

Low Gradients, Low Learning: School Governance and the Equity Paradox in Indonesia's PISA 2022

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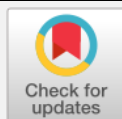
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ABSTRACT

Indonesia combines widespread socioeconomic disadvantage with weak mathematics performance and an unusually shallow socioeconomic gradient. This article examines that combination as an equity paradox and asks what it implies for school governance. Using a secondary quantitative analysis of officially published PISA 2022 population estimates for Indonesia, triangulated across OECD country, results, technical, and Education GPS sources, the study integrates indicators of achievement, socioeconomic status, resilience, staffing, instructional support, and decision authority. Indonesia's ESCS gradient was 14 score points per unit, ESCS explained 5.5% of mathematics variance, and the top-bottom national ESCS quartile gap was 34 points; yet only 18% of students reached Level 2 and 68.2% of advantaged students were low performers. Staffing constraints improved while instructional support remained uneven. The findings show that a shallow social gradient can coexist with broadly low learning, making institutional conversion capacity – not gradient size alone – central to educational equity.

Keywords: Educational Inequality; School Governance; Instructional Leadership; PISA 2022; Socioeconomic Status

1. Introduction

Indonesia's contemporary education problem is no longer adequately described as a problem of access alone. Participation has expanded, but the capacity of schooling to convert attendance into foundational learning remains uneven. PISA 2022 reported that only 18% of Indonesian 15-year-olds reached at least Level 2 in mathematics, compared with 69% across OECD countries. The mean mathematics score was 366, far below the OECD average of 472. At the same time, socioeconomic disadvantage was unusually widespread: 43% of Indonesian students were located in the bottom international quintile of the PISA index of economic, social and cultural status (ESCS), and the national mean ESCS was approximately -1.56 (OECD, 2023a; OECD, 2023d; OECD Education GPS, n.d.). These figures place low learning and social disadvantage at the centre of the Indonesian education problem rather than at its margins.

A striking feature of the same evidence is that Indonesia's socioeconomic gradient in mathematics is comparatively shallow. A one-unit increase in ESCS was associated with about 14 score points, ESCS accounted for only 5.5% of the variance in mathematics performance, and the national performance gap between students in the top and bottom ESCS quartiles was 34 points. Each of these values is small by international comparison (OECD, 2023a; OECD Education GPS, n.d.). At first sight, this might be read as a sign of equity: family socioeconomic position appears less strongly related to achievement than in many other systems. That interpretation, however, becomes problematic when combined with the fact that 82% of students did not reach baseline mathematical proficiency and that 68.2% of socioeconomically advantaged students were themselves low performers in mathematics (OECD Education GPS, n.d.).

This juxtaposition motivates the paper's central concept, the equity paradox of low gradients and low learning. A narrow achievement gap can arise because disadvantaged students perform relatively well, because advantaged students perform relatively poorly, or because performance is compressed at a low level across the social distribution. These possibilities have very different social meanings. Distributional equality is therefore not synonymous with adequate educational opportunity. An education system may exhibit a weak association between social origin and test performance while still failing to provide most students, including relatively advantaged students, with foundational learning.

The distinction matters for the sociology of education because it shifts attention from inequality as a simple gap between social groups to the institutional processes that convert family resources into learning. Schools distribute professional attention, instructional time, feedback, safety, expectations, and access to knowledgeable adults. When these organizational resources are weak, students with fewer family resources may be especially exposed, but widespread institutional weakness can also suppress achievement across the entire socioeconomic distribution. The relevant question is thus not only whether social gradients are steep, but whether schools have the capacity to convert formal resources and decision authority into reliable instructional support.

School governance is analytically important at this conversion point. PISA 2022 shows that Indonesia experienced a substantial reduction in reported staffing constraints between 2018 and 2022: the share of students in schools where principals reported that instruction was hindered by a lack of teaching staff fell from 42% to 18%, and the share affected by inadequate or poorly qualified staff fell from 25% to 13%. Yet only 64% of students reported that teachers gave extra help when needed in most mathematics lessons, and 57% reported that teachers showed interest in every student's learning. At the same time, local decision authority was substantial: 56% of students attended schools where principals had main responsibility for hiring teachers and 70%

attended schools where teachers had main responsibility for choosing learning materials (OECD, 2023d). The coexistence of improving resources, formal authority, and uneven student-experienced support raises an organizational question about conversion rather than provision alone.

