2010).

According to the constructivist learning approach, everyone attaches a personal meaning to the information, makes sense of it within himself, and constructs it by combining it with his previous knowledge (Cobern, 1993). In constructivist learning environments, students are expected to develop results by following scientific methods by presenting a real-life problem or situation. When students scientifically interact with the world, they find themselves observing, asking questions, making hypotheses, estimating, researching, interpreting, and communicating (Ekici & Erdem, 2020). Thus, instead of memorizing information as the teacher tells or written in the book, students transform it into a meaningful and permanent form by passing it through science process skills

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(Şen & Nakipoğlu, 2012). Science teaching not only focuses on knowledge and thinking, but also on other dimensions such as the learning process, and participation in science-based activities engages scientific process skills (Duda et al., 2019). Appropriate learning models require the availability of teaching media and teachers as facilitators in learning to develop process skills and the suggested model for learning is constructivism, which is consistent with process skills (Arantika et al., 2019; Çetinkaya-Aydin & Cakiroglu, 2017). Science teaching with a constructivist approach can be an effective way for students to learn and correctly interpret the natural environment. In science learning, students should be given direct experience through a learning process based on process skills and scientific attitudes (Juhji & Nuangchalerm 2020). In this way, students learn about universally valid concepts, principles, and theories through a set of processes known as science processes (Siregar et al., 2020). In addition, the nature of science consists of scientific processes and scientific attitudes (Juhji & Nuangchalerm 2020).

SPS is defined as defining a problem, making hypotheses, making predictions, defining variables, testing assumptions by doing experiments, collecting data, analyzing data, and presenting findings (Tobin & Cape, 1982). SPS is also defined as insights to develop the intellectual, social, and physical skills that are the source of the student's self (Atmojo, 2012). SPS is one of the most important skills that every student should have, because these skills are used in daily life and affect personal, social, and individual lives in the global world (Siregar et al., 2020). They are inseparable from the conceptual understanding of learning and applying science in practice (Harlen, 1999a). Students can model, observe, experiment, or research according to the nature of the subject and problem (Choirunnisa et al., 2018).

SPS is one of the competencies that students should acquire in research and inquiry environments and scientific content and concept learning (Windschitl et al., 2008). Science process skills are a very important science learning approach for scientific research (Siregar et al., 2020). These skills are an essential asset for science students who can support mastery of science concepts (Duda et al., 2019). The purpose of science education is not only to contribute to the development of scientific concepts (Tobin et al., 1990); developing science process skills should be a fundamental goal of science education (Harlen, 1999b). The main purpose of science education is to teach students to think effectively, form hypotheses, manipulate the natural world, and reason based on data with the help of science process skills (Özgelen, 2012). Learning science subjects by understanding requires using science process skills (Ergül et al., 2011). In this regard, an important task of science educators is to help students develop the thinking skills of scientists (Roth & Roychoudhury, 1993).

Many studies show that science process skills are effective in students' learning of scientific approaches (Ergül et al., 2011). The study of Brotherton and Preece (1995) evaluated the Piagetian development level of secondary school students and determined a significant overlap between the scientific process skills and the Piagetian development level. Chang and Mao (1999) conducted a study with secondary school students, they revealed that inquiry-oriented teaching is superior in promoting students' achievement and attitudes towards earth science. Af'idayani et al. (2018) state that the learning by inquiry model offers students the opportunity to explore and research a concept that is procedural, systematic, and interconnected between one concept and another. Hodosyova et al. (2005) examined the development of science process skills of secondary school students and revealed that these skills are especially useful for hypothesizing, controlling variables, and planning experiments. Students with strong foundations in science process skills can use these skills in more intensive scientific research and are more likely to be successful in this research (Wilke & Straits, 2005). If these skills are not well developed, the concepts learned will not help students understand the world around them (Harlen, 1999a).

To overcome the challenges of the 21st century in the science and technology sector and to increase students' competitiveness in the age of globalization, they need to be equipped with 21st century skills (Turiman et al., 2012). Science process skills, which are among the most important skills to have in the twenty-first century (North Central Regional Educational Laboratory, 2003; National Science Foundation, 2000), play a critical role in the development of high-level thinking skills, which are critical for children's mental development (Tan & Temiz, 2003). Children are like scientists. Many children already have an inquisitive curiosity in their nature, and this curiosity leads them to research. In this way, children start researching at an early age (Ergül et al., 2011). Students with science process skills take an active role in acquiring and structuring information. They can manage a scientific study appropriate to their cognitive level, develop solutions to daily life problems with the help of the information they learn in the classroom, approach events in the form of cause-effect relationships and approach them in different ways. Ergül et al. (2011) stated the benefits of science process skills for students as follows; it facilitates learning in physical sciences, provides active student participation, develops students' sense of responsibility for their learning, increases the permanence of learning, and enables students to acquire research ways and methods. Science process skills are also learning processes designed so that students can find facts, form concepts and theories, and develop intellectual skills and scientific attitudes that can be developed through hands-

on activities (Siregar et al., 2020). They can establish connections between events and predict the probability of certain events that may occur in the future. Thus, students' mental and cognitive skills such as predicting the consequences of a possible situation or problem that they may encounter in the future, making decisions, making judgments, and expressing themselves develop over time (Şen & Nakipoğlu, 2012).

