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Research Article

Self-Efficacy as a Predictor of Teaching Competence: A Systematic Review and Meta-Analysis

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Abstract

Self-efficacy and teacher competence are two closely related aspects of psychology and professional constructs that define the effectiveness of a teacher. This meta-analysis examines the relationship between Teaching Competence and Self-efficacy. Through a systematic literature review, 16 empirical studies with a combined sample of 6248 teachers from diverse geographical and educational contexts were included. Individual study correlations between self-efficacy and teaching competence are found to vary from small positive correlations (r = 0.096) to very strong positive correlations (r = 0.930). A random-effect model was used to find out the combined correlation, which revealed r = 0.51, with a 95% confidence interval extending from 0.35 to 0.65. According to Cohen's (1988) conventional effect size benchmarks, this magnitude indicates a large positive association between these constructs. The heterogeneity statistics reveal very substantial between-study variability, which led to an exploration of the moderating variables. Subgroup analysis reveals that the in-service teachers exhibited a slightly higher correlation (r = 0.53) than the pre-service teachers (r = 0.48), which may indicate that the interrelation of self-efficacy and competence as a teacher may increase with the overall professional experience and classroom practice. Thus, the teacher training programme must focus on the enhancement of self-efficacy that has a positive effect on teacher competency.

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1. INTRODUCTION

1.1 Background and context

The conceptualisation of teaching competence refers to a complex set of professional knowledge, pedagogical skills, and dispositions that help teachers to facilitate cognitive, affective, and behavioural growth in students systematically (Cheng, 2015). Effective teachers are not just technically skilled in their content matter and methods of instruction, but also capable of classroom management, differentiation of instruction, maintenance of student interest and critical self-reflection on their practice. Teaching competence has emerged as a key construct in contemporary educational practice of teacher training, accountability systems and quality assurances in education.

Teacher self-efficacy is based on the social cognitive theory of Bandura and is described as the belief that teachers have in their ability to arrange and implement courses of action that they need to effectively perform certain teaching tasks in a specific situation (Bandura, 1997). As a motivational process, self-efficacy determines the degree of effort teachers put into it, their persistence during the challenges, and their resilience to stress and failure (Bandura, 1997; Caprara et al., 2006). The Teachers' Sense of Efficacy Scale has been used to measure teacher self-efficacy in the field of education and is used to determine efficacy about engagement with students, instructional plans and classroom management (Tschannen-Moran and Woolfolk Hoy, 2001; Klassen et al., 2011). The empirical evidence always indicates that teachers who are more self-affirmative indicate more openness to innovative practices, better classroom control, and are more responsive to student misbehaviour (Klassen and Chiu, 2010; Zee and Koomen, 2016).

From a theoretical perspective, the relationship between self-efficacy and teaching competence is supposed to be strong and positive. With high self-efficacy, teachers tend to establish more demanding instructional objectives, explore more complicated teaching methods, and continue to refine their practice via trial-and-error, which in the long-term is manifested in increased perceived competence (Bandura, 1997; Tschannen-Moran and Woolfolk Hoy, 2001). The teachers who possess low self-efficacy, on the other hand, might evade challenging pedagogical activities, stick to limited routines, and distance themselves when pressured to limit the cultivation and demonstration of competence in the classroom (Caprara et al., 2006; Zee and Koomen, 2016). It is of considerable theoretical and practical importance to clarify, therefore, the empirical strength and consistency of this relationship in different contexts.

1.2 Rationale for the meta-analysis

Even though numerous empirical studies have explored the relationship between teaching competence and self-efficacy, their results differ greatly in terms of magnitude and are even opposite in other cases. The coefficient values in the current data are both small and positive (r=0.096) and very strong (r=0.930). This heterogeneity is probably caused by the differences in the operationalisation of teaching competence and self-efficacy, differences in the sample composition (pre-service and in-service teachers), differences in the educational levels and countries, and methodological peculiarities, including measurement tools, design of the study, and sample size.

