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A Research on Primary School Teachers' Proficiencies on Inclusive Education and Teaching Mathematics for Inclusion Students

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ABSTRACT

This study aims to examine primary teachers' proficiency in inclusion and teaching mathematics to inclusive students within the scope of some variables. Survey design was adopted in the research. The study group consists of 324 primary teachers. The data were collected through the Teacher Efficacy for Inclusion Scale and Teaching Mathematics in Inclusive Settings Scale. The Mann-Whitney U test, and the Kruskal-Wallis H test was used. As a result of the current study, it was determined that female teachers were more proficient in inclusion in teaching mathematics. It was determined that primary teachers with a master's degree were more proficient in inclusion. It was determined that primary teachers who have fewer inclusive students in their class were more proficient on inclusion in teaching mathematics. It was determined that more experienced primary teachers were more proficient in inclusion. It was determined that primary teachers teaching in the second, third and fourth grades and teaching mathematics were more proficient than those teaching in the first grade. It was determined that teachers who teach in less crowded classrooms were more proficient in inclusion.

Keywords: Inclusive student, primary teacher, teaching mathematics

Sınıf Öğretmenlerinin Kaynaştırma ve Kaynaştırma Öğrencilerine Matematik Öğretimi Yeterlikleri Üzerine Bir Araştırma

ÖZ

Bu araştırmada sınıf öğretmenlerinin kaynaştırma yeterliklerinin ve kaynaştırma öğrencilerine matematik öğretimi yeterliklerinin bazı değişkenlere göre incelenmesi amaçlanmıştır. Araştırmada tarama modeli benimsenmiştir. Çalışma grubu uygun örneklemeye göre belirlenmiştir. Çalışma grubunu 324 sınıf öğretmeni oluşturmaktadır. Veriler, Kaynaştırmada Öğretmen Yeterliği Ölçeği ve Kaynaştırma Uygulamalarında Matematik Öğretimi Ölçeği aracılığıyla toplanmıştır. Verilerin analizinde Mann-Whitney U testi ve Kruskal-Wallis H testi kullanılmıştır. Araştırma sonucunda sınıf öğretmenlerinin cinsiyet değişkenine göre kaynaştırmada matematik öğretimi yeterlikleri bakımından kadın öğretmenlerin daha yeterli oldukları belirlenmiştir. Eğitim düzeyi değişkenine göre, kaynaştırma yeterlikleri ve kaynaştırmada matematik öğretimi yeterlikleri bakımından yüksek lisans yapmış olan sınıf öğretmenlerin daha yeterli oldukları belirlenmiştir. Öğretim yaptığı sınıfta bulunan kaynaştırma öğrencisi sayısı değişkenine göre, sınıfında daha az kaynaştırma öğrencisi bulunan sınıf öğretmenlerinin kaynaştırma yeterlikleri ve kaynaştırmada matematik öğretimi yeterliklerinin daha yüksek olduğu belirlenmiştir. Mesleki kıdem değişkenine göre, daha kıdemli olan sınıf öğretmenlerinin kaynaştırma yeterlikleri ve kaynaştırmada matematik öğretimi yeterliklerinin daha yüksek olduğu belirlenmiştir. Öğretim yaptığı sınıf düzeyi değişkenine göre, ikinci, üçüncü ve dördüncü sınıflarda öğretim yapan sınıf öğretmenlerinin birinci sınıfta öğretim yapanlara göre kaynaştırma yeterliklerinin ve kaynaştırmada matematik öğretimi yeterliklerinin daha yüksek olduğu belirlenmiştir. Öğretim yaptığı sınıf mevcudu değişkenine göre, daha az mevcutlu sınıflarda öğretim yapan sınıf öğretmenlerinin kaynaştırma yeterliklerinin ve kaynaştırmada matematik öğretimi yeterliklerinin daha yüksek olduğu belirlenmiştir.

Anahtar kelimeler: Kaynaştırma öğrencisi, sınıf öğretmeni, matematik öğretimi

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1 | INTRODUCTION

Teachers are the main contributors to the achievement of education (Goldhaber, 2007). Teacher proficiency is one of the factors which affects student success (Connor et al., 2005; Lee & Lee, 2020; Rivkin et al., 2005). Most countries make investment and develop educational policies in order to improve teacher proficiency. (Feng & Sass, 2018). The inadequacies related to teacher proficiency have negative effects on student success (Lee, 2018).