Science process skills are necessary for students to take place in a world dominated by science and technology. Teaching science process skills to students are considered among the main objectives of science education (National Research Council, 2000). To keep up with the needs and requirements of the age, it is aimed to gain these behaviors to the students by adding various skills and behaviors to the education programs. Science teachers should integrate science process skills into their lessons in student-centered constructivist learning environments. Science process skills can be defined as the skills that scientists use when researching and structuring knowledge. They are transferable skills that can be applied to many sciences (Ergül et al., 2011). Science process skills are the thinking skills scientists use to construct knowledge by solving problems and formulating results (Özgelen, 2012). These skills include observing, classifying, estimating/hypothesizing, measuring, changing, and controlling variables, experimenting, recording data, and using data and modeling (Tan & Temiz, 2003). Science process skills are scientific only when applied in the context of science, and applications do not always have to be related to limited scientific content.

On the contrary, the applications of science process skills are related to scientific content and have a central role in learning by understanding this scientific content (Harlen, 1999b). The skills and processes that students use and develop are the same as those used by scientists while working. These studies are necessary to understand the workings of nature and prepare livable environments (Özgelen, 2012). Studies conducted with almost all grade level students indicated that science process skills should teach in constructivist learning environments to develop students' science process skills. These studies also demonstrated that there is an increase in students' problem-solving skills, conceptual understanding, and academic achievement. Since studies show that science process skills developed with the integration of additional treatment, it is necessary to integrate science process skills in a science lesson through curriculum and textbooks (Colvill & Pattie, 2003).

Textbooks, which are one of the materials used in the course process, can also influence the acquisition of these skills in the curriculum. One of the important features of an effective textbook is that a textbook is designed to be compatible with the curriculum adopted in the country (Morgil & Yılmaz, 1999). Kul et al. (2018) stated that textbooks are frequently used teaching material in the teaching and learning processes. The basic principle in the preparation of textbooks to be used in teaching processes is that the textbooks contain activities that can provide students with the behaviors, knowledge, skills, and various features determined in the curriculum and that they are guiding in the realization of these activities (Ünsal & Güneş, 2003). It is important how much the science process skills specified in the 2018 curriculum are represented in the textbooks and play an important role in gaining the determined skills. According to Aybek et al. (2014), the quality of the textbooks taught in schools directly affects the quality of education given to students. In this sense, the published books must be in a way that would provide the necessary skills. For this reason, it is necessary to evaluate the textbooks in terms of the skills that the program is based on for students (Yıldız, Feyzioğlu & Tatar, 2012). In this respect, the main aim of this study was to investigate the extent to which science process skills are represented in the texts and activities in the 3rd, 4th, 5th, 6th, 7th, and 8th-grade school science textbooks according to the learning areas in the science curriculum.

The sub-problems of the study are as follow:

- According to grade levels, what is the distribution of science process skills used in texts and activities in science textbooks?
- According to the units covered, what is the distribution of science process skills used in texts and activities in science textbooks?
- According to the disciplines of science covered, what is the distribution of science process skills used in texts and activities in science textbooks?

Method

Research Design

This research was carried out by document analysis method. Document analysis is a method used to obtain information about the subject and to make sense of the subject by examining the written materials about the research issue without observation or interview (Bowen, 2009; Corbin & Strauss, 2008). This study investigated

the extent to which science process skills are represented in the texts and activities in the 3rd, 4th, 5th, 6th, 7th and 8th-grade science textbooks according to the learning areas in the science curriculum in Turkey.

In the current study, the texts, and activities in the science textbooks within the scope of the study were analyzed by considering the science process skills. 42 units in 7 textbooks were examined using the "Textbook Review Template" given in Appendix 1. The texts and activities in the science textbooks were analyzed using descriptive analysis. Descriptive analysis is used in the analyses made by considering the codes, categories, and themes predetermined by the researcher or already exist within the scope of the theoretical framework (Glesne, 2013).

The analysis of the texts and activities in science textbooks in terms of science process skills was carried out as follows: (1) The texts and activities in the 6th-grade science textbook were analyzed together by the researchers to ensure agreement between the analyzers in the analyses; (2) Science textbooks other than 6th grade were randomly distributed to different researchers, and the analysis of the texts and activities in the textbooks for science process skills was carried out individually by the researchers; (3) The reliability analysis of the study was carried out by examining 15 activities from each science textbook, a total of 120 activities, by an expert not involved in the current study on science process skills. The reliability coefficient of the study was calculated by comparing the analysis results of the researchers with the expert analysis. The reliability coefficient of the analysis was calculated as .94 by using the reliability coefficient formula determined by Miles & Huberman (1994) by evaluating similar results with the field expert in the "consensus" category and different results in the "disagreement" category.

Ethical Procedures

Ethics committee approval is not required for this study as document analysis was conducted.

Results

In the present study, analyses were conducted across units/subjects and grade levels for the use of science process skills in the science textbooks tutored at the 3rd, 4th, 5th, 6th, 7th, and 8th grades of primary and secondary schools under the supervision of the Ministry of National Education. The number and percentages of science process skills determined according to the units at the 3rd, 4th, 5th, 6th, 7th, and 8th-grade science textbooks are presented in the tables below. Table 1 presents the distribution of science process skills according to the 3rd grade level science textbook units.

