



Research Article

Effectiveness of preservice training program for mathematic teacher candidates¹

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Abstract

It is very important to identify and train gifted individuals who lead the development of societies. It is observed that teachers have a great importance in the identification and education of gifted students. At this point, teacher candidates field knowledge, attitudes and self-efficacy towards gifted students gain importance. This study aims to examine the effects of the Mathematics Teaching for Gifted Students course given in the faculties of education and the education provided by the Science and Art Center on the self-efficacy beliefs and attitudes of mathematics teacher candidate towards teaching the gifted mathematics course. The research model is a descriptive survey model. The research was designed as a single-group pretest-posttest experimental design. The data collection tools of the research are the Attitude Scale for the Education of the Gifted, adapted by Tortop (2014), and the mathematics lesson adaptation was used by making use of the scale developed by Girgin (2021) to determine the self-efficacy of mathematics teacher candidates regarding the education of gifted students. 86 teacher candidates who were studying in the department of primary education mathematics teaching at a state university in the Marmara Region and took the course of teaching mathematics to gifted students were included in the study with appropriate case sampling. The data obtained from the attitude and self-efficacy scales about the education of gifted students, which were applied to the mathematics teacher candidates at the beginning and end of the term, were analyzed with the SPSS 27 program using descriptive analysis, t-test, variance and correlation analysis. As a result of the research, it was concluded that the training provided caused a statistically significant difference in the self-efficacy beliefs and attitudes of the mathematics teacher candidates regarding the teaching of the gifted mathematics lesson. As a result of the research, no difference is observed in the self-efficacy and attitudes of teacher candidates related to the education of gifted students in terms of gender factor.

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Introduction

Education of gifted individuals is of great importance for the future of countries. Gifted individuals are candidates for taking many responsibilities for the rise of societies and humanity with their innate characteristics (Hökelekli & Gündüz, 2007). These individuals need special education due to their individual differences. Failure to provide this and not meeting the educational needs of gifted students will be a significant loss for countries. It has been found that societies that tolerate individual and cultural differences and pre-service teachers who shape those societies have a

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positive view of gifted education. It is very important for the future of gifted education to train teachers who can look at society with the concept of multiculturalism and look at the classroom, which is a mini society through individual differences (Tortop, 2014).

It is very important that these high-potential, gifted individuals, whom we can see as scientist candidates, are recognized and diagnosed and that they receive appropriate training. One of the main problems in the education of gifted students is the qualifications of the teachers who will teach them. In this context, teachers play an important role in the success of gifted education (Summak & Çelik-Şahin, 2014; Plunkett, 2000). Gifted students' teachers should be more talented and more imaginative than others (Lewis, 1982). To make a healthy diagnosis of gifted students, it is very important for teachers to have a positive attitude as well as having sufficient knowledge about the education of gifted students (Tortop & Kunt, 2012).

It is seen that gifted students learn most of the achievements in the program more quickly before the grade level (Tomlison & Alan, 2000). Differentiated instructional opportunities for gifted students should be provided. When the studies on gifted students are examined, it is frequently stated that these students are different from other students who attend formal education and they need to be supported by different teaching programs (Horn, 2002). In order to provide an appropriate education to gifted individuals, the programs should be suitable for the characteristics of these students and at the same time, the teachers who implement the program should receive special training and recognize the characteristics of these students.

When the literature is examined, many studies have shown that teachers' attitudes to gifted education and their self-efficacy beliefs about teaching these individuals are not at an adequate level (Gallagher, 1996; Gross, 1994; Sak, 2011; McCoach & Siegel, 2007; Lassig, 2003; McCoach, 2007, Tortop & Ersoy, 2015). The reason why the attitude to the education of the gifted is still being focused on may be factors such as the lack of knowledge of the educators in this area and the inability to provide adequate education on the education of the gifted (Lewis & Milton, 2005; Gallagher, 2007). In recent studies in Turkey, it is important to emphasize that teachers' attitudes towards gifted education are slightly above the undecided and that they are not very aware of institutions such as SAC (Tortop & Kunt, 2012; Kunt, 2012).

