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Comparison of Problem-Posing Self-Efficacy Beliefs among Mathematics Teachers in Science and Art Centres (SAC) and State Schools

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Abstract
The aim of this study is to compare the self-efficacy beliefs in problem posing of middle school mathematics teachers in Science and Art Centres and state schools. A descriptive research model was employed. The study was conducted with 187 teachers and "Teachers' Problem Posing Self-Efficacy Beliefs Inventory" (TPPBEI) was used. In the study, it was observed that the problem posing self-efficacy beliefs of middle school mathematics teachers in both groups were high, and there was a statistically significant difference between the two groups, favoring the teachers working in SAC.

Keywords: Problem-Posing, Self-Efficacy Beliefs, State Schools, Science and Art Centres, Mathematics Teachers.

Introduction

There is a strong bidirectional relationship between problem-solving and problem-posing. Consequently, problem-posing plays a prominent role within the domain of mathematics education,and it is even known to help students develop certain essential skills (Korkmaz & Gür, 2006) and assist students in making sense of mathematics (Stoyanova, 2003). Therefore, it is crucial to conduct problem-posing activities effectively.

Problem-posing, regarded as one of the most critical constituents of problem-solving, is defined as the creation of a new problem related to a given number or situation or the reconfiguration of an existing problem (English, 2003). Even if the ChatGPT and its effect on the researchers has become a phenomenon in scientific researches (Aydın Yıldız & Çınar Yağcı, 2023), for educators, problem-posing can be perceived as a window into students' thinking styles (Çıldır & Sezen, 2011). In this context,educators are anticipated to create instructional settings that facilitate problem-posing activities. From a mathematical perspective, the ability to create mathematical problems is emphasized as a fundamental element of the professional competence of mathematics teachers (Tichá & Hošpesová, 2013). Therefore, in this research, mathematics teachers will be examined.

Several affective variables, such as self-efficacy, influence the skill of problem posing (Şengül-Akdemir & Türnüklü, 2017). In the realm of mathematics education, self-efficacy is deemed one of the noteworthy affective factors (Kartal, et al., 2022; Yıldız & Kardaş, 2021). Therefore, the enhancement of individuals' problem-solving or problem-posing skills can be understood through the revelation of self-efficacy beliefs in problem-solving (Mason, 2003).

Individuals with high self-efficacy trust themselves in handling new situations and believe they can be successful in the tasks they undertake (Sakız, 2013). Individuals with high self-efficacy perception make efforts to accomplish tasks and do not easily give up when facing setbacks (Schunk, 2009). Teachers with strong self-efficacy beliefs regarding problem posing are more willing and confident in allocating more time to this activity. However, a pertinent question arises: Can students' achievements and needs differentiate the self-efficacy beliefs of teachers regarding problem posing? Therefore, this study, the self-efficacy beliefs of mathematics teachers in Science and Art Centres (SAC) and state schools will be compared.

In Turkey, the education of exceptionally gifted individuals can also be provided through Science and Art Centres (SAC). In SACs, exceptionally gifted students attending pre-school, primary, and secondary education institutions are identified, and they receive education in their areas of talent. Exceptionally gifted children in SAC receive education in both the fields of art and science, which is why these institutions are referred to as "Science and Art Centres" (Gökdere & Çepni, 2005). One of the disciplines in which exceptionally gifted students receive education at SACs is mathematics. Mathematics activities in SAC are conducted by mathematics teachers assigned to the mathematics unit at SAC. Teachers appointed to SAC can work according to the centres' program for the morning, afternoon, and evening, on Saturdays and Sundays.

In the literature, in addition to studies focusing on teaching through problem-posing approaches, research concerning the problem-posing skills and strategies of students, teacher candidates, and teachers of all age groups, starting from elementary school, is also prevalent. In Turkey, these studies predominantly concentrate on examining the problem-posing abilities of students at the primary and secondary education levels from various perspectives (Aykurtlu, 2019; Bulut & Serin, 2020; Övez & Çınar, 2018; Sümen, 2021; Türkkan, 2018). However, when examining studies conducted with teachers, it has been determined that such studies are limited and primarily focused on mathematics (Çomarlı & Özdemir, 2018; Yıldız & Baltacı, 2015). On the other hand, studies conducted in our country related to Science and Art Centers are primarily geared towards gifted students (Aktepe & Aktepe, 2009; Baltaci, et al. 2014). Despite the presence of various theories in the literature, there is a need for research that examines the situations of teachers who play a significant role in their education and compares them with other teachers. Therefore, it can be said that any research related to teachers, which aims to improve education as a whole, is important for future decision-making. Based on this, the aim of this study is to compare the self-efficacy beliefs in problem posing of middle school mathematics teachers in Science and Art Centres and state schools. Hence, when examining previous studies, it can be stated that this research will be original and provide significant contributions to the literature.

