International Journal of Theory and Application in Elementary and Secondary School Education (IJTAESE) Vol. 09 No. 01 (2026) https://10.33830/ijtaese.v12i01.13697

Research Papers

teacher self-efficacy and student engagement in elementary education: a meta-analysis

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Received: 24 October 2025	Revised: 19 December 2025	Accepted: 01 April 2026	Online: 30 April 2026

Abstract

This meta-analytical research explores the relationship between teacher self-efficacy and student engagement in the context of primary and secondary education. Based on Bandura's Social Cognitive Theory, teacher self-efficacy refers to the teacher's confidence in his or her ability to manage classroom challenges, deliver learning effectively, and encourage positive student learning outcomes. A systematic literature search was conducted using the Scopus database for publications from 2014 to 2024, and resulted in 20 studies that met the criteria with correlation data that could be analyzed. The results of the meta-analysis showed a significant positive and moderate relationship (r = 0.48; CI 95%: 0.33–0.63), which indicates that the higher the teacher's self-efficacy, the higher the cognitive, emotional, and behavioral engagement of students. Heterogeneity analysis showed significant variation between studies (Q = 1014,661, p <,001), suggesting that contextual factors such as education level, type of measurement instrument, and geographic location may moderate the relationship. Subgroup analysis and publication bias tests (funnel plots and Egger tests) showed consistent and reliable results. These findings suggest that teachers with high self-efficacy tend to create supportive learning environments, implement adaptive learning strategies, and provide individualized support to students. This research emphasizes the importance of professional training that focuses on improving teacher efficacy, especially in the context of digital and hybrid learning. These results also encourage longitudinal and cross-cultural research to enrich understanding and support evidence-based education policies.

Keywords: *Teacher Training; Digital Learning; Self-Efficacy*

INTRODUCTION

Self-efficacy or self-confidence is a concept introduced by Bandura et al., (1999) within the framework of social-cognitive theory, which emphasizes that human behavior is influenced by the interaction between personal factors, the environment, and individual actions. In the context of education, teacher self-efficacy is defined as the teacher's individual belief in his or her ability to plan, organize, and execute the teaching activities necessary to achieve the desired learning objectives, even in challenging situations. This concept is the main highlight in educational studies because it has been proven to have significant influence on teaching quality, classroom management, student motivation, and the achievement of optimal learning outcomes (Cardullo et al., 2021; Guirguis & Plotka, 2022; Sibagariang & S. Pandia, 2021).

Teachers with high levels of self-efficacy show a tendency to be more reflective and innovative in developing learning strategies, more confident in managing student behavior, and more persistent in facing challenges in the classroom. This condition is in line with the findings of previous research which shows that teachers' self-efficacy plays an important role in shaping

effective pedagogical practices and creating a learning environment conducive to student involvement (Capron Puozzo & Audrin, 2021). They tend to create a safe, supportive, and open learning environment, allowing students to be more actively involved in the learning process emotionally, cognitively, and behaviorally. On the other hand, teachers with low self-efficacy often experience doubts in pedagogical decision-making, tend to avoid challenges, and have difficulty in building positive relationships with students, leading to low student involvement in learning activities (Marschall & Watson, 2022; Shah & Bhattarai, 2023; Woodcock et al., 2022). Students' involvement in learning not only reflects their active participation, but is also an indicator of success in creating a meaningful learning process. Teachers who believe in their capacity to manage the classroom and motivate students are more likely to use varied instructional approaches, build positive relationships, and provide effective feedback, all of which contribute to increased student enthusiasm and engagement in the classroom (Emiru & Gedefaw, 2024; Khalid & Akhter, 2021).

However, the relationship between teacher self-efficacy and student engagement is not linear and simple. Longitudinal studies in Germany conducted by Hassan, (2019) This shows that Teachers' confidence in supporting students emotionally affects students' perceptions of social support, which further increases students' interest and engagement in math learning. These findings highlight the importance of intervention variables, such as students' perceptions of teachers, instructional strategies used, and classroom climates shaped by teachers.

Furthermore, a design study by Wagler & Moseley, (2005), shows that Training focused on developing teachers' self-efficacy can increase student engagement, although its implementation in environments with limited infrastructure and institutional support requires contextual adaptation. Meanwhile, Imanda, (2021) Through an experimental approach, it was shown that increased self-efficacy through training does not necessarily result in a significant increase in student engagement, depending on social, cultural, and student characteristics. Therefore, the local context becomes an important dimension that cannot be ignored when evaluating the effectiveness of interventions to improve teachers' self-efficacy. The difference in findings between these studies shows that the effectiveness of teachers' self-efficacy in increasing student involvement is highly dependent on the dynamics of the learning context faced by teachers. Changes in the learning environment, pedagogical demands, and forms of interaction used in the learning process have the potential to modify the role of teachers' self-efficacy, so that this construct cannot be understood statically, but as an adaptive capacity that develops along with changes in the education system.

On the other hand, the phenomenon of educational transformation due to technological developments and the impact of the COVID-19 pandemic has encouraged teachers to adapt to digital and hybrid learning methods. Teachers' self-efficacy in utilizing learning technologies such as Learning Management System (LMS), interactive applications, and digital media is the main determinant of the success of the implementation of distance learning. In this situation, student engagement relies heavily on the teacher's ability to maintain personal connections, create engaging learning experiences, and deliver material adaptively through digital platforms (Mohammad & Kamran, 2023; Ninković et al., 2024).