Table 1. Distribution of science process skills according to units in the 3rd grade level science textbook

		Units (7)								
		Let's Get to Know Our Planet	Our Five Senses	Let's Get to Know the Force	Let's Get to Know the Matter	Light and Sounds Around Us	Journey to the World of the Living	Electric Vehicles	Total	
Grade Level	Science Process Skills	n	n	n	n	n	n	n	%	n (112)
3rd Grade	Observing	6	-	6	6	15	8	2	38.4	43
	Classifying	-	-	1	5	4	3	2	13.4	15
	Estimating/ Hypothesizing	4	-	3	1	6	6	1	18.7	21
	Measuring	2	-	-	-	-	1	-	2.68	3
	Changing and Controlling Variables	1	-	3	1	3	-	-	7.15	8
	Experimenting	1	-	3	1	4	1	-	8.94	10
	Recording Data	-	-	1	2	-	2	-	4.47	5

	Using Data and Modelling		2	-	-	-	-	2	3	6.26	7
	Total	n	16	0	17	16	32	23	8		
		%	14.1	-	15.3	14.1	28.6	20.5	7.14	100	

According to Table 1, 112 science process skills are identified in 7 units of the 3rd-grade science textbook. The most used science process skills at the 3rd-grade level were the *observing* (n=43) and the *estimating/hypothesizing* (n=21), and the least used ones were the *recording data* (n=5) and *measuring* (n=3). It is noted that the unit containing the most science process skills in the 3rd-grade science textbook is the "Light and Sounds Around Us" unit (n=32). On the other hand, it is noteworthy that no activity or content would improve science process skills in the unit related to "Our Five Senses" (n=0). Table 2 presents the distribution of science process skills according to the 4th grade level science textbook units.

Table 2. Distribution of science process skills according to units in the 4th grade level science textbook

			Units (7)								
			Earth and Crust Movements	Our Food	Effects of Force	Properties of Matter	Lighting Technologies	Human and Environment	Simple Electric Circuits	Total	
Grade Level	Science Process Skills		n	n	n	n	n	n	n	%	n (131)
4th Grade	Observing		3	2	4	15	2	1	4	23.66	31
	Classifying		-	3	2	4	2	-	-	8.39	11
	Estimating/ Hypothesizing		5	7	5	7	3	-	3	22.90	30
	Measuring		-	-	-	4	-	-	-	3.05	4
	Changing and Controlling Variables		-	2	4	9	-	-	2	12.97	17
	Experimenting		-	1	4	11	-	-	2	13.74	18
	Recording Data		1	2	3	7	-	-	1	10.68	14
	Using Data and Modelling		1	1	1	1	1	-	1	4.58	6
	Total	n	10	18	23	58	8	1	13		
		%	14.1	-	15.3	14.1	28.6	20.5	7.14	100	

Table 2 presents that 131 science process skills are identified in the 4th-grade science textbook covering 7 units. The most used science process skills in the 4th-grade science textbook are *observing* (n=31) and *estimating/hypothesizing* (n=30), while the least used skills are *using data and modeling* (n=6) and *measuring* (n=4). It is found that while science process skills mainly were included in the unit "Properties of Matter" (n=58), these skills were used the least in the "Human and Environment" unit (n=1). Table 3 presents the distribution of science process skills used in science textbooks according to science disciplines at the primary school level.

Table 3. Distribution of science process skills used in science textbooks according to the disciplines of science at primary school level

		Science Process Skills									
		Observing	Classifying	Estimating/ Hypothesizing	Measuring	Changing and Controlling Variables	Experimenting	Recording Data	Using Data and Modelling	Total	
Grade Level	Disciplines of Science	n	n	n	n	n	n	n	n	n	%
3rd Grade	Human and environment	23	7	12	1	3	5	2	2	55	49.1
	Physics	8	3	4	-	3	3	1	3	25	22.3
	Astronomy and earth science	6	-	4	2	1	1	-	2	16	14.3
	Chemistry	6	5	1	-	1	1	2	-	16	14.3
	Biology	-	-	-	-	-	-	-	-	-	-
	Total	43	15	21	3	8	10	5	7	112	100
4th Grade	Chemistry	15	4	7	4	9	11	7	1	58	44.3
	Physics	8	2	8	-	6	6	4	2	36	27.5
	Biology	2	3	7	-	2	1	2	1	18	13.7
	Astronomy and earth science	3	-	5	-	-	-	1	1	10	7.6
	Human and environment	3	2	3	-	-	-	-	1	9	6.9
	Total	31	11	30	4	17	18	14	6	131	100
	The Overall Total	74	26	51	7	25	28	19	13	243	100

When Table 3 is examined, it was determined that science process skills took place mostly in the disciplines related to human and the environment (n=55) in science textbooks, followed by physics (n=25), astronomy and earth science (n=16), and chemistry (n=16) at the 3rd-grade level. On the other hand, at the 4th-grade level, science process skills mainly were included in science textbooks in the discipline related to chemistry (n=58), followed by physics (n=36), biology (n=18), astronomy and earth science (n=10), and human and environment (n=9), respectively. Table 4 presents the distribution of science process skills according to the 5th grade level units.