There are many components affecting teacher proficiency. It can be said that educational level, professional seniority, expertise of subject field are the fundamental factors which are effective on teacher proficiency (Lee & Lee, 2020). Some scholars conducted studies that reveal the educational level of teachers who had a positive (Goldhaber & Brewer, 1997; Harris & Sass, 2011), negative (Clotfelter et al., 2007; Goe, 2007) or neutral (Buddin & Zamarro, 2009; Shuls & Trivitt, 2015) effect on students' success. It was determined that professional seniority affects student success positively (Clotfelter et al., 2007; Ladd, 2008; Wiswall, 2013), affects less (Chingos & Peterson, 2011; Shuls & Trivitt, 2015), that the positive effect in the first years of profession turns into negative (Chingos & Peterson, 2011; Winters et al., 2012), and professional seniority has no effect on student success (Xin et al., 2004). Expertise in the subject field has a positive contribution to student success (Betts & Frost, 2000; Ferguson & Womack, 1993; Monk & King, 1994). Besides, expertise of subject field effects teaching styles of teacher. Teachers who have more information about any subject use more different and effective teaching methods (Banks, 2008).

INCLUSIVE EDUCATION

Inclusive education is stated as an education type that adapts students with special needs for the future life academically, socially, and professionally, is arranged for their needs, in the same educational environment with their peers who are developing typically, based on the principles of the least restrictive environment. Inclusion is not only that students with special needs are physically included in general educational environment but also that all students with disabilities and without disabilities are given supportive services according to their individual differences and traits (Mastropieri & Scruggs, 2004; Salend, 2005).

Students with special needs develop their social skills and academic performance within inclusive education. Teachers, school administrators and families have various roles in the achievement of inclusive education and students developing positive attitudes and behaviours. During inclusive education, the shareholders of this process should have some proficiencies in order all of students to be able to have all their potential. Students' individual differences and learning styles should be taken into consideration and learning environments should be personally arranged. Since they spend more time with students, that teachers working especially in inclusive environment are experienced, quite effective on that they can adapt curriculum according to students' individual differences, they can effectively manage their classroom and orientating of students with disabilities and without disabilities (Bauer & Kroeger, 2004; Friend, 2006; Jarvis & Iantaffi, 2006; Wood, 2002).

Teacher proficiency has an active role on meeting student needs, establishing and maintaining a proper communication between them, developing their academic skills, improving the social acceptance of individuals with special needs. It is known that teachers with more academically and professionally proficiencies contribute positively to student development (Causton-Theoharis et al., 2011; Onyishi & Sefotho, 2020). Teachers' positive or negative opinions and attitudes towards inclusive education and students with special needs affect the achievement of inclusive education. Besides, it is stated that other factors effecting the achievement of inclusion are teachers' willingness, tolerant and proficiencies. Teachers with inclusive students in their classroom should conduct activities based on measurement and evaluation curriculum development for their students, in order to make inclusion more successful, arrange learning environments taking individual differences of students with special needs into consideration, guide parents, and create equal opportunities for all kids (Akman et al., 2018; Batu, 2000; Friend & Bursuck, 2006).

MATHEMATICS TEACHING IN INCLUSION

It is a well-known fact that even children who develop typically have difficulties in learning basic mathematical skills and operation, however; children with special needs have more difficulties in those subjects. Unlike their peers developing typically, students with special needs also have difficulties in learning maths due to the type and

level of their inability. Students with special needs have difficulties in learning maths because of the reasons such as ineffective teaching, the problems related oral language, inadequate reading skill, affective factors, attention and perception problems. Moreover, when the content of curriculum is not convenient for student needs, they may not be able to have relevant mathematical skills and acquisitions (Katsiyannis & Prillaman, 1990; Yıkmış, 2012).

Inclusive students need more support in learning mathematical skills compare to their peers developing typically. Teachers' mathematical proficiencies related to their teaching level and pedagogical professionalism in terms of the effectiveness and quality of maths teaching for students with special needs in a classroom is quite important (DeSimone, 2004). The more inclusive students with special needs improve their academic skills, the more their mathematical skills develop. This facilitates the daily life of students with special needs, as well; because there is a direct relationship between mathematical skills in their daily life and basic mathematical processes (Bley & Thornton, 2001; Geary, 2004).

