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Effects of Positive School Culture on Basic Education Quality: A Meta-Analysis

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Purpose
The study was intended to synthesize empirical evidence on the effects of positive school culture on basic education quality, calculated pooled effect sizes, and identified key moderator variables.

Method
This meta-analysis made uses of PRISMA 2020 guidelines, a systematic search across Scopus, Web of Science, ERIC, and Google Scholar (2014–2024) to identify 75 peer-reviewed studies (N = 38,472; 24 countries). Effect sizes were computed as Hedges' g under a random-effects model; moderators were examined via subgroup analysis and meta-regression.

Results/findings
Positive school culture produced large pooled effects on teacher performance (g = 0.68, 95% CI [0.59, 0.77]) and student engagement (g = 0.61, 95% CI [0.52, 0.70]). Emotional engagement was the most culturally responsive sub-dimension (g = 0.66). Both effects remained large after bias correction. Geographic region, school size, grade level, and publication year significantly moderated effect sizes.

Conclusion
Positive school culture was a robust predictor of teacher performance and student engagement in primary education, underscoring the centrality of school culture development in school improvement policies, especially in Indonesia and other Asian educational systems.

Keywords
school culture, basic education quality, teacher performance, student engagement, meta-analysis; PRISMA 2020

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Abstrak

Tujuan
Penelitian ini bertujuan untuk mensintesis bukti empiris mengenai pengaruh budaya sekolah positif terhadap mutu pendidikan dasar—mencakup kinerja guru dan keterlibatan siswa—menghitung pooled effect size, serta mengidentifikasi variabel moderator kunci.

Metode
Kajian ini menggunakan protokol PRISMA 2020, pencarian sistematis di Scopus, Web of Science, ERIC, dan Google Scholar (2014–2024) menghasilkan 75 studi bereputasi (N = 38.472; 24 negara). Effect size dihitung menggunakan Hedges' g dalam random-effects model. Analisis moderator dilakukan melalui analisis subkelompok dan meta-regresi untuk wilayah geografis, jenjang kelas, ukuran sekolah, dan tahun publikasi.

Hasil/temuan
Budaya sekolah positif memberikan pengaruh besar terhadap kinerja guru (g = 0,68, 95% CI [0,59, 0,77]) dan keterlibatan siswa (g = 0,61, 95% CI [0,52, 0,70]). Keterlibatan emosional merupakan sub-dimensi yang paling responsif (g = 0,66). Kedua efek tetap besar setelah koreksi bias publikasi. Wilayah geografis, ukuran sekolah, jenjang kelas, dan tahun publikasi terbukti memoderasi effect size secara signifikan.

Kesimpulan
Budaya sekolah positif merupakan prediktor yang kuat dan signifikan secara praktis bagi kinerja guru dan keterlibatan siswa di pendidikan dasar. Temuan ini menegaskan sentralitas pengembangan budaya sekolah dalam kebijakan peningkatan mutu berbasis bukti, khususnya dalam konteks reformasi pendidikan dasar di Indonesia dan sistem pendidikan Asia lainnya.

Kata kunci
Budaya sekolah, mutu pendidikan dasar, kinerja guru, keterlibatan siswa, meta-analisis, PRISMA 2020

الملخص

الهدف
تهدف هذه الدراسة إلى تجميع الأدلة التجريبية المتعلقة بتأثير الثقافة المدرسية الإيجابية على جودة التعليم الابتدائي، بما في ذلك أداء المعلمين ومشاركة الطلاب، وحساب أحجام التأثير المجمعة، وتحديد المتغيرات الوسيطة الرئيسية.

الطريقة
استخدمت هذه الدراسة بروتوكول PRISMA 2020، وأجرت بحثًا منهجيًا في قواعد بيانات Scopus وWeb of Science وERIC وGoogle Scholar (2014-2024)، مما أسفر عن 75 دراسة موثوقة (عدد المشاركين = 38,472؛ من 24 دولة). حُسبت أحجام التأثير باستخدام معامل Hedges' g في نموذج التأثيرات العشوائية. أُجريت تحليلات المتغيرات الوسيطة من خلال تحليلات المجموعات الفرعية والتحليل التلوي للانحدار، وذلك حسب المنطقة الجغرافية والمرحلة الدراسية وحجم المدرسة وسنة النشر.

النتائج/المخرجات
للثقافة المدرسية الإيجابية تأثيرٌ كبيرٌ على أداء المعلمين (g = 0.68)، فاصل الثقة 95% [0.59، 0.77]) ومشاركة الطلاب (g = 0.61)، فاصل الثقة 95% [0.52، 0.70]). وكانت المشاركة العاطفية هي البُعد الفرعي الأكثر استجابةً (g = 0.66). وظلّ كلا التأثيرين كبيرين بعد تصحيح تحيّز النشر. كما تبيّن أن المنطقة الجغرافية، وحجم المدرسة، والمرحلة الدراسية، وسنة النشر تُعدّل حجم التأثير بشكلٍ ملحوظ.

الخلاصة
تُعدّ الثقافة المدرسية الإيجابية مؤشراً قوياً وذا أهمية عملية لأداء المعلمين ومشاركة الطلاب في التعليم الابتدائي. وتؤكد هذه النتائج على مركزية تطوير الثقافة المدرسية في سياسات تحسين الجودة القائمة على الأدلة، لا سيما في سياق إصلاح التعليم الابتدائي في إندونيسيا وغيرها من أنظمة التعليم الآسيوية.

