



# International Journal of Educational Methodology

Volume 9, Issue 2, 435 – 450.

ISSN: 2469-9632

<https://www.ijem.com/>

## The Influence of Teacher Efficacy on Education Quality: A Meta-Analysis

Ratna Hidayah\* 

Universitas Negeri Yogyakarta,  
INDONESIA

Muhammad Nur

Wangid 

Universitas Negeri Yogyakarta,  
INDONESIA

Wuri Wuryandani 

Universitas Negeri Yogyakarta,  
INDONESIA

Moh Salimi 

Universitas Sebelas Maret,  
INDONESIA

Received: December 11, 2022 • Revised: March 9, 2023 • Accepted: April 28, 2023

**Abstract:** This research aims to prove the influence of teacher efficacy on learning quality with quantitative meta-analysis. The eligibility criteria in this study include: (a) The publication can be searched in Google Scholar, ERIC, DOAJ, Research Gate, and or ScienceDirect; (b) The publication is indexed in Scopus, WoS, SINTA (a portal indexing journal managed by the Ministry of Education and Culture of the Republic of Indonesia, equivalent to DOAJ and Index Copernicus), DOAJ, Index Copernicus, and at least they must be indexed in Google Scholar; (c) The topic of the studies must be relevant; (d) The studies must be carried out in the 2014-2023 year range; (e) The publication must have a value of (r), (t) or (F); (f) The studies have a magnitude of  $N \geq 20$ . This study used the JASP application for data analysis. The results showed that: (a) the 40 studies analyzed were heterogeneous and normally distributed; (b) the influence of teacher efficacy on education quality is classified as strong ( $p < 0.05$ ;  $rRE = 0.800$ ); (c) publication bias was not detected. This study concluded that there is a strong influence of teacher efficacy on education quality.

**Keywords:** Education quality, meta-analysis study, teacher efficacy.

**To cite this article:** Hidayah, R., Wangid, M. N., Wuryandani, W., & Salimi, M. (2023). The influence of teacher efficacy on education quality: A meta-analysis. *International Journal of Educational Methodology*, 9(2), 435-450. <https://doi.org/10.12973/ijem.9.2.435>

### Introduction

Important aspects that are directly involved in improving human quality in the field of education are educators and students. The performance of teachers as human resources in schools is one of the benchmarks for the high and low quality of education. Education is declared to be of good quality if teachers refer to the visions, missions, goals, and structured educational goals used to respond to changes by mobilizing the potential of existing resources in educational institutions (Budiharso & Tarman, 2020; Lacruz et al., 2019; Salimi et al., 2020). The achievement of the intended educational goals will not be possible to be reached without the presence of qualified teachers. Therefore, teachers have a strategic position to determine the direction of national education (Hidayah et al., 2022; Singh et al., 2020; Susiani et al., 2021). Because teachers are the backbone of education, their quality must always be improved. Besides, teachers are considered central figures in education because of their roles in driving and facilitating learning (Budiharso & Tarman, 2020; Otara & Niyirora, 2016; Singh et al., 2020).

One of the things that can be seen from teachers' ability to improve the quality and effectiveness of teaching is self-efficacy (García-Lázaro et al., 2022; Saputro et al., 2020). Self-efficacy is the belief that one can control the situation and produce good results (Damayanti & Musafik, 2022; Sarifah et al., 2021). In addition, self-efficacy is a people's belief in their ability to exercise some control over his functions and events in their environment (Özcan, 2022; Rahemi, 2007). Consequently, self-efficacy is one of the most important aspects of human self-knowledge in everyday life (Yoong & Hoe, 2022). This is because self-efficacy affects individuals' ability to determine the actions that need to be taken to achieve goals in the face of various events (Noviani & Kuswando, 2022). In addition, effective decision-making is the result of a cognitive process in terms of beliefs or expectations by which a person evaluates his ability to perform certain tasks or activities necessary to achieve a desired outcome (Agormor et al., 2022; Demirkol et al., 2022).

Self-efficacy in teaching is an important factor that influences teachers' ability to teach students more effectively (García-Lázaro et al., 2022; Rahemi, 2007; Sandaraj & Hashim, 2022). Teachers' self-efficacy is also defined as the teachers' belief that they can design and organize teaching and learning activities that can achieve predetermined educational goals (Mertasari & Candiasa, 2020; Sibagariang & Pandia, 2021; Yurtdakal & Karakas, 2021). Teacher self-efficacy is the teachers' belief that can engage students in teaching and learning activities even though the students

#### \* Corresponding author:

Ratna Hidayah, Universitas Negeri Yogyakarta, Indonesia. ✉ [ratnahidayah.2019@student.uny.ac.id](mailto:ratnahidayah.2019@student.uny.ac.id)



experience difficulties or are less motivated to learn (Ateş et al., 2019; Seneviratne et al., 2019; Sibagariang & Pandia, 2021).

In a learning process, teachers must have confidence in their abilities (self-efficacy) to achieve learning objectives (Malagsic et al., 2021). Furthermore, self-efficacy is a self-assessment of self-ability to behave properly or achieve certain goals (Oktaviola & Lubis, 2022). Some experts also state that teachers' Self-efficacy is a teachers' belief in his own abilities to take responsibilities for the sake of student performance (Hassan, 2019; Özcan, 2022; Rahemi, 2007). Moreover, teachers' ability to convey information, manage learning activities, and increase interest to shape students' attitudes are several things related to teacher self-efficacy (Krasniqi & Ismajli, 2022; Yoo, 2016).

According to Bandura, there are three aspects of self-efficacy (García-Lázaro et al., 2022; Öztürk et al., 2020; Saputro et al., 2020). The aspects are (a) the level of magnitude related to the degree or level of task difficulty when individuals have a belief to be able to do something well. If individuals have to handle tasks classified or organized by difficulty self-efficacy may be limited to very easy or very difficult tasks depending on the extent to which one can meet the performance requirements at each level; (b) strength related to the judgment about individual skills which will determine the resilience and tenacity of individuals in their attempts; (c) generality relates to the broad spectrum of behavior in which individuals are confident in their abilities without being confined to a particular activity or situation (Brown et al., 2021; Cocca et al., 2018; Hartawati & Mariyanti, 2014; Krasniqi & Ismajli, 2022; Saputro et al., 2020; Silalahi & Susilo, 2018). The indicators of self-efficacy are (a) individuals have confidence in their abilities in overcoming task difficulties; (b) the students' belief in facing difficulties and finding references or library sources; (c) individuals are diligent in completing tasks; (d) individuals can face obstacles in achieving goals, and (e) individuals can use life experience as a step to achieve success (Ateş et al., 2019; Febriana et al., 2022; Hassan, 2019; Noviani & Kuswandono, 2022; Nurcahyani et al., 2022).

Individuals with high self-efficacy will show enthusiasm and strong self-confidence. Self-efficacy will determine the type of effort made to solve problems or select tasks and how long it can deal with unwanted obstacles (Malagsic et al., 2021; Odanga & Aloka, 2022). Self-efficacy makes people with various unpleasant situations by encouraging them to believe that they can be strong (Bustami et al., 2022; Nurcahyani et al., 2022). Teachers need to have high self-efficacy because it will greatly affect the quality of student learning. This means that the teachers must first be confident in their abilities and be able to provide quality learning for their students (Krasniqi & Ismajli, 2022; Orakçı et al., 2023; Suico, 2021).

Teachers' self-efficacy will have a major impact on the education quality (Seneviratne et al., 2019; Yoo, 2016). Quality of education is the use of education for the success of an educational institution (Girmanová et al., 2022; Pramana et al., 2021). Furthermore, quality education is responsive to various challenges and issues either at this moment or in the future (Singh et al., 2020; Winn & Green, 1998; Rukayah et al., 2022). The quality of education is the ability of institutions and systems of institutions to use educational resources to improve quality through an effective educational process in accordance with educational expectations or goals (Otara & Niyirora, 2016; Pramana et al., 2021; Shahmohammadi, 2018).

The ability of the education system to add value to quality output by delivering and developing education in a quality and efficient manner is called the quality of education. The output produced by quality education must meet the needs of stakeholders (Budiharso & Tarman, 2020; Otara & Niyirora, 2016; Singh et al., 2020; Winn & Green, 1998). A quality education is one that can produce quality degrees both academic and non-academic in nature and can be enhanced by reforms and changes to respond to different challenges and problems of the present and future (the nation's hope).

Quality in terms of educational outcomes means results or achievements achieved by a school over a period of time (for example at the end of each quarter, year-end, 2 years, 5 years, or even 10 years) (Lacruz et al., 2019; Pramana et al., 2021). Achievements or educational results (student achievement) can be in the form of results of academic ability tests, for example, general tests or national exams. Achievements can also be made in other fields such as sports, art, or certain additional skills. Even school achievement can be in the form of conditions that cannot be held (Girmanová et al., 2022; Haseena & Ajims, 2015; Singh et al., 2020). The quality of education that is emphasized in this section is quality that emphasizes learning participants, lecturers or teachers, learning environment, learning structures, methods and learning and teaching processes, and educational outputs (Haseena & Ajims, 2015; Sukadari et al., 2021; Winn & Green, 1998).