Single primary studies and narrative reviews do not offer a quantitative estimate of the overall relationship and a rigorous test of the heterogeneity and modifying variables (Borenstein et al., 2009). Meta-analysis, on the other hand, combines evidence of correlation on independent samples, producing combined effect sizes, statistical measures of heterogeneity, and tests of possible moderators (DerSimonian and Laird, 1986; Huedo-Medina et al., 2006). Modern guidelines also focus on reporting the range of prediction, stating the range within which the actual effect of the future studies will probably fall, particularly when the heterogeneity is high (IntHout et al., 2016; Borenstein, 2023). Internally, also, publication-bias diagnostic tools can be used to determine whether the evidence we have seen is due to over-reporting. Though self-efficacy has been a significant area of research in teacher-education studies, relatively limited systematic quantitative synthesis has been conducted on the nature of the relationship between teaching competence and self-efficacy as two distinct constructs. The current meta-analysis is filling this gap by giving a broad quantitative review of studies that have reported correlations of these variables among pre-service and in-service teachers.

1.3 RESEARCH OBJECTIVES

The objectives of this meta-analysis are to:

1. Estimate the overall pooled correlation between teaching competence and teacher self-efficacy.
2. Examine whether the magnitude of this correlation differs between pre-service and in-service teachers.
3. Derive implications for teacher education, professional development and educational policy.

2. METHODOLOGY

2.1 Data collection

A systematic literature search was conducted in major academic databases and repositories, including ScienceDirect, ERIC, Semantic Scholar, DOAJ, ResearchGate, Shodhganga, Google Scholar, and other relevant educational portals, to identify studies reporting correlations between teaching competence and teacher self-efficacy. The search strategies were based on the synonyms of teaching competence and self-efficacy using Boolean operators, i.e., (“teaching competence” OR “teaching competency” OR “teacher competence”) AND (“self-efficacy” OR “teacher self-efficacy” OR “teaching self-efficacy”).

The process of study identification, screening, eligibility, and inclusion was based on PRISMA 2020 to maximise the transparency and reproducibility (Moher et al., 2009; Page et al., 2021). The screening of records occurred on the level of title and abstract screening and subsequently on the level of full-text screening on the predetermined inclusion and exclusion criteria. Manual searches of relevant articles and theses' reference lists also did the same to find more eligible

studies with the help of backward citation search (Borenstein et al., 2009).

2.2 Inclusion and exclusion criteria

Studies were considered eligible if they met the following;

Inclusion Criteria

- Empirical quantitative investigations reporting a correlation between teaching competence and teacher self-efficacy.
- Participants comprised pre-service or in-service teachers at any educational level.
- Published in the English language between 2015 and 2025, reflecting contemporary teacher-education contexts.
- Had sufficient statistical data (e.g., r and N) to calculate an effect size.

Exclusion criteria were:

- Theoretical, conceptual, or qualitative studies without extractable quantitative correlations.
- Duplicate reports of the same dataset.
- Studies without accessible full texts or with insufficient statistical information.

2.3 Data extraction and coding

A coding sheet was created as a standardised coding sheet to draw out the main information of each of the studies. The data they contained were as follows: (a) author(s) and the year of publication; (b) the total size of the sample; (c) Pearson correlation between teaching competence and self-efficacy, and (d) the type of participants (pre-service or in-service teacher). This methodology resembles the implemented practice in correlational data meta-analysis review studies (Borenstein et al., 2009; Huedo-Medina et al., 2006).

2.4 Effect size calculation

Pearson's correlation coefficient (r) was used as the primary effect-size measure. To stabilise variance and normalise the sampling distribution, each correlation was transformed to Fisher's z-score before analysis. Once the pooled effect was calculated using the random-effects model, the summary Fisher's z was back-transformed to a correlation coefficient for ease of interpretation.