Table 4. Distribution of science process skills according to units in the 5th grade level science textbook

		Units (7)								
		Sun, Earth and Moon	World of Creatures	Measuring Force and Friction	Matter and Change	Propagation of Light	Human and Environment	Electrical Circuit Elements	Total	
Grade Level	Science Process Skills	n	n	n	n	n	n	n	%	n (125)
5th Grade	Observing	2	1	3	10	8	3	2	23.2	29
	Classifying	-	1	1	-	3	-	-	4	5
	Estimating/ Hypothesizing	4	1	6	4	8	5	2	24	30
	Measuring	-	-	2	4	3	-	-	7.2	9
	Changing and Controlling Variables	-	-	3	6	4	-	2	12	15
	Experimenting	-	1	3	9	7	1	2	18.4	23

	Recording Data	-	1	1	3	5	-	-	8	10
	Using Data and Modelling	2	-	1	-	-	-	1	3.2	4
	Total	n	8	5	20	36	38	9	9	
		%	6.40	4.00	16.0	28.8	30.4	7.20	7.20	100

Table 4 presents that 125 science process skills are identified in the 5th-grade science textbook covering 7 units. Findings similar to the analysis results of the 4th-grade textbook are also found in the 5th-grade textbook. According to Table 4, the most used science process skills in the 5th-grade science textbook are *estimating/hypothesizing* (n=30) and *observing* (n=29), while the least used skills are *measuring* (n=9) and *using data and modeling* (n=4). It was also found that the science process skills were mostly used in the unit of "Propagation of Light" (n=38), at least in "World of Creatures" (n=5). Table 5 presents the distribution of science process skills according to units in the 6th grade level science textbook.

Table 5. Distribution of science process skills according to units in the 6th grade level science textbook

		Units (7)							Total	
		Solar System and Eclipses	Systems in Our Body	Force and Motion	Matter and Heat	Sound and Features	Systems and Health in Our Body	Conduction of Electricity		
Grade Level	Science Process Skills	n	n	n	n	n	n	n	%	n (215)
6th Grade	Observing	5	7	4	8	14	5	5	22.32	48
	Classifying	1	2	1	2	-	3	2	5.11	11
	Estimating/ Hypothesizing	3	6	3	9	7	-	5	15.34	33
	Measuring	-	1	6	8	-	1	1	7.90	17
	Changing and Controlling Variables	3	1	3	7	9	4	5	14.88	32
	Experimenting	1	2	5	10	13	5	5	19.06	41
	Recording Data	1	2	6	9	1	5	5	13.48	29
	Using Data and Modelling	2	1	-	-	1	-	-	1.86	4
	Total	n	16	22	28	53	45	23	28	
		%	7.44	10.23	13.02	24.65	20.95	10.69	13.02	100

In Table 5, a total of 215 science process skills are identified in 7 units of the 6th-grade science textbook. It is noteworthy that the distribution science process skills used in the 6th-grade textbook (n=215) are higher than that of other grade levels. The distribution of the use of science process skills at this grade level is as follows: *observing* (48), *experimenting* (n=41), *estimating/hypothesizing* (n=33), *changing and controlling variables* (n=32), *recording data* (n=29), *measuring* (n=17), *classifying* (n=11), and *using data and modeling* (n=4). Science process skills were used the most in the "Matter and Heat" unit (n=53), and the least in the unit of "Solar System and Eclipses" (n=16) at the 6th-grade level. Table 6 presents the distribution of science process skills according to the 7th grade level science textbook units.

Table 6. Distribution of science process skills according to units in the 7th grade level science textbook

		Units (7)								
		Solar System and Beyond	Cell and Divisions	Force and Energy	Pure Substances and Mixtures	Interaction of Light with Matter	Reproduction, Growth and	Electric Circuits	Total	
Grade Level	Science Process Skills	n	n	n	n	n	n	n	%	n (169)
7th Grade	Observing	4	5	10	8	9	1	5	24.85	42
	Classifying	1	4	2	4	1	-	2	8.28	14
	Estimating/ Hypothesizing	3	4	10	10	10	3	3	25.44	43
	Measuring	-	-	4	2	2	1	4	7.70	13
	Changing and Controlling Variables	-	1	4	2	4	2	3	9.46	16
	Experimenting	-	1	5	3	5	2	5	12.42	21
	Recording Data	-	1	4	2	2	1	4	8.29	14
	Using Data and Modelling	1	-	1	2	1	-	1	3.56	6
	Total	n 9	16	40	33	34	10	27		
		% 5.44	9.46	23.7	19.5	20.1	5.9	15.9	100	

Table 6 presents that a total of 169 science process skills are identified in 7 units of the 7th-grade science textbook. As in the 3rd, 4th, and 5th-grade science textbooks, the 7th-grade science textbook focuses on the science process skills of *estimating/hypothesizing* (n=43) and *observing* (n=42). *Recording data* (n=14) and *using data and modeling* (n=6) are also the least used science process skills in this grade-level science textbook. It is determined that at the 7th grade level, science process skills are mostly used in the "Force and Energy" unit (n=40) and the least in the "Solar System and Beyond" unit (n=9). Table 7 presents the distribution of science process skills according to the 8th grade level science textbook units.