In the last few decades, there have been many studies focusing on educational issues influenced by several teacher competencies such as pedagogical, social, and professional competencies. Design and implementation of student learning and development Many studies have shown that educational aspects such as the design of learning assessment and implementation of educators understanding of students to reach their full potential are the most influential things on the quality of education. Another influential thing in the quality of education is teacher professional competence related to mastery of basic competencies and competency standards in each subject (Moltudal et al., 2019; Podkhodova et al., 2020; Widodo et al., 2022; Zakirova, 2016). In reality, in various teacher training, material studied in depth tends to strengthen pedagogic and professional competencies (Perzigian, 2018; Seneviratne et al., 2019; Sukadari et al., 2021). Besides, the Indonesian government policies regarding Teacher Competency Tests also prioritize teacher

pedagogic and professional competencies (Hakim, 2015). Several other studies also stated that the most influential things in the quality of education are aspects of teacher social competence such as having good skills to communicate with students and their parents; being sympathetic; Can work closely with the board of education or school board; Good communication with peers and academic partners; and to understand the world or surrounding environment (Anisa et al., 2019; Carstensen & Klusmann, 2021; Dung & Zsolnai, 2021; Perzigian, 2018; Wight & Chapparo, 2008).

On the other hand, competencies in personality areas such as self-efficacy, self-control, self-concept, leadership, self-esteem, and other aspects of personality are often neglected and are considered not to have a very important for the quality of education. The development and strengthening of personality competencies are often seen as if they were only personal matters and the responsibility of teachers themselves (Čepić et al., 2015; Wardoyo, 2015). Whereas, teachers must have an educative personality because they are role models for students' success (Nurchayani et al., 2022; Rachmawati & Fadhilawati, 2020). Teachers' personality is the most influential thing to improve their performance which will have a strong impact on the educational quality. Therefore, teachers' good personal competence will provide a strong impetus for teachers themselves to work well and produce maximum performance (García-Lázaro et al., 2022; Singh et al., 2020; Wardoyo, 2015). Several studies have indeed analyzed and discussed the effect of teacher efficacy on the quality of education (Bachtiar, 2020; Demirkol et al., 2022; García-Lázaro et al., 2022; Krasniqi & Ismajli, 2022; Parker et al., 2020; Rahemi, 2007; Yoo, 2016; Yoong & Hoe, 2022). However, no single study has analyzed and discussed the effect of teacher efficacy on the quality of education comprehensively and broadly. This meta-analytic research analyzes the effect of teacher efficacy on the quality of education in various levels of education and various countries so that the conclusions of this study can describe the real conditions validly. This study aims to analyze the effect of teacher efficacy on the quality of education comprehensively.

## Methodology

### Research Design

The research method used in this research is quantitative meta-analysis. Meta-analysis is an integrative analysis of research results with the same focus or theme (Tantry et al., 2021). Meta-analysis is a special research method used for combining studies whose effect size can be measured. Furthermore, meta-analysis can be utilized as a way to summarize, integrate, combine, aggregate, and interpret the results of selected studies in certain fields (Copas & Lozada-Can, 2009; Huedo-Medina et al., 2006). Through a meta-analysis study, the strengths and weaknesses of each study can be seen. Besides, the differences in the results of each study can be found as well (Chamdani et al., 2022; Yusuf & Fajari, 2022).

### Eligibility Criteria

The eligibility criteria in this study include (a) The studies analyzed are from journals that can be searched in Google Scholar, ERIC, DOAJ, Research Gate, ScienceDirect and or other online international journal search databases; (b) The publications are indexed in Scopus, WoS, SINTA (a portal indexing journal managed by the Ministry of Education and Culture of the Republic of Indonesia, equivalent to DOAJ and Index Copernicus), DOAJ, Index Copernicus, and at least they must be indexed in Google Scholar; (c) The topic of the studies must be relevant; (d) The studies must be carried out in the 2014-2023 year range; (e) The publication must have a value of (r), (t) or (F); (f) The studies have a magnitude of  $N \geq 20$ . The data coding was carried out by considering specific aspects of the study such as names, years, numbers of samples (N), r, t, and F values, sample characteristics, countries, and journal index.

Table 1. The Data Coding of the 40 Studies

No	Author	N	r	t	F	Samples	Countries	Indexes
1.	Orakcı et al. (2023)	379			18.673	Elementary school teacher	Turkey	Scopus Q1
2.	García-Lázaro et al. (2022)	390	0.793			Education students	Spain	Scopus Q1
3.	Liu et al. (2021)	496	0.824			Junior high school teacher	China	Scopus Q1
4.	Yoo (2016)	148		13.92		Elementary school teacher	USA	Scopus Q2
5.	Saputro et al. (2020)	44		7.222		Education students	Indonesia	Scopus Q3
6.	Krasniqi and Ismajli (2022)	377	0.720			Elementary school teacher	Republic of Kosovo	Scopus Q3
7.	Saienko et al. (2020)	60		7.270		Senior high school teacher	Ukraine	Scopus Q4
8.	Özcan (2022)	329		2.862		Senior high school teacher	Turkey	Scopus Q4

Table 1. Continued

No	Author	N	r	t	F	Samples	Countries	Indexes
9.	Rahemi (2007)	80		9.485		Senior high school teacher	Iran	Scopus No-Q
10.	Mertasari and Candiasa (2020)	58	0.540			Junior high school teacher	Indonesia	Proceeding Scopus
11.	Sarifah et al. (2021)	41951			185.635	Elementary school teacher	Indonesia	Proceeding Scopus
12.	Sandaraj and Hashim (2022)	30	0.333			Elementary school teacher	Malaysia	Web of Science ESCI
13.	Hassan (2019)	1100		23.753		Junior high school teacher	Pakistan	Web of Science ESCI
14.	Suico (2021)	190	0.791			Senior high school teacher	Philippines	Index Copernicus
15.	Odanga and Aloka (2022)	327			11.498	Kindergarten teacher	South Africa	Index Copernicus
16.	Kiran (2021)	238	0.355			Education students	Turkey	Index Copernicus
17.	Brown et al. (2021)	58			62.40	Senior high school teacher	Puerto Rico	Index Copernicus
18.	Septianti et al. (2021)	167	0.729			Education students	Indonesia	Index Copernicus
19.	Malagsic et al. (2021)	319	0.436			Senior high school teacher	Philippines	Index Copernicus
20.	Yoong and Hoe (2022)	384		0.919		Elementary school teacher	Malaysia	Index Copernicus
21.	Nurchayani et al. (2022)	250	0.596			Education students	Indonesia	Index Copernicus
22.	Escobin et al. (2022)	258	0.844			Junior high school teacher	Philippines	DOAJ
23.	Seneviratne et al. (2019)	350	0.406			Senior high school teacher	Sri Lanka	DOAJ
24.	Öztürk et al. (2020)	435	0.713			Senior high school teacher	Turkey	DOAJ
25.	Yurtdakal and Karakas (2021)	138		0.493		Elementary school teacher	Turkey	DOAJ
26.	Ahmed et al. (2022)	828		6.93		Junior high school teacher	Nigeria	SINTA 2
27.	Sibagariang and Pandia (2021)	342	0.571			Elementary school teacher	Indonesia	SINTA 2
28.	Demirkol et al. (2022)	160	0.576			Junior high school teacher	Turkey	SINTA 2
29.	Oktaviola and Lubis (2022)	127	0.919			Junior high school teacher	Indonesia	SINTA 3
30.	Bustami et al. (2022)	118	0.454			Senior high school teacher	Indonesia	SINTA 4
31.	Rachmawati and Fadhilawati (2020)	21	0.779			Senior high school teacher	Indonesia	SINTA 4
32.	Septiara & Listiadi (2019)	84	0.789			Education students	Indonesia	SINTA 4
33.	Damayanti and Musafik (2022)	198	0.951			Senior high school teacher	Indonesia	SINTA 5
34.	Suryanto and Sunarto (2022)	112	0.296			Senior high school teacher	Indonesia	SINTA 5
35.	Agormor et al. (2022)	1343	0.543			Senior high school teacher	Ghana	Google Scholar
36.	Ateş et al. (2019)	115		1.49		Elementary school teacher	Turkey	Google Scholar

Table 1. Continued

No	Author	N	r	t	F	Samples	Countries	Indexes
37.	Cocca et al. (2018)	26	0.757			Elementary school teacher	Mexico	Google Scholar
38.	Hartawati and Mariyanti (2014)	40	0.691			Kindergarten teacher	Indonesia	Google Scholar
39.	Parker et al. (2020)	51	0.85			Elementary school teacher	North Carolina	Google Scholar
40.	Jumiati and Kartiko (2022)	88	0.652			Senior high school teacher	Indonesia	Google Scholar

### Research Procedure

The procedures of this research are as follows: (a) searching for articles related to the topic; (b) sorting articles based on the eligibility criteria; (c) performing data coding; (d) converting the value of F to t and r, and convert the value of t to r; (e) performing heterogeneity test; (f) performing a normality test; (g) calculating the mean and standard error; (h) calculating summary effect size and visualizing forest plots; and (i) conducting publication bias tests through funnel plots, egger tests, and also trim & fill method. The JASP application is used to analyze research data. While Cohen's effect size criteria (Correll et al., 2020) can be seen in Table 2 below.

