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Beyond Pupil-Teacher Ratios: Administrative Staffing and Primary Leaving Examination Performance in Selected Schools in Kabale District, Uganda

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Abstract: *Administrative pupil-teacher ratio (PTR) is widely used as a staffing indicator, yet teacher headcount may not represent pupils' instructional conditions. This study examined associations between whole-school PTR, the Primary Seven (P7) pupils-per-assigned-teacher ratio, and school-level Primary Leaving Examination (PLE) pass rates in 10 government-aided primary schools in Kabale District, Uganda. A documentary longitudinal design used a structured document-review guide to extract eight years (2017-2024) of enrolment, staffing, P7 allocation and PLE records, yielding 80 school-by-year records. Descriptive statistics and Spearman correlations were computed. Whole-school PTR averaged 41.03 (SD = 17.33), the P7 ratio 7.84 (SD = 3.02), and PLE pass rate 92.40% (SD = 10.60). Associations with PLE pass rate were very small for whole-school PTR (rho = .102, p = .366) and the P7 ratio (rho = .049, p = .668). Because records were repeated within schools and PLE pass rates showed a ceiling effect, coefficients are interpreted as exploratory descriptive associations rather than causal estimates. Administrative staffing ratios therefore appear to reflect potential staffing capacity more than actual instructional exposure. Staffing decisions should combine PTR with class or stream size, teacher presence, timetabled load, instructional time and more discriminating grade-level achievement indicators.*

Keywords: Pupil-teacher ratio, Staffing, Instructional exposure, PLE performance, Primary education. Kabale; Uganda

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1. Introduction

Expanding access to schooling without weakening instructional quality remains one of the most persistent policy challenges in low-income education systems. Uganda illustrates this tension clearly. The Ministry of Education and Sports reported that, in 2025, public primary schools had a pupil-teacher ratio of 61:1 compared with 35:1 in private schools; the corresponding pupil-classroom ratios were 79:1 and 38:1, respectively (Ministry of Education and Sports [MoES], 2026). The difference between the staffing ratio and the classroom ratio is analytically important: the number of teachers on a school register is not the same as the number of pupils learning together in an actual classroom.

The quality challenge is equally urgent. The World Bank (2024a) estimates that 82% of Ugandan children at late-primary age are unable to read and understand a short age-appropriate text when out-of-school children are included. Such a learning deficit cannot be explained by any single school input. It reflects accumulated exposure to teacher availability, instructional time, teaching quality, attendance, materials, home support, and school leadership. Staffing ratios nevertheless remain attractive to planners because they are simple to calculate, easy to compare, and routinely available in administrative systems.

The central problem is that PTR measures potential teaching capacity rather than instructional exposure. A school may appear adequately staffed while particular grades remain crowded, teachers rotate across subjects, staff carry administrative duties, or teachers are absent from classrooms. Bennell (2022) cautions that student-teacher ratios can be poor indicators of both efficiency and quality when they conceal actual teaching loads and classroom organisation. In Uganda, service-delivery evidence has similarly shown that nominal staffing does not guarantee that teachers are present and teaching (World Bank, 2024b).

Research on class size and teacher availability also resists a universal smaller-is-better conclusion. Datta and Kingdon (2023) found little achievement gain from class-size reduction across much of the observed range in India, while Tanaka and Wang (2025) identified positive average effects of smaller classes on mathematics achievement in Japan that varied by peer composition. In Ghana, Duflo et al. (2024) found learning gains from interventions that changed the effective organisation of instruction through remedial teaching, classroom splitting, tracking, or additional instructional time. Taken together, these studies suggest that staffing matters through the instructional opportunities it creates, not through the ratio alone.

African and Ugandan evidence reinforces this interpretation. Fubile and Sawe (2022) associated high PTR with weaker literacy and numeracy competencies in Tanzania. Gilligan et al. (2022) showed in rural Uganda that teacher incentives affected attendance and some learning outcomes only when complementary textbooks were available, underscoring the interaction between staffing, incentives, and material resources. Mugume and Bulime (2024), using longitudinal records from 7,824 Ugandan primary schools, further demonstrated that institutional quality, inspection, ownership, location, and class size operate together in shaping pupil retention.

Kabale District provides a useful setting in which to examine what administrative PTR can and cannot tell education managers. Government-aided primary schools vary substantially in enrolment and teacher allocation, and P7 may receive concentrated staffing because it is the national examination grade. This creates a potential mismatch between the whole-school teacher stock and the staffing environment experienced by PLE candidates. It also raises a second measurement problem: the percentage of candidates who pass PLE may be insensitive where pass rates are already high and where four performance divisions are collapsed into a single pass category.