2.5 Statistical analysis

Meta-analytic estimates used a random-effects model, which is suitable when there is a difference in the true effect sizes caused by the variation in the population, instruments, and contexts and hence gives a conservative confidence interval and wider generalisability (DerSimonian and Laird, 1986; Borenstein et al., 2009). Inverse-variance weighting was used to get the pooled correlation and 95% CI. To measure heterogeneity, Cochran Q, I^2 (percentage of variance explained by true differences) and between-study variance components τ^2 and τ were used (Higgins and Thompson, 2002; Huedo-Medina et al., 2006).

Mixed-effects models with teacher career stage as a moderator were employed to test between-group differences using Q decomposition and pseudo-R^2 to estimate the amount of heterogeneity explained (Borenstein et al., 2009). A prediction interval of 95% showed the anticipated ranges of effects in future research (IntHout et al., 2016). Publication bias was measured through funnel plots, Egger regression, Begg Mazumdar rank correlation, Duval Tweedie trim-and-fill and Rosenthal Orwin fail-safe N tests (Egger et al., 1997; Begg and Mazumdar, 1994; Duval and Tweedie, 2000; Rosenthal, 1979; Orwin, 1983).

3. RESULTS

3.1 Study identification and sample description

The search and screening process was systematic, and 16 eligible studies that reported the correlations between teaching competence and teacher self-efficacy and had sufficient data to be included in the meta-analysis were obtained.

Combined, these studies used a total of 6,248 teachers who were of different geographical and institutional backgrounds, such as pre-service teacher education programs and in-service teaching jobs at various levels of education. The sizes of the samples were between 30 and 1,036, and the effect sizes were between small positive correlations (e.g., r=0.096) and extremely large positive associations (e.g., r=0.930), which means that the observed correlations have a wide distribution.

The classification of participants into pre-service (5 study effects; N=2,512) and in-service (11 study effects; N=3,736) groups enabled formal examination of potential moderation by career stage. An eligibility phase flow diagram in the PRISMA style would give a summary of the number of records found, screened, excluded, and finally included, and the causes of their exclusion.

Figure 1: PRISMA 2020 flow diagram for systematic review (Page et al., 2021)