Table 2. Cohen's Effect Size Criteria

Value	Criteria of Effect
< 0 + / -.1	Weak
< -.3	Modest
< -.5	Moderate
< -.8	Strong
≥ -.8	Very strong

### Findings/Results

Based on the 40 reviewed articles, an analysis of the influence of teacher efficacy on the quality of education was obtained with a total sample of 52209 consisting of 155 PAUD (kindergarten) teachers, 43953 elementary school teachers, 3662 junior high school teachers, 3266 high school teachers, and 1173 education students or teacher candidates. Furthermore, the reviewed articles came from various countries. The following is the percentage of the origin of the reviewed articles.

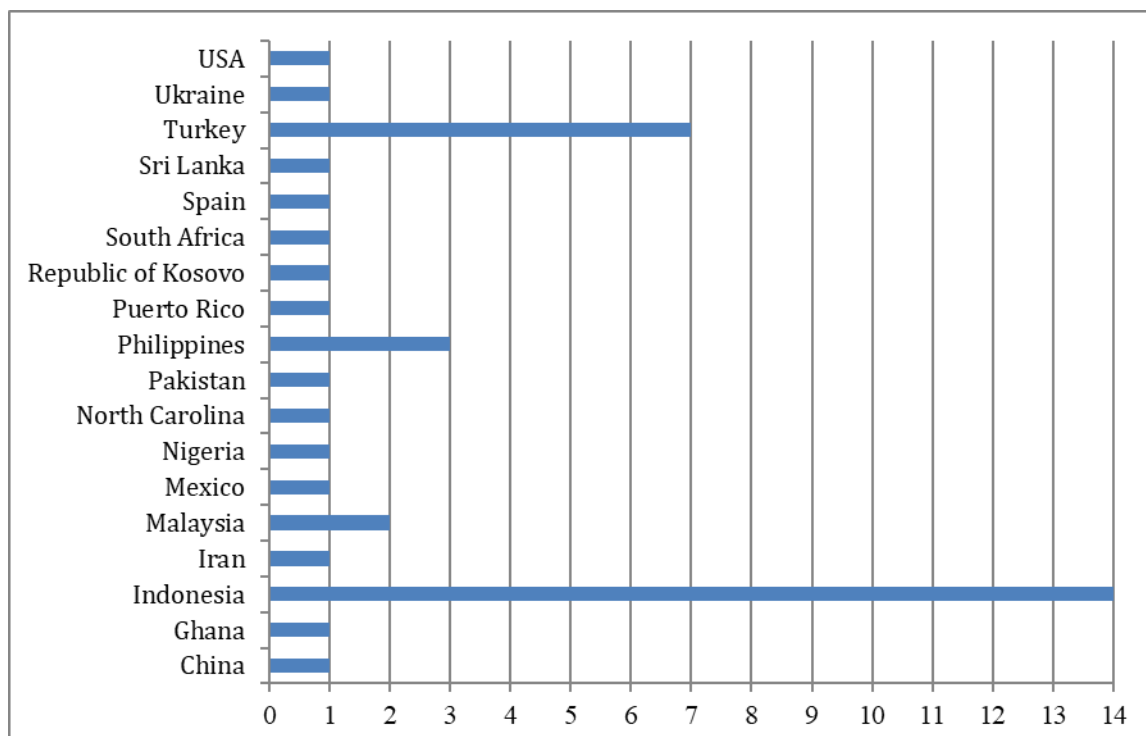


Figure 1. The Percentage of Origin of the Reviewed Articles

The reviewed articles were taken from Scopus, Web of Science, The Directory of Open Access Journal, Science Direct, ProQuest, Google Scholar, Wiley Library Online, Taylor and Francis, The Education Resources Information Center, etc. The distribution of journal indexation for each article is as follows.

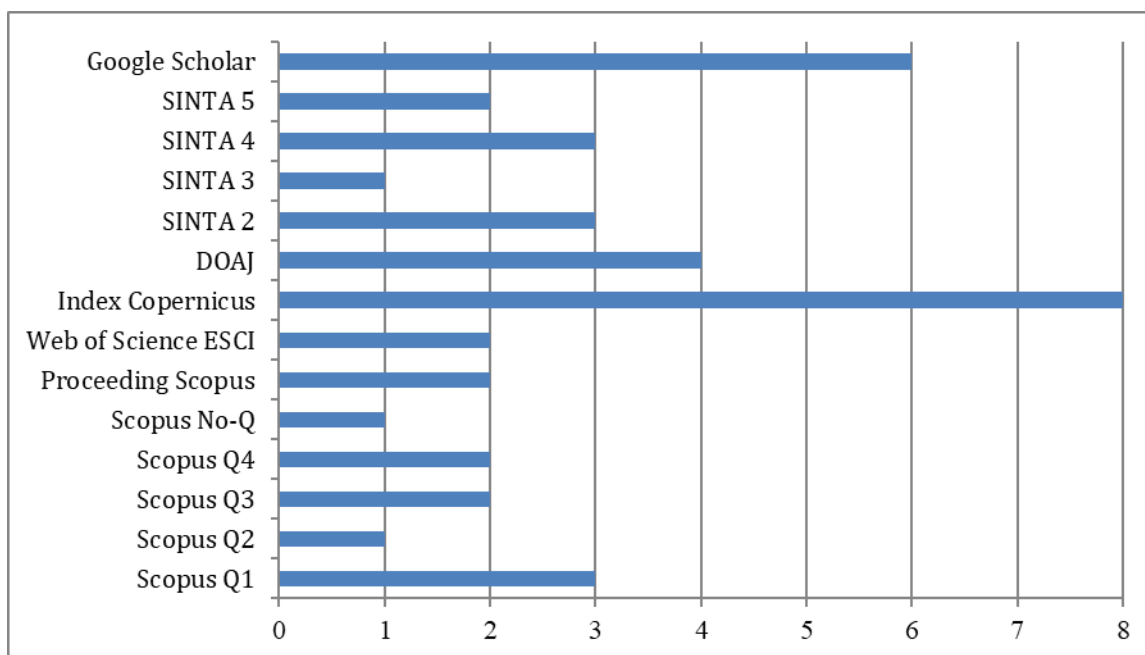


Figure 2. The Percentage of Journal Indexation of the Reviewed Articles

The first step of data analysis was conducting a heterogeneity test. The results of the heterogeneity test were shown in Tables 3 and 4. Table 3 showed that the results of the heterogeneity test from 40 studies processed using the JASP software was heterogeneous. With the  $p < 0.001$ , it could be concluded that each study showed heterogeneous data.

Table 3. The Fixed and Random Effects

	Q	df	p
Omnibus test of model coefficients	119.8	1	< .001
Test of residual heterogeneity	2285.8	39	< .001

Table 4 provides information on several heterogeneity measures. The variance among effect sizes of the reviewed studies ( $\tau^2$ ) was estimated using the Laird Dersimonian’s estimator of 0.2043 with a standard deviation among studies ( $\tau$ ) of 0.4520. If the value of  $\tau^2 > 0$  or  $\tau > 0$ , then each study shows heterogeneity. Furthermore, the index in table 4 showed that the resulting heterogeneity was high, namely the value of  $I^2$  (%) was close to 100%. The value in this study was 98% with a confidence interval between 98.4094% - 99.3630%, indicating that the study was heterogeneous because the value was close to 100%.

Table 4. The Residual Heterogeneity Estimates

	Estimate	Lower Bound	Upper Bound
$\tau^2$	.2043	.1326	.3343
$\tau$	.4520	.3641	.5782
$I^2$ (%)	98.9619	98.4094	99.3630
$H^2$	96.3259	62.8707	156.9981

The normality test of the research data was carried out by analyzing Radial Plots and normal Q-Q plots. Figure 3 shows that all data come from a normal distribution. This can be seen from the dots showing that each study is dominant in the area of analysis. Only 2 studies are outside the analysis area.

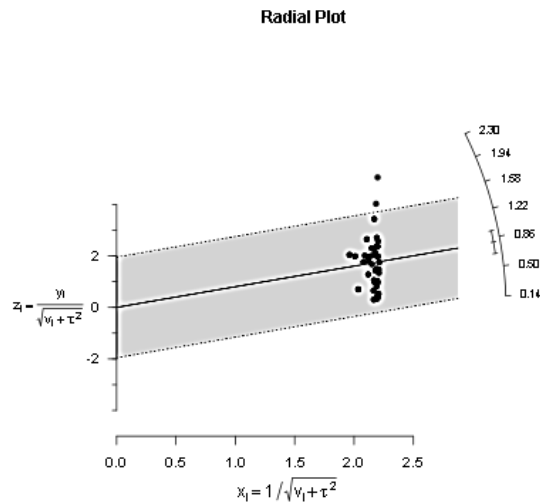


Figure 3. The Radial Plot Test Results

The Radial (or Galbraith) Plot showed the largest weight was closest to the Y axis. Studies within boundaries were interpreted as homogeneous. Furthermore, the normal distribution of the research data can also be seen from the results of the Normal Q-Q Plot analysis showing that the dots, the symbols of each study analyzed, are in the analysis area and only 1 is outside the area. Therefore, it can be concluded that the study data are normally distributed. After the data were stated to be heterogeneous and normally distributed, the next step was to test the summary effect size. A summary effect is the average effect of various studies. In this study, the type of statistical model used is the random effect model.