Inclusive students with special needs have less mathematical skills than they should have. These students generally have difficulties in word problems and setting mathematical relationships. Moreover, they have problems in measurement, time, counting money, mental calculating, and solving problems (Beacham & Trott, 2005; Cortiella & Horowitz, 2014).

In order to resolve problems which students with special needs face, having mathematical skills could be effective in making instructional contents simple, to differentiate instructional methods, to separate teaching into small levels, to increase teaching time, to choose effective instruction methods, to teach students mathematical prerequisite skills, to give more time for mathematical operations, and to exemplify for real life in teaching (Bryant et al., 2011; Montague, 2007). In consideration of the role of mathematical knowledge and skills which students with special needs for their daily life, it can be said that maths teaching should be set for students with special need and presented by individualizing towards their needs. In inclusive education, convenient curriculum should be planned for students with special needs because of the difficulties in gaining mathematical skills and concepts for those students. Teachers have an active role for inclusion to be successful. Therefore, they should correctly determine the educational performance and needs of students with special needs in inclusion in their classroom (Batu, 2000; Hudson & Miller, 2006). In this context, it can be said that teacher proficiency has positive or negative impact on inclusion and more qualified teachers can affect positively both process and students learning.

THE CURRENT STUDY

According to the literature, various studies related to teacher proficiencies on inclusion were conducted. Soodak and Podell (1993) found that primary teachers with less proficiencies approach negatively to individuals with special needs in inclusion have education in the same place with their peers. Soodak et al. (1998) revealed that primary teachers who have better proficiencies can differentiate instructional activities, and are good at teamwork, have a more positive attitude towards inclusion and make more contributions to the development of students with special needs. Diken (2006) conducted a study finding that teacher candidates with proficiencies have a more positive opinion on inclusion and there is a medium-level relationship between teacher candidates' proficiencies and approaches to inclusion. Weisel and Dror (2006) investigated primary teacher's proficiencies and found that teachers with proficiencies were more successful to integrate and make students with special needs participate in inclusive environments. Almog and Shectman (2007) stated that primary teachers with higher proficiencies are more successful to develop instructional strategies for students with special needs. Camadan (2012) found that both primary teachers and teacher candidates, who have high-level proficiencies, are more successful in educational processes in inclusion. Dolapçı and Yıldız Demirtaş (2016) conducted a study revealing that there is a significant relationship between inclusive proficiency and self-efficacy of teacher candidates. They emphasized that the more teacher candidates' self-efficacy increases, the more their proficiency related to education increase.

The current study aims to investigate primary teachers' proficiency of inclusion and maths teaching for inclusive students in terms of some variables. In this context, the statistical impact of the variables of gender, educational level, professional seniority, the number of inclusive students in class that teachers teach, class level that teachers teach, and the total number of students in class that teachers teach, primary teachers' proficiencies in inclusion and maths teaching for inclusive students was investigated.

2 | METHOD

RESEARCH DESIGN

This study employed a survey design which is one of the descriptive designs. Survey design aims to comprehend qualifications of a group or a situation by means of an interview or a questionnaire (Fraenkel et al., 2012). The current study is a cross-sectional survey study since the data were collected at one time.

PARTICIPANTS

The participants of the current study consist of 324 primary teachers working at schools in Istanbul which are affiliated with Ministry of National Education, in the second term of 2020-2021 academic year. The participants were determined by convenience sampling, one of the non-random sampling methods. Then descriptive qualifications related to the participants are presented in Table 1.

Table 1. Qualifications Related to the Participants

Variable		f	%
Gender	Female	175	54
	Male	149	46
Professional seniority	1-5 years	70	21.6
	6-10 years	64	19.8
	11-15 years	63	19.4
	16-20 years	66	20.4
	21 and more years	61	18.8
Educational level	Undergraduate	292	90.1
	Graduate	32	9.9
Class level that teachers teach	1st grade	78	24.1
	2nd grade	82	25.3
	3rd grade	81	25
	4th grade	83	25.6
The total number of students in class that teachers teach	26-30 students	40	12.3
	31-35 students	161	49.7
	36-40 students	110	34
	41-45 students	13	4
The number of inclusive students in class that teachers teach	One student	270	83.3
	Two students	40	12.3
	Three students	10	3.1
	Four students	4	1.2
Total		324	100