1.1 Study Gap and Justification

Despite the policy prominence of PTR, there remains limited evidence from Ugandan primary schools on whether routinely reported whole-school staffing ratios correspond with examination-grade outcomes when staffing is organised differently across grades. Existing Ugandan evidence has highlighted teacher attendance, incentives, institutional quality, and complementary resources, but these strands do not resolve whether a school-level PTR is an adequate proxy for the instructional conditions experienced by P7 candidates. This measurement gap is important for district planning because staffing decisions are often made from administrative headcounts, whereas examination performance is generated through grade-level instructional processes.

This study therefore asks a deliberately narrower question than whether PTR causes achievement: do differences in administrative staffing ratios correspond with differences in school-level PLE pass rates? The study is justified by the need for district planners to know whether routinely available staffing headcounts provide a sufficiently informative proxy for the instructional conditions experienced by P7 candidates. The paper contributes in three ways. First, it uses repeated documentary records rather than perceptions of staffing or self-reported performance. Second, it distinguishes whole-school staffing from P7 pupil-to-assigned-teacher allocation, thereby testing whether an examination-grade allocation indicator corresponds more closely with PLE outcomes. Third, it treats near-zero associations as evidence about the limits of administrative indicators and aggregated outcomes, rather than as proof that teacher availability is educationally unimportant.

1.2 Research Questions

RQ1. What is the association between whole-school PTR and school-level PLE pass rate?

RQ2. What is the association between the P7 pupils-per-assigned-teacher ratio and school-level PLE pass rate?

Given the exploratory design, the analysis emphasises the magnitude and direction of associations. Statistical significance tests are reported as secondary evidence and are interpreted cautiously because the school-year observations are clustered within schools.

2. Literature Review

2.1 Administrative Staffing and Instructional Exposure

The literature is interpreted through an instructional-exposure perspective informed by education-production reasoning. From this perspective, administrative staffing is an enabling input whose educational value depends on how teacher capacity is converted into actual teaching opportunities. PTR, class size and effective instructional exposure are therefore related but distinct concepts. PTR is normally calculated by dividing enrolled pupils by the number of teachers attached to a school or education level. Class size refers to the number of pupils taught together at a particular time. Effective instructional exposure refers to the amount, organisation and quality of teaching that pupils actually receive after teacher deployment, attendance, timetabling, instructional time, pedagogy, feedback and

classroom organisation are taken into account. The indicators may move together, but they need not.

This distinction helps explain why studies based on administrative PTR often produce weaker or less stable associations than interventions that alter the teaching environment directly. Bennell (2022) shows that aggregate student-teacher ratios in sub-Saharan Africa can conceal both low teaching loads and very large classes. Ugandan national statistics illustrate the same disconnect: public-primary PTR and pupil-classroom ratios differ substantially (MoES, 2026). Teacher presence also matters. Where absenteeism and time on task vary, schools with the same PTR can provide very different quantities of instruction (World Bank, 2024b).

2.2 Whole-School PTR and PLE Performance

Empirical evidence on staffing and achievement shows that class-size and staffing effects are heterogeneous, nonlinear and context-dependent. Datta and Kingdon (2023) found that achievement in their Indian sample was roughly unrelated to class size across a broad middle range, with deterioration becoming clearer only at larger sizes. Tanaka and Wang (2025) found positive effects of class-size reduction in Japanese primary schools, but effect sizes varied with peer composition. Duflo et al. (2024), working at scale in Ghana, demonstrated that learning improved when government programmes changed the effective organisation of instruction through smaller groups, targeted teaching and additional instructional opportunities. These studies caution against treating a whole-school staffing ratio as a direct or uniform predictor of examination performance.

Evidence syntheses point in the same direction. Angrist et al. (2025), reviewing more than 200 impact evaluations across 52 countries, identify targeted instruction and structured pedagogy among the most cost-effective strategies for improving learning. Piper and Dubeck (2024) emphasise that structured pedagogy works as a package involving appropriate materials, teacher preparation, coaching, and support. Staffing is therefore best viewed as an enabling condition whose educational return depends on the instructional system around the teacher.

Taken together, this literature suggests that the policy question is not simply how many teachers are attached to a school, but whether staffing translates into smaller or better-organised instructional groups, adequate time on task, targeted support, and effective pedagogy. This distinction is particularly relevant in Uganda, where administrative staffing and classroom conditions can diverge.

School resources rarely operate independently. Yang and Lee (2022) show that the relationship between school resources and achievement differs across socioeconomic and national contexts. In sub-Saharan Africa, Kouamo (2024) similarly demonstrates that pupil and school characteristics jointly shape learning. Methodologically, this means that a bivariate staffing coefficient can be small because important school conditions are omitted, effects vary across schools, or the outcome measure is insensitive to the form of learning that staffing affects.