In the study, investigations were conducted to address the following research questions:

1. Do middle school mathematics teachers working in state schools and SAC have significantly different self-efficacy beliefs related to problem posing?
2. Do middle school mathematics teachers in state schools and SAC have significantly different self-efficacy beliefs related to problem posing based on their educational levels?
3. Do middle school mathematics teachers in state schools and SAC have significantly different self-efficacy beliefs related to problem posing based on their genders?
4. Do middle school mathematics teachers in state schools and SAC have significantly different self-efficacy beliefs related to problem posing based on their professional experiences?

Method

In this section, information is provided about the research design, the study group, and data collection and analysis.

Research Design

Since the primary aim of this research was to compare the self-efficacy beliefs related to problem posing of middle school mathematics teachers in SACs and state schools to arrive at general assessments, a descriptive research model

was employed. Therefore, the current situation was initially presented, followed by comparisons between the problem-posing self-efficacy of the two groups.

Study Group

The study group of the research consists of 73 teachers who teach mathematics to middle school student groups at SACs in the Black Sea Region of Turkey, and 114 mathematics teachers from randomly selected middle state schools located in the same cities as SACs. Thus, the study was conducted with 187 teachers who voluntarily participated. The distribution of the teachers participating in the research based on their educational levels, genders, and experiences is shown in Table 1.

Table 1 Descriptive Statistics for the Study Group

		State		SAC	
		N	%	n	%
Education Level	University	94	82,5	35	47,9
	M.A.	20	17,5	38	52,1
Gender	Female	77	67,5	38	52,1
	Male	37	32,5	35	47,9
Experience	0-8 years	67	58,8	28	38,4
	9-16 years	34	29,8	34	46,6
	17 years+	13	11,4	11	15,1

While middle school mathematics teachers working in state schools make up 60.96% of the sample, teachers in SACs constitute 39.04%. When examining the distribution based on the teachers' educational levels and genders in Table 1, it can be observed that the SAC group has a balanced distribution in terms of both the school graduated from (35 individuals with undergraduate degrees, 38 individuals with postgraduate degrees) and gender (38 females, 35 males). In contrast, in the group of teachers working in state schools, the distribution (94 undergraduates, 77 females) is in favour of graduates and females. On the other hand, when examining the teachers' experiences, it can be stated that most teachers working in state schools (67 individuals) fall within the 0-8 years range, while in the SAC group, it can be said that the 0-8 years (28 individuals) and 9-16 years (34 individuals) groups are balanced.

Data Collection Tool

In the research, Kılıç and İncikabı's (2013) "Teachers' Problem Posing Self-Efficacy Beliefs Inventory" (TPPBEI) was used to determine teachers' self-efficacy beliefs related to problem posing. The scale consists of 26 items. Individuals express their level of agreement with each item on the scale using a Likert-type five-point rating scale. As a result of the exploratory factor analysis conducted by Kılıç and İncikabı (2013), the scale was found to have three sub-components named "teaching efficacy," "effective teaching efficacy," and "content knowledge efficacy." The measurement tool is evaluated by obtaining total scores across the sub-factors and the overall scale. The scale's α coefficient, in this research, was calculated as 0.91. The reliability coefficients calculated using the Cronbach Alpha method by the developers of the TPPBEI scale varied between 0.77 and 0.88 for all sub-components based on the analyses.

Data Analysis

The data collection instrument was administered to voluntary participating teachers. Statistical analysis of the data was conducted using SPSS 21.0. The analysis of the data revealed that, based on the significance value obtained from the Kolmogorov-Smirnov test, which was less than 0.05, and the skewness-kurtosis coefficient falling within the range of +2.0 to -2.0, the data exhibited a normal distribution. Consequently, parametric tests were employed in this context.