According to Table 1, it is seen that 175 (54%) of the primary teachers participating in the study are female and 149 (46%) are male.70 (21.6%) primary teachers have a 1-5 year professional seniority, 64 (19.8%) primary teachers have a 6-10 year professional seniority, 63 (19.4%) primary teachers have a 11-15 year professional seniority, 66 (20.4%) primary teachers have a 16-20 year professional seniority, and 61 (18.8%) primary teachers have a 21-and-more year professional seniority. 32 (9.9%) of the teachers participating in the study are graduates of a master's degree. 78 (24.1%) of the teachers teach at the 1st grade, 82 (25.3%) of them teach at the 2nd grade, 81 (25%) of them teach at the 3rd grade, and 83 (25.6%) of them teach at the 4th grade level. Total number of students in class that teachers teach are usually between 31 and 40. There is one inclusive student in the classroom of most of the teachers (f=270, 83.3%).

DATA COLLECTION

Data were collected through the Teacher Efficacy for Inclusion (TEI) Scale and the Teaching Mathematics in Inclusive Settings (TMIS) Scale.

The TEI Scale was developed by Hollender (2011) and adapted into Turkish by Meral and Bilgiç (2012). The scale has 24 items with 5-likert type (1=I never do; 5=I can mostly do). The lowest score of the scale which has one factor is 24, and the highest score is 120. The higher scores of the scale shows that teacher proficiency are at

a good level. The CFA results (χ^2/df=4.06, RMSEA=.09, SRMR=.05, NFI=.96, NNFI=.97, CFI=.97) of the scale, which was adapted into Turkish, demonstrate that the one-factor-structure of the scale has acceptable values of goodness of fit index. Cronbach Alpha internal consistency coefficient is .96 (Meral & Bilgiç, 2012).

The TMIS Scale was rearranged by Aerni (2008) and adapted into Turkish by Meral and Takunyacı (2016). The scale consists of 12 items with 9-Likert type (1=not at all; 9=quite a lot). The scale consists of two sub-dimensions: effectiveness in classroom management and effectiveness in teaching strategies. The sub-dimensions of the scale can be separately scored and the lowest score that can be obtained from the sub-dimensions is 6 and the highest score is 54. A total score can be obtained from the entire scale, as well; and the lowest score that can be obtained in this way is 12, and the highest score is 108. The higher score of the scale indicates that the maths teaching proficiency in inclusive education is at a good level. The DFA results of the scale which was adapted into Turkish (χ2/df=4.4, RMSEA=.10, SRMR=.04, GFI=.90, AGFI=.85, NFI=.98, NNFI=.97, RFI=.97, IFI =.98, CFI=.98) shows that the two-factor structure of the scale has acceptable values of goodness of fit index. The Cronbach Alpha internal consistency coefficient is .95 for the whole scale and the Cronbach Alpha internal consistency coefficients are .92 and .90 for the sub-dimensions (Meral & Takunyacı, 2016).

The scales were applied online in line with voluntary participation and in a way that did not interfere with the teaching activities of the teachers. Data collection was carried out in a period of approximately one month.

DATA ANALYSIS

In the analysis of the data, the total scores obtained from the scale were taken into account. The relationships between the scales were determined by calculating the correlation coefficients. Kolmogorov-Smirnov[a] test, measures of central tendency (mean, median, mode) and skewness kurtosis values were used to determine the normality of the distribution. Therefore, the Mann-Whitney U test, which is one of the non-parametric tests, was used in order to compare the averages of the two groups, and the Kruskal-Wallis H test was used in order to compare the averages of more than two groups.

RESEARCH ETHICS

All ethical procedures were performed in this study. Ethical permission of the research was approved by Bartın University Social and Human Sciences Ethics Committee. Ethics committee document number is 2021-SBB-0306.

3 | FINDINGS

As a result of Kolmogorov-Smirnov[a] test, it was determined that the data obtained from the scale were not normally distributed (p<.05). Besides, other factors that show non-normal distribution are that the mean, median, and mode are far from each other and the ratios of the skewness and kurtosis values to the standard error are outside the range of -1.96 to +1.96 (Can, 2013). Therefore, the Mann-Whitney U Test, one of the non-parametric tests, was used for gender and education level variables in order to determine whether there is a statistically significant difference between the groups according to the variables; The Kruskal-Wallis H Test was used for the variables of the number of inclusive students in the class teachers teach, professional seniority, the class level that teachers teaches and the total number of classroom that teachers teach. Spearman Rank Differences correlation coefficients were calculated to determine the relationships between the scales.