There is a 2-hour theoretical elective course called "Teaching Mathematics to Gifted Students" in the undergraduate education mathematics teaching program of education faculties. A 2-hour theoretical course given to some teacher candidates and not taken by all teacher candidates may not contribute much to the proficiency levels related to the education of gifted students. In this respect, it is necessary to include more courses to improve teacher efficacy regarding the education of gifted students. There are findings related to the fact that in-service training for existing teachers increase teachers' self-efficacy regarding gifted education (Tortop, 2014; Lassig, 2009; Plunkett, 2000). In this respect, it is important to increase the number of in-service training that can be done with SAC.

The importance of teaching mathematics for facilitating our lives is indisputable. This is even more important when it comes to gifted students. Because it makes it necessary for the programs to be prepared for them to differentiate further in mathematics (Sophian, 2004). In this context, mathematics teachers and candidates have more duties than other branches. It is really important to use new assessment and evaluation approaches in order to identify gifted students in the field of mathematics and to start teaching earlier, that is, the attitude and competence of the teacher. It is necessary to offer interesting activities that will ensure the participation of gifted students and encourage them to develop their mathematical abilities (Sheffield, 1994).

It is very important to identify and train gifted individuals who lead the development of societies. It is observed that teachers have great importance in the identification, training and education of gifted students. Professional competencies and personal characteristics of teacher candidates are very important in the development of their students. At this point, pre-service teachers' field knowledge, attitudes and self-efficacy toward gifted students gain importance.

When the studies conducted in our country on the education of gifted students are examined, it is seen that the

number of studies examining teachers' attitudes and self-efficacy is limited (Kaya, 2019; Sarar, 2018; Daştan, 2016; Akar, 2015; Güneş, 2015; Tortop, 2014; Dağlıoğlu, 2010). It has been observed that there is no study comparing their attitudes or self-efficacy. The main goal of the study is to examine the effects of the Mathematics Teaching for Gifted Students course given in the faculties of education and the education provided by the Science and Art Center on the self-efficacy beliefs and attitudes of pre-service mathematics teachers towards teaching the gifted mathematics course. In this context, answers to the following questions were in demand:

- What are the self-efficacy belief levels of mathematics teacher candidates related to the education of the gifted and do these levels change after the education received?
- What are the attitudes of mathematics teacher candidates to the education of the gifted and do these attitudes change after the education received?
- According to the gender variable do mathematics teacher candidates' self-efficacy and attitudes to the education of gifted students differ?
- Is there a significant relationship between mathematics teacher candidates' self-efficacy and attitudes toward gifted education?

Method

Research Model

In this research, within the scope of the descriptive survey model; $Q1 \rightarrow X \rightarrow Q2$ single-group pre-test and post-test experimental design method was used. Here, a group is first administered a pretest, then an experimental procedure and a posttest at the end of the process (Creswell, 2013). The above-mentioned (Q1) mathematics teacher candidates' attitudes and self-efficacy levels to the education of gifted students were determined by pre-test before the applications, (X) Mathematics Teaching for Gifted Students course and SAC training process that continued with the participants for 14 weeks, (Q2) after the trainings. It shows the post-test that will examine the effect of teacher candidates on the attitudes and self-efficacy levels to the education of gifted students.

Study Group

86 teacher candidates, 61 female and 25 male, who were studying in the department of primary education mathematics teaching at a state university in the Marmara Region and took the course of teaching mathematics to gifted students, were included in the study with appropriate case sampling.

Data Collection Tools

As data collection tools, Mathematics Education of the Gifted for Self-Efficacy Scale developed by Girgin (2021), Gifted Education Towards Attitude Scale developed by Tortop (2014) were used.

