

Factors Influencing Science Teachers' Self-Efficacy

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ABSTRACT

This research explored the level of teachers' self-efficacy based on their gender, education degree, title, grade levels, years of teaching and the correlation between these factors. Convenience sampling was used to select 148 science teachers in China. A survey method was used, and the data were collected using the Teacher Teaching Efficacy Scale (TSES). The results showed that the self-efficacy of most science teachers is at a medium level. Furthermore, there was a significant gap in the teachers' self-efficacy based on their gender, education degree, years of teaching. Surprisingly, it was found that the efficacy of males is stronger than females in science teaching. Moreover, there was a moderate positive and significant correlation between science teachers' self-efficacy and years of teaching. Teachers with a long teaching experience had the tendency to obtain a higher self-efficacy score. However, the science teachers with higher degree would have a lower sense of efficacy. Therefore, it is concluded that skills training in student management, classroom management and teaching strategies should be strengthened while improving the degree among the pre-service teachers. In addition, the self-efficacy of female science teachers should be more concerned.

Keywords: self-efficacy, science teacher, gender, years of teaching

INTRODUCTION

Self-efficacy was first proposed by psychologist Bandura in 1977 (Bandura, 1977). He believes that self-efficacy refers to an individual's perception or belief in the ability to effectively control all aspects of his or her life (Bandura, 1989). Self-efficacy is a judgment of the state of the future self. Through its own expectations, it can integrate the future of planning into the present; in addition, through the current cognitive representation, the future state of imagination is changed into the motive and regulator of current behavior. Therefore, teachers' self-efficacy is considered to be the basis for improving teaching efficiency (Gibson & Dembo, 1984) and will contribute to teacher training.

There are a lot of researches on teachers' self-efficacy. These studies explore the relationship between teachers' self-efficacy and their teaching practice and students' academic results (Gibson & Dembo, 1984; Woolfold & Hoy, 1990). Different scholars have different classifications of teachers' self-efficacy. Gibson et al. believe that teacher' teaching efficacy includes both general teaching self-efficacy and individual teaching self-efficacy. Bandura outlines the teaching efficacy of teachers from the perspective of teachers' tasks. The teacher's teaching self-efficacy is divided into seven parts, which are the self-efficacy of making decisions, the self-efficacy of school resources, the self-efficacy of teaching, the self-efficacy of management discipline, and the involvement of parents. The self-efficacy of education, the self-efficacy of engaging the community in education, and the self-efficacy of creating a positive school atmosphere.

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Table 1. Distribution of samples

Items	N	Percentage	Items	N	Percentage		
Gender	Male	48	33.1	Grade levels	Primary school	74	51.03
	Female	97	66.9		Junior high school	34	23.45
Education degree (ED)	Below undergraduate	6	4.14		High school	37	25.52
	Undergraduate	102	70.34	≤5years	68	46.9	
	Master	37	25.52	6~10 years	15	10.34	
Title	Senior	12	8.28	Years of teaching (YT)	11~15 years	9	6.21
	First-level	49	33.79		16~20 years	12	8.28
	Second-level	42	28.97		21~30 years	34	23.45
	Third-level	9	6.21		≥31years	37	4.83
	Pre-service	33	22.76				

Bandura (1981) argues that self-efficacy has different structures in different contexts. Compared with the general form of teaching efficacy, science teachers' self-efficacy has a special performance. Based on Gibson et al.'s research on teacher efficacy, Riggs et al. proposed teachers' self-efficacy in the field of science teaching, including general science teaching self-efficacy and individual science teaching self-efficacy, and measured pre-service science teachers (Riggs & Enochs, 1990). Ali (2010) used the science teaching efficacy belief scale (STEBS) to study the self-efficacy of pre-service teachers and in-service teachers of different genders, types of graduates, teaching experience and professionalism, and found that there was no significant difference in the self-efficacy belief and outcome expectation of science teaching between in-service and pre-service middle school science teachers. In addition, self-efficacy has nothing to do with their gender and teaching experience, but with their type and major (Azar, 2010). Adam (2018) studied the relationship between the level of science literacy and the level of self-efficacy of primary school science teachers, and the results showed that there was a moderate positive correlation between the two. However, the above research did not consider the differences of self-efficacy of science teachers with different educational background, professional title, teaching period and teaching age. Therefore, it is necessary to study the relationship between variables of science teachers' academic background, title, tenure and teaching age and their self-efficacy, which will be conducive to more accurate prediction of science teachers' behaviors and help science teachers to make positive changes (Riggs & Enochs, 1990). The research questions of this study are determined as follows:

What is the level of self-efficacy relating to science teaching in science teachers?