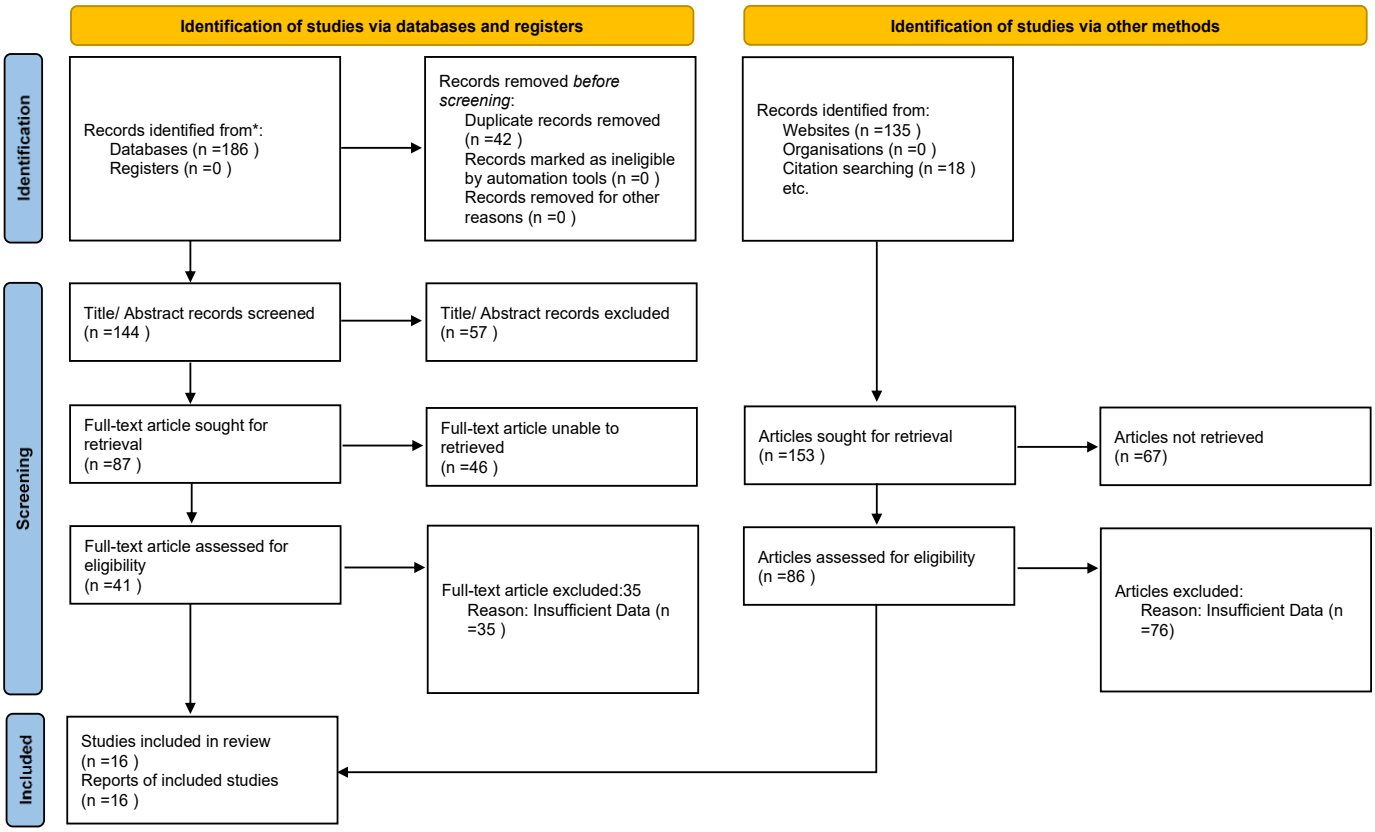


Table 1: Meta-analysis with combined effect size

Meta-analysis model	
Model	**Random effects model**
Confidence level	**95%**
Combined Effect Size	
Correlation	**0.51**
Confidence interval LL	**0.35**
Confidence interval UL	**0.65**
Prediction interval LL	**-0.13**
Prediction interval UL	**0.85**
Z-value	**5.99**
One-tailed p-value	**0.000**
Two-tailed p-value	**0.000**

Figure 2: Forest plot for meta-analysis of the correlation of Teaching Competence and Self-efficacy

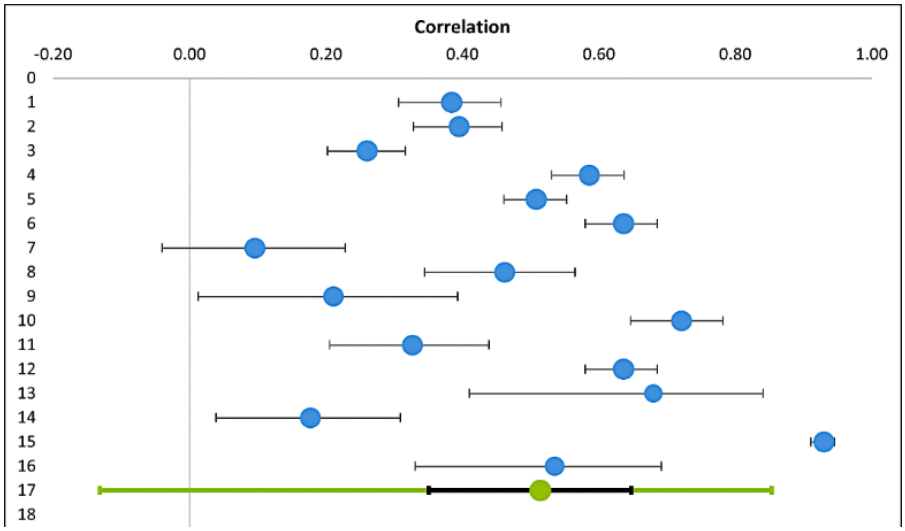


Table 1 and Figure 2 of the meta-analytic output show that the overall random-effects pooled correlation between teaching competence and teacher self-efficacy was r=0.51 with a 95% confidence interval of 0.35 to 0.65. The Z-value on the corresponding was 5.99 (two-tailed p <.001), which verified that the average effect is not equal to zero and that increased self-efficacy is significantly correlated with increased levels of teaching competence.