The mean (M), standard deviation (SD), skewness and kurtosis values and correlation coefficients calculated for the TEI and TMIS are presented in Table 2.

Table 2. Descriptive Statistics Related to the Scales and Corelation Coefficients

	1	2	*M*	*SD*	skewness /SH	kurtosis /SH
1. TEI	-		95.63	22.96	-10.2	1.70
2. TMIS	.806**	-	83.77	21	-10.4	1.99

**p<.001

According to Table 2, there is a high-level and positive (r=.806, p<.001) significant relationship between TEI and TMIS. The values calculated as a result of the ratio of the skewness and kurtosis values to the standard error show that the data are not normally distributed.

The test results according to the gender variable of the TEI and TMIS scores of the primary teachers are presented in Table 3.

Table 3. The Results of Mann-Whitney U Test According to Gender

	Group	N	Mean rank	Rank sum	U	*p*
TEI	Female	175	169.99	29749	11726	.11
	Male	149	153.70	22901		
TMIS	Female	175	172.10	30117	11358	.04
	Male	149	151.23	22533		

According to Table 3, there is no statistically significance between the groups in the TEI scores in terms of the gender variable (U=11726, $p>.05$), while there is a statistically significance between the groups in the TMIS scores (U=11358, $p<.05$). When mean ranks are examined, it can be said that the TMIS scores of female teachers are higher than male teachers'.

According to educational level, the test results of the TEI and TMIS scores of the primary teachers are presented in Table 4.

Table 4. The results of Mann-Whitney U Test According to Educational Level

	Group	N	Mean rank	Rank sum	U	*p*
TEI	Undergraduate	292	157.05	45859	3081	.00
	Graduate	32	212.22	6791		
TMIS	Undergraduate	292	158.10	46166.50	3388.50	.01
	Graduate	32	202.61	6483.50		

According to Table 4, there is a statistical significance between the groups in terms of educational level (TEI U=3081, $p<.05$; TMIS U=3388.50, $p<.05$). When the mean rank is examined, it can be said that this significance derives from that the scores of the teachers who have a master's degree are higher than the scores of the teachers who have an undergraduate degree.

According to the variable of the number of inclusive students in the class that teachers teach, the test results of TEI and TMIS scores of primary teachers are presented in Table 5.

Table 5. The Results of Kruskal-Wallis H Test According to the Number of Inclusive Students in the Class that Teachers Teach

	Group	N	Mean rank	sd	χ^2	*p*	Significance	η^2
TEI	One Student (1)	270	185.83	3	100.903	.00	1-2	.31
	Two Students (2)	40	48.18				1-3	
	Three Students (3)	10	45.50				1-4	
	Four Students (4)	4	23.38				2-3	
TMIS	One Student (1)	270	185.82	3	100.887	.00	1-2	.31
	Two Students (2)	40	48.96				1-3	
	Three Students (3)	10	42.90				1-4	
	Four Students (4)	4	22.75				2-3	

According to Table 5, there is a statistical significance between the groups in terms of the variable of the number of inclusive students in the class that primary teachers teach (TEI $\chi^2_{(3)}=100.903$, $p<.05$; TMIS $\chi^2_{(3)}=100.887$, $p<.05$). As a result of the multiple comparisons made with the Mann-Whitney U Test, it was found that the significances are between the first group and the second, third and fourth groups, and the second group and the third group. In terms of the mean rank, it can be said that this significance derives from that the scores of the group that has one and two inclusive students in the class taught are higher than the scores of the group that has three and four inclusive students in the class taught.

According to the professional seniority variable, the test results of the TEI and TMIS scores of the primary teachers are presented in Table 6.