Instructional leadership provides a useful framework for interpreting this problem. Leadership that defines instructional priorities, organizes teacher learning, observes classrooms, and follows up on teaching problems can influence learning indirectly through professional practice and organizational conditions (Hallinger, 2003; Leithwood et al., 2020). PISA 2022 operationalizes instructional leadership through principal-reported activities such as feedback based on classroom observation and actions that reinforce teachers' responsibility for student learning (OECD, 2023b). Importantly, OECD analyses caution that such leadership measures are only weakly associated with mathematics performance in most systems after accounting for socioeconomic profiles, and that more active leadership can sometimes be a response to organizational problems rather than their cause. At the system level, however, stronger educational and instructional leadership was associated with greater socioeconomic fairness after accounting for GDP per capita, although this relationship did not hold when OECD countries were examined separately (OECD, 2023b).

The present study does not attempt to estimate an Indonesia-specific student-level leadership moderation coefficient from raw PISA microdata. Instead, it asks a question that can be answered fully and reproducibly with published PISA 2022 estimates: what does the combination of low learning, a shallow socioeconomic gradient, improving staffing conditions, uneven instructional support, and meaningful school-level authority imply for the governance of educational equity in Indonesia? This secondary quantitative design removes the need to infer unobserved coefficients while retaining an empirical basis in nationally representative PISA estimates.

Three research questions guide the analysis. First, how should Indonesia's unusually shallow socioeconomic gradient be interpreted when absolute mathematics performance is low across much of the population? Second, what do PISA 2022 indicators of staffing, instructional support, and school autonomy reveal about the institutional capacity of Indonesian schools? Third, how can the OECD's wider evidence on instructional leadership be used to interpret governance as an equity-relevant mechanism without making causal or student-level claims that the available published indicators cannot support? The contribution is both substantive and methodological: it reframes educational equity as the joint distribution of social gradients and learning levels, and it demonstrates how governance evidence can be interpreted without conflating formal authority, leadership activity, and demonstrated instructional capacity.

2. Literature Review and Analytical Framework

2.1. Social Inequality and the Limits of the Achievement-Gap Lens

Educational stratification research consistently shows that family socioeconomic resources shape academic achievement through multiple pathways. Parents differ in educational credentials, occupational status, material resources, familiarity with school expectations, capacity to purchase supplementary learning, and ability to intervene when schooling does not meet a child's needs. Bourdieu's (1986) account of capital and social reproduction draws attention to the institutional conversion of unequally distributed economic, cultural, and social resources into educational advantage. From this perspective, the association between ESCS and achievement is not simply a property of families; it is partly a property of institutions that reward, amplify, or compensate for those resources.

Yet social reproduction is not mechanically deterministic. Students with similar socioeconomic backgrounds achieve differently, and the strength of the socioeconomic gradient varies across schools and systems. PISA's work on academic resilience shows that a meaningful share of disadvantaged students can achieve high performance relative to peers in their own countries, suggesting that institutional and relational conditions matter even under material disadvantage (Agasisti et al., 2018). Research in Society has similarly emphasized that economically disadvantaged students and families mobilize social capital, trust, parental involvement, and relational resources under conditions of limited economic capital (Martono et al., 2023; Urbaningrum et al., 2024).

This literature usually treats a weaker socioeconomic gradient as desirable because it implies that achievement depends less heavily on social origin. That interpretation remains valid only when the level of achievement is considered simultaneously. If a weak gradient results from high performance among disadvantaged students, it is consistent with substantive equity. If it results from low performance among students across the social distribution, the same statistical pattern has a different meaning. The present framework therefore distinguishes gradient equity – the strength of the association between social position and achievement – from learning adequacy – the extent to which students reach foundational performance. Neither dimension should substitute for the other.

2.2. Institutional Compensation and Conversion Capacity

The idea of institutional compensation is particularly relevant in systems where disadvantage is widespread. Schools cannot directly equalize household income, parental education, or access to private tutoring, but they can reduce the educational consequences of those inequalities by providing coherent instruction, timely feedback, skilled teachers, predictable expectations, safe learning environments, and additional support when students struggle. Teacher-student relationships and school climate are associated with engagement and achievement, indicating that institutional experiences mediate how students encounter formal schooling (Roorda et al., 2011; Wang & Degol, 2016).