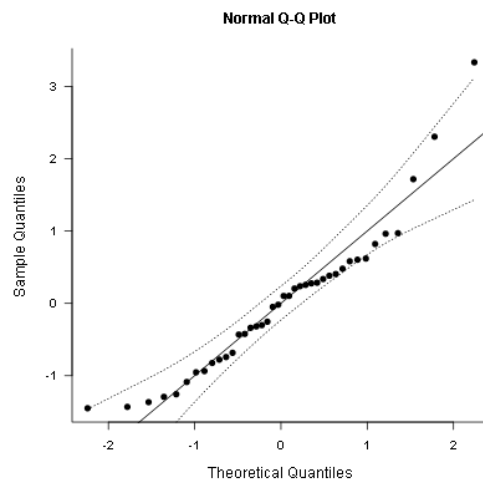


Figure 4. Q-Q Plot Normal Test Results

The results of calculations using the Jeffrey’s Amazing Statistics Program (JASP) application showed that there was a strong positive influence of teacher efficacy on the quality of education. An influence is said to be positive because the results of the estimated value show a positive value (.800). The significance level used in this study is based on a *p-value* of less than .001 at a significance level of 95% or alpha ( $\alpha$ ) .05 so that the *p-value* is less than .05. Furthermore, the estimated standard error value of .800 indicates that the influence of teacher efficacy on the quality of education is classified as a strong influence based on Cohen’s summary effect size criteria.

Table 5. The Summary Effect/Mean Effect Size

Estimate	Standard Error	z	p	Lower Bound	Upper Bound	
Intercept	.8008	.0732	10.946	< .001	.6574	.9441

The distribution of the effect sizes of each study can be analyzed with Forest Plots. Figure 5 shows that there is some information related to the effect size score of each study that has been analyzed using the JASP software. The effect size values of the analyzed studies varied in magnitude between .66, which is the smallest effect value, to .94 which is the largest effect size score. The summary effect size shown .800 is in the category of strong influence.

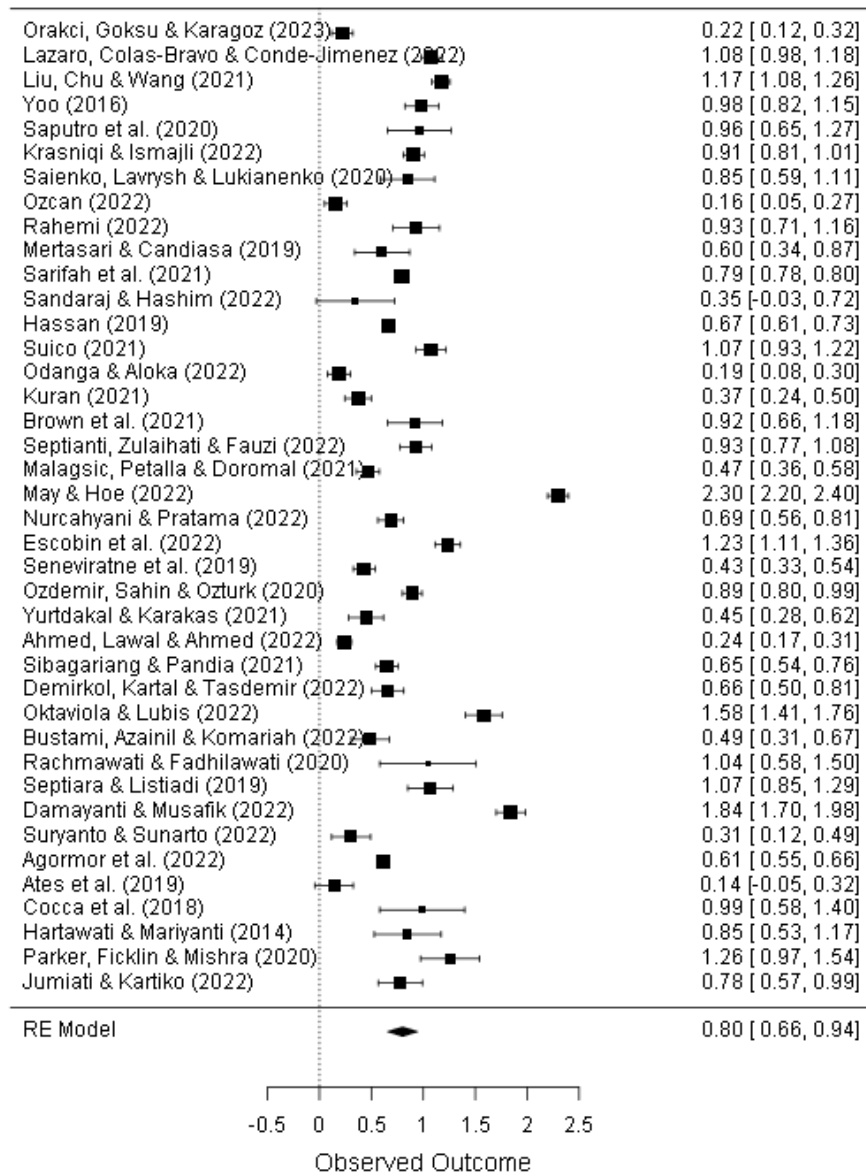


Figure 5. The Forest Plots

The publication bias of this meta-analysis research was analyzed using the Funnel Plot, Egger Test, and also the Trim & Fill method. Funnel plots are diagrams in meta-analyses that show possible publication bias. The funnel plot shows correlation between effect size and sample size or standard error of each study's effect size. The followings are the visual results of the Funnel Plot from the 40 analyzed studies.



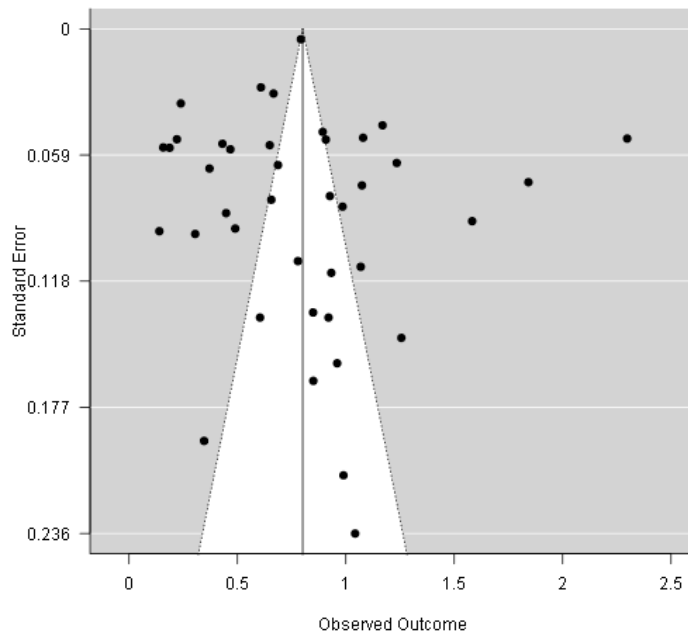


Figure 6. The Funnel Plots

Figure 6 shows that out of the 40 studies analyzed, none of them is seen as an empty dot, meaning that all of the research studied has no potential for publication bias. Furthermore, the distribution of studies analyzed in this meta-analysis seems to be normally distributed, but it is still difficult to conclude if the distribution of the studies is visually symmetrical. However, it is difficult to conclude whether the funnel plot results are symmetrical, so it is necessary to use the results of other methods, the Egger test and Rank Correlation. Therefore, a further test is carried out, the Egger Test, to deal with the visual bias. Following are the results of the Egger Test of this meta-analysis study.

Table 6. The Egger Test Result

	<b>z</b>	<b>p</b>
sei	.5377	.591

Note. sei = predictor for the standard error

Table 6 shows that the  $p > .05$ . It indicates that there is no publication bias based on the results of the Egger Test. Furthermore, the publication bias of this study was tested using the Rank Correlation Test. The followings are the results of the Rank Correlation Test.

Table 7. The Rank Correlation Test

	<b>Kendall's <math>\tau</math></b>	<b>p</b>
Rank test	.0706	.522

Table 7 indicates that Kendall's value in the Rank Correlation Test is 0.07. It indicates a large correlation coefficient between effect size and variance. Then the p-value of .522 is greater than the value of .05. It indicates that the  $H_0$  hypothesis is rejected. In other words, there is no indication of publication bias. The followings are the Trim and Fill result analysis of this meta-analysis.