In order to ascertain teachers' self-efficacy beliefs related to problem posing, participants' responses to the measurement instrument were examined on scale factors and on a total scale basis. The relationship between the self-efficacy beliefs of mathematics teachers working at SACs and state schools in relation to problem posing and whether there were significant differences was investigated using an independent samples t-test. Due to the unequal number of teachers in the groups formed by their educational levels, gender, and experience variables, a one-way analysis of variance (ANOVA) was employed, instead of a two-way analysis of variance, as suggested by Ford and Harris (1992). Complementary post-hoc analysis techniques,

such as Tukey test, were employed to determine which groups exhibited significant differences after the significant difference found through one-way ANOVA.

Findings

In the first subproblem, an independent samples t-test was conducted to answer the question of whether there is a significant difference in the self-efficacy beliefs of middle school mathematics teachers working in SACs and state schools concerning problem posing. The results are presented in Table 2.

Table 2 Independent Samples t-Test Results for the Mean Scores of TPPEBI (Teachers' Problem Posing Efficacy Beliefs Inventory) for State and SAC Teachers

		n	x	S	df	t	p*
Effective Teaching Efficacy	State	114	35,88	5,30	185	-3,514	0,001
	SAC	73	38,47	4,24			
Content Knowledge Efficacy	State	114	33,72	4,43	185	-3,176	0,002
	SAC	73	35,67	4,46			
Teaching Efficacy	State	114	37,46	4,85	185	-2,751	0,007
	SAC	73	39,38	4,31			
Overall Score	State	114	107,07	13,55	185	-3,373	0,001
	SAC	73	113,53	11,43			

* $p<0,05$

In the scale, scores within the range of 9-45 can be obtained for the "Teaching Efficacy" and "Effective Teaching Efficacy" dimensions, scores between 8 and 40 for the "Content Knowledge Efficacy" dimension, and scores between 26 and 130 for the total scale. Teachers' scores were categorized according to the possible scores they could achieve, and when the average scores were examined as shown in Table 2, it was observed that middle school mathematics teachers in both groups received high scores on the sub-dimensions of the scale and the total scale. However, upon closer inspection of the score averages, it was determined that teachers in the SAC group scored higher in each category.

As observed in Table 2, when teachers from both groups are compared, it is evident that a noteworthy difference exists in teachers' self-efficacy beliefs related to problem posing in the sub-dimensions of the scale: "Effective Teaching Efficacy" ($t= -3.51$, $p<0.05$), "Content Knowledge Efficacy" ($t= -3.17$, $p<0.05$), and "Teaching Efficacy" ($t= -2.75$, $p<0.05$). Furthermore, this difference is in favor of middle school mathematics teachers working in SAC. Similarly, when examined for the overall scale, there is a statistically significant difference in favor of SAC teachers ($t= -3.37$, $p<0.05$) between the two groups.

To address the second subproblem and investigate whether there is a significant difference in the mean scores obtained from TPPEBI based on the educational levels of the two groups, four groups were formed according to the institutions and educational levels of the teachers (State-Bachelor's Graduates, SAC-Bachelor's Graduates, State-Master's Graduates, SAC-Master's Graduates). The ANOVA results obtained from the comparison of these groups are presented in Table 3.

Table 3 One-Way ANOVA Test Results for the Mean Scores of TPPEBI for State and SAC Teachers by Educational Level Variable

	Source of Variance	Sum of Squares	d	Mean of Squares	F	p*	Sig. Diff.
Effective Teaching Efficacy	Between Groups	384,873	3	128,291	5,338	0,002	Bachelors in State-MA in SAC**
	Within Groups	4398,197	183	24,034			
	Total	4783,070	186				
Content Knowledge Efficacy	Between Groups	214,247	3	71,416	4,304	0,006	Bachelors in State-MA in SAC**
	Within Groups	3036,470	183	16,593			
	Total	3250,717	186				
Teaching Efficacy	Between Groups	274,925	3	91,642	4,308	0,006	Bachelors in State-MA in SAC**
	Within Groups	3892,518	183	21,271			
	Total	4167,444	186				
Total Competence Scores	Between Groups	2550,168	3	850,056	5,280	0,002	Bachelors in State-MA in SAC**
	Within Groups	29460,752	183	160,988			
	Total	32010,920	186				

* p<0,05

*For the sub-dimension of Effective Teaching Efficacy: State-Bachelor's: X□=35.64, State-Master's: X=37.00, SAC-Bachelor's: X□=37.57, SAC -Master's: X=39.31.