Compensation, however, requires more than the presence of resources. Organizational resources must be converted into practice. Additional teachers do not automatically produce differentiated instruction; authority over learning materials does not automatically produce coherent curricula; classroom observation does not automatically produce developmental feedback. This conversion problem is visible in studies of academic supervision in Indonesia, where planning and formal supervisory procedures can be undermined by limited principal time, weak follow-up, or restricted supervisory capacity (Miftakhi & Malagola, 2025). The distinction between resource availability and conversion capacity is central to the present analysis.

Conversion capacity refers here to the institutional ability to translate staffing, professional authority, leadership routines, and information about student needs into dependable instructional support. It is not a directly measured PISA latent variable. Rather, it is an analytical concept used to interpret the relationship among observed PISA indicators. Evidence of improving staffing alongside limited student-reported support, for example, does not prove weak leadership, but it does show that resource improvement and experienced instructional support are empirically distinct outcomes.

2.3. Instructional Leadership as Academic Governance

Instructional leadership differs from generic administration because it focuses on the core technology of schooling: teaching and learning. Hallinger (2003) conceptualizes it around defining the school mission, managing the instructional programme, and promoting a positive learning climate. Leithwood et al. (2020) similarly emphasize that school leaders influence student outcomes primarily through teachers, organizational conditions, and professional practices rather than through direct contact with student achievement.

PISA 2022's instructional-leadership construct is therefore relevant to governance even when no causal leadership effect is estimated. The OECD index captures how frequently principals or other school-management members engage in activities that include giving teachers feedback based on classroom observations and taking action to strengthen teachers' responsibility for student learning (OECD, 2023b). These practices locate leadership at the interface between formal authority and instructional practice. They also make leadership potentially distributive: decisions about which problems receive attention, which teachers receive feedback, and which students receive additional support can influence how institutional resources are allocated.

At the same time, cross-sectional leadership measures are vulnerable to reverse interpretation. A principal may collaborate more intensively with teachers because discipline is already poor, increase observation because instruction is weak, or strengthen monitoring after performance has fallen. OECD's PISA 2022 governance analysis explicitly notes that education-leadership indicators are generally weakly associated with mathematics performance after socioeconomic profiles are considered and that some negative associations may reflect leaders responding to difficulties (OECD, 2023b). This caution prevents the present study from treating leadership frequency as a causal effectiveness score.

2.4. Analytical Expectations

The framework generates three interpretive expectations rather than confirmatory causal hypotheses. First, a shallow socioeconomic gradient should not be interpreted as substantive equity unless it is considered together with the level and distribution of learning. Second, improvements in staffing and the presence of local decision authority should not be assumed to generate student-experienced instructional support; the relationship depends on organizational conversion capacity. Third, instructional leadership is best interpreted as a potentially equity-relevant governance mechanism rather than as a simple predictor of average test scores. These expectations organize the empirical synthesis that follows.

3. Methods

3.1. Research Design and Data Sources

This study uses a secondary quantitative empirical design based exclusively on officially published PISA 2022 population estimates and documentation. It does not re-estimate student-level models from the public-use microdata. The primary evidence base comprises four OECD sources: the Indonesia PISA 2022 country note, PISA 2022 Results Volume I, PISA 2022 Results Volume II, and the OECD Education GPS country profile for Indonesia. The PISA 2022 Technical Report is used to verify the sampling, weighting, and measurement architecture behind the published estimates (OECD, 2023a, 2023b, 2023c, 2023d, 2024; OECD Education GPS, n.d.).

The Indonesian PISA 2022 achieved sample consisted of 13,439 students in 410 schools and represented approximately 3.79 million 15-year-olds, or an estimated 85% of the national population of that age. OECD reported that Indonesia met the applicable PISA technical quality

standards and that its results were fit for reporting (OECD, 2023d). The published indicators used here are therefore survey estimates produced under PISA's complex sampling and plausible-value framework rather than unweighted descriptive statistics calculated from downloaded records.

3.2. Indicator Selection

Indicators were selected before synthesis according to three domains derived from the analytical framework. The first domain, social distribution and learning, includes mean mathematics performance, the share reaching Level 2, mean ESCS, the share in the bottom international ESCS quintile, the mathematics difference associated with a one-unit increase in ESCS, the share of mathematics variance associated with ESCS, the top-bottom national ESCS quartile gap, within-school performance variation, the share of advantaged students who are low performers, and the share of disadvantaged students who are academically resilient. These indicators distinguish the strength of social differentiation from the absolute level of learning.