الكلمات الرئيسية
الثقافة المدرسية؛ جودة التعليم الابتدائي؛ أداء المعلمين؛ مشاركة الطلاب؛ التحليل التلوي؛ PRISMA 2020

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INTRODUCTION

Basic education quality is a multidimensional construct that reflects the capacity of primary schooling systems to produce meaningful, fair, and sustainable learning outcomes for all children. Central to this quality is the organizational environment in which teachers teach and students learn—an environment fundamentally shaped by school culture. School culture, defined as the shared values, beliefs, norms, and behavioral patterns that collectively constitute the identity of a school community, has long been recognized as a foundational determinant of educational quality at the primary level (UNESCO, 2021). A positive school culture creates conditions conducive to teaching excellence, deep student learning, and institutional improvement. Crucially, it operates as a system-level variable that simultaneously elevates teacher performance and strengthens student engagement, the two most proximal contributors to basic education quality (Hoy et al., 2012; Schein, 2010). In basic education, which encompasses the formative years of a child's academic and socio-emotional development—the dual role of teachers and students as the primary agents of educational quality makes school culture an indispensable lever for systemic improvement (Hoy et al., 2006; Schein, 2010).

In recent decades, educational policymakers across the globe have increasingly acknowledged the strategic importance of cultivating positive school cultures as a lever for improving educational quality and equity (OECD, 2020; International Commission on the Futures of Education, 2021). Policy frameworks in leading educational systems, including those of Finland, Singapore, and South Korea, have integrated school culture development as a key component of educational reform agendas. In Indonesia, the *Profil Pelajar Pancasila* initiative—embedded within the transformative Merdeka Curriculum—explicitly targets the cultivation of positive cultural values within schools as a foundational prerequisite for transformative and meaningful learning outcomes (Kemendikbudristek, 2022). This initiative reflects a growing recognition that educational reform efforts focused exclusively on curriculum content or instructional techniques, without addressing the underlying cultural conditions of schooling, are unlikely to produce sustainable improvements in educational quality.

At the operational level, however, a persistent and concerning gap exists between policy intentions and actual implementation at the school level. Schools in resource-constrained environments frequently struggle to institutionalize the norms and values prescribed by national policy, resulting in fragmented, inconsistent, or superficial expressions of school culture. Teachers—who serve as the primary agents of cultural transmission within schools—often lack the professional support structures, collaborative frameworks, and leadership guidance necessary to embody and sustain a positive school culture in their daily practice(Day et al., 2016; Hargreaves & Fullan, 2015). The cumulative effect of this gap is that many primary school students are deprived of the culturally enriching and emotionally supportive environments that are essential for their holistic development and sustained academic engagement.

Further complication arises from the notable inconsistency among existing empirical studies examining the relationship between positive school culture and educational outcomes. While numerous studies affirm a strong, significant positive relationship between school culture and teacher effectiveness (Deal & Peterson, 2010; Gruenert & Whitaker, 2015), others report only modest or context-dependent associations, particularly in developing countries and rural school settings (Berkovich & Eyal, 2017; Thapa et al., 2013). Similarly, with respect to student engagement, some researchers report robust correlations between school culture and students' behavioral, emotional, and cognitive engagement (Fredricks et al., 2004; Wang & Degol, 2016), while others find that the relationship is significantly mediated by individual student characteristics, socioeconomic background, and classroom-level factors (Skinner et al., 2012). The inconsistencies found in the empirical literature emphasize the urgent need for a thorough, systematic synthesis using a comprehensive meta-analytic approach.

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Given this theoretical and empirical context, the present study addresses the following three research questions: (RQ1) To what extent does positive school culture affect teacher performance in primary education, as measured by pooled effect sizes across empirical studies? (RQ2) To what extent does a positive school culture affect student engagement in primary education, as measured by pooled effect sizes across empirical studies? (RQ3) What moderator variables, including geographic region, grade level, school size, and publication year, significantly influence the relationship between positive school culture, teacher performance, and student engagement? To address these questions, this study pursues three specific objectives: (1) to systematically synthesize empirical studies published between 2014 and 2024 using PRISMA 2020 as the guiding framework; (2) to calculate the overall pooled effect size (Hedges' g) of positive school culture on both teacher performance and student engagement using a random-effects model; and (3) to identify and analyze significant moderator variables through subgroup analysis and meta-regression, in order to explain the heterogeneity observed across included studies and to provide contextually nuanced guidance for policy and practice.

METHOD

Research Design and Eligibility Criteria

This study employs a meta-analysis design following PRISMA 2020 guidelines to ensure methodological transparency and reproducibility. Eligibility was determined using the PICO framework (Borenstein et al., 2021; Glass, 1976). Table 1 presents the PICO eligibility criteria.

Table 1. PICO Framework for Eligibility Criteria

Component	Description	Operationalization
P – Population	Teachers and students in primary/basic education (SD/MI, Grades 1–6)	Elementary school level; classroom teachers or students aged 6–12 years
I – Intervention	Positive school culture (validated instruments)	OCDI, OCDQ, SCAI, or equivalent; Cronbach's $\alpha \geq 0.70$
C – Comparison	Negative, neutral, or low school culture; control group	Comparative groups within correlational or experimental designs
O – Outcome	Teacher performance AND/OR student engagement	Quantitative outcomes; studies must report r, d, F, t, or β convertible to effect size

Note. OCDI = Organizational Culture Diagnostic Instrument; OCDQ = Organizational Climate Description Questionnaire; SCAI = School Culture Assessment Instrument.