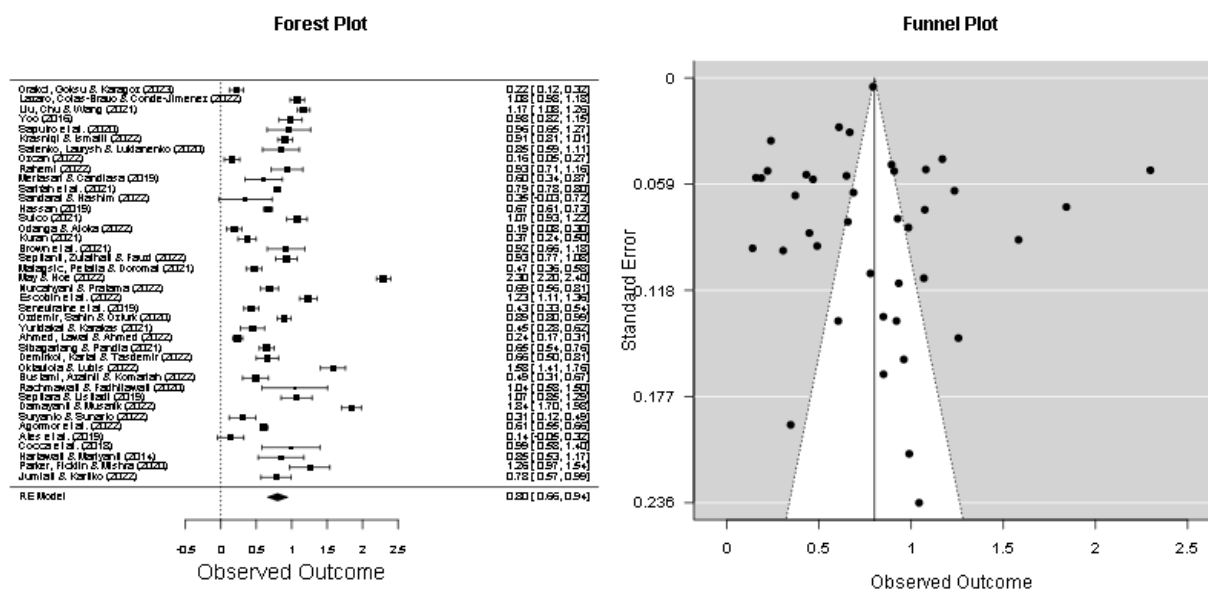


Figure 7. The Results of Trim and Fill Test

Figure 7 describes that the forest plots in trim-and-fill results in these meta-analyses does not imply publication bias. This is because of summary effect results on the forest plot do not shift or are less than the summary effect obtained before.

### Discussion

Based on the 40 reviewed articles, there are come from various countries, various sample and taken from various reputable international journal searches of databases. The first step of data analysis was conducting a heterogeneity test. The presence of heterogeneity is problematic when it exceeds the heterogeneity of the study sample (von Hippel, 2015). If it is ignored, it can lead to an underestimate (Huedo-Medina et al., 2006; Sedgwick, 2015). Heterogeneity can arise from research design or other various bias in the obtained results (Imrey, 2020). Besides, heterogeneity may arise from differences in studies or random effect sizes or from systematic differences between the two. Heterogeneity can be modeled if it is due to random variations. The results of the homogeneity test show that the population effect size is heterogeneous so it is more appropriate to use a random effects model (Higgins, 2008; Huedo-Medina et al., 2006; Sedgwick, 2015).

The normality test of the research data was carried out by analyzing Radial Plots and normal Q-Q plots. A radial (or Galbraith) plot shows the z-statistic (the score divided by the standard error) on the vertical axis and the weight scale on the horizontal axis (Bowden et al., 2018; Copas & Lozada-Can, 2009). Studies with higher weights are closer to the Y-axis than most studies in the range are treated as homogenous. Out-of-state studies may be outliers. An outlier or also known as an anomaly is a data or observation that deviates extremely from the average of the existing data set (Copas & Lozada-Can, 2009; Tantry et al., 2021). Also, Normal Q-Q plot analysis shows that the study data are normally distributed. QQ charts (quantile-quantile charts) can be used to visually check whether a data set follows a normal distribution because they show the actual data sizes expected from a normal distribution (Velez & Correa Morales, 2015). The Q-Q plots take sample data, sort them from the smallest to the largest value, and then plot them in terms of points and compare with the quantity (percentage) from the theoretical distribution calculation. The points are at or near the 45° reference line if the data is normally distributed. Points deviate from the reference line if the data is not normally distributed. Then all points will fall close to the diagonal line used to determine normality if the data is normally distributed. A kurtosis problem occurs if the points are spread above or below the diagonal line this indicates a kurtosis problem. If the points are around the diagonal line this may indicate a problem with the skewness of the data distribution (Velez & Correa Morales, 2015; Voorman et al., 2011; Wang & Bushman, 1998).

After the data were stated to be heterogeneous and normally distributed, the next step was to test the summary effect size. A summary effect is the average effect of various studies. In this study, the type of statistical model used is the random effect model. The results of calculations using the Jeffrey's Amazing Statistics Program (JASP) application showed that there was a strong positive influence of teacher efficacy on the quality of education. An influence is said to be positive because the results of the estimated value show a positive value (0.800). The summary effect is analyzed to find out an overview of the effect size to be observed. When calculating the summary effect, special attention is needed because it cannot directly calculate the average effect size of the selected journals (Lin & Chu, 2018; Shi & Lin, 2019; Sterne & Harbord, 2004, 2004). This is because the research journals analyzed have different sample sizes and characteristics.

Teachers with high self-efficacy have higher expectations and set higher goals for student learning outcomes. They make more effort when teaching, and persist in helping student learning processes (García-Lázaro et al., 2022; Saputro et al., 2020). Teachers self-efficacy makes them more willing to try new teaching ideas and strategies that can improve students learning processes, and persist in helping student learning processes (Bachtiar, 2020; Nurcahyani et al., 2022; Öztürk et al., 2020). On the other hand, teachers with low self-efficacy have a low desire to try new teaching ideas or strategies that can improve student learning processes (Agormor et al., 2022; Noviani & Kuswandono, 2022; Özcan, 2022; Yoong & Hoe, 2022; Susiani et al., 2020). Therefore, teachers' self-efficacy greatly influences the quality of education.

The distribution of the effect sizes of each study can be analyzed with Forest Plots. Forest plots provide a summary of the data included for each study (X. Shi et al., 2017). In addition, forest plots also inform weights for each study; effect sizes, methods, and models used to carry out the meta-analysis; confidence interval used; impact estimates from each study, overall effect estimates, and statistical significance analyses (Huedo-Medina et al., 2006; Sedgwick, 2015; Tantry et al., 2021). The findings of each study appear as boxes. A square on the left indicates that the new treatment is better and a square on the right indicates that the new treatment is worse. The squared size represents the weight of each study included in the meta-analysis. The horizontal line through the rectangle in each study represents the uncertainty in the estimate of the treatment effect. The pooling effect measure obtained by combining all studies looks like a diamond (Huedo-Medina et al., 2006; Imrey, 2020; Sedgwick, 2015; X. Shi et al., 2017; Tantry et al., 2021).

The publication bias of this meta-analysis research was analyzed using the Funnel Plot, Egger Test, Rank Correlation and also the Trim & Fill method. The funnel plot shows that out of the 40 studies analyzed, none of them is seen as an empty dot, meaning that all of the research studied has no potential for publication bias. A further test is carried out, the Egger Test, to deal with the visual bias. The Egger test is a method used for detecting publication bias. It consists of a simple linear regression of the effect size across studies divided by the standard error versus the inverse of the standard error then testing (Palmer et al., 2008; L. Shi et al., 2020; X. Shi et al., 2017). Based on the Egger test result, there is no publication bias. Also, the Kendall's value in the Rank Correlation Test show that there is no indication of publication bias. This research also detects publication bias with the Trim and Fill method. The method will remove outlier research, the smallest or the most extreme from the positive side of the funnel plot, and recalculate it so that the funnel plot is symmetrical (Lin & Chu, 2018; Lin et al., 2018; L. Shi et al., 2020). In addition, this trim can improve the variance because it produces an effect size with a narrower confidence range and also reduces the effect variance (Duval & Tweedie, 2000; Shi & Lin, 2019). Forest Plots using the Trim and Fill method shows that the results of the meta-analysis do not indicate publication bias because the results of the summary effect on the Forest Plot do not shift or are less than the summary effect obtained before. Additionally, there are no open circles in the funnel plot indicating missing or unpublished research that should be added. This is reinforced by the Funnel Plot images before and after the Trim and Fill analysis which is not different. It shows that the conclusions made based on the fixed-effect model regarding the effect of teacher efficacy on the quality of education are valid and can be trusted because there is no potential for publication bias. The publication bias indicates inaccurate information or research results because the published articles do not represent the research conducted (Lin & Chu, 2018; Yang & Berdine, 2021). The biased publication also indicates the possibility of finding research results that only accept the null hypothesis ( $H_0$ ) or studies that only publish the desired research results (Lin et al., 2018; Shi & Lin, 2019; X. Shi et al., 2017). Therefore, meta-analytic research needs to examine in-depth and thoroughly regarding publication bias.