2.3 P7 Teacher Allocation and PLE Performance

Evidence relevant to examination-grade staffing raises the possibility of selective teacher allocation within schools. Gilligan et al. (2022) draw attention to educational triage under high-stakes conditions, where teacher effort may be concentrated on pupils perceived as more likely to succeed. In Primary Seven, a comparable process may occur where schools assign several subject teachers to the examination class, provide additional instructional attention, or prioritise P7 in preparation for the Primary Leaving Examination. A favourable P7 pupils-per-assigned-teacher ratio may therefore reflect deliberate staffing concentration around an examination grade. However, such a ratio does not necessarily indicate smaller teaching groups, more instructional periods, regular teacher presence or greater individualised attention. The distinction between administrative allocation and actual instructional exposure is therefore essential when assessing whether grade-level staffing corresponds with PLE performance.

Recent evidence further indicates that how teachers are distributed across schools and classes may be as important as the overall number of teachers available. Fagernäs and Pelkonen (2026), examining teacher allocation under India's Right to Education reforms, found that improved reallocation of teachers was associated with learning gains across districts and cohorts, particularly among pupils at lower levels of attainment. Their findings are especially relevant to the present study because they distinguish between simply increasing the teacher stock and reorganising existing teachers so that staffing is better aligned with pupil needs. This suggests that a school may have an apparently favourable overall PTR while still experiencing inefficient grade-level deployment, whereas purposeful allocation to specific grades or learner groups may improve the instructional opportunities available to pupils.

Comparable study from sub-Saharan Africa reinforces the importance of targeted deployment. Wong et al. (2026), using administrative data from Malawi, examined reforms intended to improve the allocation of teachers across primary schools. Schools that gained teachers and moved from extremely high pupil-qualified-teacher ratios to less severe staffing levels experienced reductions in repetition and dropout. Importantly, the study also showed considerable variation in districts' adherence to teacher-allocation rules, illustrating that formal staffing policies do not automatically produce equitable deployment. For P7, this implies that the educational relevance of an assigned-

teacher ratio depends not simply on how many teachers appear on the grade allocation register, but on whether staffing decisions actually relieve instructional pressure and create opportunities for sustained teaching, assessment and learner support.

African class-size research also demonstrates that staffing-achievement relationships may be non-linear and context dependent. Nyatsikor et al. (2026), using nationally representative primary-school assessment data from Ghana, found that the relationship between class size and achievement varied by class-size threshold, subject and geographical context rather than following a uniform pattern. Similarly, Tanaka and Wang (2025) found positive average effects of class-size reduction on mathematics achievement in Japanese primary schools, but the magnitude of these effects differed according to peer composition. These findings caution against interpreting either whole-school PTR or grade-level teacher-allocation ratios as having a single, uniform relationship with achievement. Instead, staffing effects may depend on the initial level of crowding, pupil composition, subject taught and the manner in which additional teacher capacity is translated into classroom organisation.

The effectiveness of teacher allocation also depends on what assigned teachers actually do once they reach the classroom. Hoadley (2024), drawing on observations of 188 early-grade lessons in Uganda and Liberia, found that structured pedagogy programmes improved some features of instructional provision, including access to materials and lesson structure, but produced more limited changes in interactive aspects of classroom pedagogy. This finding is particularly relevant to administrative staffing measures because it shows that the provision of teachers, materials or prescribed instructional structures does not by itself guarantee improvements in the quality of teacher-pupil interaction. Similarly, Piper and Dubeck (2024) conceptualise structured pedagogy as a coordinated package involving appropriate instructional materials, teacher preparation and continuing support. Taken together, these studies suggest that teacher availability produces stronger educational benefits when staffing is accompanied by effective pedagogy, instructional resources and ongoing professional support.

Teacher presence and instructional time further complicate the interpretation of P7 allocation ratios. A teacher may be administratively assigned to P7 but spend only a proportion of the timetable teaching that grade, teach multiple subjects or classes, undertake administrative duties, or be absent during scheduled instructional periods. Thus, two schools recording the same number of assigned P7 teachers may provide substantially different quantities and qualities of instructional exposure. Recent research therefore supports moving beyond teacher headcounts toward measures that capture deployment, time on task, classroom organisation and actual teaching practice. The implication for the present study is that the P7 pupils-per-assigned-teacher ratio should be treated as an indicator of potential grade-level staffing capacity, rather than as a direct measure of class size or instructional intensity.