While there are studies that have explored the relationship between teacher self-efficacy and student engagement, most of these studies have limitations in terms of geographic coverage, education level, and population diversity. Most of the research is still regional, focuses on one specific level of education (e.g. primary or junior high school only), and has not integrated the results thoroughly. There have not been many meta-analytic studies that have systematically measured the strength of this relationship across the education system and identified moderation variables that can strengthen or weaken this relationship, such as teaching experience, field of study, student background, and school culture (Fackler et al., 2021a, 2021b).

This lack of integration across studies creates disparities that are important to bridge.

Without a comprehensive mapping of existing research outcomes, it is difficult for education stakeholders, whether policymakers, curriculum developers, or teacher trainers, to design evidence-based and contextual interventions. In other words, a scientific synthesis approach through meta-analysis is needed to get a broader, accurate, and generalizable picture of the extent to which teachers' self-efficacy affects student engagement in learning.

Based on this background, this study aims to conduct a meta-analytical synthesis of various studies that explore the relationship between teacher self-efficacy and student involvement at the primary and secondary education levels during the period 2014 to 2024. Specifically, the objectives of this study are formulated as follows:

RO1: To estimate the overall effect of teacher self-efficacy on general student engagement at the primary and secondary education levels based on the findings of relevant quantitative studies. RO2: Explore the role of moderation factors such as education level, sample characteristics, geographic location, and measurement instruments that can strengthen or weaken the relationship between teacher self-efficacy and student engagement. RO3: Formulate strategic recommendations for teacher professional development and education policies that focus on improving the quality of learning through strengthening teachers' self-efficacy, including in the context of digital and hybrid learning.

LITERATURE REVIEW

Self-efficacy theory developed by Bandura et al., (1999) is an important basis for understanding how a person's belief in their abilities can affect motivation, behavior, and performance outcomes. In the context of education, this concept becomes especially relevant because teachers who believe in their own ability to manage the classroom, deliver materials, and build positive relationships with students tend to show more effective teaching performance. Teachers' self-efficacy is reflected in the belief that they can influence student learning even when faced with difficult conditions, such as limited means or the diversity of students' character. Teachers who have a high level of self-efficacy demonstrate reflective, innovative, and willing to take pedagogical risks for student success.

In addition, teachers' self-efficacy does not appear out of nowhere, but is formed through meaningful teaching experiences, social reinforcement from peers, and the achievement of positive student learning outcomes. Study by Bandura, (1990) This suggests that high-efficacy teachers are more likely to use collaborative technology-based learning strategies and emphasize on students' exploration of concepts. They are also more open to curriculum changes and instructional adaptations. Guo et al., (2023) adding that teachers with high self-efficacy have better emotional control and can facilitate a conducive and psychologically safe learning environment. In this context, structural support from school leaders, a supportive organizational culture, and ongoing professional training are important elements that support the growth of teacher efficacy (Barni et al., 2019).

The relationship between teacher self-efficacy and student engagement has been studied in various studies, both quantitatively and qualitatively. Research conducted by Emiru and Emiru & Gedefaw, (2024) showed that teacher self-efficacy explains nearly 20% variation in student engagement rates. This is a significant enough number to explain that teachers' perceptions of their abilities have a direct impact on how students interact, participate, and focus on the learning process. Teachers who are confident in their competencies tend to create learning that is active, inclusive, and relevant to students' lives, so that students feel valued and more engaged. Overall, the research findings show that teacher self-efficacy is an important determinant of student engagement, with a fairly strong empirical contribution to the variation in learning behavior. However, the magnitude of this influence indicates that self-efficacy is not the only determining

factor, but rather works interactively with pedagogical strategies and classroom contexts. Therefore, the meaning of teacher self-efficacy needs to be placed within a broader framework, which takes into account instructional dynamics and student characteristics.

Tyaningsih et al., (2021), explaining that the study on online learning also emphasizes that teachers' self-efficacy remains an important predictor of student engagement even in distance learning conditions. In a pandemic situation, teachers who have high efficacy can still maintain students' enthusiasm for learning through empathetic digital interactions and tailored learning strategies. Yoo, (2016) This shows that teachers with high efficacy are able to give individualized attention, use differentiation techniques in teaching, and adopt methods that touch on different student learning styles. In addition, the study underscores that the successful implementation of pedagogies that support engagement is also influenced by environmental factors, such as collaborative school climate, principals' leadership styles, and peer support. While a study by (Guo et al., (2023) shows that the emotional support provided by teachers can increase student engagement both directly and through the mediation of variables such as academic self-efficacy and resilience. In online and hybrid learning, the role of teachers as providers of emotional support becomes increasingly important as social interaction becomes limited.

The results of the research conducted by Li, (2023) It shows that teachers who have high self-efficacy tend to be more positive in interacting, more patient in dealing with students' difficulties, and provide reinforcement that encourages students to stay involved despite learning obstacles. They are also more consistent in conveying realistic high expectations, so that students feel challenged but still motivated. In addition, the emotional approach applied by teachers also serves as a preventative of academic stress and pressure, as well as increasing students' perception of school as a place that supports personal and academic growth. This collaborative and emotionally safe classroom culture ultimately creates a positive cycle between teacher self-efficacy and student engagement.