Search Strategy and Study Selection

A systematic literature search was conducted across Scopus, Web of Science (WoS), ERIC, and Google Scholar (January 2014–December 2024) using Boolean strings combining terms for school culture, teacher performance, student engagement, and primary education level. Snowball sampling via manual reference searches supplemented database coverage. Two independent reviewers applied the four-stage PRISMA 2020 selection protocol; inter-rater reliability was excellent (Cohen's $\kappa = .86$). Table 2 presents the inclusion and exclusion criteria.

Effect Size Calculation and Analytical Approach

All effect sizes were converted to Hedges' g (bias-corrected Cohen's d) using standardized formulas (Sawilowsky & Sawilowsky, 2009). Benchmarks: small (g = 0.00–0.19), medium (0.20–0.49), large (0.50–0.79), very large (≥ 0.80). Table 3 presents the conversion formulas.

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Table 2. Inclusion and Exclusion Criteria

Criterion	Inclusion	Exclusion
Education Level	Primary/elementary (Grades 1–6, ages 6–12)	Junior/senior high, university, or non-formal education
Research Design	Quantitative: experimental, quasi-experimental, correlational	Purely qualitative; theoretical papers; mixed-methods without extractable quantitative data
Language	English or Indonesian (Bahasa Indonesia)	Other languages without English/ Indonesian translation
Publication Type	Peer-reviewed journal articles indexed in Scopus, WoS, ERIC, or SINTA ≥ 2	Theses, dissertations, conference proceedings, book chapters
Publication Period	January 2014 – December 2024	Before 2014 or after December 2024
Statistical Data	Reports r, d, F, t, β convertible to Hedges' g	Insufficient statistical data; descriptive statistics only
Construct Validity	School culture measured with validated instrument (Cronbach's α ≥ 0.70)	Single-item scales, unvalidated instruments, or researcher-developed tools without reported reliability

Note. Studies meeting all inclusion criteria and none of the exclusion criteria were advanced to data extraction and coding.

Table 3. Effect Size Conversion Formulas

Source Statistic	Conversion Formula	Reference
Pearson r	$g = 2r / \sqrt{(1 - r^2)}$	Borenstein et al. (2021)
t-statistic	$g = 2t / \sqrt{(df)}$	Cohen (1988)
F-statistic (2-group)	$g = 2\sqrt{(F / (F + df\_error))}$	Rosenthal (1994)
Standardized β	$g \approx \beta \times (SD\_x / SD\_y)$	Peterson & Brown (2005)

Note. All conversions were cross-validated using Comprehensive Meta-Analysis (CMA) v.3 software and the R metafor package (Viechtbauer, 2010).

A random-effects model (REM) was applied given the expected heterogeneity across contexts, instruments, and designs (Hedges et al., 1998). Heterogeneity was assessed via Cochran's Q and I^2 (Higgins et al., 2003) (benchmarks: I^2 25% low, 50% moderate, 75% high). Publication bias was evaluated via funnel plot inspection, Egger's regression test (Egger et al., 1997), Trim-and-Fill method (Duval & Tweedie, 2000), and Rosenthal's Fail-Safe N (Rosenthal, 1979). Moderator analysis used subgroup analysis for categorical variables and meta-regression for continuous variables. All analyses used CMA v.3 and R 4.3.1 (metafor package).

RESULT/FINDING AND DISCUSSION

Concept of Positive School Culture

School culture is a multidimensional construct that encompasses the deeply embedded values, shared beliefs, established norms, symbolic artifacts, and recurring behavioral patterns that collectively define the character and identity of a school community (Deal & Peterson, 2010; Schein, 2010). Positive school culture is distinguished from merely functional or neutral culture by its capacity to foster a climate of trust, collaborative professionalism, shared purpose, and continuous improvement (Gruenert & Whitaker, 2015; Schein, 2010) .Schein, (2010) seminal framework identifies three interconnected levels

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through which culture manifests: artifacts (visible structures and rituals), espoused values (explicit goals and philosophies articulated by school leadership), and basic underlying assumptions (unconscious, taken-for-granted beliefs that ultimately govern behavior). In schools with a genuinely positive culture, alignment across all three levels is evident.

Hoy, W. K., & Miskel, C. G. (2012) school culture framework highlights collegial leadership, professional teacher behavior, academic press, and community engagement as defining dimensions of healthy school culture in basic education. Research employing this framework consistently demonstrates that schools characterized by collegial trust, shared professional norms, and collective commitment to academic achievement exhibit superior organizational effectiveness (Hoy et al., 2006). For the purposes of this meta-analysis, positive school culture is operationalized as a composite construct defined by: (a) a shared sense of mission and purpose among all school stakeholders; (b) high levels of interpersonal trust between teachers, administrators, students, and families; (c) norms of collaboration, reflective practice, and continuous professional growth; (d) a student-centered orientation that affirms the intrinsic value of each learner; and (e) rituals and traditions that reinforce collective identity and aspirations.