According to Cohen's conventional benchmarks, an effect that has a value of r= 0.51 is considered to be large, meaning that teacher self-efficacy is a substantively significant correlate of teaching competence in a behavioural research context. The squared pooled correlation indicates that the variance in self-efficacy beliefs may be statistically related to the variance in teaching competence (r^2 = ≈0.26), but this value should be viewed as approximated because of the uncertainty about the causality and the estimation of the shared variance between the two.

The 95% prediction interval of the total effect ranged between r = -0.13 and r = 0.85. Such a broad range suggests that in a future study based on a population similar to those sampled in the meta-analysis, the actual correlation would fall between near-zero or even slightly negative values and very strong positive correlations. Thus, while the central tendency supports a robust positive relationship, the strength of the association appears to be highly context-sensitive.

3.3 Heterogeneity analysis

The heterogeneity statistics established extremely wide between-study dispersion in the effect sizes. The Q value was Q = 567.93 and 15 degrees of freedom, and p=.001, which says that the dispersion of observed correlations is significantly larger than what could be done only due to sampling error. The I^2 index was 97.36%, which implied that approximately 97% of the correlation difference in the results is a true difference in effect sizes between the studies compared, as opposed to random error.

The estimated between-study variance on the Fisher z scale was τ^2=0.10, with a corresponding standard deviation of the true effects τ=0.31. These values state that there is a substantial dispersion of the underlying population correlations and are relevant to the extent of the prediction interval. Such extreme heterogeneity is not surprising given the varied geographical setting, types of institutions, teaching competence and self-efficacy measures, and teacher-related characteristics, but this warns against treating the pooled effect as a universal constant.

3.4 Subgroup analysis

Subgroup analyses compared the pooled correlations between teaching competence and self-efficacy for in-service and pre-service teachers using a random-effects model.

Table 2: Subgroup Analysis of Pooled Correlations by Type of Participant

Subgroup Name	Correlation(r)	CI Lower Limit	CI Upper Limit	Weight	Q	p_Q	I^2	τ^2	τ	PI LL	PI UL
In-Service Teacher	0.53	0.30	0.70	52.24%	479.83	0.00	0.98	0.15	0.39	-0.31	0.90
Pre-Service Teacher	0.48	0.16	0.72	47.76%	87.85	0.00	0.95	0.05	0.21	-0.17	0.84
Combined Effect Size	0.51	0.46	0.55		567.93	0.00	0.97	0.10	0.31	0.46	0.55

Table 2 shows that in the case of in-service teachers (11 study effects, N=3,736), the pooled correlation was r=0.53, with a 95% confidence interval of between 0.30 and 0.70, which is a large positive association. In this subgroup, heterogeneity was still extreme (Q = 479.83, p<.001; I^2=98%; τ=0.39), and the prediction interval was r= -0.31 to r= 0.90.

In the case of pre-service teachers (5 study effects, N=2,512), the pooled correlation r=0.48, with a confidence interval of 0.16 to 0.72, also demonstrates a large positive correlation. Heterogeneity was also high in this subgroup (Q = 87.85, p<.001; I^2=95%; τ=0.21), and the prediction interval was r = -0.17 to r = 0.84. Therefore, pre-service and in-service teachers depicted strong positive relationships between self-efficacy and teaching competence, but with significant differences in magnitude between studies.