High-stakes examination preparation may reinforce this distinction. Schools may prioritise P7 by assigning experienced subject teachers, providing additional revision lessons, increasing assessment frequency or concentrating learning materials on examination candidates. Such practices can weaken the correspondence between whole-school PTR and PLE outcomes because the learning conditions experienced by P7 candidates may differ substantially from those prevailing elsewhere in the school. At the same time, a favourable P7 staffing ratio does not guarantee better examination outcomes if teachers have insufficient instructional time, weak pedagogical support, inadequate materials, irregular learner attendance or limited opportunities for remediation. Consequently, grade-level teacher allocation is best understood as one component of a broader instructional system rather than an independent determinant of examination performance.

A further issue concerns the sensitivity of the outcome used to detect staffing effects. In the present study, PLE performance is represented primarily through the overall pass rate, yet high pass rates may conceal substantial differences in the quality of achievement. Staffing improvements could potentially influence the proportion of candidates obtaining Divisions I and II, subject-level performance or mean aggregate scores without substantially changing the percentage of pupils classified as passing. Recent evidence that class-size and teacher-allocation effects vary across learner groups and achievement levels reinforces the need for more differentiated outcome measures (Fagernäs & Pelkonen, 2026; Nyatsikor et al., 2026). Thus, an apparently weak association between P7 staffing and overall pass rate should not automatically be interpreted as evidence that grade-level teacher deployment is educationally unimportant.

For the present study, this evidence implies that the relationship between P7 staffing allocation and PLE performance is unlikely to be a simple numerical function of pupils divided by assigned teachers. The educational significance of staffing depends on whether allocated teachers are translated into meaningful instructional exposure through regular presence, sufficient teaching time, appropriate grouping, effective pedagogy, assessment, feedback and remediation. The empirical contribution of this study is therefore to examine whether two administrative staffing indicators whole-school PTR and the P7 pupils-per-assigned-teacher ratio correspond with school-level PLE pass rates, while recognising that several instructional and contextual mechanisms that could explain such relationships were not directly measured.

2.4 Conceptual Framework

The paper uses an instructional-exposure framework informed by education-production reasoning. Administrative PTR represents a stock of potential human resources rather than a direct measure of what pupils'

experience in classrooms. Teacher numbers can influence learning only through their conversion into instructional conditions such as deployment, teacher presence, actual class or group size, instructional time, feedback, assessment, remediation, and pedagogy. These processes are conditioned by school leadership, learning materials, pupil attendance, family support, prior achievement, examination practices, and school- or year-specific shocks. PLE performance is the observed endpoint in the present analysis. Importantly, the intermediate instructional conditions shown in Figure 1 are theoretical mechanisms; they were not directly measured as mediators in the documentary dataset and are therefore not tested as causal pathways in this study.