Mathematics Education of the Gifted for Self-Efficacy Scale

Mathematics lesson adaptation was used by making use of the scale developed by Girgin (2021) to determine the self-efficacy of mathematics teacher candidates regarding the education of gifted students. They were asked to give a score between 0-5 (0 = not at all appropriate, 5 = completely appropriate) for the evaluation of the items of the scale. Cronbach's Alpha coefficient was calculated to determine the reliability of the 12 statements that make up the scale. The internal consistency coefficient of this study was determined as 0,929.

Gifted Education Towards Attitude Scale

It was developed by Gagne (1991) to determine the attitudes of teacher candidates to gifted education and its Turkish adaptation study was carried out by Tortop (2014a). As a result of the adaptation work of the scale, 14 items remained. As such, the scale consists of three dimensions: Needs and Support of the Gifted, Opposition to Special Services for the Gifted, and Creating Special Talent Classes. The internal consistency coefficient of this study was determined as 0.767. If the attitude scores obtained from the scale are above 4.00, it indicates a very positive attitude, if it is lower than 2.00, it indicates a very negative attitude, and between 2.75 and 3.25 indicates a state of neutral (Gagné, 1991).

Data Analysis

The data collected from the participants were analyzed with descriptive and inferential statistical methods. While calculating statistics such as mean and standard deviation as descriptive statistics, descriptive statistical methods were used to calculate skewness and kurtosis values for normality analyses. Field (2009) states that examining skewness and kurtosis coefficients in determining normality in social science studies will give more reliable results than Kolmogorov-Smirnov and Shapiro-Wilk tests. Mean, standard deviation, and paired samples t-test and correlation analysis were used in the analysis of the data determined to be normally distributed. All analyzes were performed using the SPSS 27 statistical software program. The ranges used when interpreting the mean score obtained from the scale as a result of the analysis are 0.00-1.80 "Very low", 1.81-2.60 "Low", 2.61-3.40 "Medium", 3.41-4.20 "High", 4.21-5.00 "Very high".

Procedure

The collection of data with the applications and measurement tools used during the research process was carried out with pre-service teachers for 14 weeks between March 2023 and June 2023. The calendar for the implementation processes of the research is given in the Table.

Table 1. Application schedule of the study

Date	Application
01.03.2023-08.03.2023 (1 week)	Application of Scales (Pre-test)
09.03.2023-.15.06.2023 (12 weeks)	Mathematics Teaching Course for Gifted Students
06.04.2023-06.04.2023 (3hours)	Kocaeli SAC Education(online)
05.05.2023-05.05.2023 (3 hours)	Kocaeli SAC Education(online)
16.06.2023- 23.06.2020 (1 week)	Application of Scales (Post-test)

A one-week period was allocated for the pre-test applications of the scales. After the pre-test applications, the course was taught for 12 weeks within the scope of Teaching Mathematics to Gifted Students. In the process, 3-hour training were given to teacher candidates online twice by Kocaeli SAC Education. At the end of the semester, the post-test scale applications were made and the data collection process of the research was completed. To teacher candidates; identification of gifted students in mathematics, advantages and disadvantages of labeling; characteristics of gifted students, development of gifted students in mathematics, program preferences for gifted students, differentiation, enrichment, acceleration for gifted students, supporting gifted students in the classroom, social relations with gifted students; Individualized education programs were provided for gifted students.

Results

Descriptive Statistics for the Variables of the Research

In order to determine whether the variables have a normal distribution, skewness and kurtosis values, mean and standard deviation values were calculated.

Table 2. Definitional statistics of scores from scales

Variable		N	\bar{X}	Ss	Skewness		Kurtosis	
					Value	Std.	Value	Std.
Attitude	Pre-test	86	3,62	0,570	,083	,281	-,326	,555
	Post-test	86	3,85	0,383	-,155	,281	-,409	,555
Self-Efficacy	Pre-test	86	3,39	0,774	-,719	,281	,306	,555
	Post-test	86	3,98	0,496	-,567	,281	-,273	,555

Table 2 when examined, it is seen that the skewness values of the variables are between -0.719 and 0.083, and the kurtosis values are between -0.409 and 0.306. For the variables to have a normal distribution, the skewness and flatness values must be between +2 and -2 (George & Mallery, 2010). It was observed that the calculated values were included in the specified range, and the assumption of normal distribution was met.