3.4.1 Between-subgroup comparison

Analysis of variance (mixed-effects meta-regression) was used to determine whether the differences between subgroups were statistically significant:

Table 3: Analysis of Variance

Analysis of variance	Sum of squares (Q*)	df	p
Between / Model	0.15	1	0.702
Within / Residual	18.63	14	0.180
Total	18.77	15	0.224
Pseudo R^2	0.78%		

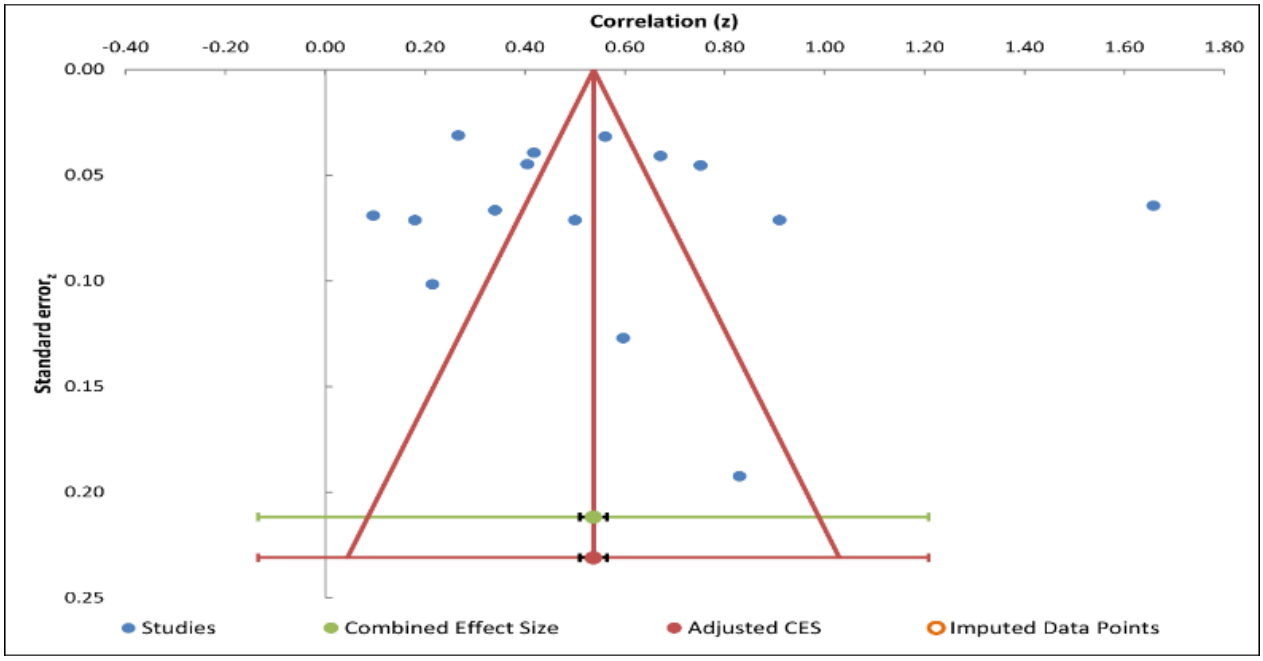
The analysis of differences in subgroups, similar to ANOVA (Q*), produced a between-groups Q* = 0.15 with 1 degree of freedom and a p-value of 0.702, which shows that the difference in the pooled correlations of pre-service and in-service teachers was not statistically significant. The unexplained heterogeneity between studies was still rather significant (Q within = 18.63, df=14, p=0.180), indicating that the majority of the between-study variation cannot be attributed to teacher career stage.

The pseudo-R^2 of the moderator was 0.78, which implies that the dichotomy between pre-service and in-service status explained less than 1% of the heterogeneity in effect sizes. Such a weak explanatory value means that the relationship between teaching competence and self-efficacy is generally of a similar strength between pre-service and in-service teachers and that there are other, non-measured moderators (e.g., cultural context, institutional climate, programme structure or measurement tools) that are likely to be driving the noted variance.

3.5 Publication bias assessment

Several publication-bias diagnostics tests were applied to evaluate whether the meta-analytic results might be unduly influenced by selective reporting of significant or large effects.