The second domain, institutional and instructional capacity, includes principal-reported staffing constraints, student-reported teacher interest and extra help, selected disciplinary conditions, and parental involvement. The third domain, governance authority and leadership, includes principal responsibility for hiring, teacher responsibility for learning materials, and OECD's broader PISA findings on educational and instructional leadership. Only indicators with a clear definition and a directly reported Indonesia value or an explicitly identified cross-system OECD finding were retained. No unpublished value was reconstructed from figures and no missing indicator was imputed.

3.3. Analytical Procedure

The analysis proceeded in three stages. First, the selected Indonesia indicators were organized into an equity-learning profile. This stage identifies whether a shallow social gradient coincides with strong or weak learning. Second, institutional-capacity indicators were examined as a conversion profile, distinguishing resource constraints, student-experienced instructional support, and formal decision authority. Third, these Indonesia-specific patterns were interpreted alongside OECD's cross-system evidence on instructional leadership. The third stage is contextual rather than inferential: cross-system associations are used to assess theoretical plausibility and policy relevance, not to attribute an unobserved leadership effect to Indonesian schools.

The approach is deliberately conservative about uncertainty. Where OECD reports population estimates with standard errors or confidence intervals in its underlying tables, the present study retains the published point estimates and does not recompute significance tests. Differences over time are described only where the OECD country note reports the corresponding values. Because the study synthesizes official design-weighted estimates rather than unit records, it does not calculate new standard errors, p-values, regression coefficients, or cross-level interactions. This is a design choice, not a missing analysis: the research questions concern the observed configuration of inequality, learning, and governance rather than an unexecuted moderation model.

3.4. Validity, Ethics, and Reproducibility

Construct validity is protected by retaining OECD terminology and indicator definitions. ESCS is treated as the PISA index of economic, social and cultural status; instructional leadership is interpreted according to the OECD construct rather than replaced by an ad hoc governance composite. The analysis also distinguishes student-reported instructional support from principal-reported staffing and authority, because these are substantively different levels of evidence.

PISA data are anonymized and publicly released for research, and the present study uses only published aggregate estimates. No personally identifiable information or direct participant contact is involved. Reproducibility is straightforward: every quantitative value reported in the Results appears in the OECD Indonesia country note, PISA Results tables, or Education GPS country profile. The source-to-indicator map is summarized in Tables 1 and 2.

4. Results

4.1. Broad Disadvantage and Low Foundational Learning

The first empirical pattern is the breadth of disadvantage. Indonesia's mean ESCS in PISA 2022 was -1.56, among the lowest values across participating systems. Forty-three percent of Indonesian students were in the bottom international socioeconomic quintile. Their mean mathematics score was 354, and the national mean mathematics score was 366 (OECD, 2023d; OECD Education GPS, n.d.). Socioeconomic disadvantage therefore describes a large segment of the national student population rather than a small residual group.

The second pattern is low foundational learning across the system. Only 18% of Indonesian students reached at least Level 2 in mathematics. Put differently, more than four in five did not reach the PISA baseline proficiency level. This is not confined to the most disadvantaged students. Education GPS reports that 68.2% of socioeconomically advantaged Indonesian students were low performers in mathematics, one of the highest shares among PISA participants (OECD Education GPS, n.d.). The low-learning problem therefore extends substantially into the upper part of the national socioeconomic distribution.

There is nevertheless evidence of mobility against disadvantage. Approximately 15% of disadvantaged Indonesian students performed in the top national quarter of mathematics achievement, meeting PISA's definition of academic resilience (OECD, 2023d). This minority is sociologically important because it shows that disadvantage does not determine performance mechanically. Yet resilience at this scale does not offset the system-wide prevalence of low proficiency.