Teacher Performance and Student Engagement in Basic Education

Teacher performance in the context of primary education is a complex, multifaceted construct that extends well beyond the narrow confines of instructional delivery. Drawing on the Indonesian national framework for teacher competency standards (*Permendikbud No. 16 Tahun 2007*, n.d.) as well as international research literaturem (Darling-Hammond, 2017; Stronge, 2018), teacher performance in basic education is understood to encompass four interdependent domains: pedagogical competence, professional competence, social competence, and personal competence. The relationship between school culture and teacher performance is theorized from multiple theoretical perspectives. (Herzberg, 1966) Two-Factor Theory distinguishes between hygiene factors (extrinsic conditions) and motivators (intrinsic factors such as achievement, recognition, and professional growth), suggesting that positive school culture directly addresses the motivational dimension of teacher performance. Deci & Ryan, (2000) Self-Determination Theory posits that motivation is optimally sustained when three fundamental psychological needs are met: autonomy, competence, and relatedness—all of which a positive school culture systematically satisfies.

Student engagement, extensively researched for its robust associations with academic achievement, school retention, and long-term well-being (Reschly & Christenson, 2022), is conceptualized through (Fredricks et al., 2004) seminal three-dimensional framework: behavioral engagement (active participation in academic activities, attendance, and positive conduct), emotional engagement (affective responses including belonging, interest, and identification with the school community), and cognitive engagement (psychological investment in learning, including the use of deep learning strategies and self-regulated learning behaviors). A growing body of research confirms that school culture exerts powerful influence on all three dimensions of student engagement (Wang & Eccles, 2013). Theoretically, positive school culture functions as a systemic antecedent variable exerting both direct and indirect effects on educational outcomes: directly shaping teacher motivation and professional effectiveness, and indirectly influencing student engagement through the quality of classroom environments that culturally empowered teachers create (Leithwood et al., 2008). Despite this theoretical coherence, the empirical literature reveals significant heterogeneity—underscoring the necessity of systematic meta-analytic synthesis (Berkovich & Eyal, 2017; Wang & Degol, 2016).

Study Selection and Descriptive Characteristics

The systematic search across Scopus, Web of Science, ERIC, and Google Scholar, combined with manual reference searches, yielded a total of 2,847 records prior to deduplication. Following the removal of 634 duplicate records, 2,213 records were screened at

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the title and abstract level, of which 1,891 were excluded as irrelevant to the research focus. The remaining 322 records were retrieved in full text for eligibility assessment. After applying the inclusion and exclusion criteria detailed in Table 2, 247 full-text articles were excluded for the following reasons: wrong educational level (n = 89), insufficient quantitative data for effect size extraction (n = 67), non-peer-reviewed publication type (n = 43), measurement instrument not validated (n = 31), and study design not meeting inclusion criteria (n = 17). Ultimately, 75 studies met all inclusion criteria and were retained for meta-analytic synthesis. The inter-rater reliability for the study selection process yielded a Cohen's Kappa of $\kappa = .86$, indicating excellent agreement between the two independent reviewers (Landis & Koch, 1977). This high level of agreement reflects the clarity and specificity of the eligibility criteria applied and the rigorous calibration sessions conducted between reviewers prior to the screening process.

The 75 included studies were published between 2014 and 2024, with the largest concentration of publications appearing in the period 2019–2024 (n = 52, 69.3%), reflecting the growing scholarly attention to school culture research in the post-pandemic educational landscape. The studies were conducted across 24 countries, with the highest representation from Indonesia (n = 19, 25.3%), followed by the United States (n = 12, 16.0%), China (n = 8, 10.7%), Turkey (n = 6, 8.0%), and Malaysia (n = 5, 6.7%). The disproportionate representation of Indonesian studies reflects both the growing research output of Indonesian scholars in education management and the particular policy salience of school culture in the Indonesian educational reform context. Combined, the 75 studies comprised a total of N = 38,472 participants, with individual sample sizes ranging from 84 to 2,315 participants (M = 512.96, SD = 387.43). The predominant research design was correlational/survey (k = 51, 68.0%), followed by quasi-experimental (k = 16, 21.3%) and randomized controlled trial (RCT) designs (k = 8, 10.7%). The methodological quality assessment using the Newcastle-Ottawa Scale and Cochrane RoB 2 tool indicated that the majority of included studies (73.3%) were rated as moderate to high quality, providing a sound evidence base for the meta-analytic synthesis. Table 4 presents the complete descriptive characteristics of the included studies.

Table 4. Descriptive Characteristics of Included Studies (k = 75)

Characteristic	Category / Range	k (%)
Publication Year	2014–2016	11 (14.7%)
	2017–2018	12 (16.0%)
	2019–2021	24 (32.0%)
	2022–2024	28 (37.3%)
Geographic Region	Asia	42 (56.0%)
	Europe	11 (14.7%)
	Americas	14 (18.7%)
	Africa / Oceania	8 (10.7%)
Research Design	Correlational / Survey	51 (68.0%)
	Quasi-experimental	16 (21.3%)
	Experimental (RCT)	8 (10.7%)
Outcome Variable	Teacher Performance only	28 (37.3%)
	Student Engagement only	31 (41.3%)
	Both outcomes	16 (21.3%)
Sample Size (N)	< 200	18 (24.0%)
	200–500	34 (45.3%)
	> 500	23 (30.7%)

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Overall Effect Size Results

Across the 44 studies (k = 44, N = 18,934) that examined the relationship between positive school culture and teacher performance, the random-effects meta-analysis yielded a statistically significant pooled effect size of g = 0.68 (95% CI [0.59, 0.77], p < .001). According to the interpretive conventions adopted in this study (Sawilowsky & Sawilowsky, 2009), this pooled effect size falls squarely within the large range, indicating that schools with positive cultures are associated with substantially higher levels of teacher performance compared to schools with neutral or negative cultural orientations. The variance around the pooled estimate was modest (SE = 0.046), suggesting a consistent pattern of positive association across the included studies. The practical significance of this effect size is also considerable: based on a normal distribution of teacher performance scores, an effect size of g = 0.68 implies that the average teacher in a school with a positive culture would perform better than approximately 75% of teachers in schools with neutral or negative cultural orientations—a finding with profound implications for school improvement strategies.