### Conclusion

Based on the discussion of the research data above, it can be concluded that the 40 analyzed articles in this study (a) are heterogeneous ( $I^2$  (%) = 98,962 and normally distributed from the visualization of the Radial Plot and Normal Test Q-Q Plot; (b) Teacher efficacy has a strong influence on the quality of education ( $p < .05$ ;  $r_{RE} = 0.800$ ) based on the Summary Effect Size test supported by the Forest Plot visualization, (c) There is no indication of publication bias based on the results of the Funnel Plot visualization, Egger Test, and Trim & Fill analysis. So, it can be concluded that self-efficacy is an aspect that needs attention in education because it is proven to affect the quality of education. Furthermore, this meta-analysis study's results are reliable since there was no publication bias.

### Recommendations

Based on the conclusion, it is recommended for teachers and practitioners to develop self-efficacy more deeply because it has proven to be very influential on the quality of education at all levels of education. In fact, there is a need for special self-efficacy development activities for teachers, practitioners, and students. Another recommendation is that future researchers examine other affective aspects of teachers such as self-concept, self-esteem, self-control, etc. Also, future researchers can also combine the affective influence of other teachers with other dependent variables. Furthermore, future researchers are also advised to be able to conduct meta-analytic research with specific samples, for example, especially elementary school students, middle school students or only at the higher education level.

### Limitations

The limitation of this study lies in the research variables which only focus on teacher self-efficacy as an influence on the quality of education. In fact, many teachers' affective factors also influence other educational influences.

### Authorship Contribution Statement

Hidayah: Writing, Analysis, Conceptualization. Wangid: Supervision. Wuryandani: Editing/ reviewing. Salimi: Editing/ reviewing

### References

- Agormor, S., Apawu, J., Aboagye-Agbi, J. J., & Hokor, E. K. (2022). Prior mathematics achievement and mathematics self-efficacy as indicators for success in pre-service teachers' achievement in geometry and trigonometry. *Journal of Research in Instructional*, 2(2), 115–128. <https://doi.org/10.30862/jri.v2i2.83>
- Ahmed, M. A., Lawal, A. A., & Ahmed, R. A. (2022). Influence of teachers' self-efficacy on secondary school students' self-efficacy in biology in Ogbomoso, Nigeria. *Journal Pendidikan Biologi Indonesia*, 8(1), 58–64. <https://doi.org/10.22219/jpbi.v8i1.17231>
- Anisa, L., Suganda, L. A., & Jaya, H. P. (2019). Indonesian english teachers' social-emotional competence and students' English learning motivation. *Indonesian Journal of English Language Teaching and Applied Linguistics*, 4(1), 83–94. <https://doi.org/10.21093/ijeltal.v4i1.320>
- Ateş, Y. T., Ateş, H., Özbek, N., & Afacan, Ö. (2019). Special Education teachers' self-efficacy beliefs toward science course. *Science Education International*, 30(4), 241–250. <https://doi.org/10.33828/sei.v30.i4.1>
- Bachtiar, B. (2020). The characteristics of effective professional development that affect teacher's self-efficacy and teaching practice. *Eduvelop: Journal of English Education and Development*, 3(2), 131–144. <https://doi.org/10.31605/eduvelop.v3i2.624>
- Bowden, J., Spiller, W., Del Greco, F. M., Sheehan, N., Thompson, J., Minelli, C., & Smith, G. D. (2018). Improving the visualization, interpretation and analysis of two-sample summary data Mendelian randomization via the Radial plot and Radial regression. *International Journal of Epidemiology*, 47(4), 1264–1278. <https://doi.org/10.1093/ije/dyy101>
- Brown, R., Silva Rivera, G., López González, M., & Kuhn, K. P. (2021). Teacher self-efficacy, dispositional optimism, resiliency, and behavior management in high school classrooms in Puerto Rico. *Revista Puertorriquena de Psicología*, 32(1), 18–32. <https://bit.ly/3K3EyGn>
- Budiharso, T., & Tarman, B. (2020). Improving quality education through better working conditions of academic institutes. *Journal of Ethnic and Cultural Studies*, 7(1), 99–115. <https://doi.org/10.29333/ejecs/306>
- Bustami, M. R., Azainil, A., & Komariah, L. (2022). Teacher satisfaction, self-efficacy affect on teacher performance: An evidence from a vocational school of pharmaceutical study program East Borneo, Indonesia. *EduLine: Journal of Education and Learning Innovation*, 2(3), 291–296. <https://doi.org/10.35877/454RI.eduline1159>
- Carstensen, B., & Klusmann, U. (2021). Assertiveness and adaptation: Prospective teachers' social competence development and its significance for occupational well-being. *British Journal of Educational Psychology*, 91(1), 500–526. <https://doi.org/10.1111/bjep.12377>
- Čepić, R., Vorkapić, S. T., Lončarić, D., Andić, D., & Mihić, S. S. (2015). Considering transversal competences, personality and reputation in the context of the teachers' professional development. *International Education Studies*, 8(2), 8–20. <https://doi.org/10.5539/ies.v8n2p8>
- Chamdani, M., Yusuf, F. A., Salimi, M., & Fajari, L. E. W. (2022). Meta-analysis study: The relationship between reflective thinking and learning achievement. *Journal on Efficiency and Responsibility in Education and Science*, 15(3), 181–188. <https://doi.org/10.7160/eriesj.2022.150305>
- Cocca, M., Cocca, A., Martinez, E. A., & Bulnes, M. G. R. (2018). Correlation between self-efficacy perception and teaching performances: The case of mexican preschool and primary school teachers. *Arab World English Journal*, 9(1), 56–70. <https://doi.org/10.24093/awej/vol9no1.4>
- Copas, J., & Lozada-Can, C. (2009). The radial plot in meta-analysis: Approximations and applications. *Journal of the Royal Statistical Society. Series C: Applied Statistics*, 58(3), 329–344. <https://doi.org/10.1111/j.1467-9876.2008.00650.x>
- Correll, J., Mellinger, C., McClelland, G. H., & Judd, C. M. (2020). Avoid Cohen's "small", "medium", and "large" for power analysis. *Trends in Cognitive Sciences*, 24(3), 200–207. <https://doi.org/10.1016/j.tics.2019.12.009>

- Damayanti, A. S., & Musafik, M. N. (2022). The effect of teacher self-efficacy toward english learning achievement through motivation as a moderator variabel. *Jurnal Pendidikan Bahasa Inggris Proficiency*, 4(1), 1–9. <https://doi.org/10.32503/proficiency.v4i1.2243>
- Demirkol, K., Kartal, B., & Tasdemir, A. (2022). The effect of teachers' attitudes towards and self-efficacy beliefs regarding STEM education on students' STEM career interests. *Journal of Science Learning*, 5(2), 204–216. <https://doi.org/10.17509/jsl.v5i2.43991>
- Dung, D. T., & Zsolnai, A. (2021). Teachers' social and emotional competence: A new approach of teacher education in Vietnam. *Hungarian Educational Research Journal*, 12(2), 131–144. <https://doi.org/10.1556/063.2021.00050>
- Duval, S., & Tweedie, R. (2000). Trim and fill: A simple funnel-plot-based method of testing and adjusting for publication bias in meta-analysis. *Biometrics*, 56(2), 455–463. <https://doi.org/10.1111/j.0006-341X.2000.00455.x>
- Escobin, M. R., Yazon, A. D., Tan, C. S., Bandy, M. M., & Buenvenida, L. P. (2022). A mixed study on the school head's and teacher's self-efficacy and school performance: An input for policy enhancement for social media learning in the Philippines during the new normal. *International Journal of Theory and Application in Elementary and Secondary School Education*, 4(2), 177–201. <https://doi.org/10.31098/ijtaese.v4i2.1088>
- Febriana, A. D., Saiful, J. A., & Ro'ifah. (2022). Microsoft 365 digital classroom tools and the development of English teachers' self-efficacy in ICT. *English Education: Journal of English Teaching and Research*, 7(1), 19–30. <https://doi.org/10.29407/jetar.v7i1.17784>
- García-Lázaro, I., Colás-Bravo, M. P., & Conde-Jiménez, J. (2022). The impact of perceived self-efficacy and satisfaction on preservice teachers' well-being during the practicum experience. *Sustainability*, 14(16), Article 10185. <https://doi.org/10.3390/su141610185>
- Girmanová, L., Šolc, M., Blaško, P., & Petrik, J. (2022). Quality management system in education: Application of quality management models in educational organization—case study from the Slovak Republic. *Standards*, 2(4), 460–473. <https://doi.org/10.3390/standards2040031>
- Hakim, A. (2015). Contribution of competence teacher (pedagogical, personality, professional competence and social) on the performance of learning. *The International Journal of Engineering and Science*, 4(2), 1–12. <https://bit.ly/3ln0jZB>
- Hartawati, D., & Mariyanti, S. (2014). Hubungan antara self-efficacy dengan burnout pada pengajar taman kanak-kanak sekolah "X" di Jakarta [The relationship between self-efficacy and burnout in kindergarten teachers at "X" school in Jakarta]. *Jurnal Psikologi*, 12(2), 54–60. <https://bit.ly/40b15XN>
- Haseena, V. A., & Ajims, P. M. (2015). Aspects of quality in education for the improvement of educational scenario. *Journal of Education and Practice*, 6(4), 100–106. <https://bit.ly/2PfpY0k>
- Hassan, M. U. (2019). Teachers' self-efficacy: Effective indicator towards students' success in medium of education perspective. *Problems of Education in the 21st Century*, 77(5), 667–679. <https://doi.org/10.33225/pec/19.77.667>
- Hidayah, R., Wangid, M. N., & Wuryandani, W. (2022). Elementary school teacher perception of curriculum changes in Indonesia. *Pegem Journal of Education and Instruction/Pegem Eğitim ve Öğretim Dergisi*, 12(2), 77–88. <https://doi.org/10.47750/pegegog.12.02.07>
- Higgins, J. P. T. (2008). Commentary: Heterogeneity in meta-analysis should be expected and appropriately quantified. *International Journal of Epidemiology*, 37(5), 1158–1160. <https://doi.org/10.1093/ije/dyn204>
- Huedo-Medina, T. B., Sánchez-Meca, J., Marín-Martínez, F., & Botella, J. (2006). Assessing heterogeneity in meta-analysis: Q statistic or I<sup>2</sup> Index? *Psychological Methods*, 11(2), 193–206. <https://doi.org/10.1037/1082-989X.11.2.193>
- Imrey, P. B. (2020). Limitations of meta-analyses of studies with high heterogeneity. *JAMA Network Open*, 3(1), Article e1919325. <https://doi.org/10.1001/jamanetworkopen.2019.19325>
- Jumiati, & Kartiko, A. (2022). Pengaruh self efficacy dan locus of control terhadap kinerja guru [The effect of self-efficacy and locus of control on teacher performance]. *Academicus: Journal of Teaching and Learning*, 1(1), 32–44. <https://bit.ly/44aRMdN>
- Kiran, D. (2021). A quantitative investigation of final year preservice science teachers' sources of self-efficacy beliefs. *International Journal of Contemporary Educational Research*, 8(4), 47–58. <https://doi.org/10.33200/ijcer.869003>
- Krasniqi, D., & Ismajli, H. (2022). Teacher evaluation feedback and their self-efficacy in classroom management skills. *International Electronic Journal of Elementary Education*, 15(1), 23–31. <https://doi.org/10.26822/iejee.2022.275>