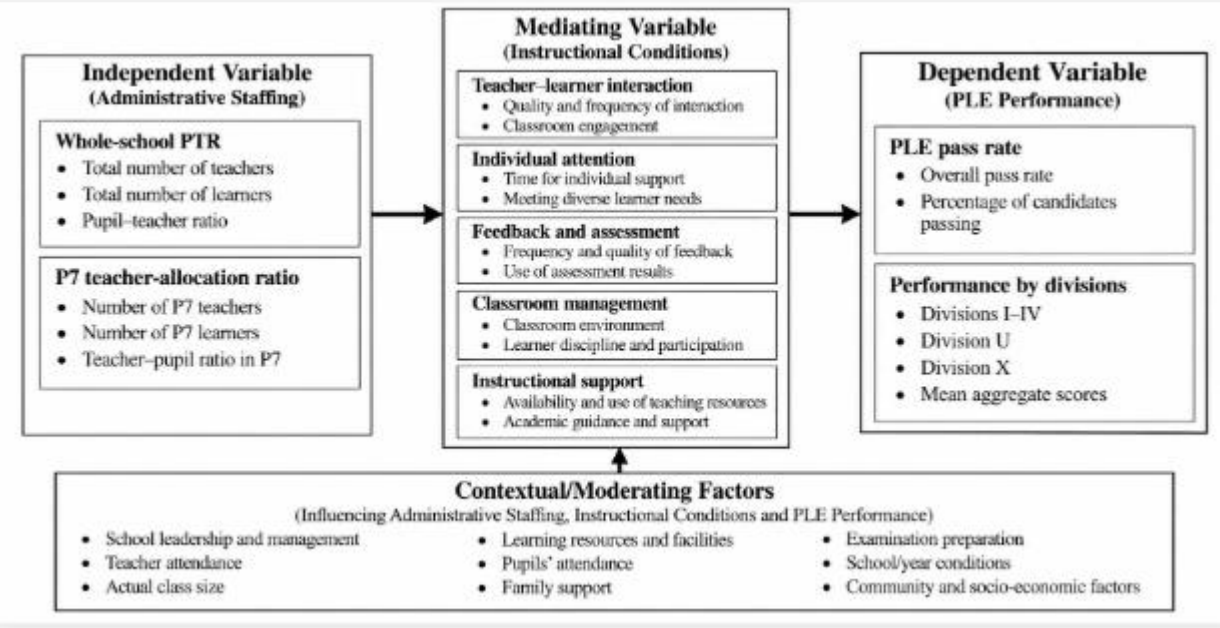


Figure 1. Conceptual framework linking administrative staffing capacity to learning through effective instructional exposure.

The framework therefore allows a near-zero correlation between an administrative staffing ratio and a bounded school pass rate even when teacher availability matters for learning. Schools with similar PTRs may differ in staff deployment, teacher presence, actual teaching-group size, timetable load, and use of instructional time. In the present study, the empirical analysis is restricted to the available administrative indicators and PLE outcomes; the instructional-exposure variables in the framework guide interpretation rather than constitute measured mediators.

3. Methodology

3.1 Research Design

The study adopted a documentary longitudinal design within a broader quantitative descriptive-correlational study conducted in selected government-aided primary schools in Kabale District, south-western Uganda. The present paper uses official administrative records to examine the correspondence between two staffing indicators, whole-school pupil-teacher ratio (PTR) and the P7 pupils-per-assigned-teacher ratio and school-level Primary Leaving Examination (PLE) performance. The design is observational and non-experimental; accordingly, the analysis describes and explores associations rather than estimating causal effects.

The documentary series covered eight school-year observation periods (2017-2024). The school-by-year record, rather than the individual pupil or questionnaire respondent, was the unit of analysis. Ten retained schools each contributed one record in each of the eight years, yielding 80 school-by-year records. These records are repeated measurements nested within 10 schools and should not be interpreted as 80 independent schools. This structure is taken into account in the cautious interpretation of the exploratory correlation results.

3.2 Study Population, Sample and Sampling Procedures

The source population for the broader study comprised 3,717 participants: 3,467 Primary Seven pupils, 137 Primary Seven teachers and 113 head teachers in 113 government-aided primary schools in Kabale District. The school sampling frame therefore comprised 113 schools. To improve geographical representation, schools were stratified by sub-county and 12 schools were randomly selected from the resulting strata. Within the broader parent study, P7 pupils were selected through simple random sampling, while head teachers and P7 teachers were purposively included because of their direct roles in staffing, deployment, classroom instruction and academic monitoring.

The broader parent study targeted 370 questionnaire respondents (346 P7 pupils, 12 P7 teachers, and 12 head

teachers), of whom 331 participated (89.5%). These figures describe the provenance and scope of the parent study only; the present article does not analyse questionnaire responses as independent evidence for the PTR-PLE associations.

For the documentary analysis reported here, a school was retained only when the required annual enrolment, staffing, P7 allocation, and PLE outcome fields were sufficiently complete across the eight observation years to construct the study variables consistently. Two of the 12 sampled schools did not meet this documentary completeness requirement and were excluded. The retained analytic set therefore comprised 10 schools observed over eight school-year periods, yielding 80 school-by-year records. The distinction is important: the study spans eight school-year observation periods, while the statistical file contains 80 repeated school-by-year records nested within 10 schools.

3.3 Data Collection Instrument and Procedure

Data were collected from official school records using a structured document-review guide. For each school and observation year, the guide captured total school enrolment, total teaching staff, P7 enrolment, the number of teachers recorded as assigned to P7, the number of registered PLE candidates, and candidate counts in Divisions I, II, III, IV, U and X. The same guide was used across schools and years to standardise the fields abstracted and reduce dependence on retrospective perceptions of staffing and performance.

3.4 Operationalisation of Variables and Data Quality

Whole-school PTR was calculated as total enrolment divided by the total number of teachers recorded for the school-year. It is an administrative staffing measure and should not be interpreted as actual class size. The P7 pupils-per-assigned-teacher ratio was calculated as P7 enrolment divided by the number of teachers recorded as assigned to P7. Across the school-by-year records, P7 staffing averaged 3.97 teachers (SD = 0.55; range = 3-6), while P7 enrolment averaged 31.31 pupils (SD = 13.66; range = 15-71). The resulting ratio is therefore interpreted as a staffing-allocation indicator rather than a conventional pupil-class measure. The records did not identify full-time-equivalent teaching load, concurrent streams, teacher attendance or the proportion of each teacher's timetable devoted to P7.