Are there significant differences in self-efficacy among science teachers of different genders, education background, titles, grades and teaching ages?

Which factors are correlated with the self-efficacy of science teachers?

RESEARCH SAMPLE AND METHODS

Research Sample

This study randomly selected science (including science, physics, chemistry and biology) teachers from schools in Beijing and Shandong province as research objects, then 148 questionnaires were issued, 145 were collected, 145 were valid, and the effective recovery rate was 97.97%. Among them, 64 science teachers are from Beijing and 81 science teachers are from Shandong. The specific situation of the respondents is shown in **Table 1**.

Research Methods

Research instrument

In this study, the Teacher Teaching Efficacy Scale (TSES) compiled by Tshannan-Moran and Woolfolk Hoy in 2001 was adopted for testing. The scale consists of two parts. The first part is the basic information of the teacher. The second part is the formal topic, which includes 24 channels, including student management, class management and instructional strategies. Three different dimensions are used to evaluate teachers' teaching efficacy. The scale is scored from 0 to 11 points, and the higher the score, the higher the teaching efficacy (Dixon, 2014). The Cronbach Alphas coefficient of the scale was 0.962, indicating that the questionnaire was of credibility. The Bartlett spherical test results show that the approximate chi-square value is 291.745, the

Table 2. Mean and Standard Deviation of Science Teachers' Self-efficacy

Variables	High-SE	Moderate-SE	Low-SE	Total-SE
SM	75.98±7.09	60.55±6.50	45.83±5.39	63.72±11.72
CM	78.94±5.96	64.59±6.59	49.44±2.91	67.36±11.15
IS	76.43±6.17	62.53±5.47	49.17±6.74	65.37±10.54
N	47	80	18	145
Percentage	32.41%	55.17%	12.42%	100%

Table 3. Independent Samples t-test

Variables	Gender	N	Mean	SD	Percentage	F	P
SM	M	48	66.56	12.768	72.41	0.344	0.040
	F	97	62.32	10.958			
CM	M	48	70.79	10.695	76.55	0.505	0.009
	F	97	65.66	11.028			
IS	M	48	67.98	10.387	74.28	0.014	0.036
	F	97	64.08	10.431			

significance level is less than 0.001, and the KMO coefficient is 0.934, indicating that the questionnaire has good structural validity.

Statistical analysis

The database was built using SPSS 22.0 and statistical analysis was performed. The statistical methods included t-test, one-way ANOVA, and Pearson correlation analysis.

RESULTS

The Overall Level of Self-efficacy of Science Teachers

The scores of student management, instructional strategy and classroom management in the teacher self-efficacy scale are 88 points, with a total score of 264 points. The prescribed score is between 80% and 100% of the total score is high self-efficacy, between 60% and 80% is the middle self-efficacy, and between 0% and 60% is the low self-efficacy.

As shown in **Table 2**, teachers with a high level of self-efficacy accounted for 32.41% of the total, teachers with a moderate level of self-efficacy accounted for 55.17% of the total, teachers with lower levels of self-efficacy accounted for 12.42% of the total. Overall, the level of self-efficacy of most science teachers is at a medium to upper level.

On the one hand, among the science teachers with high self-efficacy, self-efficacy and high self-efficacy, the average score of self-efficacy is the highest in classroom management, and the lowest is in student management self-efficacy. The average score of self-efficacy is at an intermediate level. On the other hand, the self-efficacy of science teachers in student management is the most polarized, and the self-efficacy in teaching strategies is more concentrated.

Comparison of Self-efficacy of Science Teachers of Different Genders

From the independent sample t-test results in **Table 3**, the average score of male teachers is higher than that of female teachers in terms of student management efficacy, classroom management efficacy and instructional strategy efficacy. In addition to the sense of student management self-efficacy, female teachers are more polarized in terms of classroom management efficacy and instructional strategy efficacy than male teachers. From the percentage, the classroom management self-efficacy is 76.55, which is higher than the student's management efficacy and instructional strategy efficacy.

P=0.040 in terms of student management self-efficacy, P=0.009 in classroom management self-efficacy, and P=0.036 in instructional strategy self-efficacy. The results show that there are significant differences between male and female science teachers in terms of student management efficacy, classroom management efficacy and instructional strategy efficacy.

