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The Research Self-Efficacy of Elementary Teachers: Current status, Factors, and Strategies for Improvement

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Abstract: Research self-efficacy is of great significance for teachers to improve their interest and achievements in scientific research. In this study, 261 elementary teachers were surveyed through online questionnaires to understand their research self-efficacy. The results showed that most elementary teachers have good research self-efficacy; education background, years of teaching, research environment, and attitude toward research all had influence on the research self-efficacy of elementary teachers. Based on this situation, schools should make efforts, such as improving communication, providing financial support, establishing a scientific research support center, and helping teachers under unfavorable situations. For elementary teachers, they should realize the importance of education research and improve their research literacy.

Keywords: Elementary teachers; Research self-efficacy; Status; Factors; Strategies for improvement

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1. Introduction

The concept of "teachers as researchers" was first proposed by Lawrence Stenhouse in the 1970s [1,2]. Other than abundant experiences in teaching, teachers should also carry out research in teaching and apply their academic achievements to their daily teaching [3,4]. In view of this, a large number of elementary teachers have thrown themselves into research.

Self-efficacy is regarded as one of the most important influencing factors in determining behavioral outcomes [5,6]. It is much easier for a person to engage in a behavior if he or her believes that he or she has the capability to achieve success in this given behavior [7]. The research self-efficacy of an elementary teacher, which reflects the confidence of a teacher in his or her capabilities to conduct research-related activities, plays key roles in the implementation process of research [8,9]. In this sense, it is of great significance to understand the current status of elementary teachers' research self-efficacy, analyze the factors that influence it, and promote strategies for improvement.

In this study, 261 elementary teachers were surveyed through online questionnaires. First, research self-efficacy was divided into five dimensions: self-efficacy of raising academic question (S1), self-efficacy of proposing academic viewpoints (S2), self-efficacy of implementing research (S3), self-efficacy of data analysis (S4), and self-efficacy of presenting research results (S5). Following that, a questionnaire was designed, comprising of 67 questions in four sections: basic information (i.e., gender, subjects, title of a professional post, school location, education background, and years of teaching), attitude toward research, research environment, and research self-efficacy. Subsequently, the questionnaires were distributed online,

and the data were analyzed using the Statistical Package for Social Sciences (SPSS) software. The average scores of the five dimensions were considered as the current status of elementary teachers' research self-efficacy. The factors were analyzed and determined according to the analysis of variance. Finally, strategies for improving the research self-efficacy of elementary teachers were proposed. This paper is arranged as shown in **Figure 1**.