Table 7. Distribution of science process skills according to units in the 8th grade level science textbook

		Units (7)							
		Seasons and Climate	DNA and Genetic Code	Pressure	Matter and Industry	Elementary Machines	Transformation of Energy and Environmental	Electrical Charge and Electrical Energy	Total
Grade Level	Science Process Skills	n	n	n	n	n	n	n	% n (147)
8th		4	2	4	10	3	7	5	23.80 35

Observing										
Classifying		-	1	-	1	-	2	-	2.77	4
Estimating/ Hypothesizing		3	1	3	6	-	3	-	10.89	16
Measuring		2	-	2	8	2	4	-	12.25	18
Changing and Controlling Variables		-	-	3	7	2	5	3	13.60	20
Experimenting		2	1	3	10	2	5	5	19.04	28
Recording Data		2	1	2	6	1	3	1	10.89	16
Using Data and Modelling		2	2	1	1	1	2	1	6.80	10
Total	n	15	8	18	49	11	31	15		
	%	10.2	5.46	12.25	33.3	7.50	21.09	10.2	100	

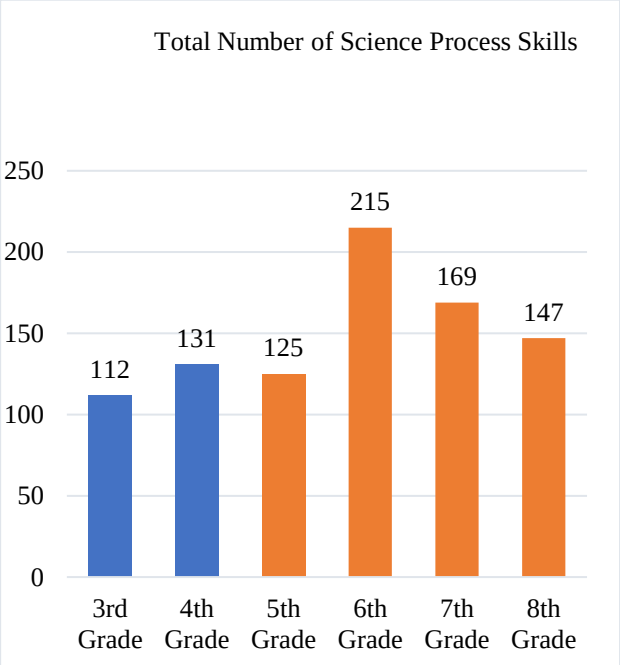
Table 7 presents that a total of 147 science process skills are identified in 7 units of the 8th-grade science textbook. While it is determined that the science process skills of *observing* (n=35) and *experimenting* (n=28) are mostly included in the 8th-grade science textbook, *using data and modeling* (n=10) and *classifying* (n=4) are the least included ones. It is seen that science process skills are mostly included in the "Matter and Industry" unit (n=49), and the least in the "DNA and Genetic Code" unit (n=8). Table 8 presents the distribution of science process skills used in science textbooks according to science disciplines at the secondary school level.

Table 8. Distribution of science process skills used in science textbooks according to the disciplines of science at secondary school level

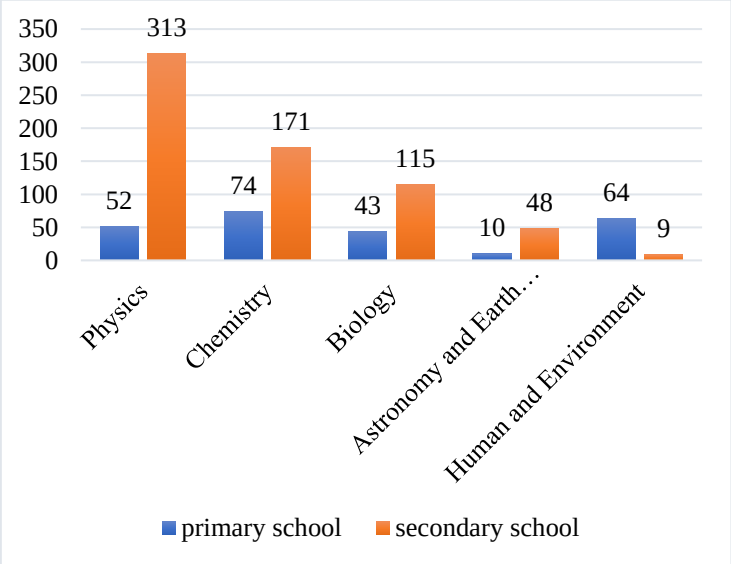
		Science Process Skills									
		Observing	Classifying	Estimating/ Hypothesizing	Measuring	Changing and Controlling Variables	Experimenting	Recording Data	Using Data and Modelling	Total	
Grade Level	Disciplines of Science	n	n	n	n	n	n	n	n	n	%
5th Grade	Physic	13	4	16	5	9	12	6	2	67	53.6
	Chemistry	10	-	4	4	6	9	3	-	36	28.8
	Human and environment	3	-	5	-	-	1	-	-	9	7.2
	Astronomy and earth science	2	-	4	-	-	-	-	2	8	6.4
	Biology	1	1	1	-	-	1	1	-	5	4.0
	Total	29	5	30	9	15	23	10	4	125	100
6th Grade	Physics	23	3	15	7	17	23	12	1	101	47.0
	Chemistry	8	2	9	8	7	10	9	0	53	24.6
	Biology	12	5	6	2	5	7	7	1	45	21.0
	Astronomy and earth sciences	5	1	3	0	3	1	1	2	16	7.40
	Total	48	11	33	17	32	41	29	4	215	100