The primary outcome was the annual school-level PLE pass rate. Candidates in Divisions I-IV were grouped as passing outcomes, while records in U and X were included in the non-passing category in the archived analytic dataset. This operationalisation reproduces the archived analysis but is substantively coarse because an X classification may not represent the same academic outcome as an ungraded result, and a binary pass measure cannot distinguish a school dominated by Divisions I-II from one dominated by Divisions III-IV. Use of a common structured extraction guide supported consistency of data abstraction; however, the archived study materials do not document independent double extraction or inter-rater verification. Record completeness, transcription accuracy and consistency in schools' staffing records are therefore acknowledged as potential measurement limitations.

3.5 Data Analysis

Data were analysed in IBM SPSS Statistics, version 27. Means, standard deviations, minimum values, and maximum values were used to summarize staffing and examination indicators. Shapiro-Wilk tests were used to assess distributional departure from normality. Because the variables were non-normally distributed, two-tailed Spearman rank correlations were used to examine monotonic bivariate associations at alpha = .05. The statistical file contained 80 school-by-year records from 10 schools observed over eight years. The repeated observations within schools violate the independence assumption underlying conventional correlation-based significance testing; therefore, the reported p values are not presented as cluster-adjusted inferential tests. Interpretation emphasizes effect magnitude and substantive meaning. No causal effect, predictive relationship, or general population estimate is claimed. If the underlying dataset becomes available, a school- and year-aware panel or multilevel model, together with sensitivity analyses using more discriminating PLE outcomes, would be an appropriate next analytical step.

3.6 Ethical Considerations

Ethical clearance was obtained from the relevant research authority at Victoria University before data collection, and formal permission was granted by the Kabale District Education Office and participating schools. In the broader study, informed consent was obtained from adult participants, while P7 pupils received age-appropriate study information and provided voluntary assent under school-authority permission. School and participant identities were replaced with codes, no identifying information was reported, and the records were used only for approved academic purposes. The present article reports de-identified administrative records and aggregate sampling information.

4. Results and Discussion

4.1 School-year staffing profile

Table 1: Descriptive profile of school-by-year enrolment and staffing (80 records; 8 observation years across 10 schools)

Variable	M	SD	Minimum	Maximum
Total school enrolment	568.01	431.05	32	2,095
Total teachers	13.01	4.90	7	30
P7 enrolment	31.31	13.66	15	71
P7 teachers assigned	3.97	0.55	3	6

Across the eight observation years, the repeated school-by-year records show substantial variation in total enrolment, from 32 to 2,095 pupils, while recorded teacher numbers ranged from 7 to 30. P7 enrolment was smaller and less variable, while the number of teachers recorded as assigned to P7 was comparatively stable. This difference is important for interpreting the P7 pupils-per-assigned-teacher ratio: variation in its denominator was limited relative to variation in pupil numbers.

4.2 Descriptive profile of staffing ratios

Table 2: Descriptive profile of administrative staffing ratios (80 school-by-year records)

Variable	M	SD	Minimum	Maximum
Whole-school PTR	41.03	17.33	3.20	110.93
P7 pupils-per-assigned-teacher ratio	7.84	3.02	3.75	18.00

Whole-school PTR averaged 41.03 pupils per teacher (SD = 17.33) and varied widely across the school-by-year records. The P7 pupils-per-assigned-teacher ratio was much lower (M = 7.84, SD = 3.02). This contrast should not be interpreted as indicating that P7 pupils were typically taught in classes of eight. Rather, several subject teachers were recorded as assigned to the examination grade, so the ratio is best read as an indicator of staffing concentration around P7 rather than actual class size.

4.3 PLE performance

Table 3: Descriptive profile of PLE outcomes (80 school-by-year records)

Indicator	M	SD	Min.	Max.
Division I candidates	1.10	2.00	0.00	9.00
Division II candidates	18.00	12.20	0.00	56.00
Division III candidates	8.00	5.20	0.00	24.00
Division IV candidates	2.80	2.60	0.00	12.00
Division U candidates	1.60	2.50	0.00	13.00
Division X candidates	0.60	0.90	0.00	4.00
Pass rate (%)	92.40	10.60	38.10	100.00
Failure rate (%)	7.60	10.60	0.00	61.90

The mean PLE pass rate was 92.40% (SD = 10.60), with observations ranging from 38.10% to 100%. Many school-years were concentrated near the upper bound. The division-level counts show why pass rate is an insensitive summary: successful candidates were distributed across four divisions, and Division II candidates were substantially more numerous than Division I candidates on average. Collapsing these categories into a single pass percentage discards performance information that could be more responsive to instructional differences.