While there is a lot of research confirming a positive relationship between teacher self-efficacy and student engagement, there are a number of methodological gaps that need to be addressed in future research. Most studies are still cross-sectional, making it difficult to conclusively identify the direction of causality. Gordon et al., (2023) revealed that although positive relationships were detected, the dynamics of changing teacher efficacy over time were still not well explained. Therefore, longitudinal studies are needed to explore how experience, training, and social interaction affect the development of teachers' self-efficacy over time. Malatesha Joshi & Wijekumar, (2019) explains that a mixed-methods approach would be very useful for exploring not only how strong the relationship is between the two variables, but also how and why that relationship occurs. The use of qualitative methods such as in-depth interviews, case studies, and classroom observations can enrich existing quantitative data.

In general, although empirical evidence suggests a positive relationship between teacher self-efficacy and student engagement, methodological limitations in existing research limit a comprehensive understanding of the dynamics of these relationships. The dominance of cross-sectional design makes it difficult to trace the direction of causality and the development of teachers' self-efficacy over time. Therefore, longitudinal research and mixed-methods approaches are crucial to capture the change processes, mechanisms, and contexts that explain how and why teachers' self-efficacy affects student engagement.

RESEARCH METHODS

Literature Search Strategy

Literature searches are carried out systematically using the Scopus database as a primary source due to its completeness and reputation in covering reputable international publications. The

keywords used in the search process were "teacher self-efficacy", "student engagement", and "correlation analysis". Variations of keywords such as "teaching effectiveness", "learning motivation", and "academic engagement" are also used to broaden the scope of the search. Boolean operators such as AND and OR are used to combine keywords logically. The search was limited to journal articles published in the period 2014–2024, with restrictions on English language and document types in the form of scientific articles (research articles) that are available in PDF format and can be accessed in full. In addition, to ensure the diversity of the research, further search is also carried out by checking the bibliography of the relevant main article (snowball technique). Through this technique, researchers can find other studies that have conceptual or methodological relevance but were not netted in the initial search of the database due to keyword limitations, indexation, or term variations. Thus, the snowball technique serves to expand and deepen the scope of the literature, improve the completeness of the data, and minimize the risk of missing important research relevant to the focus of the study.

Inclusion and Exclusion Criteria

Inclusion criteria include studies that: (1) discuss the relationship between teacher self-efficacy and student engagement, (2) present quantitative data in the form of correlation measures (e.g., r, F, T, or P values), (3) involve relevant respondents (teachers and students at the elementary level), and (4) publish in indexed journals. Articles are also considered when including data that allows transformations to general-effect measures such as d Cohen or z Fisher. On the other hand, excluded articles are: (1) articles that do not present statistical data that can be processed in meta-analysis, (2) articles that are systematic reviews or narrative reviews without primary quantitative data, (3) articles in languages other than English, and (4) articles that are only available in abstract form or are not fully accessible. To minimize selection bias, two researchers independently assessed the feasibility of the article based on the title and abstract, then through a full-text review.

Data Extraction and Coding

The data extraction process is carried out manually and systematically. The information collected from each study included: author name, year of publication, sample size (N), correlation value (r), F and T values (if available), P values, respondents' education level, participant characteristics (age, gender), and the geographic location of the study. In addition, measurement instruments used to measure self-efficacy (e.g. Teacher Efficacy Sense Scale) and student engagement (e.g. Student Engagement Scale) are also coded. Two independent researchers perform the extraction process to ensure accuracy, and any discrepancies are resolved through discussion or consultation with a third researcher. In addition to the main data, each article was also analyzed based on methodological design (experimental, correlational, or longitudinal) as well as the type of inferential statistics used. To minimize the risk of human error in the manual extraction process, this study used standardized coding sheets developed based on meta-analysis objectives and tested on a limited basis before full use. Clear and consistent data extraction protocols were implemented by both researchers, thereby improving the reliability of the coding process and ensuring uniformity of interpretation of the variables and indicators analyzed.

Statistical Analysis Using JASP

Data analysis is done with the latest version of JASP software that provides complete meta-analysis features. The correlation values (r), F, T, and P values obtained from each study were entered into the JASP data matrix. To evaluate heterogeneity between studies, the Cochran Q test and I^2 statistics were used. If $p > 0.1$ and $I^2 \leq 50\%$, the effect model remains used; if $p < 0.1$ or $I^2 > 50\%$, a random effects model is used. An estimated overall effect size and 95% confidence interval were calculated to measure the strength of the relationship between teacher self-efficacy and student engagement. Subgroup analysis was also carried out based on geographical location,

education level, and instrument type. For visualization purposes, a complete forest plot diagram was also made with confidence limits and weights for each study.

Publication Bias Detection

To detect publication bias, plot funnels and statistical tests of Egger's testing are used. Funnel plots are used to see the symmetry of the distribution of research results; A striking asymmetry can indicate possible publication bias. The Egger test complements visualization by providing a formal statistical test to detect imbalances in results. In addition, Fail-Safe N Rosenthal is also calculated to measure how much non-significant research is required to negate significant results obtained. As an additional step, the trim-and-fill method was used to estimate the amount of research lost due to selective publication and adjust the overall effect size estimate.