*For the sub-dimension of Content Knowledge Efficacy: State-Bachelor's: X=33.54, State-Master's: X=34.60, SAC -Bachelor's: X=35.02, SAC-Master's: X=36.26.

*For the sub-dimension of Teaching Efficacy: State-Bachelor's: X□=37.28, State-Master's: X□=38.30, SAC-Bachelor's: X□=38.20, SAC-Master's: X□=40.47.

*For the overall scale: State-Bachelor's: X=106.47, State-Master's: X□=109.90, SAC-Bachelor's: X=110.80, SAC -Master's: X□=116.05.

**Tukey Test

According to Table 3, for SAC and state middle school mathematics teachers, there is a statistically significant difference in the mean scores obtained from TPPEBI based on their educational levels for the scale's sub-dimensions of "Effective Teaching Efficacy" (F(3,183)= 5.338, p<0.05), "Content Knowledge Efficacy" (F(3,183)= 4.304, p<0.05), and "Teaching Efficacy" (F(3,183)= 4.308, p<0.05). This difference is in favor of middle school mathematics teachers working in SAC in both Bachelor's and Master's degree groups. Another finding for each sub-dimension is that SAC teachers only lag behind in terms of the sub-dimension of instructional competence, which is specific to the section where State-Master's teachers have an average of 38.30 and SAC-Bachelor's teachers have an average of 38.20. Furthermore, when examined for the overall scale, there is a statistically significant difference in favor of SAC teachers in terms of their educational levels (F(3,183)= 5.280, p<0.05).

For the third subproblem, in order to investigate whether there is a significant difference in the mean scores obtained from TPPEBI based on gender for middle school mathematics teachers working in SAC and state schools, four groups were formed according to the institutions and gender of the teachers (State-Female, SAC-Female, State-Male, SAC-Male). The ANOVA results obtained from the comparison of these groups are presented in Table 4.

Table 4 One-Way ANOVA Test Results for the Mean Scores of TPPEBI for State and SAC Teachers by Gender Variable

	Source of Variance	Sum of Squares	d	Mean of Squares	F	p*	Sig. Diff.
Effective Teaching Efficacy	Between Groups	384,873	3	128,291	4,121	0,007	State-Female SAC-Male**
	Within Groups	4398,197	183	24,034			
	Total	4783,070	186				
Content Knowledge Efficacy	Between Groups	214,247	3	71,416	4,304	0,006	Bachelors in State-MA in SAC**
	Within Groups	3036,470	183	16,593			
	Total	3250,717	186				
Teaching Efficacy	Between Groups	274,925	3	91,642	4,308	0,006	Bachelors in State-MA in SAC**
	Within Groups	3892,518	183	21,271			
	Total	4167,444	186				
Total Competence Scores	Between Groups	2550,168	3	850,056	5,280	0,002	Bachelors in State-MA in SAC**
	Within Groups	29460,752	183	160,988			
	Total	32010,920	186				

* p<0,05

*For the sub-dimension of Effective Teaching Efficacy: State-Male: $\bar{X}$=35.64, State-Female: $\bar{X}$=36.00, SAC-Male: $\bar{X}$=38.54, SAC-Female: $\bar{X}$=38.02.

*For the sub-dimension of Content Knowledge Efficacy: State-Male: $\bar{X}$=32.94, State-Female: $\bar{X}$=34.10, SAC-Male: $\bar{X}$=35.62, SAC-Female: $\bar{X}$=35.71.

*For the sub-dimension of Teaching Efficacy: State-Male: $\bar{X}$=37.27, State-Female: $\bar{X}$=37.55, SAC-Male: $\bar{X}$=39.34, SAC-Female: $\bar{X}$=39.42.

*For the overall scale: State-Male: $\bar{X}$=105.86, State-Female: $\bar{X}$=107.66, SAC-Male: $\bar{X}$=113.51, SAC-Female: $\bar{X}$=113.55.