Across the 47 studies (k = 47, N = 22,381) examining the relationship between positive school culture and student engagement, the random-effects model produced a statistically significant pooled effect size of g = 0.61 (95% CI [0.52, 0.70], p < .001), also falling within the large range. This finding demonstrates that positive school culture is a robust and practically meaningful predictor of student engagement across diverse primary school contexts and national settings. The three engagement sub-dimensions exhibited differential effect sizes that provide important theoretical nuance: behavioral engagement (g = 0.64, 95% CI [0.54, 0.74]), emotional engagement (g = 0.66, 95% CI [0.55, 0.77]), and cognitive engagement (g = 0.53, 95% CI [0.42, 0.64])—with emotional engagement demonstrating the strongest association with school culture at the primary level, and cognitive engagement demonstrating a somewhat smaller but still large effect. The pattern of emotional > behavioral > cognitive engagement effects is theoretically meaningful and will be discussed in the interpretation section below. Table 5 summarizes the overall meta-analytic results for both outcome variables.

Table 5. Summary of Overall Meta-Analytic Results

Outcome Variable	k	N	g	SE	95% CI	p	Q
Teacher Performance	44	18,934	0.68***	0.046	[0.59, 0.77]	< .001	312.4***
Student Engagement	47	22,381	0.61***	0.046	[0.52, 0.70]	< .001	287.6***
→ Behavioral Engagement	47	22,381	0.64***	0.051	[0.54, 0.74]	< .001	—
→ Emotional Engagement	47	22,381	0.66***	0.057	[0.55, 0.77]	< .001	—
→ Cognitive Engagement	47	22,381	0.53***	0.056	[0.42, 0.64]	< .001	—

*Note. k = number of studies; N = total sample size; g = Hedges' g (pooled effect size); SE = standard error; CI = confidence interval; Q = Cochran's Q heterogeneity statistic. ***p < .001. Effect size benchmarks: small = 0.00–0.19, medium = 0.20–0.49, large = 0.50–0.79, very large ≥ 0.80 (Sawilowsky, 2009).*

Heterogeneity and Publication Bias

The results of Cochran's Q-test indicated statistically significant heterogeneity for both outcome variables (see Table 6). For teacher performance, $Q(43) = 312.4$, $p < .001$, $I^2 = 86.2\%$, $\tau^2 = 0.087$; for student engagement, $Q(46) = 287.6$, $p < .001$, $I^2 = 83.9\%$, $\tau^2 = 0.079$. The I^2 values of 86.2% and 83.9% indicate that the large majority of variance in observed effect sizes is attributable to genuine between-study heterogeneity rather than sampling error, thereby confirming the appropriateness of the random-effects model and the necessity of moderator analyses to account for this variability (Higgins et al., 2003). These high I^2 values are not unexpected given the substantial diversity in cultural contexts, measurement instruments, and participant characteristics across the 75 included studies.

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Table 6. Heterogeneity Statistics for Overall Meta-Analytic Results

Outcome Variable	Q	df	p	I^2 (%)	τ^2	τ
Teacher Performance	312.4	43	< .001	86.2%	0.087	0.295
Student Engagement	287.6	46	< .001	83.9%	0.079	0.281

Note. Q = Cochran's heterogeneity statistic; df = degrees of freedom; I^2 = proportion of variance due to true heterogeneity; τ^2 = between-study variance; τ = standard deviation of true effect sizes.

Visual inspection of funnel plots for both outcome variables revealed mild asymmetry, suggesting the potential presence of publication bias. Egger's regression test yielded statistically significant intercepts for teacher performance (intercept = 1.24, SE = 0.41, t = 3.02, p = .004) and student engagement (intercept = 1.08, SE = 0.38, t = 2.84, p = .006), confirming the presence of mild publication bias in both sets of studies. Application of the Trim-and-Fill method estimated that 7 missing studies would be needed to restore funnel plot symmetry for the teacher performance analysis, yielding a bias-adjusted pooled effect size of g = 0.62 (95% CI [0.53, 0.71])—a modest reduction that remains within the large effect size range. For student engagement, 5 missing studies were estimated, with a bias-adjusted effect size of g = 0.56 (95% CI [0.47, 0.65]). Rosenthal's Fail-Safe N was calculated as Nfs = 4,892 for teacher performance and Nfs = 4,217 for student engagement, both substantially exceeding the tolerance threshold of 5k + 10 = 385, indicating that the overall findings are highly robust to the influence of unpublished null-result studies (Rosenthal, 1979).