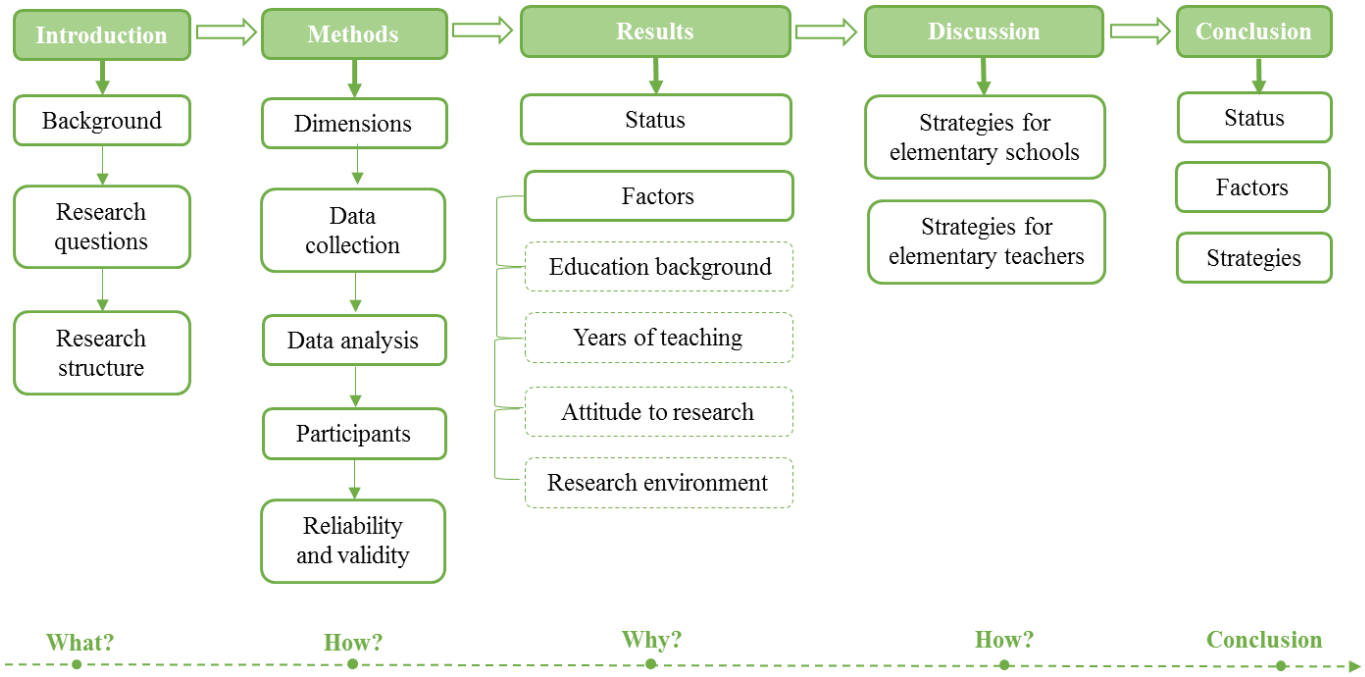

Figure 1. Structure of this paper

2. Methodology

2.1. Defining the dimensions of research self-efficacy

Research self-efficacy consists of five dimensions: self-efficacy of raising academic question (S1), self-efficacy of proposing academic viewpoints (S2), self-efficacy of implementing research (S3), self-efficacy of data analysis (S4), and self-efficacy of presenting research results (S5).

2.2. Data collection

Data were collected via online questionnaires. Each questionnaire comprised of 67 questions in four sections: basic information (i.e., gender, subjects, title of a professional post, school location, education background, and years of teaching), attitude toward research, research environment, and research self-efficacy. The respondents were requested to select their responses to each statement using the following scale: (1) strongly disagree, (2) disagree, (3) neutral, (4) agree, (5) and strongly agree. The online survey was created using Wenjuanxing (https://www.wjx.cn).

2.3. Data analysis

The data received from Wenjuanxing were analyzed by the Statistical Package for Social Sciences (SPSS) software. Analysis of variance (ANOVA) was used to determine the differences between the independent variables (gender, subjects, title of a professional post, school location, education background, years of teaching, attitude toward research, and research environment) and the dependent variables (self-efficacy of raising academic question, self-efficacy of proposing academic viewpoints, self-efficacy of implementing research, self-efficacy of data analysis, and self-efficacy of presenting research results). Significant

variances in research self-efficacy were determined via ANOVA. $p < 0.05$ indicates a statistical difference, while $p < 0.01$ indicates statistically significant difference.

2.4. Participants

A total of 261 respondents were included in this survey. They were all elementary teachers, who have interest in this research. Among them, 37.5% were male and 62.5% were female; 39.8% teaches mathematics, 39.5% teaches Chinese, 16.1% teaches English, 2.7% teaches music, 4.6% teaches science, 11.9% teaches morality and law, 6.1% teaches physical education, 3.4% teaches art, 4.2% teaches information technology, and 7.3% teaches other subjects, in which some of them teach more than one subject; the distribution by title of a professional post was 11.9% three-level teachers, 38.7% second-level teachers, 30.8% first-level teachers, 17.2% high-level teacher, and 0.4% professor-level teachers; most of them teach in cities (87.7%), while a minority teach in villages (12.3%); the distribution by education background was 3.1% with junior college qualification, 72.0% with bachelor's degree, and 24.9% with master's degree or PhD. Among them, 12.6% have taught less than three years, 19.5% have taught three to five years, 40.2% have taught five to ten years, 13.8% have taught ten to fifteen years, 5.7% have taught fifteen to twenty years, and 8.0% have taught more than twenty years. All the participants were informed that their personal information would be anonymous and kept confidential for research purposes. Besides, they had the right to refuse to participate.