7th Grade	Physics	24	5	23	10	11	15	10	3	101	59.8
	Chemistry	8	4	10	2	2	3	2	2	33	19.5
	Biology	6	4	7	1	3	3	2	-	26	15.4
	Astronomy and earth sciences	4	1	3	-	-	-	-	1	9	5.30
	Total	42	14	43	13	16	21	14	6	169	100
8th Grade	Chemistry	10	1	6	8	7	10	6	1	49	33.3
	Physics	12	-	3	4	8	10	4	3	44	30.0
	Biology	9	3	4	4	5	6	4	4	39	26.5
	Astronomy and earth sciences	4	-	3	2	-	2	2	2	15	10.2
	Total	35	4	16	18	20	28	16	10	147	100
	The Overall Total	154	34	122	57	83	113	69	24	656	100

When the content of science textbooks is examined according to the use of science process skills at the secondary school level, the frequency of activities and contents connected to the physics discipline of science (n=313) at the 5th, 6th, 7th, and 8th grade levels is notable, as shown in Table 8. The activities and contents involving science process skills related to physics subjects were followed by chemistry (n=171), biology (n=115), and astronomy and earth sciences (n=48), respectively. The graphs below show the distribution of science process skills in science textbooks by grade level and science disciplines.



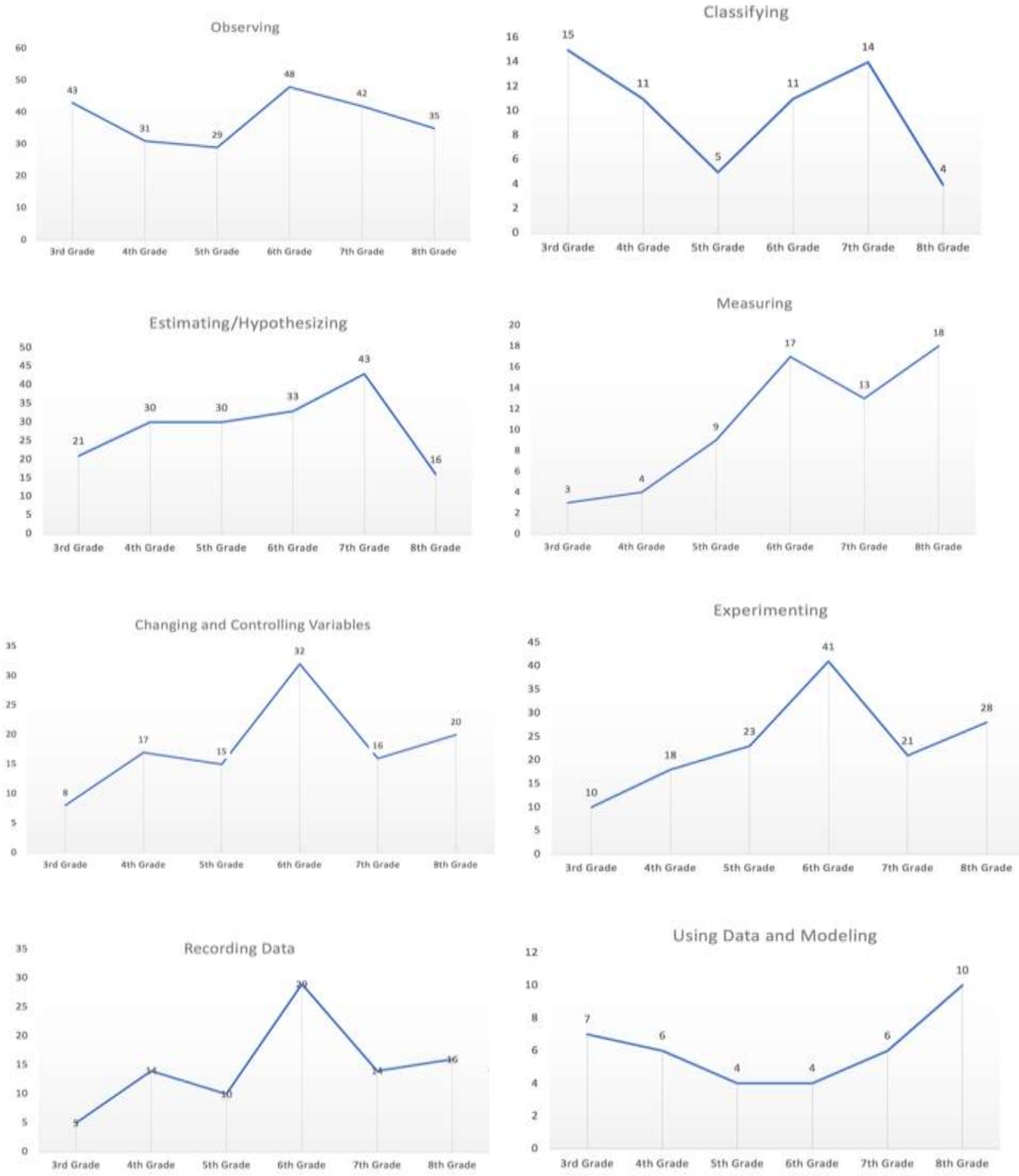
Graph 1. Distribution of science process skills in science textbooks according to different grade levels



Graph 2. Distribution of science process skills in science textbooks according to the disciplines of science

Graph 1 shows the distribution of the total number of science process skills (n=899) according to different grade levels. When science process skills in science textbooks are evaluated according to grade level, it is seen that science process skills are mostly (n=215) included in the 6th-grade science textbook, while it is the least in the 3rd-grade science textbook (n=112). In Graph 2, when the total scores related to science process skills were evaluated (3rd, 4th, 5th, 6th, 7th, and 8th grades), it is determined that science process skills are mostly included in subjects

related to physics (n=365). Subjects related to physics are followed by subjects related to chemistry (n=245), biology (n=158), human and environment (n=73), and astronomy and earth science (n=58). The graphs below can examine how each science process skill is distributed by grade level.