Moderator Analysis Results

Subgroup analysis by geographic region revealed significant between-group differences for both outcome variables: teacher performance (Q_between = 18.43, df = 3, p = .001) and student engagement (Q_between = 14.67, df = 3, p = .002). For teacher performance, Asian studies (g = 0.74, 95% CI [0.63, 0.85]) produced significantly larger effect sizes than studies from the Americas (g = 0.58, 95% CI [0.44, 0.72]) and Europe (g = 0.52, 95% CI [0.37, 0.67]). A similar pattern was observed for student engagement, with Asian studies again yielding the largest effects (g = 0.69, 95% CI [0.57, 0.81]). School size emerged as a significant moderator of teacher performance effects (Q_between = 7.34, p = .025), with small schools (< 200 students) producing larger effects (g = 0.71) than large schools (> 500 students) (g = 0.58). Grade level significantly moderated student engagement effects (Q_between = 4.82, p = .028), with lower primary students (Grades 1–3) showing larger cultural influences on engagement (g = 0.67) compared to upper primary students (g = 0.57). Table 7 presents the complete subgroup analysis results.

Meta-regression analyses examining continuous moderators revealed that publication year was a significant positive predictor of effect size for teacher performance (β = 0.032, SE = 0.011, p = .003, R^2 = 18.4%), indicating a modest but statistically significant trend toward larger effect sizes in more recently published studies. This pattern may reflect the increasing prominence of school culture development initiatives—particularly those associated with Professional Learning Communities (PLCs), transformational school leadership, and culturally responsive pedagogy—in the educational reform agendas of the 2019–2024 period. In the Indonesian context, the implementation of the Kurikulum Merdeka since 2022, with its explicit emphasis on komunitas belajar and guru penggerak programs, may be reinforcing the functional importance of school culture for teacher performance in ways that produce measurably larger effects in more recently published Indonesian studies (*Kemendikbudristek, 2022*).

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Table 7. Subgroup Analysis Results by Moderator Variable

Moderator / Subgroup	k	N	g	95% CI	I^2	Q_between	p
Geographic Region – Teacher Performance						18.43***	.001
Asia	22	10,312	0.74***	[0.63, 0.85]	84.1%	—	—
Americas	11	4,821	0.58***	[0.44, 0.72]	79.3%	—	—
Europe	7	2,614	0.52***	[0.37, 0.67]	76.8%	—	—
Africa/Oceania	4	1,187	0.61***	[0.43, 0.79]	71.4%	—	—
Geographic Region – Student Engagement						14.67***	.002
Asia	24	11,847	0.69***	[0.57, 0.81]	82.7%	—	—
Americas	12	5,634	0.54***	[0.41, 0.67]	78.2%	—	—
Europe	7	3,241	0.49***	[0.36, 0.62]	75.1%	—	—
Africa/Oceania	4	1,659	0.58***	[0.39, 0.77]	69.3%	—	—
Grade Level – Teacher Performance						9.17**	.010
Lower Primary (Gr. 1–3)	21	8,743	0.63***	[0.52, 0.74]	81.4%	—	—
Upper Primary (Gr. 4–6)	23	10,191	0.72***	[0.61, 0.83]	83.7%	—	—
Grade Level – Student Engagement						4.82*	.028
Lower Primary (Gr. 1–3)	22	9,812	0.67***	[0.55, 0.79]	80.6%	—	—
Upper Primary (Gr. 4–6)	25	12,569	0.57***	[0.46, 0.68]	79.3%	—	—
School Size – Teacher Performance						7.34**	.025
Small (< 200 students)	14	4,312	0.71***	[0.58, 0.84]	82.1%	—	—
Medium (200–500)	19	8,617	0.67***	[0.55, 0.79]	84.3%	—	—
Large (> 500)	11	6,005	0.58***	[0.44, 0.72]	80.9%	—	—

*Note. k = number of studies; g = Hedges' g; I^2 = heterogeneity index; Q_between = between-subgroup heterogeneity statistic. *p < .05; **p < .01; ***p < .001.*

This pattern may reflect the increasing prominence of school culture development initiatives—particularly those associated with Professional Learning Communities (PLCs), transformational school leadership, and culturally responsive pedagogy—in the educational reform agendas of the 2019–2024 period. In the Indonesian context, the implementation of the Kurikulum Merdeka since 2022, with its explicit emphasis on komunitas belajar and guru penggerak programs, may be reinforcing the functional importance of school culture for teacher performance in ways that produce measurably larger effects in more recently published Indonesian studies (Kemendikbudristek, 2022). This temporal strengthening of the school culture–teacher performance relationship also has important implications for the timing and evaluation of school culture interventions: policymakers and practitioners should anticipate that the full effects of deliberate school culture development efforts may require sustained implementation over multiple years before reaching their maximum impact on teacher effectiveness. Publication year was not a significant predictor of student engagement effect sizes ($\beta = 0.018$, SE = 0.013, $p = .167$, $R^2 = 4.2\%$), suggesting that the relationship between school culture and student engagement has remained relatively stable across the decade under review, without the same strengthening trend observed for teacher performance. This differential temporal pattern may itself be theoretically meaningful: while teacher performance effects may be more immediately responsive to the types of organizational and professional culture changes promoted by contemporary reform initiatives, student engagement effects may be more stable because they are anchored in deeper, slower-changing features of school culture such as interper-

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sonal trust, belonging norms, and teacher-student relational quality. Sample size was not a significant moderator for either outcome variable, suggesting that the observed associations are not systematically inflated in smaller studies and that the findings generalize across a range of study scales.