Table 1. PISA 2022 Indonesia: learning and socioeconomic distribution profile

Indicator	Indonesia / verified value	Analytical significance
Achieved sample	13,439 students; 410 schools	National population basis
Represented population	Approximately 3.79 million 15-year-olds (85% coverage)	National representativeness
Mean mathematics score	366	Low absolute performance; OECD average 472
Mathematics Level 2 or higher	18%	Only a minority reached baseline proficiency
Mean ESCS	-1.56	Widespread socioeconomic disadvantage
Students in bottom international ESCS quintile	43%	Disadvantage is population-wide rather than marginal
Math difference per one-unit ESCS	14 score points	Comparatively shallow socioeconomic gradient

Indicator	Indonesia / verified value	Analytical significance
Mathematics variance associated with ESCS	5.5%	Weak relative association with social background
Top-bottom national ESCS quartile math gap	34 score points	Small socioeconomic performance gap internationally
Low performers among advantaged students	68.2%	Low learning extends high into the socioeconomic distribution
Disadvantaged students in top national math quarter	15.2%	Academic resilience exists but is a minority pattern
Within-school mathematics variation	31.6% of OECD-average total variation	Comparatively compressed within-school achievement distribution

Source: OECD (2023a, 2023d); OECD Education GPS (n.d.). Values are official design-weighted PISA population estimates. The present study does not recompute them from unit records.

4.2. The Equity Paradox: A Shallow Gradient Inside a Low-Performing Distribution

Indonesia's social gradient in mathematics is unusually shallow. A one-unit increase in ESCS was associated with approximately 14 score points, and ESCS accounted for 5.5% of variation in mathematics performance. The difference between students in the top and bottom national ESCS quartiles was 34 points (OECD, 2023a; OECD Education GPS, n.d.). These values indicate that socioeconomic position differentiates mathematics performance less strongly in Indonesia than in most participating systems.

Viewed alone, the weak gradient could be labelled equitable. Viewed alongside the absolute performance indicators, a different interpretation becomes necessary. The coexistence of a 34-point socioeconomic gap with only 18% of students reaching Level 2 means that relatively compressed social differences occur within a generally low achievement distribution. Education GPS also reports that within-school mathematics variation in Indonesia amounts to 31.6% of the average total variation across OECD countries, among the smallest values across participating systems. The pattern is therefore one of limited differentiation rather than demonstrated high learning among disadvantaged groups.

This is the central empirical result of the paper. The Indonesian case shows why inequality metrics require a level-sensitive interpretation. A small gradient can reflect reduced dependence on family resources, which is desirable, but it can coexist with inadequate learning opportunities for students across social positions. The high share of low performers even among advantaged students makes it difficult to interpret the shallow gradient as evidence that schools have successfully neutralized socioeconomic disadvantage. A more defensible conclusion is that social stratification in measured mathematics performance is comparatively weak within a system where foundational learning is itself weak.

4.3. Improving Staffing Does Not Eliminate the Instructional-Support Gap

PISA 2022 provides evidence of improvement in one important dimension of institutional capacity. In 2018, 42% of Indonesian students attended schools where principals reported that instruction was hindered by a lack of teaching staff; by 2022 the share had fallen to 18%. The corresponding share for inadequate or poorly qualified staff fell from 25% to 13% (OECD, 2023d). These changes indicate that the staffing environment reported by school leaders improved substantially over four years.

Student experience presents a more qualified picture. In most mathematics lessons, 57% of students reported that teachers showed interest in every student's learning and 64% reported receiving extra help when needed. Both shares were below OECD averages of 63% and 70%, and both were lower than the corresponding Indonesian shares in 2012 (62% and 69%) (OECD, 2023d). In addition, 25% of students reported that they could not work well in most or all mathematics lessons. These indicators do not show that Indonesian teachers are generally unsupportive; they show that improved staffing conditions coexist with a sizeable gap in reliable, student-experienced instructional support.

The contrast is consistent with the concept of conversion capacity. Staffing is an enabling condition, but it does not specify how teacher time, expertise, observation, feedback, and additional assistance are organized. The PISA evidence therefore supports a distinction between having fewer reported staffing shortages and ensuring that students consistently experience responsive instruction.

Table 2. PISA 2022 Indonesia: institutional capacity, instructional support, and decision authority

Indicator	Indonesia / verified value	Evidence level	Interpretation
Instruction hindered by lack of teaching staff	18% in 2022; 42% in 2018	Principal report	Large improvement in staffing availability
Instruction hindered by inadequate/poorly qualified staff	13% in 2022; 25% in 2018	Principal report	Improvement in reported staff quality constraint
Teacher shows interest in every student's learning	57% in most mathematics lessons	Student report	Student-experienced instructional attention remains incomplete
Teacher gives extra help when needed	64% in most mathematics lessons	Student report	Support below OECD average (70%)
Students cannot work well	25% in most/all mathematics lessons	Student report	Instructional environment remains constrained for a sizeable group
Principal has main responsibility for hiring teachers	56% of students	Principal/school governance	Substantial local personnel authority
Teachers have main responsibility for choosing learning materials	70% of students	Principal/school governance	Substantial professional/curricular authority
At least half of families discuss progress on own initiative	43% of students' schools	Principal report	School-family linkage present but not universal
At least half of families discuss progress on teacher initiative	49% of students' schools	Principal report	Institutional outreach remains uneven

Source: OECD (2023d), *Indonesia PISA 2022 country note*. Percentages refer to the share of students associated with the reported school or classroom condition.