Figure 3: Funnel Plot for Publication Bias Assessment



The funnel plot was not observed to give systematic asymmetry indicative of strong small-study effects, and in any case, the high heterogeneity makes it difficult to interpret the funnel plot visually only.

The test of linear regression by Egger has an intercept estimate of 2.23 (SE = 4.05, 95% CI [-6.40,10.85]), t-value = 0.55 and a non-significant p-value = 0.59. Since the difference in intercept between zero was not significantly different from zero, the funnel-plot asymmetry was statistically not present and could not be attributed to small-study effects or publication bias.

The Begg and Mazumdar rank correlation test also gave a non-significant value, Kendall τ=0.12, z=0.63, p=0.528, again indicating that the relationship between effect sizes and their standard errors is not due to the selective publication of large or significant effects.

The trim-and-fill analysis of Duval and Tweedie needs to impute zero missing studies, which implies that no hypothetical further effects were needed to restore funnel-plot symmetry, and the adjusted pooled correlation was identical to the observed (r=0.51).

The fail-safe N analysis provided by Rosenthal would require 9,583 additional unpublished studies with null results to reverse the statistical significance of the aggregate effect, which is far beyond most common tolerance limits, such as the heuristic provided by Rosenthal 5*k*+10 (which equals 90 for k=16).

The fail-safe N proposed by Orwin, which concentrates on varying the effect size to a trivial significance, depicted a just as implausibly high number of zero-effect studies would be required to lower the amount of pooled correlation to a negligible level.

Combined, these indicators found strong evidence that the large positive correlation between teaching competence and self-efficacy, which was reported, was not a result of publication bias or selective reporting.

4. DISCUSSION

4.1 Summary of key findings

The results of this meta-analysis provided several significant results on the topic of the connection between competence in teaching and teacher self-efficacy:

1. In 16 studies and 6,248 teachers, the pooled correlation between teaching competence and self-efficacy showed r=0.51 (95% CI [0.35,0.65], Z=5.99, p<.001), which is a large positive association as per traditional scales. This is an indication that the teachers who report a higher self-efficacy have also been found to exhibit a higher degree of perceived or measured teaching competence.
2. Self-efficacy had a statistically significant relationship with approximately 26% of the variance of teaching competence, which means that self-efficacy is a significant correlate of teaching competence, but not the only determinant of effective teaching.
3. The extent of heterogeneity in the effect size was very high (Q = 567.93, p<.001; I^2=97.36%; τ=0.31), indicating that the magnitude of the teaching competence and self-efficacy relationship differs widely across studies, cultural settings, and measurement tools.
4. The 95% prediction interval (−0.13 to 0.85) suggests that future studies could observe from negligible negative to very high positive correlations, highlighting that the correlation is context-specific.
5. Subgroup analyses showed large positive correlations for both in-service teachers (r=0.53) and pre-service teachers (r=0.48), with no statistically significant difference between career stages and a pseudo-R^2 of only 0.78% for the moderator, indicating that self-efficacy is similarly important across the teacher career stages.
6. Though the heterogeneity was very large, a full set of tests of the publication bias (Egger's test, Begg and Mazumdar test, trim and fill test and fail-safe N test) gave consistent results, which indicated that the overall results are not significantly distorted due to selective reporting.

All these findings, in general, put teacher self-efficacy at the centre of the set of correlates of teaching competence, which is empirically validated, as expected in social cognitive theory and the literature on teacher-efficacy studies.