Self-efficacy of Mathematics Teacher Candidates towards Gifted Education

The first research question of the study, "What are the self-efficacy belief levels of mathematics teacher candidates related to the education of the gifted and do these levels change after the education received?". The findings regarding the sub-problem are given in Tables 3 and Table 4.

Table 3. The results of the analysis of the self-efficacy scores of the teacher candidates related to the education of the gifted before and after the trainings

Items		\bar{X}	Level	S.D
I can recognize my gifted student in my class in math class.	Pre-test	3,47	High	1,139
	Post-test	4,07	High	0,647
I can apply the Individual Education Program (IEP) that I have prepared for my gifted student.	Pre-test	3,13	Medium	1,117
	Post-test	3,78	High	0,786
I can make my gifted student value learning mathematics.	Pre-test	3,86	High	0,944
	Post-test	4,16	High	0,533
I can prepare a differentiated teaching plan compatible with the general curriculum for my gifted student.	Pre-test	3,22	Medium	1,172
	Post-test	3,66	High	0,776
I can communicate effectively with the family of my gifted student to support their mathematics education.	Pre-test	4,16	High	0,923
	Post-test	4,50	Very High	0,764
I can prevent the negative behaviors of my gifted student in my class that disrupt the positive classroom atmosphere in the mathematics lesson.	Pre-test	3,58	High	1,958
	Post-test	4,08	High	1,330
I can eliminate the situations that cause my gifted student to not be in harmony with his classmates in math class.	Pre-test	3,39	Medium	0,880
	Post-test	3,91	High	0,701
I can differentiate the forms of assessment for my gifted student in mathematics class.	Pre-test	3,08	Medium	1,145
	Post-test	3,87	High	0,692
I can prepare an Individual Education Program (IEP) for my gifted student.	Pre-test	2,92	Medium	1,157
	Post-test	3,80	High	0,570
I can prepare lesson activities that can be used in the education of my gifted student.	Pre-test	3,38	Medium	0,956
	Post-test	4,10	High	0,729
I can develop teaching materials for my gifted student in mathematics class.	Pre-test	3,26	Medium	0,975
	Post-test	3,66	High	0,570
I can apply instructional activities related to the education of gifted students.	Pre-test	3,23	Medium	0,940
	Post-test	3,84	High	0,772
Total	Pre-test	3,39	Medium	0,774
	Post-test	3,98	High	0,496

When Table 3 is examined, the highest average in the pre-test and post-test results is "I can communicate effectively with my gifted student's family to support their mathematics education." and the item "I can prepare an Individual Education Program (IEP) for my gifted student." has the lowest average. It was determined that there was an increase in the averages after the training in all items. When the total scores were examined, it was seen that the attitudes scores, which were medium level ($\bar{X} = 3,39$) before the trainings, increased to the high level ($\bar{X} = 3,98$) after the training.

Table 4. Paired t-test analysis of pre-test and post-test results of mathematics teacher candidates' self-efficacy scores related to gifted education

		\bar{X}	S.D	Item pairs		t	p	η^2
				\bar{X}_f	S.D			
Self-efficacy	Pre- Test	3,39	0,774	-1,170	1,894	-5,280	0,000*	0,41
	Post- Test	3,98	0,496					

When the total score averages in Table 4 are examined, a statistically significant difference was found between the pre-test and post-test results of mathematics teacher candidates' self-efficacy scores related to the education of the

gifted ($p=0.000<0.05$). In other words, it can be said that the trainings provided increase the self-efficacy of the teacher candidates due to the education of the gifted.