- Lacruz, A. J., Américo, B. L., & Carniel, F. (2019). Quality indicators in education: Discriminant analysis of the performances in Prova Brasil. *Revista Brasileira de Educacao*, 24, Article e240002. <https://doi.org/10.1590/S1413-24782019240002>
- Lin, L., & Chu, H. (2018). Quantifying publication bias in meta-analysis. *Biometrics*, 74(3), 785–794. <https://doi.org/10.1111/biom.12817>
- Lin, L., Chu, H., Murad, M. H., Hong, C., Qu, Z., Cole, S. R., & Chen, Y. (2018). Empirical comparison of publication bias tests in meta-analysis. *Journal of General Internal Medicine*, 33, 1260–1267. <https://doi.org/10.1007/s11606-018-4425-7>
- Liu, H., Chu, W., & Wang, Y. (2021). Unpacking EFL teacher self-efficacy in livestream teaching in the Chinese context. *Frontiers in Psychology*, 12, Article 717129. <https://doi.org/10.3389/fpsyg.2021.717129>
- Malagsic, M. T., Petalla, M. B., & Doromal, A. D. (2021). Self-efficacy and work commitment of the private senior high school teachers in time of pandemic. *International Journal of Sciences: Basic and Applied Research*, 60(4), 345–359. <https://bit.ly/3GKn9S9>
- Mertasari, N. M. S., & Candiasa, I. M. (2020). Improving self-efficacy in the teaching of prospective mathematics teachers by involving them in the online teacher community. *Journal of Physics: Conference Series*, 1516, Article 012038. <https://doi.org/10.1088/1742-6596/1516/1/012038>
- Moltudal, S., Krumsvik, R., Jones, L., Eikeland, O. J., & Johnson, B. (2019). The Relationship between teachers' perceived classroom management abilities and their professional digital competence. *Designs for Learning*, 11(1), 80–98. <https://doi.org/10.16993/dfl.128>
- Noviani, S., & Kuswando, P. (2022). Self-efficacy beliefs of English teachers from non- educational backgrounds towards TPACK: An insight from Indonesia. *Englisia: Journal of Language, Education, and Humanities*, 10(1), 182–201.
- Nurchayani, S. R., Saptono, A., & Pratama, A. (2022). Does teaching practice experience affect interest in becoming a teacher? the role of self-efficacy as an intervening variable. *Romeo Journal : Review of Multidisciplinary Education, Culture and Pedagogy*, 1(4), 1–16. <https://bit.ly/3Fz7MeI>
- Odanga, S. J. O., & Aloka, P. J. O. (2022). Influence of school category on teachers' self-efficacy and its domains in selected secondary schools. *EUREKA: Social and Humanities*, (5), 66–75. <https://doi.org/10.21303/2504-5571.2022.002564>
- Oktaviola, E., & Lubis, F. Y. (2022). The adaptation of the teacher's sense of efficacy scale (TSES - Indonesia): Designed for gifted students educators. *Budapest International Research and Critics Institute-Journal*, 5(3), 26125–26136. <https://bit.ly/3KRJ8sR>
- Orakçı, Ş., Göksu, D. Y., & Karagöz, S. (2023). A mixed methods study of the teachers' self-efficacy views and their ability to improve self-efficacy beliefs during teaching. *Frontiers in Psychology*, 13, Article 1035829. <https://doi.org/10.3389/fpsyg.2022.1035829>
- Otara, A., & Niyirora, A. (2016). Educational inputs: A defining factor in planning for quality secondary education in Rwanda. *International Journal of Development and Sustainability*, 5(3), 120–136. <https://bit.ly/3mXVnux>
- Özcan, M. (2022). High school teachers' self-efficacy beliefs: A mixed method research. *Waikato Journal of Education*, 27(3), 123–141. <https://doi.org/10.15663/wje.v27i3.827>
- Öztürk, N., Özdemir, G., & Şahin, S. (2020). Teachers' self-efficacy perceptions in terms of school principal's instructional leadership behaviours. *International Journal of Progressive Education*, 16(1), 25–40. <https://doi.org/10.29329/ijpe.2020.228.3>
- Palmer, T. M., Peters, J. L., Sutton, A. J., & Moreno, S. G. (2008). Contour-enhanced funnel plots for meta-analysis. *Stata Journal*, 8(2), 242–254. <https://doi.org/10.1177/1536867x0800800206>
- Parker, M., Ficklin, K., & Shaw-Ferguson, T. (2020). Qualitative research on the influence of engineering professional development on teacher self-efficacy in a rural K-5 setting. *Contemporary Issues in Technology & Teacher Education*, 20(4), 687-703. <https://bit.ly/3AjfaIt>
- Perzigian, A. (2018). Social competence in urban alternative schools. *PennGSE Perspectives on Urban Education*, 15(1), 1–13. <https://bit.ly/3JtP6hD>
- Podkhodova, N., Snegurova, V., Stefanova, N., Triapitsyna, A., & Pisareva, S. (2020). Assessment of mathematics teachers' professional competence. *Journal on Mathematics Education*, 11(3), 477–500. <https://doi.org/10.22342/jme.11.3.11848.477-500>