Discussion of Findings

The central finding of this meta-analysis—that positive school culture exerts a large and statistically robust effect on both teacher performance (g = 0.68) and student engagement (g = 0.61) in primary education—constitutes a significant contribution to the empirical literature on school organizational effectiveness. These pooled effect sizes, which remained substantively large even after bias adjustment (g = 0.62 and 0.56, respectively), provide compelling quantitative evidence that the quality of school culture is not merely a peripheral feature of school life but a central determinant of core educational outcomes. Placed in comparative perspective, these effect sizes are notably larger than those reported in prior meta-analyses of related constructs: for instance, Hattie, (2008) landmark synthesis found that school climate accounted for an average effect of d = 0.43 on student achievement—a medium-sized effect. The larger effects observed in the present analysis may reflect the more targeted focus on primary education, where children's developmental sensitivity to the relational and affective dimensions of the school environment amplifies the functional impact of cultural variables, as well as the broader operationalization of school culture employed in the included studies compared to the narrower climate measures used in Hattie's synthesis. Furthermore, the bias-adjusted effect sizes obtained through Trim-and-Fill correction (g = 0.62 for teacher performance and g = 0.56 for student engagement) remained within the large range, lending additional confidence to the robustness and generalizability of the findings beyond the boundaries of the included literature. The exceptionally large Fail-Safe N values (Nfs = 4,892 for teacher performance and Nfs = 4,217 for student engagement) further underscore the stability of these findings: it would require thousands of unpublished null-result studies to meaningfully reduce the pooled effects to non-significance, a threshold that renders the conclusions of this meta-analysis effectively impervious to publication bias concerns.

The practical significance of an effect size of g = 0.68 on teacher performance is considerable. Based on a normal distribution of teacher performance scores, this effect size implies that the average teacher in a school with a positive culture would perform better than approximately 75% of teachers in schools with neutral or negative cultural orientations. This finding carries profound implications for school improvement efforts, suggesting that strategic investments in building positive school cultures may yield returns in teacher effectiveness that are comparable to—or exceed—those achievable through conventional professional development programs focused exclusively on technical pedagogical skills. This is especially significant given that building school culture is fundamentally a leadership and organizational responsibility, amenable to intentional intervention at the school and system levels, rather than a fixed property of teachers themselves. In other words, the findings of this meta-analysis suggest that creating the right cultural conditions for teachers may be a more efficient and sustainable route to improving teacher performance than attempting to change teachers' skills or behaviors in isolation from their organizational environment. This systemic perspective has important implications for how school improvement resources are allocated and how school leadership responsibilities are conceived and evaluated.

The large effect of positive school culture on teacher performance is highly consonant with the theoretical predictions of both (Herzberg, 1966) Two-Factor Theory and (Deci & Ryan, 2000) Self-Determination Theory (SDT). From a Two-Factor Theory perspective, positive school culture serves as a powerful motivator—providing teachers with the intrinsic rewards of recognition, meaningful collegial work, professional responsibility, and achievement that are most strongly associated with sustained high performance. From an SDT perspective, positive school culture systematically satisfies teachers' fundamental

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psychological needs for autonomy (through professional trust and instructional latitude), competence (through collaborative professional learning and peer feedback), and relatedness (through authentic collegial belonging and community)—thereby producing the high-quality autonomous motivation that underlies consistently excellent teacher performance (Ryan & Deci, 2023). The finding that smaller schools (< 200 students) produced larger effect sizes (g = 0.71) compared to large schools (g = 0.58) is particularly consistent with SDT: in smaller school communities, the interpersonal density and relational intensity of cultural processes more powerfully satisfy teachers' need for relatedness and belonging.

The large effect of positive school culture on student engagement (g = 0.61) is theoretically congruent with the predictions of (Fredricks et al., 2004) multidimensional engagement framework and Eccles & Wigfield, (2002) Expectancy-Value Theory. Within this theoretical context, positive school culture operates as a proximal environmental variable that shapes students' subjective task values, their expectancies for academic success, and their sense of belonging to a valued educational community—all of which are recognized as critical antecedents of behavioral, emotional, and cognitive engagement. The differential effect sizes observed across the three engagement sub-dimensions provide theoretically informative nuance: the largest effect of school culture was observed on emotional engagement (g = 0.66), followed by behavioral engagement (g = 0.64) and cognitive engagement (g = 0.53). This pattern is consistent with the theoretical view that school culture operates most directly and immediately at the affective level—shaping students' feelings of belonging, safety, and identification with the school community—and that behavioral and cognitive engagement are, at least in part, downstream consequences of this foundational emotional connection (Wang & Eccles, 2013). The relatively smaller effect on cognitive engagement may reflect the fact that deep, self-regulated learning strategies are also powerfully shaped by classroom-level instructional variables that lie partly outside the reach of school cultural influences.

The moderator finding that lower primary students (Grades 1–3) showed larger school culture effects on student engagement (g = 0.67) compared to upper primary students (Grades 4–6) (g = 0.57) is consistent with developmental theory. Younger children at the primary level are in the process of forming their foundational orientations toward schooling and learning, and are consequently more developmentally sensitive and responsive to the affective and relational dimensions of the school environment. As students progress to the upper primary grades and develop more autonomous motivational orientations, the relative influence of macro-level cultural factors may attenuate somewhat in favor of more proximal influences such as peer relationships, subject-specific interest, and individual achievement goals.

The consistently larger effects observed in Asian educational contexts—for both teacher performance (g = 0.74) and student engagement (g = 0.69)—may reflect the greater cultural emphasis on collective identity, group harmony, and institutional loyalty that characterizes many Asian societies (Hofstede, 2011), as well as the more hierarchical nature of school organizational structures in many Asian countries. These cultural features may render school culture—as transmitted and modeled by school leadership—a more pervasive and consequential influence on both teacher behavior and student experience. Policymakers in Asian educational systems, including Indonesia, may therefore find that investments in positive school culture development yield particularly high returns compared to contexts where individualist cultural orientations attenuate the influence of collective organizational culture.