4.2 Theoretical implications

1. The strong positive correlation between teaching competence and self-efficacy supports social cognitive theory, which is that efficacy beliefs are a key mediating factor between cognition, motivation and behaviour in teaching. (Bandura, 1997; Tschannen-Moran & Woolfolk Hoy, 2001)
2. Similar associations between pre-service and in-service teachers show that self-efficacy is a stable psychological resource throughout a teaching career in how teachers engage, maintain and reflect on teaching activities. (Pfitzner-Eden, 2016; Zee & Koomen, 2016)
3. Variation across studies suggests that the competence–self-efficacy link is moderated by measurement tools, institutional context, and culture, so it should be viewed as a context-sensitive mechanism rather than a universal constant. (Higgins & Thompson, 2002; Zee & Koomen, 2016)
4. The pattern of findings aligns with models in which self-efficacy influences classroom processes such as management, cognitive activation, and support, which in turn feed back into teachers' sense of competence and professional identity. (Fauth et al., 2020; Lazarides et al., 2020)
5. Overall, the evidence supports the view that self-efficacy is not a peripheral attitude but a core component of teaching competence frameworks in educational settings. (Bandura, 1997; Zee & Koomen, 2016)

4.3 Practical and policy implications

1. Teacher education programme

Self-efficacy should be explicitly developed through the teacher education programmes by applying structured mastery experiences, modelling by successful teaching professionals, constructive and guided reflection on practicum and microteaching. (Pfitzner-Eden, 2016; Tschannen-Moran & Woolfolk Hoy, 2001)

2. Formative use of self-efficacy measures

Validated self-efficacy scales can be used formatively to identify areas where teachers feel less confident and to plan targeted mentoring, coaching, and professional development, rather than as high-stakes evaluation tools. (Tschannen-Moran & Woolfolk Hoy, 2001; Klassen et al., 2011)

3. Emphasis on professional development

The activities should incorporate efficacy-related components like collaborative experimenting, model lessons, and growth-oriented feedback (especially in more complicated domains such as classroom management and inclusive instruction) into the in-service professional development. (Opfer et al., 2023; Akyol & Cömert, 2023)

4. Teacher well-being and retention

As the high level of self-efficacy has been associated with low burnout, positive job satisfaction, and commitment, it is possible that policies that enhance self-efficacy, such as supportive leadership, mentoring, and favourable school climates, enhance teacher well-being and retention. (Zee & Koomen, 2016; Kim & Burić, 2020)

5. **Induction and early career development**

Based on the knowledge about the efficacy beliefs of beginning teachers, induction programmes must influence the early support to offer extra scaffolding when confidence is limited, such that the experiences of early mastery may solidify both competence and engagement over time. (Tschannen-Moran & Woolfolk Hoy, 2001; Pfitzner-Eden, 2016)

4.4 Limitations and directions for future research

Several key limitations should be noted.

1. The limited number of studies and the large range of variability among the studies imply that the overall outcome is merely a general overview, and not an accurate estimate to be used in all scenarios.
2. Studies used cross-sectional correlational designs, so the direction of influence between self-efficacy and teaching competence cannot be determined, and reciprocal effects are likely; stronger causal evidence will require longitudinal and intervention research.
3. The competence was operationalised in various forms, most commonly by self-report, which predisposes the possibility of common-method bias and highlights the importance of multi-source elements of the competence concept, including observations, student ratings, and supervisor ratings.
4. Publication bias tests are reassuring but not definitive with high heterogeneity; future work should promote null findings, pre-registration, moderator testing, and self-efficacy interventions.

5. CONCLUSION

This meta-analysis has strong quantitative findings that teacher self-efficacy is firmly and positively correlated with teaching competence in varied educational settings and at different career stages. The high pooled correlation (r=0.51) and convergent publication-bias tests confirm the conclusion that self-efficacy is a substantive and valid correlate of professional competence as opposed to being a marginal or artefactual factor. At the same time, the extremely high heterogeneity and wide prediction interval caution against simplistic generalisations and highlight the importance of contextual conditions and measurement designs.

To policy-makers, teacher educators and school administrators, the results indicate the significance of designing teacher education curriculum, practicum experiences, induction programmes and post-service professional development programmes that clearly support teacher self-efficacy in addition to pedagogical knowledge and skills. Through purposeful nurturing of teacher belief in their ability to guide student learning, educational systems will be in a position to promote the process of high competence in teaching practice, increase teacher welfare, and, in essence, ensure more efficient and equitable learning conditions among students.

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