Attitudes of Mathematics Teacher Candidates towards Gifted Education

The second research question of the study, "What are the attitudes of mathematics teacher candidates towards the education of the gifted and do these attitudes change after the education received?". The findings due to the sub-problem are given in Tables 5 and Table 6

Table 5. The results of the analysis of the attitudes scores of the teacher candidates regarding the education of the gifted before and after the training

Items		\bar{X}	Level	S.D
The best way to meet the educational needs of gifted students is to put them in special classes.	Pre-test	3,20	Neutral	1,345
	Post-test	3,50	Positive	0,672
Special programs for gifted students are inconvenient as they will create elitism.	Pre-test	3,55	Positive	1,225
	Post-test	3,77	Positive	0,913
Special education services for gifted students are a sign of discrimination.	Pre-test	4,10	Positive ⁺	1,256
	Post-test	4,11	Positive ⁺	0,978
Creating special classes for gifted students makes other students feel worthless.	Pre-test	2,73	Negative	1,330
	Post-test	3,30	Positive	1,132
Gifted children are often bored at school because their educational needs are not adequately met.	Pre-test	4,09	Positive ⁺	0,944
	Post-test	4,40	Positive ⁺	0,844
Gifted students waste their time in regular classrooms because their educational needs are not adequately met.	Pre-test	3,05	Neutral	1,195
	Post-test	3,74	Positive	0,968
Special education needs of gifted students are often neglected in our schools.	Pre-test	3,60	Positive	0,957
	Post-test	3,68	Positive	0,752
Gifted individuals need special attention and support to fully develop their abilities.	Pre-test	4,39	Positive ⁺	0,812
	Post-test	4,87	Positive ⁺	0,691
Our schools are already sufficient to meet the special education needs of gifted students.	Pre-test	4,24	Positive ⁺	0,858
	Post-test	3,61	Positive	1,149
Gifted students should be provided with education in regular classes, because gifted students act as an intellectual stimulant for other students.	Pre-test	3,07	Neutral	1,243
	Post-test	3,10	Neutral	0,765
If we divide students into gifted and others, we increase many more labels, such as strong-weak, sufficient-inadequate.	Pre-test	2,72	Negative	1,253
	Post-test	2,46	Negative	1,146
If gifted children are given special support and attention, they may become arrogant or selfish.	Pre-test	3,50	Positive	1,174
	Post-test	3,46	Positive	1,053
We should make the same investments for gifted students as were made for students with learning disabilities.	Pre-test	4,45	Positive ⁺	1,106
	Post-test	4,86	Positive ⁺	0,647
The normal programs of schools quench the intellectual curiosity of gifted students.	Pre-test	3,61	Positive	1,283
	Post-test	4,25	Positive ⁺	1,286
Total	Pre-test	3,62	Positive	0,570
	Post-test	3,85	Positive	0,343

When Table 5 is examined, the highest average in the pre-test and post-test results is "Gifted individuals need special attention and support to fully develop their abilities." and the item "If we divide students into gifted and others, we increase many more labels, such as strong-weak, sufficient-inadequate." has the lowest average. It was determined that there was an increase in the averages after the training in all items. When the total scores were examined, it was seen that the attitude scores that were high $\bar{X}=3.62$ before the trainings increased after $\bar{X}=3.83$ the trainings.

Table 6. Paired t-test analysis of pre-test and post-test results of mathematics teacher candidates' attitudes scores related to gifted education

		\bar{X}	S.D	Item pairs		t	p	η^2
				\bar{X}_f	S.D			
Attitudes	Pre- Test	3,62	0,570	-0,447	1,211	-3,152	0,002*	0,22
	Post- Test	3,85	0,343					

When the total score averages in Table 6 are examined, a statistically significant difference was found between the pre-test and post-test results of mathematics teacher candidates' attitude scores regarding the education of the gifted ($p=0.002<0.05$). In other words, it can be said that the trainings provided increase the attitudes of the teacher candidates regarding the education of the gifted.