Table 4. Self-efficacy of Teachers of Different Degrees

Variables	ED	N	Max	Min	Mean	SD	F	P
SM	Below undergraduate	6	86	54	67.33	13.292	2.269	0.107
	Undergraduate	102	88	32	64.75	12.419		
	Master	37	78	43	60.32	8.651		
CM	Below undergraduate	6	88	56	71.00	12.869	5.541	0.005
	Undergraduate	102	88	46	68.98	11.150		
	Master	37	79	43	62.30	9.454		
IS	Below undergraduate	6	84	53	65.17	12.608	3.261	0.041
	Undergraduate	102	88	34	66.74	10.968		
	Master	37	80	41	61.65	8.091		

Table 5. Self-efficacy of Science Teachers in Different Titles

Variables	Title	N	Max	Min	Mean	SD	F	P
SM	Senior	12	80	48	63.42	10.104	0.574	0.682
	First-level	49	88	32	65.73	13.590		
	Second-level	42	88	44	62.90	10.578		
	Third-level	9	80	45	61.67	12.237		
	Pre-service	33	79	34	62.45	10.715		
CM	Senior	12	79	48	66.67	8.937	2.184	0.074
	First-level	49	88	46	70.88	11.300		
	Second-level	42	88	46	66.57	11.043		
	Third-level	9	83	48	63.67	11.554		
	Pre-service	33	84	43	64.36	10.854		
IS	Senior	12	78	48	65.75	9.469	3.523	0.009
	First-level	49	88	46	68.90	10.075		
	Second-level	42	88	48	65.31	9.613		
	Third-level	9	76	48	57.89	8.695		
	Pre-service	33	81	34	62.12	11.575		

Comparison of Self-efficacy of Science Teachers with Different Degrees

From the results of ANOVA in **Table 4**, undergraduate teachers have the highest self-efficacy in terms of student management self-efficacy, but they have the highest degree of polarization. Although the average value of self-efficacy of master's degree science teachers is the lowest, the degree of polarization is the most concentrated. In terms of classroom management self-efficacy, teachers with the following undergraduate qualifications have the highest self-efficacy and the greatest degree of polarization. Consistent with the results of student management self-efficacy, the masters of master's degree science have the lowest average self-efficacy, but the degree of polarization is the most concentrated. In terms of self-efficacy of teaching strategies, undergraduate teachers have the highest self-efficacy, while undergraduate science teachers have the highest degree of polarization; master's degree science teachers have the lowest self-efficacy average, but the degree of dispersion is the most concentrated.

In terms of significance, student management self-efficacy $P=0.107$, $P=0.005$ in classroom management self-efficacy, $P=0.041$ in instructional strategy self-efficacy. The results show that there are significant differences between the teachers of different academic qualifications in the aspects of classroom management efficacy and instructional strategy efficacy.

Comparison of Self-efficacy of Science Teachers in Different Titles

From the results of ANOVA in **Table 5**, in terms of self-efficacy of student management, the average score of self-teaching efficacy of the first-level teachers is the highest, and the self-efficacy of the third-level teachers is the lowest. In the same way, in the sense of self-efficacy of classroom management, the first-level teachers have the highest self-teaching efficacy, the third-level teachers have the lowest self-efficacy, and the performance of the instructional strategies is consistent with the above results.

From the results of the standard deviation, it is known that in terms of student management self-efficacy, the self-efficacy of the first-level teachers is the most discrete, and the self-efficacy of the senior teachers is the least. In terms of classroom management self-efficacy, the level of self-efficacy of the three-level teachers

Table 6. Self-efficacy of Science Teachers in Different Grades

Variables	Grade	N	Max	Min	Mean	SD	F	P
SM	Primary school	74	88	32	63.05	12.283	0.247	0.782
	Junior high school	34	88	45	64.32	12.708		
	High school	37	88	48	64.51	9.654		
CM	Primary school	74	88	43	67.39	11.176	0.045	0.956
	Junior high school	34	88	48	66.91	11.879		
	High school	37	88	46	67.70	10.687		
IS	Primary school	74	88	34	64.23	10.373	1.062	0.348
	Junior high school	34	87	48	65.79	11.039		
	High school	37	88	40	67.27	10.397		

is the most discrete, and the self-efficacy of the senior teachers is the least. In terms of self-efficacy of instructional strategies, the self-efficacy of the teachers is the most discrete, and the self-efficacy of the teachers is the least.