Graph 3. Distribution of science process skills by grade levels

Graph 3 shows that the science process skill of observing is frequently used at the 6th-grade level (n=48) and least in the 5th-grade level (n=29) science textbooks. In addition, the science process skill of classifying is mainly used in the 3rd grade (n=15) and at least in the 8th-grade level (n=4) science textbooks. Moreover, there is a linear increase in estimating/hypothesizing science process skills from the 3rd to the 7th-grade level, while it decreases to the minimum at the 8th-grade level. It is determined that the estimating/hypothesizing skill is mostly used at the 7th-grade level (n=43), at least at the 3rd grade level (n=21) in science textbooks. Furthermore, there is an increase in the measuring of science process skills from the 3rd grade (n=3) to the 8th grade (n=18), excluding the 7th grade science textbook. In addition, the science process skill of changing and controlling variables is mainly used at the 6th-grade level (n=32) and at least at the 3rd grade level (n=8) in science textbooks. The science process skill of experimenting is increased from the 3rd grade (n=10) to the 6th-grade level (n=41), but the use of this skill in science textbooks decreased from the 6th grade onwards. Besides, although the science process skill of recording data in science textbooks does not increase in direct proportion with the grade level, there is an increase from the 3rd-grade level (n=5) to the 6th-grade level (n=29), but the decrease in the use of this skill after the 6th grade is also noteworthy. In addition to these, the skill of using data and modeling decreased from the 3rd to the 5th grade, but the use of this skill in science textbooks increased after the 6th grade level. It is clearly shown from the above graph that using data and modeling skills is mainly used in the 8th grade (n=10) science textbook.

Discussion and Conclusion

SPS plays an important role in science education (Saban et al., 2019). They are important in developing students' cognitive development and ensuring students' active participation in the teaching and learning process (Darus & Saat, 2014). SPS is associated with cognitive development. Developing SPS supports students' thinking, reasoning, questioning, evaluation, problem-solving skills, and creativity (Özgelen, 2012). Considering that each student has a different cognitive structure, evaluating students' SPS acquisition is an important dimension of science education in the context of measurement and evaluation and provides students with a scientific perspective (Aydin-Ceran & Ates, 2020). In addition, it is obvious that textbooks are an accessible source of science information for teachers and students. Textbooks are crucial to understanding the fundamentals of the science curriculum because many science teachers consider the content of the textbooks when designing their lessons (Dogan, 2021). When SPS is consciously included in a science and technology course emphasizing SPS, students' SPS can be developed gradually over time (Durmaz & Mutlu, 2017). In this respect, this current study focused on determining the SPS in science textbooks tutored at the 3rd, 4th, 5th, 6th, 7th, and 8th grades of primary and secondary school levels. The related analyzes of SPS in science textbooks were conducted according to units, grade levels, and science disciplines.

When the averages of SPS use in science textbooks are examined, it has been determined that SPS use in 6th and 7th-grade textbooks is above the average. While the use of SPS in science textbooks increases from the 3rd grade to the 4th grade at the primary education level, a similar increase is not determined in the use of SPS in secondary education textbooks. The study of Aydoğdu (2017) indicates that the basic process skills of primary school students are not sufficient. He concluded that the test of basic process skill scores of primary school students was higher among the upper grades than in the lower grade levels.

In the current study, it has been determined that the SPS determined in primary and secondary education levels are mostly related to physics disciplines of science, which is followed by chemistry, biology, astronomy, earth sciences, and human and environment disciplines, respectively. When the studies in the related literature are examined according to science disciplines, physics subjects in science are most studied compared to other disciplines (Duran & Ünal, 2016; Kustijono et al., 2018; Limatahu & Prahani, 2018; Jalil et al., 2018). Physics science discipline is followed by biology (Chatila & Husseiny, 2017; Erten & Taşçi, 2016; Sahin et al., 2016; Şen & Vekli, 2016) and chemistry (Daşdemir & Doymuş, 2016; Kurnaz & Kutlu, 2016).