Article Selection Procedure with PRISMA

The entire article selection process follows the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analysis) guidelines. The PRISMA flowchart is used to show the number of articles obtained from the initial search, articles screened, articles evaluated for eligibility, and the final number of studies included in the analysis. This procedure ensures transparency and replicability in the screening process, as well as minimizing potential selection bias. All stages of documentation are done using a reference manager (such as Mendeley or Zotero) and spreadsheets for systematic tracking. The final PRISMA diagram will be displayed in the results section to show a concise and informative visualization of the inclusion-exclusion process.

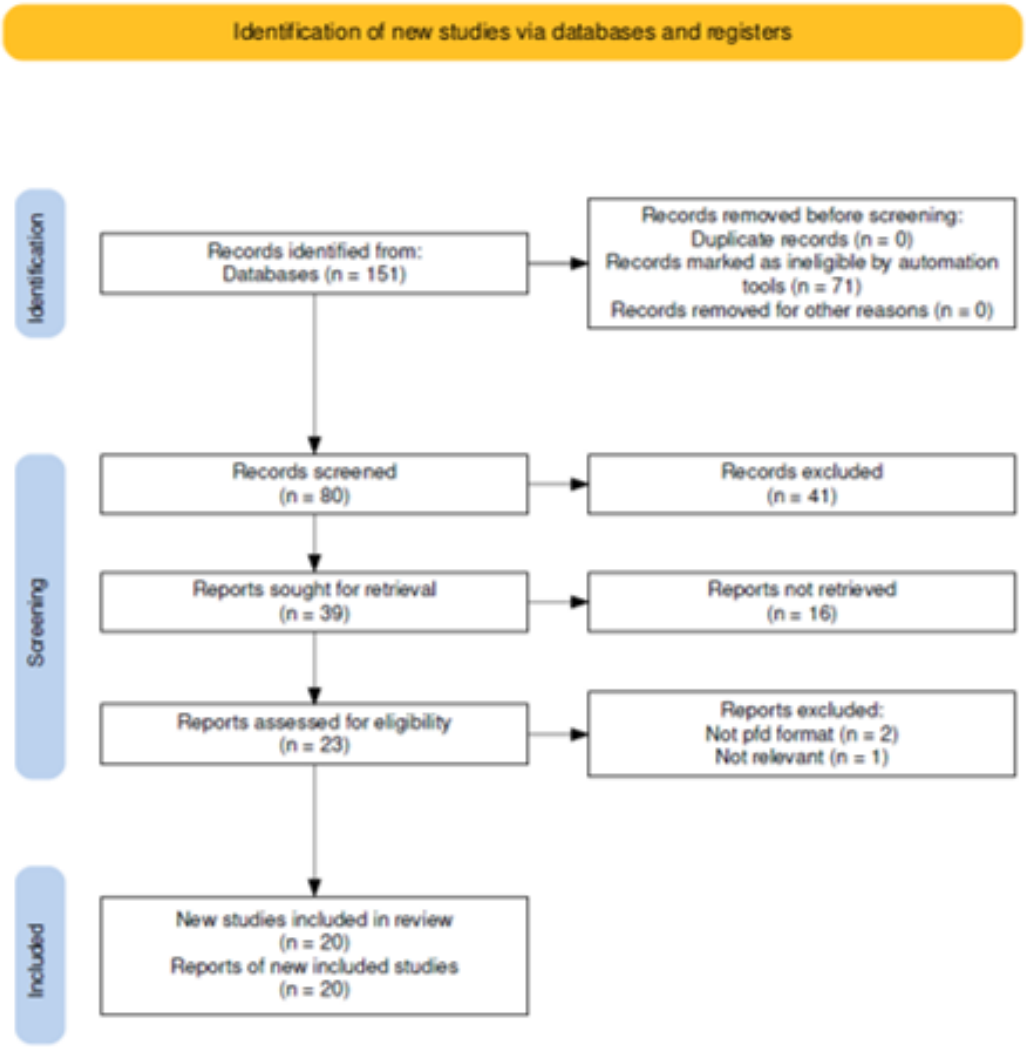

Figure 1. PRISMA Diagram

FINDINGS AND DISCUSSION

Find

The results of the meta-analysis using a randomized effects model showed that the average effect size between teacher self-efficacy and student involvement was 0.48 with a 95% confidence interval between 0.33 and 0.63. These effect measures showed a positive and significant relationship, indicating that increased teacher self-efficacy was likely to be followed by increased student involvement in learning with moderate effect strength.

Table 1. Results of Fixed and Random Effect Model Analysis

Fixed and Random Effects ▼

	Q	df	p
Omnibus test of Model Coefficients	39.632	1	< .001
Test of Residual Heterogeneity	1014.661	19	< .001

Note. *p*-values are approximate.
Note. The model was estimated using Restricted ML method.

In the analysis of the fixed and random effects models in table 1, the Omnibus test for the Model Coefficient yields a value of Q = 39.632 (df = 1, p < 0.001). This suggests that the relationship between teacher self-efficacy and overall student engagement is significant. The Residual Heterogeneity Test with a value of 1014.661 (df = 19, p < 0.001) showed that despite the variation between studies, the relationship between the two variables remained significant and could be generalized.

Table 2. Coefficient Results and Z-Statistics Test

Coefficients

					95% Confidence Interval	
	Estimate	Standard Error	z	p	Lower	Upper
intercept	0.478	0.076	6.295	< .001	0.329	0.627

Note. Wald test.