From the significant results, it can be seen that the self-efficacy of instructional strategies is $P=0.009<0.05$, which indicates that teachers with different professional titles have significant differences in their self-efficacy in instructional strategies. However, $P>0.05$ for student management self-efficacy and classroom management self-efficacy, indicating that teachers with different titles have no difference in self-efficacy in student management and self-efficacy in classroom management.

Comparison of Self-efficacy of Science Teachers in Different Grades

From the ANOVA results in **Table 6** of mean value, high school teachers have the highest self-teaching efficacy in terms of student management self-efficacy, and primary school teachers have the lowest self-efficacy. In terms of self-efficacy in classroom management, high school teachers have the highest self-teaching efficacy, and junior high school teachers have the lowest self-efficacy; In terms of the efficacy of instructional strategies, it is also consistent with the above results. It is also the highest self-teaching efficacy of high school teachers, and the primary school teachers have the lowest self-efficacy.

From the perspective of standard deviation, in the aspect of self-efficacy of student management, the self-teaching efficacy of high school teachers is the least discrete, and the self-efficacy of middle school teachers is the most discrete. In terms of self-efficacy in classroom management, it is consistent with the self-efficacy results of student management. The self-teaching efficacy of high school teachers is the least discrete, and the self-efficacy of middle school teachers is the most discrete. In terms of the self-efficacy of instructional strategies, the self-teaching efficacy of junior high school teachers is the most discrete, and the primary school teachers' self-efficacy is the least discrete.

From a significant point of view, science teachers in elementary, middle, and high schools have no significant differences in student self-efficacy, self-efficacy in classroom management, and self-efficacy in teaching strategies.

Comparison of Self-efficacy of Science Teachers of Different Teaching Years

From the ANOVA results in **Table 7**, it can be seen that from the perspective of mean value, the most educated science teachers have the highest self-teaching efficacy in terms of student management self-efficacy, and the science teachers with the least teaching years have the lowest self-efficacy. In terms of self-efficacy in classroom management, science teachers with teaching years of 21 to 30 have the highest self-teaching efficacy, and teachers with teaching years of less than 5 have the lowest self-efficacy. In terms of the efficacy of instructional strategies, it is consistent with the results of classroom management self-efficacy. The science teachers with 21 to 30 years of teaching have the highest self-teaching efficacy, and teachers with less than 5 years of teaching have the lowest self-efficacy.

From the perspective of standard deviation, in terms of student management self-efficacy, the self-teaching efficacy of science teachers who have been teaching for more than 31 years is the most discrete. Science teachers with teaching years of 11 to 15 have the least degree of self-efficacy. The self-efficacy of classroom management, instructional strategies and student management are consistent. The teaching self-efficacy of science teachers with a teaching period of more than 31 years is the most discrete. Science teachers with teaching years of 11 to 15 have the least degree of self-efficacy.

Table 7. Self-efficacy of Science Teachers of Different Teaching Years

Variables	YT	N	Max	Min	Mean	SD	F	P
SM	≤5years	68	88	34	61.46	10.605	1.086	0.371
	6~10 years	15	88	46	64.80	11.378		
	11~15 years	9	85	54	65.89	9.062		
	16~20 years	12	85	41	65.33	11.372		
	21~30 years	34	88	32	65.59	13.696		
	≥31years	7	88	49	68.86	15.313		
CM	≤5years	68	88	43	64.13	11.065	2.548	0.031
	6~10 years	15	88	48	67.53	11.096		
	11~15 years	9	85	60	71.00	8.016		
	16~20 years	12	85	53	69.92	10.122		
	21~30 years	34	88	51	71.44	10.088		
	≥31years	7	88	48	69.43	15.640		
IS	≤5years	68	88	34	61.88	10.553	3.638	0.004
	6~10 years	15	87	53	66.93	10.313		
	11~15 years	9	79	54	64.22	7.886		
	16~20 years	12	84	56	69.08	8.084		
	21~30 years	34	88	46	70.09	9.216		
	≥31years	7	84	48	68.14	14.041		

From the point of view of significance, there are significant differences in the relationship between student management self-efficacy and classroom management self-efficacy, but there is no significant difference in the self-efficacy of instructional strategies.

Correlation Analysis of Science Teachers' Self-efficacy and Various Factors

Student management self-efficacy was moderately positively correlated with classroom management self-efficacy. Student management self-efficacy was positively correlated with instructional strategy self-efficacy. Classroom management self-efficacy was positively correlated with instructional strategy self-efficacy.