The finding that small schools consistently demonstrate stronger school culture effects on teacher performance (g = 0.71 vs. g = 0.58 for large schools) has direct practical implications for school improvement policy. In small primary schools, cultural norms and values are transmitted through denser, more frequent, and more personalized social interactions—creating a more powerful cultural socialization environment for both teachers and students. In contrast, large schools (> 500 students) may face structural challenges to cultural coherence, as the sheer scale of operations can fragment collegial relationships, di-

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lute shared norms, and reduce the frequency of meaningful interpersonal contact that sustains a positive organizational culture. Effective strategies for large primary schools might therefore include the creation of smaller sub-unit structures—such as grade-level or interdisciplinary teacher teams—that preserve the relational density of small schools within a larger institutional framework. Policymakers considering school consolidation strategies should weigh these findings carefully, as the aggregation of small schools into larger units may inadvertently attenuate the cultural cohesion that sustains teacher motivation and student engagement in intimate school communities. Where consolidation is necessary for resource efficiency reasons, deliberate structural interventions to preserve small-group cultural processes should be a required component of any consolidation plan.

Despite its rigor, this meta-analysis has four primary limitations. First, while robust Fail-Safe N statistics (Nfs = 4,892 and 4,217) suggest stability, the residual risk of publication bias remains as unpublished null-result studies are inaccessible. Second, high residual heterogeneity (I^2 values remaining > 70% within most subgroups) indicates that unmeasured variables, such as student socioeconomic backgrounds or teacher experience, influenced the results. Third, the cross-sectional nature of most included studies (68.0%) prevents definitive causal inferences regarding school culture. Finally, focusing only on English and Indonesian sources may introduce language bias, potentially underrepresenting critical research from East Asian and Middle Eastern contexts.

This meta-analysis offers three major theoretical contributions. First, the large documented effects provide robust empirical support for Schein's (2010) three-level model, proving that deep-seated cultural values significantly drive teacher behavior and student engagement. Second, regional variations support Hofstede's (2011) theory that school culture effects are culturally bounded; larger effects in Asian contexts suggest that models must incorporate macro-level variables like collectivism as boundary conditions. Finally, findings support Fredricks et al. (2004) multidimensional framework, revealing a hierarchy where culture impacts emotional engagement (g = 0.66) more directly than cognitive engagement (g = 0.53)necessitating more nuanced mediational modeling.

This meta-analysis offers actionable insights for educational stakeholders. Principals should prioritize cultural development as a core responsibility by establishing Professional Learning Communities (PLC) and modeling professional norms. For policymakers, the strengthening link between culture and performance ($\beta = 0.032$, $p = .003$) particularly in the 2019–2024 period, validates Indonesia's Kurikulum Merdeka, including komunitas belajar and guru penggerak programs. Curriculum developers should note that emotional engagement is most sensitive to culture, particularly in lower primary students (Grades 1–3, g = 0.67 vs. g = 0.57 for upper primary). Consequently, teacher training must emphasize affective classroom management and restorative practices to foster culturally affirming environments.

Future research should prioritize four key areas. First, longitudinal meta-analyses are needed to track the temporal dynamics and cumulative effects of school culture over three to five years. Second, mediation meta-analyses should investigate pathways like collective efficacy (Goddard et al., 2015), psychological safety (Edmondson, 1999), and instructional leadership (Robinson et al., 2008). Third, culturally contextualized studies focusing on Southeast Asia, Sub-Saharan Africa, and Latin America will reveal how national values and post-colonial legacies shape organizational culture. Finally, intervention-focused research must evaluate specific programs—like PBIS, PLCs, and restorative practices—to provide practitioners with actionable evidence for school improvement.

CONCLUSION

This meta-analysis, synthesizing 75 peer-reviewed studies (N = 38,472; 24 countries; 2014–2024) under PRISMA 2020 guidelines, establishes that positive school culture is a robust and practically significant determinant of basic education quality. Three principal findings emerge. First, positive school culture exerts a large effect on teacher performance (g = 0.68, bias-adjusted g = 0.62; Fail-Safe N = 4,892), confirming its centrality to

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instructional effectiveness. Second, it produces an equally large effect on student engagement (g = 0.61, bias-adjusted g = 0.56), with emotional engagement as the most culturally responsive sub-dimension (g = 0.66). Third, geographic region, school size, grade level, and publication year each significantly moderated effect sizes, with Asian educational contexts and smaller schools consistently yielding the strongest associations.

These findings carry direct implications for educational stakeholders. School principals should prioritize deliberate cultural development—through Professional Learning Communities, collegial feedback systems, and trust-building practices—as a core leadership responsibility with measurable returns in teacher quality and student learning. Policymakers, particularly in Indonesia, should sustain and deepen Kurikulum Merdeka's cultural components including komunitas belajar and guru penggerak programs, given the evidence that culture-focused reforms are strengthening teacher performance over time. Teacher educators should prepare pre-service teachers to cultivate the affective dimensions of classroom culture, especially at the lower primary level where emotional engagement is most developmentally responsive to school cultural influences. In sum, positive school culture is a foundational, evidence-based lever for improving basic education quality—and investing in it is among the highest-yield strategies available to the educational system.

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