2.5. Reliability and validity

In order to ensure the reliability and validity of the survey in this study, a reliability analysis was performed using SPSS. Cronbach's alpha was 0.957, indicating that the survey has high reliability. The value of KMO was 0.937, indicating that the survey is valid.

3. Results

3.1. Current status of elementary teachers' research self-efficacy

The average scores of the five dimensions were calculated and summarized based on the results from the survey and analysis, as shown in **Table 1**. With a full score of 5, the average scores of all the dimensions were between 4.01 to 4.11, indicating that most of the respondents have good research self-efficacy [10]. The self-efficacy of proposing academic viewpoints was the highest, whereas the self-efficacy of presenting research results was the lowest.

Table 1. Results of elementary teachers' research self-efficacy in five dimensions

Dimensions	S1	S2	S3	S4	S5
Average score	4.06	4.11	4.02	4.07	4.01

3.2. Factors of elementary teachers' research self-efficacy

3.2.1. Education background

The average scores of the elementary teachers' research self-efficacy based on different education background are shown in **Table 2**. In this study, their education background had influence on their research self-efficacy, except the dimension of self-efficacy of implementing research. It can be seen that with higher education background, the research self-efficacy increased. The education background of teachers reflects their level and structure of knowledge, which ensures the successful implementation of research [11]. Teachers who possess a master's degree or PhD have had experience of research during their postgraduate studies. Therefore, they tend to have higher research self-efficacy.

Table 2. Influence of education background on elementary teachers' research self-efficacy

Education background	S1	S2	S3	S4	S5
Junior college	3.63	3.705	3.79	3.855	3.84
Bachelor	4.15	3.99	3.96	4.18	4.11
Master or Ph. D	4.32	4.28	4.09	4.2	4.37
p	0.016*	0.004**	0.3	0.047*	0.004**

Note: *$p < 0.05$; **$p < 0.01$

3.2.2. Years of teaching

The average scores of the elementary teachers' research self-efficacy based on the number of years of teaching are shown in **Table 3**. In this study, the years of teaching made a difference in three dimensions: self-efficacy of proposing academic viewpoints, self-efficacy of implementing research, and self-efficacy of presenting research results. According to the table, with the increase in years of teaching, the elementary teachers' research self-efficacy first rose, but then fell upon reaching 15 years of experience. After entering elementary schools, teachers have more opportunities to participate in research, thus gradually gaining skills. Therefore, as the years of teaching increase, the research self-efficacy of elementary teachers increases. However, it decreases after a longer period of time.

Table 3. Influence of years of teaching on elementary teachers' research self-efficacy

Years of teaching	S1	S2	S3	S4	S5
> 20	3.81	3.67	3.81	3.86	3.71
15-20	4.33	3.8	3.73	3.53	4
10-15	4.31	4.19	4.25	4.39	4.28
5-10	4.22	4.18	4.02	4.19	4.26
3-5	3.98	3.78	3.82	4.06	3.98
< 3	4.03	3.94	3.94	4.09	4.09
p	0.15	0.016*	0.1	0.039*	0.032*

Note: *$p < 0.05$; **$p < 0.01$

3.2.3. Attitude toward research

The attitude of elementary teachers toward research was also investigated. The following questions were put forward to evaluate their attitude toward research: (1) Do you like taking part in academic activities?; (2) Can you always be enthusiastic during research?; (3) Do you think the results from your research can effectively help your teaching?; (4) Do you think that carrying out research is helpful to your career?; (5) Can you persist even if the research environment is poor?; (6) Are you willing to carry out research in the case of low remuneration?

Based on the answers, the attitude toward research was divided into four levels: negative, normal, positive, and extremely positive. The average scores of the elementary teachers' research self-efficacy based on different research environment are shown in **Table 4**. From this study, it was found that 50.96% of the respondents have extremely positive attitude toward research, while 41.00% of the respondents have a positive attitude toward research. For all dimensions, there were statistically significant differences in the teachers' research self-efficacy with different attitude toward research. The more positive the teachers' attitude toward research, the higher the scores of their research self-efficacy.