4.4. Formal Authority Is Present, but Authority Is Not the Same as Instructional Capacity

Indonesia also exhibits meaningful local decision authority. Fifty-six percent of students attended schools where principals had the main responsibility for hiring teachers, close to the OECD average of 60%. Seventy percent were enrolled in schools where teachers had the main responsibility for choosing learning materials, compared with an OECD average of 76% (OECD, 2023d). These values indicate that Indonesian schools are not uniformly characterized by centralized control over all core personnel and curricular decisions.

Formal authority, however, is analytically distinct from capacity. The presence of hiring responsibility does not establish that a principal has access to an adequate pool of qualified applicants, sufficient time for instructional supervision, or effective routines for teacher development. Likewise, teacher authority over learning materials does not establish curricular coherence or differentiated support for students with fewer home resources. The combination of substantial authority with moderate student-reported support reinforces the need to evaluate how authority is converted into practice.

Parental involvement provides a further institutional bridge. In 2022, 43% of Indonesian students attended schools where principals reported that at least half of families had discussed their child's progress with a teacher on their own initiative, and 49% attended schools where this occurred on the teacher's initiative (OECD, 2023d). These values suggest that school-family interaction is neither absent nor universal. For low-ESCS students, the distribution and quality of such relational support may be particularly consequential because families differ in their capacity to navigate educational institutions.

4.5. Instructional Leadership Is Equity-Relevant but Not an Observed Indonesia-Specific Buffer

The wider PISA 2022 governance evidence helps delimit what can and cannot be concluded about instructional leadership. Across most PISA-participating systems, measures of educational and instructional leadership were only weakly associated with mathematics performance after accounting for the socioeconomic profiles of students and schools. OECD cautions that some apparently negative associations may arise because school leaders become more active when disciplinary or instructional problems are already present (OECD, 2023b). This makes a simple positive leadership-score relationship an inappropriate criterion for judging effectiveness.

At the system level, OECD reports that education systems with higher educational and instructional leadership scores were more socioeconomically fair after accounting for GDP per capita, although this pattern did not hold when OECD countries were examined separately (OECD, 2023b). This finding is compatible with the theoretical proposition that governance can matter for distribution, but it cannot be imported as an Indonesia-specific causal effect. The published evidence therefore supports an equity-relevant interpretation of instructional leadership while stopping short of claiming that leadership statistically moderates the ESCS-achievement relationship within Indonesian schools.

This distinction resolves a common inferential problem. Leadership can be central to an institutional explanation without being treated as an already demonstrated causal buffer. In the Indonesian evidence assembled here, the empirical contribution lies in identifying the governance problem that leadership would need to address: converting improving staffing and meaningful decision authority into more dependable instructional support within a system where low achievement is widespread across socioeconomic groups.

Table 3. Analytical synthesis: from observed indicators to the equity-governance interpretation

Dimension	Observed evidence	Interpretation	Inferential boundary
Broad disadvantage	Mean ESCS -1.56; 43% in bottom international ESCS quintile	Social disadvantage is a structural condition of the system, not a small subgroup problem	Does not identify causal effects of ESCS

Dimension	Observed evidence	Interpretation	Inferential boundary
Shallow social gradient	14-point ESCS slope; 5.5% variance; 34-point quartile gap	Achievement is weakly differentiated by socioeconomic position compared with other systems	A small gradient is not equivalent to high learning
Low learning across social groups	18% reach Level 2; 68.2% of advantaged students are low performers	Compressed inequality coexists with broad learning inadequacy	Relative equity must be read together with absolute proficiency
Improving staffing	Staff shortage 42%→18%; inadequate/poorly qualified 25%→13%	Input constraints improved substantially	Improvement in inputs does not prove instructional effectiveness
Incomplete instructional conversion	57% teacher interest; 64% extra help	Student-experienced support does not automatically follow resource improvement	Student reports cannot isolate leadership mechanisms
Meaningful local authority	56% principal hiring responsibility; 70% teacher material responsibility	Schools possess non-trivial decision discretion	Authority is not identical to capacity or equity
Leadership as equity-relevant governance	OECD: weak average performance association; system-level fairness association after GDP	Leadership is more plausibly evaluated through organization and distribution of support than simple main effects	Cross-system evidence cannot be imported as an Indonesia-specific moderation effect

Source: Analytical synthesis of OECD (2023a, 2023b, 2023d) and OECD Education GPS (n.d.). No unpublished coefficient or microdata estimate is introduced.