The coefficient table in table 2, shows that the intercept has a value of 0.478 with p <.001, which means that the relationship between teacher self-efficacy and student involvement is positive and statistically significant. This estimate has a 95% confidence interval between 0.329 to 0.627, suggesting that these results can be broadly applied in different educational contexts.

Table 3. Funnel Plot Asymmetry Test (Egger Test)

Regression test for Funnel plot asymmetry ("Egger's test")

	z	p
sei	0.794	0.427

The Egger's Test in table 3 was conducted to evaluate the publication bias showing a value of z = 0.794 (p = 0.427). This insignificant p-value indicates that there was no publication bias influencing the results of this meta-analysis. In other words, these findings are reliable and are not distorted by unpublished research.

Table 4. File Drawer Analysis

File Drawer Analysis

	Fail-safe N	Target Significance	Observed Significance
Rosenthal	22494.000	0.050	< .001

The analysis of File-Safe N in table 4, using Rosenthal's Fail-Safe method yields a value of 22494. This shows that as many as 22,494 studies with zero or no significant results will be needed to eliminate the significance of the results obtained in this study. This shows that the results of this study are very strong and are not affected by unpublished research or that have insignificant results.

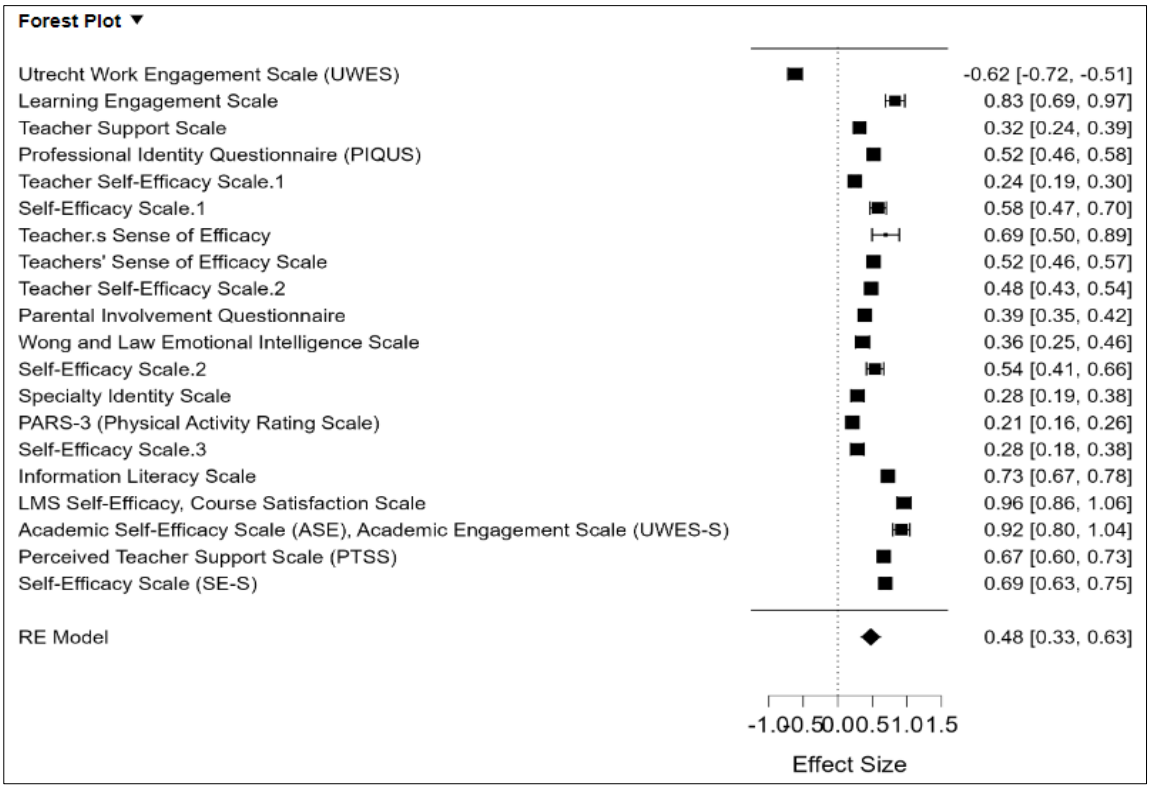

Figure 2. Forest Plot

The forest plot in figure 2, shows the distribution of effect sizes from the various scales used to measure teacher self-efficacy and student engagement. Most scales show significant positive effect sizes. The Learning Engagement Scale showed the highest effect size (0.83), followed by the Teacher Self-Efficacy Scale (0.69). This shows that student learning engagement and teacher self-efficacy have a great influence on increasing student involvement in learning.