- Pramana, C., Chamidah, D., Suyatno, S., Renadi, F., & Syaharuddin, S. (2021). Strategies to improved education quality in Indonesia: A review. *Turkish Online Journal of Qualitative Inquiry*, 12(3), 1977–1994. <https://bit.ly/3ZZZ01N>
- Rachmawati, D. L., & Fadhilawati, D. (2020). Teachers' sense of self-efficacy, english proficiency, and teaching ability in EFL setting: A case study in tertiary level. *Exposure: Jurnal Pendidikan Bahasa Inggris*, 9(1), 40–58. <https://doi.org/10.26618/exposure.v9i1.3112>
- Rahemi, J. (2007). Self-efficacy in English and Iranian senior high school students majoring in humanities. *Novitas-ROYAL*, 1(2), 98–111. <https://bit.ly/3LweO83>
- Rukayah, Daryanto, J., Atmojo, I. R. W., Ardiansyah, R., Saputri, D. Y., & Salimi, M. (2022). Augmented reality media development in STEAM learning in elementary schools. *Ingénierie des Systèmes d'Information*, 27(3), 463-471. <https://doi.org/10.18280/isi.270313>
- Saienko, N., Lavrysh, Y., & Lukianenko, V. (2020). The impact of educational technologies on university teachers' self-efficacy. *International Journal of Learning, Teaching and Educational Research*, 19(6), 323–336. <https://doi.org/10.26803/IJLTER.19.6.19>
- Salimi, M., Suhartono, S., Hidayah, R., & Fajari, L. E. W. (2020). Improving mathematics learning of geometry through the concrete-pictorial-abstract (CPA) approach: collaborative action research. *Journal of Physics: Conference Series*, 1663, Article 012046. <https://doi.org/10.1088/1742-6596/1663/1/012046>
- Sandaraj, M., & Hashim, H. (2022). Establishing the relationship between teacher efficacy and malaysian primary pupils' achievement in formative reading assessment. *Creative Education*, 13(2), 491–503. <https://doi.org/10.4236/ce.2022.132029>
- Saputro, A. D., Atun, S., Wilujeng, I., Ariyanto, A., & Arifin, S. (2020). Enhancing pre-service elementary teachers' self-efficacy and critical thinking using problem-based learning. *European Journal of Educational Research*, 9(2), 765–773. <https://doi.org/10.12973/eu-jer.9.2.765>
- Sarifah, I., Supriyati, Y., Rahayu, W., & Siregar, Y. E. Y. (2021). The impact of self efficacy beliefs and work motivation on the quality of mathematics test instruments by elementary school teachers. *AIP Conference Proceedings*, 2331, Article 020028. <https://doi.org/10.1063/5.0041761>
- Sedgwick, P. (2015). Meta-analyses: What is heterogeneity? *BMJ*, 350, 1–4. <https://doi.org/10.1136/bmj.h1435>
- Seneviratne, K. P., Hamid, J. A., Khatibi, A., Azam, F., & Sudasinghe, S. (2019). Teachers' Sense of efficacy: A challenge for professional development toward teaching science as inquiry. *Science Education International*, 30(4), 274–283. <https://doi.org/10.33828/sei.v30.i4.4>
- Septianti, D. M., Zulaihati, S., & Fauzi, A. (2021). The effect of interest in being a teacher, self-efficiency, and field experience practices on preparedness to be teacher. *International Journal of Multidisciplinary Research and Literature*, 1(5), 555–565. <https://doi.org/10.53067/ijomral.v1i5.78>
- Septiara, V. I., & Listiadi, A. (2019). Pengaruh persepsi profesi guru, efikasi diri dan program pengelolaan pembelajaran (PPP) terhadap minat menjadi guru akuntansi mahasiswa prodi pendidikan akuntansi 2015 fakultas ekonomi UNESA [The effect of teacher professional perceptions, self-efficacy and learning management programs (PPP) on interests in becoming accounting teachers students of accounting education study program 2015 faculty of economics UNESA]. *Jurnal Pendidikan Akuntansi UNESA*, 7(3), 315–318. <https://bit.ly/3m4gQsr>
- Shahmohammadi, N. (2018). The impact of total quality management on the effectiveness of educational programs of Karaj first grade high schools. *Engineering, Technology & Applied Science Research*, 8(1), 2433–2437. <https://doi.org/10.48084/etasr.1674>
- Shi, L., Chu, H., & Lin, L. (2020). A Bayesian approach to assessing small-study effect in meta-analysis of a binary outcome with controlled false positive rate. *Research Synthesis Methods*, 11(4), 535-552. <https://bit.ly/4134N74>
- Shi, L., & Lin, L. (2019). The trim-and-fill method for publication bias: Practical guidelines and recommendations based on a large database of meta-analyses. *Medicine*, 98(23), Article e15987. <https://doi.org/10.1097/MD.00000000000015987>
- Shi, X., Nie, C., Shi, S., Wang, T., Yang, H., Zhou, Y., & Song, X. (2017). Effect comparison between egger's test and begg's test in publication bias diagnosis in meta-analyses: Evidence from a pilot survey. *International Journal of Research Studies in Biosciences*, 5(5), 14–20. <https://doi.org/10.20431/2349-0365.0505003>
- Sibagariang, P. P., & Pandia, W. S. S. (2021). Teaching approach and teacher self-efficacy during early childhood distance learning. *Jurnal Pendidikan Usia Dini*, 15(1), 41–59. <https://doi.org/10.21009/jpud.151.03>
- Silalahi, M. D., & Susilo, J. D. (2018). Guru SMA katolik terakreditasi A dalam penerapan kurikulum 2013 di Surabaya [Catholic high school teachers accredited A in implementing the 2013 curriculum in Surabaya]. *Jurnal Experientia*, 6(1), 19–26. <https://bit.ly/3LvdKRO>

- Singh, C. K. S., Ong, E. T., Mohtar, T. M. T., Sing, T. S. M., & Mostafa, N. A. (2020). Quality teachers of the 21st century: An overview of theories and practice. *International Journal of Innovation, Creativity and Change*, 13(1), 1481-1494. <https://bit.ly/3ADscAv>
- Sterne, J. A. C., & Harbord, R. M. (2004). Funnel plots in meta-analysis. *The Stata Journal: Promoting Communications on Statistics and Stata*, 4(2), 127-141. <https://doi.org/10.1177/1536867x0400400204>
- Suico, C. (2021). Teachers' attributes and self-efficacy as predictors of classroom management. *International Journal of Asian Education*, 2(2), 195-212. <https://doi.org/10.46966/ijae.v2i2.176>
- Sukadari, Huda, M., Perianto, E., Haryanto, & Subarkah, E. (2021). Improving education quality of elementary school in Indonesia: A empirical research. *Journal of Southwesr Jiaotong University*, 56(4), 330-337. <https://doi.org/10.35741/issn.0258-2724.56.4.28>
- Suryanto, J., & Sunarto, S. (2022). The effect of self-efficacy and teacher commitment to teacher performance moderated academic supervision. *Attractive : Innovative Education Journal*, 4(1), 1-12. <https://bit.ly/400isuy>
- Susiani, T. P., Salimi, M., Hidayah, R., Fauziah, M., Astuti, D. (2021). Utilization of free platforms in online learning. *Association for Computing Machinery*, Article 105. <https://doi.org/10.1145/3516875.3516997>
- Susiani, T. P., Salimi, M., Ngatman, & Hidayah, R. (2020). STEAM in art education course: students perception. *Association for Computing Machinery*, Article 123. <https://doi.org/10.1145/3452144.3452266>
- Tantry, T. P., Karanth, H., Shetty, P. K., & Kadam, D. (2021). Self-learning software tools for data analysis in meta-analysis. *Korean Journal of Anesthesiology*, 74(5), 459-461. <https://doi.org/10.4097/KJA.21080>
- Velez, J. I., & Correa Morales, J. C. (2015). Gráfico Q-Q modificado para grandes tamaños de muestra [A modified Q-Q plot for large sample sizes]. *Comunicaciones En Estadística*, 8(2), 163-172. <https://doi.org/j7x8>
- von Hippel, P. T. (2015). The heterogeneity statistic  $I^2$  can be biased in small meta-analyses. *BMC Medical Research Methodology*, 15, Article 35. <https://doi.org/10.1186/s12874-015-0024-z>
- Voorman, A., Lumley, T., McKnight, B., & Rice, K. (2011). Behavior of QQ-plots and Genomic Control in studies of gene-environment interaction. *PLoS ONE*, 6(5), Article e19416. <https://doi.org/10.1371/journal.pone.0019416>
- Wang, M. C., & Bushman, B. J. (1998). Using the normal quantile plot to explore meta-analytic data sets. *Psychological Methods*, 3(1), 46-54. <https://doi.org/10.1037/1082-989X.3.1.46>
- Wardoyo, C. (2015). The measurement of teacher's personality competence and performance using embedded model. *Journal of Education and Practice*, 6(26), 18-24. <https://bit.ly/3yM6GJ1>
- Widodo, W., Gustari, I., & Chandrawaty, C. (2022). Adversity quotient promotes teachers' professional competence more strongly than emotional intelligence: Evidence from Indonesia. *Journal of Intelligence*, 10(3), Article 44. <https://doi.org/10.3390/jintelligence10030044>
- Wight, M., & Chapparo, C. (2008). Social competence and learning difficulties: Teacher perceptions. *Australian Occupational Therapy Journal*, 55(4), 256-265. <https://doi.org/10.1111/j.1440-1630.2007.00706.x>
- Winn, R. C., & Green, R. S. (1998). Applying total quality management to the educational process. *International Journal of Engineering Education*, 14(1), 24-29. <https://bit.ly/3JS9TNA>
- Yang, S., & Berdine, G. (2021). Publication bias in meta-analysis. *The Southwest Respiratory and Critical Care Chronicles*, 9(41), 67-70. <https://doi.org/10.12746/swrccc.v9i41.945>
- Yoo, J. H. (2016). The effect of professional development on teacher efficacy and teachers' self-analysis of their efficacy change. *Journal of Teacher Education for Sustainability*, 18(1), 84-94. <https://doi.org/10.1515/jtes-2016-0007>
- Yoong, S. M., & Hoe, F. S. (2022). Teachers' efficacy to teach students with mathematics learning difficulties. *Journal of Mathematics Instruction, Social Research and Opinion*, 1(3), 117-130. <https://doi.org/10.58421/misro.v1i3.29>
- Yurtdakal, K., & Karakas, H. (2021). The self-efficacy of classroom teachers to organize educational trips to out-of-school learning environments. *Hayef: Journal of Education*, 18(2), 295-322. <https://doi.org/10.5152/hayef.2021.20032>
- Yusuf, F. A., & Fajari, L. E. W. (2022). Key success factors of various quality assessment institutions and quality of higher education services: A meta-analysis study. *Eurasian Journal of Educational Research*, 2022(98), 184-202. <https://bit.ly/3VdoOG9>
- Zakirova, R. R. (2016). The structure of primary school teachers' professional competence. *International Journal of Environmental and Science Education*, 11(6), 1167-1173. <http://www.ijese.net/makale/247.html>