5. Discussion

5.1. Rethinking Educational Equity: From Gap Size to Joint Distribution

The study's first contribution is to challenge a gap-only interpretation of educational equity. Indonesia's 14-point ESCS gradient, 5.5% ESCS-related variance, and 34-point top-bottom quartile gap are all comparatively small. If those indicators were read without the achievement distribution, Indonesia could appear relatively equitable. The simultaneous observation that 82% of students are below Level 2 and that more than two-thirds of advantaged students are low performers changes the substantive meaning of the pattern.

The resulting equity paradox is not that inequality disappears. Rather, social differentiation is limited within a generally weak performance environment. This matters for sociological interpretation because equality can be produced by levelling up or by compression at a low level. Only the former is a satisfactory educational objective. A policy dashboard that rewards smaller socioeconomic gaps without simultaneously tracking minimum proficiency could therefore misclassify broad learning failure as equity progress.

The academic-resilience figure adds nuance. Around 15% of disadvantaged students reach the top national quarter, confirming that social origin is not destiny and that institutional or relational resources can interrupt disadvantage. Yet national resilience is a relative measure: a student can be in the top quarter of a low-performing national distribution without meeting an internationally high proficiency threshold. Resilience should therefore be interpreted as evidence of heterogeneity in social reproduction, not as proof that the system as a whole is delivering adequate learning.

5.2. Governance as a Conversion Problem

The second contribution is to conceptualize school governance as a problem of conversion capacity. PISA 2022 shows substantial improvement in principal-reported staffing conditions, but

student-reported instructional support remains uneven. This empirical separation is important. Resource provision is necessary, but the social value of resources depends on how they are organized, targeted, and experienced.

Instructional leadership sits precisely at this conversion point. Classroom observation, feedback, teacher learning, instructional goal-setting, and follow-up routines can help make learning problems visible and coordinate professional responses (Hallinger, 2003; Leithwood et al., 2020). In schools serving families with limited educational capital, the reliability of those routines may be especially important because students cannot assume that gaps in school support will be compensated through tutoring, parental expertise, or other private resources. In this sense, governance has distributive consequences even when the available evidence does not identify a causal leadership coefficient.

The Indonesian supervision literature reinforces this interpretation. Formal academic-supervision programmes can contain planning, implementation, evaluation, and reporting procedures, yet their developmental value depends on time, follow-up, and professional capacity (Miftakhi & Malagola, 2025). The policy implication is not simply to require more supervision. It is to evaluate whether supervisory activity produces actionable teacher feedback, whether follow-up reaches classrooms, and whether additional support is targeted toward students who are not receiving equivalent learning resources outside school.

5.3. Authority Without Automatic Equity

The third contribution concerns autonomy. The PISA country note shows meaningful principal responsibility for hiring and teacher responsibility for learning materials. These forms of authority are often treated as signs of decentralized or professional governance. The present analysis cautions against equating discretion with effective capacity. Authority can enable local adaptation, but its effects depend on information, expertise, accountability, and the distributional criteria used in decision making.

An equity-oriented approach would therefore ask not only who has authority, but how authority is exercised. Hiring responsibility matters if it allows schools to address subject shortages and recruit appropriate expertise. Teacher authority over materials matters if it supports coherent sequencing and differentiation rather than fragmented choices. Parent engagement matters if contact reaches families who are less confident navigating school institutions rather than disproportionately involving already advantaged parents. Governance should be evaluated by the social distribution of instructional support, not only by formal decentralization.

5.4. Relationship to Existing Indonesian PISA Research

Recent Indonesian PISA research has moved beyond simple national rankings. Aditia and Széll (2025) use hierarchical modelling to examine how school type, location, socioeconomic status, belonging, and institutional context shape achievement, highlighting the importance of multilevel educational environments. Latifah and Kismiantini (2025) examine teacher support, school climate, and pathways to mathematics achievement. Those studies analyse student-level relationships and school contexts directly.