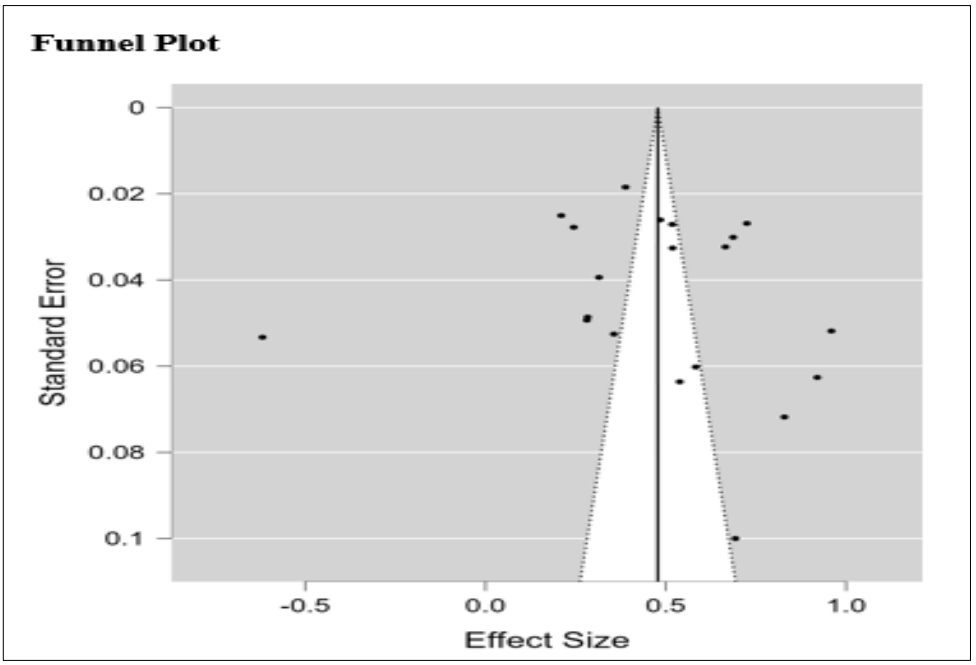

Figure 3. Plot Funnel

The funnel plot in figure 3, shows the symmetrical distribution of effect sizes. This plot symmetry suggests that there is no publication bias that affects the results of this meta analysis. The seemingly small asymmetry suggests that these findings cover a wide range of representative effect sizes.

Discussion

The results of this analysis confirmed a significant positive relationship between the two variables, with an average effect size of 0.48 (95% confidence interval: [0.33, 0.63]). These findings suggest that increased teacher self-efficacy tends to increase student engagement in learning, according to the research questions asked in this study. These results support the view that teacher self-efficacy plays an important role in creating a learning atmosphere that supports student engagement, which is also reflected in the existing literature (Yada & Savolainen, 2017).

The synthesis of studies included in this meta-analysis shows that the self-efficacy of teachers has a significant positive influence about student involvement in learning. These results are consistent with the literature that states that teachers with high self-efficacy are more likely to use teaching strategies that can increase student engagement (Chang & Chien, 2015). The results of this meta-analysis support this statement and show that the relationship between teacher self-efficacy and student engagement is moderate to strong. The random-effects model test yielded Q = 39,632 (df = 1, p <.001), while the residual heterogeneity test (Q = 1014.661, df = 19, p <.001) showed significant variation between studies.

The results of this study are in line with previous research that showed that teachers' self-efficacy is positively related to student involvement in various educational contexts. Longitudinal research by Symes et al., (2023) It also shows that increased teacher self-efficacy correlates with increased emotional support and student involvement in the classroom. The study makes a new contribution by synthesizing findings from various studies in the last decade and covering a wide range of educational contexts, thus reinforcing the generalization of results. These findings also confirm Relevance of Social Cognitive Theory Bandura et al., (1999), which explains that self-efficacy affects a person's actions and performance in achieving goals. In the context of learning, teachers who have high confidence are more effective in implementing teaching strategies that can

increase participation (Bandura, 1990; Williams et al., 2017). It also reinforces the importance of institutional support and professional training in improving teacher efficacy.

One of the interesting findings was the significant heterogeneity between studies, as reflected in the high Q values (1014,661, p <,001) and moderate to large variations in effect sizes. This shows that the relationship between teacher self-efficacy and student involvement is influenced by contextual factors such as differences in measurement instruments (Ruiz-Dotras & Lladós-Masllorens, 2022). Studies using the Teacher Self-Efficacy Scale may produce different results than those using the direct observation-based student engagement scale. Nonetheless, the overall significance of the relationship is maintained. These findings have important implications both theoretically and practically. From a theoretical perspective, this study reinforces the role of self-efficacy in teacher motivation theory and provides empirical evidence of its relationship with student engagement. In terms of education policy, the results emphasize the importance of training programs that focus on strengthening teacher efficacy, especially in the aspects of classroom management and active learning strategies. Educational institutions and policymakers need to integrate efficacy-based training into sustainable professional development (Jeffrey Landine, 2020).

In addition, these results provide the basis for the development of a teacher intervention evaluation model that emphasizes improved efficacy as a starting point. For example, schools can develop internal mentoring programs that aim to boost the confidence of novice teachers through classroom observation and reflective feedback. At the macro level, teacher performance appraisal systems should also include self-efficacy indicators as part of non-cognitive assessments that promote sustainable professional growth. These findings also demonstrate the importance of adapting teacher training curricula to include strengthening intrapersonal capacities such as emotion regulation, professional resilience, and instructional flexibility.

In the context of digital and online learning, teachers with high self-efficacy have been shown to be more effective in maintaining student engagement, even in the midst of limited physical interaction. This means that the development of digital competencies is not only technical, but also related to teachers' self-perception of their ability to manage digital classrooms. Therefore, digital training that fosters teachers' trust in technology is one of the crucial strategies in the modern learning ecosystem.