4.4 Distributional assessment and exploratory associations

Table 4. Shapiro-Wilk distributional assessment

Variable	W	df	p
Whole-school PTR	.931	80	< .001
P7 pupils-per-assigned-teacher ratio	.926	80	< .001
PLE pass rate	.701	80	< .001

Note. All three distributions departed significantly from normality.

Table 5. Exploratory Spearman associations with PLE pass rate

Predictor	Spearman rho	p (two-tailed)	N
Whole-school PTR	.102	.366	80
P7 pupils-per-assigned-teacher ratio	.049	.668	80

Whole-school PTR showed a positive but very small association with PLE pass rate (rho = .102, p = .366), while the P7 pupils-per-assigned-teacher ratio was even closer to zero (rho = .049, p = .668). These coefficients describe 80 school-by-year records drawn from eight observation years across 10 schools. Given the repeated-measures structure, the conventional p values are not cluster-adjusted and should not be treated as definitive inferential tests. The substantive emphasis is therefore on effect magnitude: within the available records, neither administrative staffing indicator showed an appreciable monotonic bivariate association with the percentage of candidates passing PLE. The result does not demonstrate that teacher availability is unimportant, nor does it imply that very high PTR is educationally harmless.

4.5 Discussion

The central result is not simply that the two coefficients were statistically non-significant; rather, both associations were close to zero despite substantial variation in whole-school PTR. This pattern must be interpreted in light of the measurement structure. Whole-school PTR and the P7 pupils-per-assigned-teacher ratio capture potential staffing capacity rather than actual instructional exposure, while PLE pass rate compresses heterogeneous achievement into a bounded percentage. The near-zero coefficients may therefore reflect weak correspondence between administrative staffing and classroom exposure, a ceiling effect in the pass-rate measure, omitted school conditions, restricted variation in P7 staffing, record-quality limitations and the small number of school clusters.

This interpretation is consistent with contemporary class-size evidence. Datta and Kingdon (2023) found little achievement gain from smaller classes across much of the observed range in India, whereas Tanaka and Wang (2025) found benefits that varied with peer composition. Duflo et al. (2024) generated learning gains in Ghana when government programmes altered the organisation of instruction through remediation, tracking, or classroom splitting. The common implication is that staffing produces learning through the way it changes instructional opportunity.

Whole-school PTR averages enrolment and staffing across every grade and therefore cannot show whether P7 has one stream or several, whether specialist teachers rotate across the examination grade, whether staff hold non-teaching responsibilities, or whether P7 receives preferential deployment. Across the repeated records, P7 had on average approximately four assigned teachers for about 31 pupils, producing a mean pupils-per-assigned-teacher ratio of 7.84. That value is not plausible as a conventional class-size indicator and is better interpreted as evidence that several teachers were administratively attached to the same examination cohort.

National statistics demonstrate the same conceptual problem at system level. Uganda's 2025 public-primary PTR was 61:1 while the public-primary pupil-classroom ratio was 79:1 (MoES, 2026). A district can therefore improve its average staffing ratio without necessarily reducing the instructional load experienced by a particular teacher or class.

Teacher headcount also says little about how much teaching pupils actually receive. Service-delivery evidence from Uganda indicates that attendance and classroom presence can vary substantially (World Bank, 2024b). Where time on task differs, schools with identical administrative PTRs may offer very different instructional exposure. Additional teachers create possibilities for smaller groups, feedback, formative assessment, and remediation, but leadership, pedagogy, timetabling, attendance, and learning materials determine whether those possibilities are realised.

Complementarity is therefore central. Gilligan et al. (2022) found stronger effects of teacher incentives where mathematics books were available, while Piper and Dubeck (2024) describe structured pedagogy as a package of aligned materials, teacher development, and ongoing support. Angrist et al. (2025) similarly show that interventions targeting instruction to pupils' learning levels can produce high learning returns. PTR should therefore be interpreted as an enabling condition rather than a sufficient cause of achievement.

The outcome measure presents a separate constraint. With a mean pass rate of 92.40% and many records near 100%, the scale has limited room to register improvement. More importantly, the pass category combines Divisions I-IV. A school producing mainly Division I-II candidates and another producing mainly Division III-IV candidates can therefore have the same pass rate. If staffing influences the quality of successful performance rather than the probability of passing at all, the binary outcome can attenuate the observed association. The treatment of Division X as non-passing in the archived analysis is an additional limitation because X may reflect circumstances different from an ungraded academic result.