The present study contributes something different. It does not offer another microdata regression. Instead, it identifies a system-level interpretive problem that can be obscured by regression coefficients: Indonesia simultaneously has widespread socioeconomic disadvantage,

a weak social gradient, and low mathematics achievement across much of the social distribution. It then connects that distributional pattern to observed governance-capacity indicators. The novelty is therefore the integration of learning adequacy, gradient equity, and institutional conversion capacity in a single Indonesia-focused framework.

This positioning also makes the paper appropriate for a studies-in-human-society audience. The argument concerns how a public institution mediates social inequality, how organizational resources are distributed, and how formal governance structures translate—or fail to translate—into experienced opportunities. Educational management is treated as a mechanism of social stratification rather than as a detached administrative topic.

5.5. Policy Implications

Three policy implications follow. First, equity monitoring should combine relative and absolute indicators. A falling SES gap is insufficient if minimum proficiency remains low. National and school-level dashboards should therefore track both social gradients and the share of students in each socioeconomic group who reach foundational learning thresholds.

Second, improvements in staffing should be accompanied by indicators of instructional conversion. Useful measures include the frequency and quality of formative feedback, access to extra help, follow-up after classroom observation, teacher collaboration around specific learning problems, and whether remedial or enrichment opportunities reach different socioeconomic groups. Such indicators move evaluation from inputs toward the organization of professional attention.

Third, leadership development should be explicitly equity-sensitive. The objective is not to maximize the frequency of management activity. It is to strengthen leaders' capacity to diagnose who is not learning, organize teacher support, use autonomy responsibly, and monitor whether school resources reduce dependence on family-provided advantages. Given the cross-sectional nature of PISA, these are governance priorities suggested by the observed configuration of evidence rather than causal treatment effects.

6. Conclusion

Indonesia's PISA 2022 profile reveals an important tension for the study of educational inequality. Socioeconomic status is less strongly associated with mathematics performance than in most participating systems, yet mathematics learning is weak for a large majority of students. The 14-point ESCS gradient, 5.5% ESCS-related variance, and 34-point quartile gap therefore cannot be interpreted independently of the fact that only 18% of students reached Level 2 and that low performance remains common even among socioeconomically advantaged students.

The analysis characterizes this pattern as an equity paradox of low gradients and low learning. It does not imply that socioeconomic inequality is irrelevant. Rather, it shows that reduced differentiation by social origin does not necessarily mean that schools are producing adequate learning opportunities. Equity requires both weaker dependence on family resources and sufficiently high learning outcomes.

School governance matters because it shapes the conversion of institutional resources into learning. Indonesia's improvement in reported staffing conditions and its meaningful local decision authority coexist with uneven student-experienced instructional support. Instructional leadership is therefore best understood as a potential conversion mechanism: one that organizes professional attention, feedback, and follow-up, but whose Indonesia-specific buffering effect cannot be inferred from aggregate published indicators. For educational policy and the sociology

of inequality alike, the key question is not only how much authority or staffing schools possess, but whether those resources are converted into reliable support for students across the social distribution.

7. Limitations

This study has four main limitations. First, it is a secondary analysis of published PISA population estimates rather than a re-analysis of student-level microdata. It therefore cannot estimate within-school ESCS slopes, school-specific variation, or an ESCS-by-instructional-leadership interaction for Indonesia. That boundary is intentional and should be preserved in interpretation.

Second, the analysis combines indicators reported at different observational levels. Student reports, principal reports, national population estimates, and cross-system OECD associations answer different questions. The paper avoids treating them as if they were measurements of a single latent governance construct, but the synthesis remains interpretive rather than a formal structural model.

Third, PISA 2022 is cross-sectional. Leadership activity, instructional support, and achievement may be jointly shaped by unobserved school conditions, and more active management can be a response to problems rather than their cause. The study therefore uses associational and institutional language rather than causal claims.

Fourth, PISA measures the knowledge and skills of 15-year-olds in sampled schools and does not capture every dimension of educational quality or inequality. Students outside the PISA target population, local curricular goals, school financing, teacher deployment rules, and subnational institutional differences may alter the governance processes described here. Future research can extend the present framework with the full PISA public-use files or other nationally representative microdata to test whether instructional leadership or related governance dimensions actually moderate socioeconomic gradients within Indonesian schools.

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