Thus, the results of this meta-analysis make a significant theoretical and practical contribution to the world of education, not only strengthening the empirical foundation on the importance of teacher self-efficacy, but also opening up space for policy interventions, training development, and learning design that are more effective and resilient in facing the challenges of the times. The entire article selection process follows the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analysis) guidelines. The PRISMA flowchart is used to show the number of articles obtained from the initial search, articles screened, articles evaluated for eligibility, and the final number of studies included in the analysis. This procedure ensures transparency and replicability in the screening process, as well as minimizing potential selection bias. All stages of documentation are done using a reference manager (such as Mendeley or Zotero) and spreadsheets for systematic tracking. The final PRISMA diagram will be displayed in the results section to show a concise and informative visualization of the inclusion-exclusion process.

CONCLUSION

This study presents a meta-analytical synthesis of the influence of teacher self-efficacy on student involvement in the context of primary and secondary education. The results of the analysis showed a positive and significant relationship, with an average effect size of 0.48, suggesting that improved teacher self-efficacy consistently encouraged students' emotional, cognitive, and

behavioral engagement. Teachers with high levels of self-efficacy tend to use a more reflective, adaptive, and student-centered approach to teaching, creating a supportive and motivating classroom climate. The study also identified moderation factors such as teaching experience, education level, field of study, and student background, that affect the strength of the relationship. These findings emphasize the importance of considering local contexts in designing teacher interventions and training. This research contributes to the development of educational policies and professional programs that focus on strengthening teachers' confidence and instructional effectiveness. However, the variation of measurement instruments between studies is a limitation that can affect the consistency of results and generalization of findings. Therefore, further research with longitudinal design, cross-cultural approaches, and exploration of contextual factors such as institutional support and learning technologies is urgently needed to strengthen understanding of the dynamics of the relationship between teacher self-efficacy and student engagement.

LIMITATIONS & FURTHER RESEARCH

This research has several limitations. The heterogeneity between studies is quite high due to differences in context, education level, and the measurement tools used, so it can affect the consistency and generalization of results. In addition, most studies correlate over time, so it has not been able to explain the cause-and-effect relationship between teacher self-efficacy and student engagement in depth. Further research is suggested using longitudinal design and mixed-method approaches to understand the dynamics of the relationship between the two variables more comprehensively. Exploration of moderator factors such as institutional support, the use of learning technologies, and the professional identity of teachers is also important to strengthen the empirical basis and expand the application of research results in various educational contexts.

CONFESSION

The author would like to thank the *Instituto Católico para a Formação de Professores* (ICFP) Baucau, Timor-Leste, for their support and cooperation during the implementation of this research. Thanks also to the supervisors, colleagues, and reviewers who have provided valuable input in improving this article. This research does not receive special funding from any institution, whether public, commercial, or non-profit.

REFERENCES

Bandura, A. (1990). Perceived self-efficacy in the exercise of control over AIDS infection. *Evaluation and Program Planning*, *13*(1). https://doi.org/10.1016/0149-7189(90)90004-G

Bandura, A., Freeman, W. H., & Lightsey, R. (1999). Self-Efficacy: The Exercise of Control. *Journal of Cognitive Psychotherapy*, *13*(2). https://doi.org/10.1891/0889-8391.13.2.158

Barni, D., Danioni, F., & Benevene, P. (2019). Teachers' self-efficacy: The role of personal values and motivations for teaching. *Frontiers in Psychology*, *10*(JULY). https://doi.org/10.3389/fpsyg.2019.01645

Capron Puozzo, I., & Audrin, C. (2021). Improving self-efficacy and creative self-efficacy to foster creativity and learning in schools. *Thinking Skills and Creativity*, *42*. https://doi.org/10.1016/j.tsc.2021.100966

Cardullo, V., Wang, C. Hsuan, Burton, M., & Dong, J. (2021). K-12 teachers' remote teaching self-efficacy during the pandemic. *Journal of Research in Innovative Teaching and Learning*, *14*(1). https://doi.org/10.1108/JRIT-10-2020-0055

Chang, D., & Chien, W. cheng. (2015). Determining the Relationship between Academic Self-efficacy and Student Engagement by Meta-analysis. *Proceedings of the 2015 International Conference on Education Reform and Modern Management*, *15*. https://doi.org/10.2991/ermm-15.2015.37

Emiru, E. K., & Gedefaw, M. T. (2024). The effect of teacher self-efficacy on learning engagement of secondary school students. *Cogent Education*, *11*(1). https://doi.org/10.1080/2331186X.2024.2308432

Eslami, Z. R., & Fatahi, A. (2008). Teachers' sense of self-efficacy, English proficiency, and instructional strategies: A study of nonnative EFL teachers in Iran. *Tesl-Ej*, *11*(4).

Fackler, S., Sammons, P., & Malmberg, L. (2021a). A comparative analysis of predictors of teacher self-efficacy in student engagement, instruction and classroom management in Nordic, Anglo-Saxon and East and South-East Asian countries. *Review of Education*, *9*(1). https://doi.org/10.1002/rev3.3242

Fackler, S., Sammons, P., & Malmberg, L. E. (2021b). Context and Implications Document for: A comparative analysis of predictors of teacher self-efficacy in student engagement, instruction and classroom management in Nordic, Anglo-Saxon, and East and South-East Asian countries. In *Review of Education* (Vol. 9, Issue 1). https://doi.org/10.1002/rev3.3241

Gordon, D., Blundell, C., Mills, R., & Bourke, T. (2023). Teacher self-efficacy and reform: a systematic literature review. *Australian Educational Researcher*, *50*(3). https://doi.org/10.1007/s13384-022-00526-3