The present results therefore point to the value of more discriminating outcomes derived from the original PLE records. Priority measures include the proportion of candidates obtaining Divisions I-II, mean aggregate PLE score where available, subject-level performance, or a defensible ordinal achievement index. A sensitivity analysis that excludes Division X from the academic-performance denominator would also help determine whether the

operational definition materially changes the findings. These extensions should be undertaken from the original school-by-year file rather than reconstructed from published summary statistics. Until such analyses are completed, the present coefficients should remain explicitly exploratory.

The Kabale finding should not be used to justify understaffing. A maximum observed whole-school PTR above 100 pupils per teacher represents an extreme administrative condition and should be interpreted cautiously because unusually large ratios may reflect genuine staffing pressure, record anomalies, or both. The more defensible policy implication is that teacher recruitment and deployment should be assessed against actual instructional need rather than judged solely through aggregate PTR.

Drawing on the present findings together with the wider literature, district information systems would be more decision-useful if teacher headcounts were routinely interpreted alongside actual class or stream size, teacher attendance and classroom presence, timetabled teaching load by grade and subject, instructional periods delivered, pupil attendance, learning-material availability, and the distribution of grade-level examination outcomes. These recommendations arise from the measurement limitations demonstrated in the present analysis; they should not be read as causal effects estimated by this study.

The highest-priority analytical extension is a reanalysis of the original school-by-year file. Verified school identifiers and calendar-year fields would permit school fixed-effects or an appropriately specified multilevel/panel model with year effects, more suitable uncertainty estimates, and sensitivity checks for unusually extreme PTR records. With only 10 school clusters, any cluster-adjusted standard errors would still require cautious interpretation. The same source file should also be used, where feasible, to compute the proportion achieving Divisions I-II and to repeat the pass-rate analysis after excluding Division X from the academic-performance denominator. A larger multi-district dataset could subsequently test whether staffing-performance relationships vary across PTR ranges, school context, peer composition, and examination-preparation practices.

5. Conclusion and Recommendations

5.1 Conclusion

Regarding RQ1, whole-school PTR showed only a very small positive association with school-level PLE pass rate (rho = .102, p = .366). Regarding RQ2, the P7 pupils-per-assigned-teacher ratio showed an even smaller association with PLE pass rate (rho = .049, p = .668). Across eight school-year observation periods in 10 government-aided primary schools in Kabale District, neither administrative staffing indicator showed an appreciable monotonic relationship with the percentage of candidates passing PLE. The appropriate conclusion is not that teachers do not matter, but that these administrative ratios correspond weakly with an outcome already concentrated near the upper end of its scale and do not directly represent class size or pupils' instructional exposure.

The findings support a shift from using PTR as a stand-alone quality indicator toward interpreting it as a measure of potential staffing capacity. District and school leaders should continue to identify and correct extreme staffing imbalances, but staffing decisions should also be informed by actual class and stream size, teacher presence, timetabled instructional load, grade-level deployment, learning materials, pupil attendance, and the distribution of examination performance across divisions. Recruitment alone cannot be assumed to improve learning unless additional teachers are present, appropriately deployed, and supported to provide effective instruction.

The Kabale records therefore provide evidence about the limits of using administrative staffing ratios as stand-alone indicators of instructional conditions. Stronger causal or predictive conclusions require panel analyses that account for school and year effects, cluster-aware uncertainty estimates, and more sensitive achievement outcomes. The methodological contribution of the present study is to show why what education systems count as teacher availability may differ from what pupils experience as teaching, and why administrative staffing indicators should be interpreted alongside measures of actual instructional exposure.

5.2 Recommendations

Based on the findings of this study, the following recommendations were made:

1. District and school staffing decisions should interpret whole-school PTR alongside actual class and stream size, teacher presence, timetabled teaching load, enrollment pressure and teachers' non-teaching responsibilities. This would make staffing decisions more responsive to the instructional conditions that whole-school PTR alone cannot reveal.
2. P7 teacher allocation should be monitored as a grade-level deployment indicator rather than treated as equivalent to class size. Schools should document how assigned teachers translate into actual teaching periods, subject coverage, learner contact and examination-grade instructional support.
3. Assessment of school performance should move beyond overall PLE pass rates by incorporating more discriminating indicators such as the proportion of candidates obtaining Divisions I-II, subject-level achievement and mean aggregate scores where available. This would reduce the information loss created by a pass-rate measure with a strong ceiling effect.
4. Extreme staffing imbalances should continue to receive policy attention. Although the study did not establish a strong association between PTR and PLE pass rate, unusually high administrative ratios should trigger investigation of staffing shortages, enrolment pressure,

deployment practices and possible record inconsistencies rather than being interpreted as educationally acceptable.

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