Table 6. The Results of Kruskal-Wallis H Test Results According to Professional Seniority

	Group	N	Mean rank	sd	χ^2	*p*	Significance	η^2
TEI	1-5 years (1)	70	60.18	4	121.463	.00	1-2, 1-3 1-4, 1-5 2-3, 2-4 2-5, 3-5 4-5	.37
	6-10 years (2)	64	162.84					
	11-15 years (3)	63	184.67					
	16-20 years (4)	66	190.54					
	21 and more years (5)	61	226.33					
TMIS	1-5 years (1)	70	59.78	4	124.224	.00	1-2, 1-3 1-4, 1-5 2-3, 2-4 2-5, 3-5 4-5	.38
	6-10 years (2)	64	159.31					
	11-15 years (3)	63	183.55					
	16-20 years (4)	66	195.30					
	21 and more years (5)	61	226.50					

According to Table 6, there is a statistical significance between the groups according to the variable of professional seniority (TEI $\chi^2_{(4)}$=121.463, p<.05; TMIS $\chi^2_{(4)}$=124.224, p<.05). As a result of the multiple comparisons made with the Mann-Whitney U test, the significances are between the first group and the second, third, fourth and fifth; the second group and the third, fourth and fifth; between the third group and the fifth group, and the fourth group and the fifth group. In terms of the mean rank, it can be said that this significance derives from the higher scores of teachers with more professional seniority.

According to the class level variable, the test results of the TEI and TMIS scores of the primary teachers are presented in Table 7.

Table 7. The Results of Kruskal-Wallis H Test Results According to Class Level

	Group	N	Mean rank	sd	χ^2	*p*	Significance	η^2
TEI	1st grade (1)	78	131.36	3	15.317	.00	1-2 1-3 1-4	.04
	2nd grade (2)	82	164.73					
	3rd grade (3)	81	163.11					
	4th grade (4)	83	188.96					
TMIS	1st grade (1)	78	131.63	3	15.689	.00	1-2 1-3 1-4	.04
	2nd grade (2)	82	166.07					
	3rd grade (3)	81	160.65					
	4th grade (4)	83	189.78					

Table 7 indicates that there is a statistical significance between the groups according to the variable of the class level that teachers teach (TEI $\chi^2_{(3)}$=15.317, p<.05; TMIS $\chi^2_{(3)}$=15.689, p<.05). As a result of multiple comparisons made with the Mann-Whitney U Test, it is determined that this significance is between the first group and the second, third and fourth groups. In terms of the mean rank, it can be said that this significance derives from the higher scores of the second, third and fourth grades.

According to the total number of students, the test results of the TEI and TMIS scores of the primary teachers are presented in Table 8.

Table 8. The Results of Kruskal-Wallis H Test Results According to the Total Number of Students

	Group	N	Mean rank	sd	χ^2	*p*	Significance	η^2
TEI	26-30 students (1)	40	193.95	3	67.654	.00	1-3,1-4 2-3,2-4 3-4	.20
	31-35 students (2)	161	192.32					
	36-40 students (3)	110	123.59					
	41-45 students (4)	13	25.65					
TMIS	26-30 students (1)	40	201.30	3	71.817	.00	1-3,1-4 2-3,2-4 3-4	.22
	31-35 students (2)	161	191.15					
	36-40 students (3)	110	123.46					
	41-45 students (4)	13	18.65					

According to Table 8, it is seen that there is a statistical significance between the groups according to the variable of total number of students (TEI $\chi^2_{(3)}$=67,654, p<.05; TMIS $\chi^2_{(3)}$=71.817, p<.05). As a result of the multiple comparisons made with the Mann-Whitney U Test, the significances are between the first group and the third and

fourth groups; between the second group and the third and fourth groups, and between the third and fourth groups. In terms of the mean rank, it can be stated that this significance derives from the higher scores of the teachers who have more students in their class.

4 | DISCUSSION & CONCLUSION

The current study reveals that there is a high-level and positive correlation between TEI and TMIS. Based on this result, it can be concluded that there is a relationship between primary teachers' proficiencies on inclusion and maths teaching in inclusion and the two proficiencies affect each other.

The primary teachers participating in the study can be said to have similar characteristics in terms of inclusion proficiencies according to the gender variable. This finding is similar to the results of the results of other research studies (Berk et al., 2009; Hofman & Kilimo, 2014; Telef, 2011; Tschannen-Moran & Hoy, 2007; Şahbaz & Kalay, 2010), which state that the gender variable does not affect teacher proficiency.