Student management self-efficacy is negatively correlated with gender, and male science teachers have higher self-efficacy in student management than female science teachers. Classroom management self-efficacy is negatively correlated with gender, and male science teachers have higher classroom management self-efficacy than female science teachers. The self-efficacy of instructional strategies is negatively correlated with gender, and the male teachers' teaching strategies have higher self-efficacy than female science teachers.

The science teacher's self-efficacy, classroom management self-efficacy and instructional strategy self-efficacy are not related to the grade level. There is a significant negative correlation between classroom management self-efficacy, instructional strategy self-efficacy and titles. The higher the title of a science teacher, the lower the self-efficacy of classroom management and the self-efficacy of teaching strategies. There is no correlation between student management self-efficacy and title.

Classroom management self-efficacy, student management self-efficacy and instructional strategy self-efficacy are significantly positively correlated with teaching years. The higher the age of science teachers, the higher the sense of classroom management self-efficacy, student management self-efficacy and instructional strategy self-efficacy.

Student management self-efficacy, classroom management self-efficacy and instructional strategy self-efficacy are significantly negatively correlated with academic qualifications. The higher the degree of science teacher's education, the lower the student management self-efficacy, classroom management self-efficacy and instructional strategy self-efficacy.

Table 8. Correlation Analysis of Science Teachers' Self-efficacy and Various Factors

	SM	CM	IS	gender	grade	title	AT	ED
SM	1							
CM	0.823**	1						
IS	0.831**	0.831**	1					
Gender	-0.171*	-0.217**	-0.175*	1				
Grade	0.056	0.008	0.121	-0.109	1			
Title	-0.089	-0.186*	-0.238**	0.202*	-0.119	1		
YT	0.177*	0.269**	0.315**	-0.270**	0.223**	-0.752**	1	
ED	-0.174*	-0.259**	-0.179*	0.183*	0.031	0.275**	-0.464**	1

Note: **Correlation is significant at the .01 level (2-tailed).

*Correlation is significant at the .05 level (2-tailed).

DISCUSSION

Discussion on the Level of Self-efficacy

The aims of this research were to ascertain the level of science teachers' self-efficacy based on their gender, education background, professional titles, grade levels and age of teaching and to investigate the relationship between self-efficacy and various factors. These teachers were enrolled from Beijing and Shandong province in China. The results of the TSES revealed that mostly science teachers' average self-efficacy score was included in the medium level (55.17%), in addition, 32.41% of science teachers was considered low and 12.42% of science teachers was considered high. In a word, a total of 67.59% of the teachers' self-efficacy was above the average level. The research results show that teachers' high performance occurred due to the fact that they may think science teaching is interesting. But the remaining third felt powerless and bored in science teaching.

Discussion on the Self-efficacy of Science Teachers of Different Genders

Independent sample t-test was used in order to determine the difference between male and female science teachers. The results showed that there were statistically significant differences in self-efficacy between male and female science teachers. It was also found that there is a statistically significant difference in the self-efficacy perception of pre-service teachers according to gender (Ali, 2010; Britner & Pajares, 2006).

However, many studies have found that there is no statistically significant differences in the self-efficacy of teachers of different genders (Arsal, 2006; Çakiroglu, 2005). The study by Mulholl (2004) concluded that gender does not have any effect on science teaching self-efficacy. Joern (2004) found that there is no statistical difference in the population means of the TSI (Teaching Science as Inquiry), IM (instruction management) and PM (people management) scores with regards to participants' gender. Similarly, the other studies of indicated that gender does not cause an important difference in science teaching self-efficacy (Egger, 2006; Hoy & Woolfolk, 1993; Sun, 1995; Tschannen-Moran & Woolfolk Hoy, 2001). The difference in the results of the studies may result from cultural differences (Ali, 2010).

Discussion on the Self-efficacy of Science Teachers of Different Degrees

According to the result of ANOVA, science teachers with different education degrees showed significant differences in classroom management efficacy and instructional strategy efficacy. The influence of teachers' educational background on teachers' self-efficacy was studied. Teachers with rich subject background knowledge have stronger self-efficacy (Muijs & Reynolds, 2001). Cantrell et al. (2003) found that teachers with strong science background have higher self-efficacy than those with weak science background. William (2009) found that there was no significant difference in self-teaching efficacy between teachers majoring in science and those majoring in non-science. However, Desouza et al. (2004) discovered that science teachers with a science degree had a higher self-efficacy towards teaching science than those without a science degree. Some studies have shown that high self-efficacy can regulate non-scientific background factors and science teachers with non-scientific backgrounds can adjust through high self-efficacy. This provides two inspirations for teacher selection and training. The first point of revelation is that the selection of science teachers should be preferred to candidates with a scientific background. The second point is that improving the self-efficacy of non-scientific teachers is an effective measure to make up for the lack of professionalism.