**Tukey Test

According to Table 4, a statistically significant difference is observed in the mean scores obtained from TPPEBI for the overall scale between SAC and state middle school mathematics teachers based on their gender ($F(3,183)= 3.925$, $p<0.05$). However, no statistically significant difference in terms of gender was found in the "Teaching Efficacy" sub-dimension of the scale ($F(3,183) = 2.531$, $p>0.05$). In the analysis of which groups exhibit significant differences in the other sub-dimensions, a significant difference in favor of SAC teachers was observed in the "Effective Teaching Efficacy" sub-dimension between female teachers in the state and male teachers in SAC. Similar analyses were conducted for the "Content Knowledge Efficacy" sub-dimension. Accordingly, a significant difference in favor of SAC groups was detected among male teachers between the SAC and state groups and between female teachers working in SAC and male teachers in the state.

To address the fourth subproblem and investigate whether there is a significant difference in the mean scores obtained from TPPEBI based on the experience levels of the two groups, six groups were formed according to the institutions and experience levels of the teachers (State_0-8 years, State_9-16 years, State_17 years and above, SAC_0-8 years, SAC_9-16 years, SAC_17 years and above). First, Table 5 provides descriptive statistics for state and SAC mathematics teachers based on their experience levels.

Upon examining Table 5, it is generally observed that in both groups, as professional experience increases, the mean self-efficacy scores associated with problem-posing exhibit an inclination to rise. However, there are three exceptions to this trend. In the sub-dimensions of "Content Knowledge Efficacy" and "Teaching Efficacy" as well as for the overall scale, mathematics teachers working in state schools with 0-8 years of experience have higher average scores compared to those with 9-16 years of experience. On the other hand, the ANOVA results obtained from the comparison of the groups in terms of professional experience are presented in Table 6.

Table 5 Descriptive Statistics for State and SAC Teachers by Experience Variable

		n	x	sd
Effective Teaching Efficacy	State_0-8 years	67	35,4328	5,03991
	State _9-16 years	34	36,0000	5,72078
	State _17 years+	13	37,9231	5,48424
	SAC_0-8 years	28	37,9643	4,52550
	SAC_9-16 years	34	38,6765	4,26203
	SAC_17 years+	11	39,1818	3,62817
	Total	187	36,8984	5,07104
Content Knowledge Efficacy	State _0-8 years	67	33,8209	4,23523
	State 9-16 years	34	33,1765	4,77665
	State _17 years+	13	34,6923	4,66163
	SAC_0-8 years	28	35,0357	3,72660
	SAC_9-16 years	34	35,7353	3,40507
	SAC_17 years+	11	37,0909	2,66288
	Total	187	34,4866	4,18055
Teaching Efficacy	State _0-8 years	67	37,3881	4,68057
	State _9-16 years	34	37,3529	5,43770
	State _17 years+	13	38,1538	4,43182
	SAC_0-8 years	28	39,0000	4,65872
	SAC_9-16 years	34	39,0882	4,20222
	SAC_17 years+	11	41,2727	3,52394
	Total	187	38,2139	4,73346
Total Competence Scores	State _0-8 years	67	106,6418	12,81063
	State _9-16 years	34	106,5294	14,95698
	State -17 years+	13	110,7692	13,94724
	SAC_0-8 years	28	112,0000	12,53144
	SAC_9-16 years	34	113,5000	11,26069
	SAC_17 years+	11	117,5455	8,60655
	Total	187	109,5989	13,11875

Table 6 One-Way ANOVA Test Results for the Mean Scores of TPPEBI for State and SAC Teachers by Experience Variable

	Source of Variance	Sum of Squares	d	Mean of Squares	F	p*	Sig. Diff.
Effective Teaching Efficacy	Between Groups	381,657	5	76,331	3,139	0,010	State (0v8) -SAC(9v16)**
	Within Groups	4401,413	181	24,317			
	Total	4783,070	186				
Content Knowledge Efficacy	Between Groups	224,664	5	44,933	2,688	0,023	State (0v8) –SAC (17ü)**
	Within Groups	3026,052	181	16,719			
	Total	3250,717	186				
Teaching Efficacy	Between Groups	217,159	5	43,432	1,990	0,082	-

Teaching Efficacy	Within Groups	3950,285	181	21,825	1,990	0,082	-
	Total	4167,444	186				
Total Competence Scores	Between Groups	2297,511	5	459,502	2,799	0,018	State (0v8) –SAC (17ü)**
	Within Groups	29713,409	181	164,162			
	Total	32010,920	186				