Gender Factor

The third research question of the study, " According to the gender variable do mathematics teacher candidates' self-efficacy and attitudes to the education of gifted students differ? ". The findings regarding the sub-problem are given in Table 7 and Table 8.

Table 7. Independent samples t-test analysis of the gender variable of the self-efficacy scores of mathematics teacher candidates regarding the education of the gifted

		\bar{X}	S.D	t	p
Pre- test	Female	3,39	0,773	-0,83	0,934
	Male	3,41	0,811		
Post- test	Female	3,93	0,514	-1,454	0,155
	Male	4,11	0,431		

* $p<0,05$

When the total score averages were examined, it was seen that there was no statistically significant difference between the pre-test and post-test results of the pre-service teachers' self-efficacy scores due to the education of the gifted and the gender variable (pre- $p=0,934>0,05$ / post- $p=0,155>0,05$).

Table 8. Independent samples t-test analysis of the gender variable of the attitudes scores of mathematics teacher candidates regarding the education of the gifted

		\bar{X}	S.D	t	p
Pre-test	Female	3,63	0,513	0,08	0,993
	Male	3,61	0,731		
Post-test	Female	3,83	0,683	0,416	0,679
	Male	3,80	0,722		

* $p<0,05$

When the total score averages were examined, it was seen that there was no statistically significant difference between the pre-test and post-test results of the pre-service teachers' self-attitudes towards the education of the gifted and the gender variable (pre- $p=0,993>0,05$ / post- $p=0,679>0,05$).

Relationship of Self-efficacy between Attitudes towards Gifted Education

The fourth research question of the study, " Is there a significant relationship between mathematics teacher candidates' self-efficacy and attitudes towards gifted education?". The findings regarding the sub-problem are given in Tables 9 and Table 10.

Table 9. Correlation results between teacher candidates' attitudes to the education of gifted students and their self-efficacy before the training

Before the training		AGE	SGST
AGE	r	1	-0,051
	p	-	0,666
SGST	r	-0,051	1
	p	0,666	-

** $p < 0,01$ AGE: Attitude towards Gifted Education SGST: Selfefficacy of Gifted Students' Teachers

As can be seen in Table 9, no relationship was found between the self-efficacy score averages and attitude scores regarding the education of gifted students in the pre-test results.

Table 10. Correlation results between teacher candidates' attitudes towards the education of gifted students and their self-efficacy after the training

After the training		AGE	SGST
AGE	r	1	0,404**
	p	-	0,000
SGST	r	0,404**	1
	p	0,000	-

** $p < 0,01$ AGE: Attitude towards Gifted Education SGST: Selfefficacy of Gifted Students' Teachers

According to the post-test results in Table 10, it has been determined that there is a moderately positive relationship between the self-efficacy score averages about the education of the gifted and their attitude scores. In other words, as the self-efficacy scores about the education of the gifted increase, their attitudes towards the education of the gifted also increase positively.

Conclusion and Discussion

In this study, which attempts to determine the attitudes and self-efficacy of mathematics teacher candidates to the education of gifted students; It was found that the effects of the "Teaching Mathematics for the Gifted" course given in the education faculties and the "training given by the Science and Art Center" on the self-efficacy beliefs and attitudes of the pre-service mathematics teachers towards teaching the gifted mathematics course were found to be statistically significant. In the study, pre-test attitude scores of mathematics teacher candidates regarding the education of gifted students were found to be positive ($\bar{X}=3.62$). A positive attitude average was also obtained in studies in which the attitudes of teachers and teacher candidates to the education of gifted students were determined (Tortop & Kunt, 2012; Tortop, 2014; Güneş, 2015; Yıldırım & Öz, 2018). These results show parallelism with the findings of our study. Contrary to these studies, McCoach and Siegle (2007), in their study examining the attitudes of special education teachers towards gifted students, determined that they exhibited more negative attitudes than others. After the trainings, it was observed that there was an increase in the post-test attitude scores related to the education of the gifted and approached the "very positive" level by increasing ($\bar{X}=3.85$).