Discussion on the Self-efficacy of Science Teachers of Different Titles

In China, in order to promote the professional growth of teachers, there are five levels of professional titles from senior professional title to staff level, namely senior professional title, senior professional title, first-level teacher, second-level teacher and third-level teacher. From the ANOVA results, although the self-teaching efficacy of high school teachers is higher than that of primary school teachers, there is no significant difference in the quality of student management self-efficacy, classroom management self-efficacy, and instructional strategy self-efficacy in elementary, middle, and high school science teachers. This shows that the self-efficacy of science teachers is not affected by professional level.

Discussion on the Self-efficacy of Science Teachers of Different Grades

According to the ANOVA results, from the perspective of significance, the science teachers in elementary, middle, and high schools have no significant differences in student self-efficacy, self-efficacy in classroom management, and self-efficacy in teaching strategies. However, Davis (2006) pointed out that the self-efficacy of secondary school teachers may play a very important role, because these teachers may teach subjects that they do not have in-depth understanding at a more complex level of content than primary schools.

Discussion on the Self-efficacy of Science Teachers of Different Years of Teaching

According to the results of ANOVA, science teachers of different teaching ages have significant differences in self-efficacy of student management and self-efficacy of classroom management, but no significant differences in self-efficacy of teaching strategies. Joern (2009) found that when certification source and years of experience were combined for analysis, traditionally certified teachers with many years of experience were significantly less controlling than those with alternative certification and fewer years of experience. In conclusion, there is no statistical difference in the population means of the Teaching Science as Inquiry (TSI), instruction management (IM) and people management (PM) scores at the different age levels, and there is no statistical difference in the population means of the TSI, IM and PM scores with regards to the different levels of years of teaching experience. Ali (2010) thought that the average score of teachers' teaching efficacy was found to be very similar to the experience of in-service teachers and in-service teachers with 2~7 years of experience or 8~11 years of experience. This also shows that there is no difference in the self-efficacy of teachers of different teaching ages. However, Ay (2005) found that the efficacy, self-efficacy and outcome expectancy scores of teachers rise in line with the increase in teaching experience. In a word, teaching years may only be the external expression of teaching efficacy, while teaching years may have other reasons affecting teaching efficacy.

Discussion of Factors Related to Self-efficacy

In the correlation analysis, the years of teaching can have a positive effect on the self-efficacy of science teachers, while with the improvement of title and educational degree, the self-efficacy of teachers decreases. The reason why teachers with higher education qualifications are lower than those with low education may be due to lack of student management, lack of training or training in classroom management and teaching strategies, and emphasis on academic training. In addition, Shahid and Thompson's (2001) study of teacher-efficiency based on gender emphasizes a positive correlation between self-efficacy and gender. Accordingly, the study of Edwards et al. (1996) indicated that there is a relation between gender and efficacy belief and the self-efficacy belief of the females is higher than that of males. Garret (1977) compares the self-efficacy beliefs and gender of 373 female and male teachers, and points out that female teachers have higher self-efficacy beliefs than male teachers. However, the self-efficacy of female science teachers was lower than that of male teachers here, therefore the teaching efficacy of female teachers in science education has been highly valued and improved.

CONCLUSION

The results suggest that the average self-efficacy of most science teachers is at a medium level. There were statistically significant differences in self-efficacy between male and female science teachers, and the self-efficacy of female science teachers was lower than that of male teachers. There is a significant difference between the teacher's teaching efficacy and the degree, and the teacher's self-efficacy decreases with the increase of the degree. There is no significant difference in the teaching efficacy of science teachers between title and grade. The sense of classroom management efficacy and the self-efficacy of teaching strategies

increase with the extension of teaching years. The self-efficacy of science teachers is significantly positively correlated with the years of teaching, and is significantly negatively correlated with gender and educational background. Finally, science teachers' self-efficacy may be improved by increasing years of teaching.

Disclosure statement

No potential conflict of interest was reported by the authors.

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