Table 4. Influence of attitude toward research on elementary teachers' research self-efficacy

Attitude to research	Proportion	S1	S2	S3	S4	S5
Negative	0.77%	3.50	2.50	2.50	3.00	3.00
Normal	7.28%	3.00	2.84	3.26	3.21	2.95
Positive	41.00%	3.93	3.74	3.72	3.81	3.90
Extremely positive	50.96%	4.47	4.42	4.29	4.50	4.50
p	/	0.000**	0.000**	0.000**	0.000**	0.000**

Note: *$p < 0.05$; **$p < 0.01$

3.2.4. Research environment

In order to explore the influence of research environment on elementary teachers' research self-efficacy, research environment can be divided into four levels: poor, normal, good, and excellent. Research environment refers to the support from schools, including academic discussions among teachers, opportunities to attend academic conferences, instruments for research, organizations of academic report, and bonuses for publications. All the participants were requested to assess the level of their research environment. More than half of the respondents declared that their research environment was excellent. The average scores of the elementary teachers' research self-efficacy based on different research environment are shown in **Table 5**. For all dimensions, there were statistically significant differences in the elementary teachers' research self-efficacy with different research environment. With the improvement of research environment, elementary teachers' research self-efficacy is enhanced accordingly.

Table 5. Influence of research environment on elementary teachers' research self-efficacy

Research environment	Proportion	S1	S2	S3	S4	S5
Poor	1.92%	4.00	3.60	3.60	4.80	4.20
Normal	7.28%	3.68	3.11	3.26	3.58	3.58
Good	36.78%	3.94	3.81	3.77	3.86	3.86
Excellent	54.02%	4.33	4.28	4.21	4.33	4.38
p	/	0.000**	0.000**	0.000**	0.000**	0.000**

Note: *$p < 0.05$; **$p < 0.01$

3.2.5. Gender, subjects and title of a professional post

Gender, subjects, and title of a professional post were also taken into consideration. However, no statistical difference was found in terms of these factors. Therefore, it can be deduced that gender, subjects, and title of a professional post do not affect the research self-efficacy of elementary teachers.

4. Discussion

4.1. Strategies for elementary schools

Elementary schools are supposed to enhance the communication among teachers and create an academic environment. For example, they can establish a research system and organize academic seminars by term. Promoting the confidence of teachers' research prospects is also significant. Teachers should be encouraged to publish high quality articles, and senior teachers should be urged to assist new teachers in conducting research.

Elementary schools ought to provide financial support for scientific research. Attending high-quality academic conferences and listening to preeminent academic reports can effectively improve the attitude of

teachers toward research. Schools may assume the cost of travel and registration. Besides, awards can be given to encourage achievements in scientific research.

Schools can also invite experts in education science to give speeches and training for teachers. The study found that the self-efficacy of presenting research results was the lowest, so training of academic writing is highly necessary

More attention should be paid to teachers with poor attitude toward research. They should be encouraged to be involved in scientific research, devote more to conducting research, and gain confidence to face challenges while carrying out research.

4.2. Strategies for elementary teachers

Most important of all, elementary teachers should accept the concept of "teachers as researchers" and realize the importance of carrying out research. Keeping a positive attitude during the research process is truly important. Teachers should improve their academic ability and literacy to ensure the successful implementation of research. Finally, research should be well integrated into teaching. For instance, teachers can raise academic questions and propose academic viewpoints from the ordinary situation in teaching, and the results from research implementation can be utilized to support future teachings.

5. Conclusion

In this study, 261 elementary teachers were surveyed through online questionnaires to understand the current status of elementary teachers' research self-efficacy and analyze the factors that influence it. The results showed that most of the elementary teachers have good research self-efficacy. The self-efficacy of proposing academic viewpoints was the highest, whereas the self-efficacy of presenting research results was the lowest. In this research, education background, years of teaching, research environment, and attitude toward research influenced the research self-efficacy of elementary teachers. In the final section of this paper, several strategies were put forward to help improve the research self-efficacy of elementary teachers. Elementary schools should enhance the communication among teachers, create an academic environment, provide financial support for scientific research, invite experts in education science to give speeches and provide training for teachers, as well as pay more attention to teachers with poor attitude toward research. Elementary teachers should accept the concept of "teachers as researchers," realize the importance of conducting research, improve academic ability and literacy, as well as integrate research into teaching.

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