It was determined that female teachers are more proficient in terms of mathematics teaching in inclusive education. According to some studies (e.g. Fakolade et al., 2009; Forlin et al., 2009; Kumar, 2016; Palavan et al., 2018) female teachers are stated to have more positive attitudes towards inclusion. It can be said that this situation supports the finding that female teachers' proficiency in teaching mathematics in inclusion is also higher. Besides, it is thought that the previous education-teaching experiences of the primary teachers participating in the study on teaching mathematics in inclusion may be different.

According to the educational level, it was determined that primary teachers who have a master's degree were more proficiency in terms of inclusion proficiencies and mathematics teaching proficiencies in inclusion. Based on this, it can be stated that the increase in the educational level positively affects the proficiencies of primary teachers. There are various studies (e.g. Forlin et al., 2009; Parasuram, 2006; Sharma et al., 2008) revealing that higher education level of teachers positively affects their attitudes towards inclusion. Accordingly, it can be said that teachers who have positive attitudes towards inclusion may have higher inclusion proficiencies and maths teaching proficiencies in inclusion.

According to the variable of the number of inclusion students in the classroom that primary teachers teach, it was determined that primary teachers who have fewer inclusive students in their classroom have higher inclusion proficiencies and maths teaching proficiencies in inclusion. Schmidt and Vrhovnik (2015) stated that teachers who have two or less inclusion students in their class have a more positive attitude towards inclusion. The high number of inclusive students in the classroom causes teachers to work more and be stressed (Avramidis & Kalyva, 2007). It can be stated that because teachers who have more students with special needs in their classroom can allocate less time to these students and do not have enough time to adapt the content of teaching and curriculum, and therefore their inclusion proficiency and maths teaching proficiency in inclusion may be lower.

According to the professional seniority variable, it was determined that primary teachers with more senior have higher proficiencies on inclusion and maths teaching in inclusion. In the studies of Campbell (1996), Daugherty, (2005), Gençtürk and Memiş, (2010) and Tschannen-Moran and Hoy, (2002) it was found that the proficiency of teachers increases as their professional seniority increases. Based on this, it can be said that as the seniority of the primary teachers increases, they have more inclusion students and gain experience in adaptation and teaching.

According to the grade level variable, it was determined that primary teachers teaching in the second, third and fourth grades have higher proficiencies in inclusion and in maths teaching in inclusion than teachers teaching in the first grade. Sadioglu et al. (2012) found that primary teachers stated that educational activities are more tiring in the first grade of primary school, and they are more tired because they allocate extra time to the inclusion student in the first grade. On the other hand, Schmidt and Vrhovnik (2015), stated that secondary school teachers have more positive attitudes towards inclusive students than primary teachers. In this respect, it can be said that the presence of inclusive students in the first grade of primary school causes primary teachers' proficiencies on inclusion and maths teaching in inclusion to be lower than that of primary teachers teaching at other grade levels.

According to the variable of the total number of students that teachers teach, it was determined that the inclusive proficiency and maths teaching proficiency of the primary teachers who teach in less crowded classrooms are higher. Arico (2011) revealed that the academic achievement of inclusive students in lower crowded classrooms

was higher and that the teachers also thought in this way. Köse-Biber (2009) stated that crowded classrooms in inclusive education make it difficult for teachers to communicate with children with special needs and pointed out that the inability of teachers to take care of students with special needs in crowded classrooms causes negative attitudes in teachers. Smith and Smith (2000) stated that the decrease in the number of students in classrooms increases teachers' perceptions of success in inclusion. Shin and Chung (2009) stated that student achievement decreased in crowded classrooms, while Robertson (2005) stated that class size affects the quality of education and the quality in less crowded classrooms increases. Consequently, it can be said that the crowded classrooms may decrease the working efficiency of the teachers, therefore; negatively affect the primary teachers' proficiencies on inclusion and proficiency in maths teaching in inclusion.

STATEMENTS OF PUBLICATION ETHICS

Ethical permission of the research was approved by Bartın University Social and Human Sciences Ethics Committee. Ethics committee document number is 2021-SBB-0306.

RESEARCHERS' CONTRIBUTION RATE

Authors	Literature review	Method	Data Collection	Data Analysis	Results	Conclusion
Sedat Turgut	☒	☒	☒	☒	☒	☒
Mahir Uğurlu	☒	☒	☒	☒	☒	☒

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CONFLICT OF INTEREST

We confirm that there are no conflicts of interest associated with this study.

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