Guirguis, R., & Plotka, R. (2022). Strategies Supporting ECE Teachers' Sense of Self-Efficacy. *HS Dialogue: The Research to Practice Journal for the Early Childhood Field*, *25*(1). https://doi.org/10.55370/hsdialog.v25i1.1380

Guo, Q., Samsudin, S., Yang, X., Gao, J., Ramlan, M. A., Abdullah, B., & Farizan, N. H. (2023). Relationship between Perceived Teacher Support and Student Engagement in Physical Education: A Systematic Review. In *Sustainability (Switzerland)* (Vol. 15, Issue 7). https://doi.org/10.3390/su15076039

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). https://doi.org/10.33225/pec/19.77.667

Imanda, I. (2021). Teacher Self-Efficacy Training to Improve Teachers' Work Engagement. *Journal of Social Science Education*, *30*(1). https://doi.org/10.17509/jpis.v30i1.29678

Jeffrey Landine, J. S. (2020). Relationship Between Metacognition, Motivation, Locus of Control, Self-Efficacy, and Academic Achievement. *Procedia - Social and Behavioral Sciences*, *8*(1).

Khalid, S., & Akhter, M. (2021). Effect of Teachers' Self Efficacy and Instructional Strategies on Students' Engagement at Secondary School Level. *Global Educational Studies Review*, *VI*(IV). https://doi.org/10.31703/gesr.2021(vi-iv).03

Li, S. (2023). The effect of teacher self-efficacy, teacher resilience, and emotion regulation on teacher burnout: a mediation model. *Frontiers in Psychology*, *14*. https://doi.org/10.3389/fpsyg.2023.1185079

Malatesha Joshi, R., & Wijekumar, K. (Kay). (2019). Introduction: teacher perception, self-efficacy and teacher knowledge relating to literacy. In *Annals of Dyslexia* (Vol. 69, Issue 1). https://doi.org/10.1007/s11881-018-00173-3

Marschall, G., & Watson, S. (2022). Teacher self-efficacy as an aspect of narrative self-schemata. *Teaching and Teacher Education*, *109*. https://doi.org/10.1016/j.tate.2021.103568

Mohammad, R. F., & Kamran, M. (2023). Examining the efficacy of online learning in nurturing students' learning: an analysis of students' experiences. *Asian Association of Open Universities Journal*, *18*(3). https://doi.org/10.1108/AAOUJ-11-2022-0163

Ninković, S., Olić Ninković, S., Lazarević, T., & Adamov, J. (2024). Serbian teachers' perceptions of online assessment during COVID-19 school closure: the role of teachers' self-efficacy. *Educational Studies*, *50*(4). https://doi.org/10.1080/03055698.2021.1960151

Ruiz-Dotras, E., & Lladós-Masllorens, J. (2022). Entrepreneurial Self-efficacy and Financial and Calculation Skills Can Shape Different Profiles of Venture Intentions. *Journal of Entrepreneurship*, *31*(1), 153–183. https://doi.org/10.1177/09713557211069319

Shah, D. B., & Bhattarai, P. C. (2023). Factors Contributing to Teachers' Self-Efficacy: A Case of Nepal. *Education Sciences*, *13*(1). https://doi.org/10.3390/educsci13010091

Sibagariang, P. P., & S. Pandia, W. S. (2021). Teaching Approach and Teacher Self-Efficacy during Early Childhood Distance Learning. *JPUD - Journal of Early Childhood Education*, *15*(1). https://doi.org/10.21009/jpud.151.03

Symes, W., Lazarides, R., & Hußner, I. (2023). The development of student teachers' teacher self-efficacy before and during the COVID-19 pandemic. *Teaching and Teacher Education*, *122*. https://doi.org/10.1016/j.tate.2022.103941

Tyaningsih, A. R., Suryadi, S., & Rahmawati, D. (2021). Self-Efficacy, Teacher Leadership and Teacher Professionalism in Secondary School. *Iqra' Journal : Studies of Education*, *6*(2). https://doi.org/10.25217/ji.v6i2.1331

Wagler, R., & Moseley, C. (2005). Preservice teacher efficacy: Effects of a secondary education methods

course and student teaching. *Teacher Education and Practice*, *18*(4).

Williams, O., Leighton-Herrmann Quinn, E., Ramirez, M., Sawyer, V., Eimicke, J. P., & Teresi, J. A. (2017). Development of a Menu Board Literacy and Self-efficacy Scale for Children. *Journal of Nutrition Education and Behavior*, *49*(10), 867-871.e1. https://doi.org/10.1016/j.jneb.2017.07.008

Woodcock, S., Sharma, U., Subban, P., & Hitches, E. (2022). Teacher self-efficacy and inclusive education practices: Rethinking teachers' engagement with inclusive practices. *Teaching and Teacher Education*, *117*. https://doi.org/10.1016/j.tate.2022.103802

Yada, A., & Savolainen, H. (2017). Japanese in-service teachers' attitudes toward inclusive education and self-efficacy for inclusive practices. *Teaching and Teacher Education*, *64*. https://doi.org/10.1016/j.tate.2017.02.005

Yoo, J. H. (2016). The effect of professional development on teacher efficacy and teachers' self-analysis of their efficacy change. In *Journal of Teacher Education for Sustainability* (Vol. 18, Issue 1). https://doi.org/10.1515/jtes-2016-0007