* p<0,05; * * Tukey Test

According to Table 6, there is a statistically significant difference in the mean scores obtained from TPPEBI for the overall scale between SAC and state middle school mathematics teachers based on their experience levels ($F(5,181)= 2.799$, $p<0.05$). A significant difference was observed between state mathematics teachers with 0-8 years of experience and SAC mathematics teachers with 17 years and above of experience. However, in the "Teaching Efficacy" sub-dimension of the scale, no statistically significant difference in terms of experience was found ($F(5,181) = 1.990$, $p>0.05$). In the analysis of which groups exhibit significant differences in the other sub-dimensions, a significant difference in favor of SAC teachers was observed in the "Effective Teaching Efficacy" sub-dimension between state teachers with 0-8 years of experience and SAC teachers with 9-16 years of experience. A similar analysis for the "Content Knowledge Efficacy" sub-dimension revealed a significant difference between state teachers with 0-8 years of experience and SAC teachers with 17 years and above of experience.

Discussion

Teaching problem posing in a way that requires individuals to think creatively and logically can be conducted by teachers who are conscious of this and have acquired basic knowledge and skills related to the subject. In this study, the problem posing self-efficacy beliefs of middle school mathematics teachers in SACs and state schools were determined and compared. In the study, it was observed that the problem posing self-efficacy beliefs of middle school mathematics teachers in both groups were high, and there was a statistically significant difference between the two groups, favoring the teachers working in SAC. When reviewing the literature, it is seen that similar results are found between teachers and teacher candidates in Turkey (Altıntaş & Tanrıseven, 2017; Deringöl, 2018). Indeed, this outcome can be attributed to the mutual support between self-efficacy beliefs associated with mathematics instruction and beliefs linked to problem-solving. Şahin et al., (2014) found that the self-efficacy beliefs of mathematics teachers regarding mathematics teaching were high, and also, Tarhan (2015) found that the beliefs of mathematics teachers regarding problem-solving were positive. Furthermore, most of the studies in the literature have found that the problem posing skill levels of teachers and teacher candidates are at a moderate level (Crespo & Sinclair, 2008; Korkmaz & Gür, 2006; İskenderoğlu & Güneş, 2016; Leung & Silver, 1997; Mestre, 2002; Ulusoy & Kepçeoğlu, 2018). Therefore, it can be inferred that skills do not always correspond to affective criteria such as beliefs/self-efficacy.

Past experiences and socio-cultural environments have an impact on problem posing (Stickles, 2006). In this study, when middle school mathematics teachers working in SAC and state schools were compared in terms of their educational levels (undergraduate/postgraduate), a significant difference in favor of SAC teachers was observed and those with postgraduate education. This finding is in contrast with the results found in the studies of Benzer (2011) and Ateş (2016), where there was no statistically significant difference found between teachers' self-efficacy beliefs and their educational levels.

Another result of the research is that, except for the "Instructional Competence" sub-dimension, there is a statistically significant difference in problem posing self-efficacy beliefs between SAC and state middle school mathematics teachers in terms of gender. However, when each group is examined individually, gender does not create a significant difference within each group. This result is in line with the literature on self-efficacy beliefs and problem posing self-efficacy beliefs of teachers in Turkey. Ateş (2016) and Gençtürk and Memiş (2010) found that the self-efficacy beliefs of teachers

did not significantly differ between male and female teachers. Additionally, Özgen et al., (2019) found that the problem posing self-efficacy beliefs of mathematics teachers did not significantly differ by gender. Similarly, Altıntaş and Tanrıseven (2017) found in their research that the problem posing self-efficacy beliefs of class teachers did not differ by gender.

In the research, it was generally observed that the problem posing self-efficacy mean scores of middle school mathematics teachers increased as their professional experience increased. However, when each group was examined individually, it was seen that experience did not create a significant difference among individuals working in the same group. Stickles (2011) found in his study with teachers that teaching experience and background had an impact on problem posing. However, like in this study, Ateş (2016) also stated in his study that the self-efficacy beliefs of teachers showed no variation based on age.

In accordance with the research findings, further research could be conducted to identify and compare the problem-solving beliefs and problem posing self-efficacy of mathematics teachers working in different types of schools. Qualitative research could also be conducted to delve deeper into the problem-solving beliefs and problem posing self-efficacy of teachers. Additionally, exploring the relationship between teachers' problem posing skills and problem posing self-efficacy beliefs could be a subject of future research.

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