In the study, pre-test self-efficacy scores of pre-test mathematics teacher candidates regarding the education of gifted students were at the level ($\bar{X}=3.39$). Güneş (2015), Girgin and Şahin (2019) determined teachers' self-efficacy for gifted students. It was determined that he was at a slightly above average level in the studies he examined. After the trainings, it was observed that the post-test self-efficacy scores related to the education of the gifted increased ($\bar{X}=3.98$) and reached the "high" level. In the study conducted by Tortop (2014) to determine the self-efficacy of teachers or teacher candidates about the education of gifted students, a training was prepared for teachers on the education of gifted individuals, and as a result of the training, there was a significant difference in teachers' self-efficacy perceptions related to the education of gifted individuals. It has been observed that self-efficacy perceptions related to gifted education have increased. This result shows that our study supports the higher self-efficacy perception of teacher candidates who attend a seminar or training on the education of gifted students. It is seen in studies that providing

teachers with training on gifted students and their characteristics causes an increase in teachers' self-efficacy related to the education of gifted students (Hansen & Feldhusen, 1994; Goodnough, 2001; Gross, 1994; McCoach & Siegle, 2007; Lassig, 2009; Tortop, 2014b). It is also very important to increase the attitudes and self-efficacy of teacher candidates towards gifted education in the educational process (Tortop, 2014c).

The outcome of our research is that there is no significant difference when the attitudes and self-efficacy of mathematics teacher candidates to the education of the gifted are examined due to the gender variable. Yıldırım and Öz (2018), Demirhan, Kaya, Canan and Gür (2016), Tortop and Kunt (2013), Güneş (2015) and Troxclair (2013) reported in their studies that the attitudes of teachers and teacher candidates to the education of gifted students do not change according to the gender variable they have done. Contrary to these studies, Gencil and Satmaz (2017) and Metin, Şenol and İnce (2017) determined that there was a significant difference in favor of female teacher candidates. When the literature is examined, it was seen that the self-efficacy of teacher candidates regarding the education of gifted students did not change due to the gender variable in the studies of Girgin and Şahin (2019), Güneş (2015) and Tortop and Ersoy (2015).

It has been determined that there is no significant relationship between the pre-test scores of mathematics teacher candidates' self-efficacy regarding the education of the gifted and their attitude to the education of the gifted, and there is a moderate positive relationship after the training given. In the study of Güneş (2015), a weak relationship was determined between classroom teachers' self-efficacy regarding the education of gifted students and their attitude scores. Tortop (2014b) stated that gifted students should have positive views and attitudes and a perception of self-efficacy for differentiated teaching practices related to education. In this context, it can be thought that an increase in the self-efficacy levels of teachers and teacher uncles related to the education of gifted students may also correspond to an increase in their attitudes towards gifted education.

In line with the findings of this study, suggestions can be made that:

- The number and hours of lectures for the education of gifted students in all branches in education faculties should be increased.
- During undergraduate education, teacher candidates in different branches should be given trainings to increase their self-efficacy and attitudes towards gifted education.
- In addition to quantitative studies, qualitative research can be conducted on the gifted education of teacher candidates and teachers in different branches during or after undergraduate education.
- It has been observed that the education conducted within the scope of the research increased the self-efficacy and awareness levels of the teacher candidates regarding the education of gifted individuals.

In this context, it should be ensured that gifted individuals make observations and practices in the Science and Art Centers where they are educated, within the scope of the teaching practice course or with different approaches.

Limitations of Study

The research was carried out with a limited sample of 86 teacher candidates at Kocaeli University Faculty of Education. Repeating this study with a higher number of participants and examining different variables will increase generalizability. The study was carried out using purely quantitative data.

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