In this study, it was found that the most common science process skill in all grade levels is *observing*, followed by *estimating/hypothesising*, *experimenting*, *changing and controlling variables*, *recording data*, *measuring*, *classifying*, and *using data or modelling*, respectively. In other words, the analysis results showed that the most frequently used science process skill in primary and secondary school science textbooks is *observing*, and the least used one is *using data and modelling*. According to the findings of a survey of primary school teachers' science practices in Spain, *observation* is the only scientific ability developed in science teaching (Montero-Pau & Tuzón, 2017).The acquisition of SPS skills such as *observing*, *predicting*, *measuring*, *comparing*, and *classifying* was at or above average in a study conducted by Saban et al. (2019) with 5th-grade students, while *inferring*, *organizing data*, *identifying, and using experimental materials*, *processing data*, and *formulating models*, *controlling variables*, *experimenting*, *interpreting*, and *inferring* were below average. They stated that while preparing activities to develop SPS, it is essential to focus on the basic reasons that support the correct development of SPS,

that there is a relationship between academic success and SPS. Therefore, frequent activities focusing on SPS can also help students' academic success. They underlined that to create a higher impact, students should be active and make informed decisions in activities focused on SPS. The findings of Darus and Saat's (2014) research showed that primary school students have a low ability to formulate hypothesis skills. These students could not identify the variables of any given experiment. Although this skill is fundamental to the ability to form hypotheses, they could not establish relationships between the variables either. The findings also revealed that some students memorized statements about forming hypotheses, and it was determined that students could only give the correct answer for some situations. In other words, the inconsistency in their hypothesis-forming skills may be due to their memorization syndrome. In the study by Aziz and Zain (2010), they compared the science process skills in the content of the 10th, 11th, and 12th-grade physics textbooks used in Yemeni schools, it was revealed that "*observing*" was the most common SPS among the three textbooks. *Experimenting* for the 10th grade, *interpreting the data* for the 11th grade, and *operational definitions* for the 12th grade had the highest percentages for integrated science process skills. Ozkan and Umdu Topsakal (2021) analyzed the learning outcomes of the 2018 science curriculum in Turkey, starting from the 4th grade to the 8th grade in terms of SPS. The study results indicated that the least common science process skills were *measuring* and *hypothesizing* dimensions, while the most common ones were *data interpreting* and *inferring* dimensions. Dogan (2021) revealed that *observing* and *inferring* were the most frequently used skills for grades 9-12 biology textbooks. Duruk, Akgün, Dogan, and Gülsuyu (2017), in their study in which they examined the Turkish Secondary School Science Curriculum revised in 2013, concluded that as the grade level increases, there was a regular increase in learning outcomes and the ratio of SPS represented. When the secondary school science curriculum was evaluated according to the basic SPS, it was worth noting that the *observin*g skill followed by *classifying* and *communicating* skills had a significant representation rate at the 5th, 6th, 7th, and 8th-grade levels. When the science curriculum was analyzed according to integrated science process skill skills, it was seen that the representation rate of *experimenting* and *interpreting data* skills, followed by the *modeling* skill, was high at secondary school grade levels.

The examination of middle school science textbooks used in the 2013-2014 academic year in Turkey shows that the activities in these textbooks were at the planning and starting skill level of SPS. In addition, it has been revealed that the SPS suggested in science curricula was not reflected in the science textbooks used in middle schools. Skills such as *determination and changing controlling variables* were either at the lowest rate or not at all in the science textbooks used. Also, the representation of each skill varied by grade level, publisher, and unit (Aslan, 2015). SPS is also included in the school science textbooks of different countries. For example, SPS have become one of the needed components in the 2013 curriculum in Indonesia, especially in elementary schools. They can be used not only in school but also in daily life. Scientific learning provides the application of learning on scientific principles to develop students' thinking skills and skills in the science process necessary to train students to conduct scientific activities. These skills are *observing, interpreting observations, predicting, using tools* and *materials, applying the concept, planning research,* and *communicating* (Amarta, Sarwanto & Rintayati, 2018). Sideri and Skoumios (2021) examined the involvement of SPS in the content of science school textbooks of the last two primary school grades in Greece. It was concluded that the activities in the primary school textbooks in Greece mainly included the skills of *communicating, observing,* and *inferring*. In contrast, the participation of the remaining science process skills was limited. As a result, they stated that school textbooks do not provide students with satisfactory opportunities for the development of SPS and a better understanding of scientific ideas and concepts. Bangladesh's revised basic primary science textbooks support a student-centered inquiry-based approach teaching. A content analysis of these textbooks showed that they put the most emphasis on inquiry process skills like *observing* results, *recording data*, and *communicating* results (Chakraborty & Kidman, 2021). Morris, Masnick, Baker, and Junglen (2015) conducted a descriptive study examining middle school science textbooks through many activities. Their results showed that although half of the activities in the textbooks contain data, few of these activities provide opportunities to learn how to *record*, *analyze* and *interpret data*. Examination of in Lebanese national science textbooks according to science process skills showed that more attention should be paid to the inclusion and diversification of SPS to enable students to be prone to *creativity, problem-solving,* and *reflective thinking*. Furthermore, more emphasis should be placed on skills such as *designing experiments, formulating hypotheses, interpreting data,* and *formulating models* (Zeitoun & Hajo, 2015).

In summary, the descriptive analysis of SPS in the texts and activities in the 3rd, 4th, 5th, 6th, 7th, and 8th grade science textbooks shows that 899 scientific process skills have been identified in school science textbooks covering a total of 42 units. SPS is included in the 6th-grade science textbook at most and in the 3rd grade science textbook at least. Moreover, when the average use of SPS in science textbooks is examined, it is determined that SPS use in 6th and 7th-grade textbooks is above the average. Furthermore, while the use of SPS in science textbooks increases from the 3rd grade to the 4th grade at the primary education level, a similar increase is not determined in the use of SPS in secondary school science textbooks. In addition, when science textbooks are evaluated according

to grade levels in terms of SPS, it is determined that the most common SPS identified is *observing*, and the least used one is the *using the data and modeling*.

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