Policy brief
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School performance

The role of early stage learning environments

In brief

- Research shows Ghana's schools are some of the lowest performing in the world. Students reportedly struggle in the areas of problem solving, reasoning, and using concepts.
- These skills are thought to be important for low-income economies because they promote innovation and enhance workers' skills.
- This brief evaluates the influence of the school learning environment on students' academic outcomes by assessing the quality of the learning environment in the classroom and determining the extent to which it affects pupil performance.
- The researchers find that class size is negatively correlated with teaching outcomes, structural classroom environments disadvantage kindergarten students compared to lower primary students, and privately educated students have a higher attainment rate which increases over time.
- The researchers provide five policy proposals for improving academic outcomes in Ghanaian schools.

This project was funded by IGC Ghana

Background

This project seeks to understand the influence of the school learning environment on students' academic outcomes by assessing the quality of the learning environment in the classroom for kindergarten and early primary levels and determining the extent to which the environment affects pupil performance.

In 2003, 2007, and 2011, the Trends in International Mathematics and Science Study (TIMSS) ranked Ghana in the bottom three performing countries. The TIMSS reports indicate that Ghanaian students perform at the facts and procedures level but fail in the areas of problem solving, reasoning, and using concepts. While the average underperformance speaks to challenges with infrastructure, the weakness in the more advanced areas is primarily a pedagogical issue. Developing critical thinking skills such as problem solving and reasoning are important for low-income economies because they promote innovation and enhance workers' skills.

Many industrialised countries have invested substantially in research related to classroom learning environments because of the positive association between the quality of the environment and student learning. Studies of learning environments are better suited to understanding pedagogical issues such as teaching style, student engagement, and quality of instruction time. This study seeks to extend the learning environments research to the Ghanaian context by assessing the association between early grade classroom environments and pupil performance. Literacy and numeracy skill acquisition in early childhood is important for economic development. Low levels of literacy and numeracy skills are both linked to low wages, greater risk of unemployment, lower standards of living, and poorer health for adults – all factors that have a negative impact on labour force productivity and economic growth.

Data

Data for this study comes from the Classroom Learning Environments Ghana Study (CLEGS) conducted by the Regional Institute for Population Studies, University of Ghana in 2016. The survey took place in three districts selected from the Greater Accra and Central Regions of Ghana. Public schools were randomly selected from the Education Management Information Systems (EMIS) list. Private schools were a convenience sample of schools in the same locality as the selected public schools. Data was collected from one Kindergarten 1 (KG1), Kindergarten 2 (KG2), and Primary 1 (P1) classroom each using the following instruments:

School questionnaire	Collects information on head teacher characteristics, school information, teaching staff, and early childhood education.
Teacher questionnaire	Collects information on teacher experience and training, classroom management, working conditions, and teaching style.
Classroom observation inventory	Assesses the environment through observation of visual and learning aids, layout and design, and sensory distractions.
Pupil workbook	Assesses emergent literacy, numeracy, and reasoning skills of pupils with grade-specific questions.
Pupil questionnaire	Collects information on family characteristics, household socioeconomic status, and educational support at home.
Child-caregiver interaction scale	Assesses the interaction between teachers and pupils in three domains – emotional, cognitive/physical, and social.

Findings

The study analysed data on 61 schools, 174 classrooms, and 4,720 pupils using bivariate frequencies and multilevel regression analyses.

Sampled schools had substantial class sizes in the early grades, an average of 33 students per class. Public schools had about 7 students more per class in the sample. About one-fifth of the classrooms in the study (26 public and 8 private) had classes with 50 or more students. While there is no established optimal class size in literature, empirical evidence indicates that smaller classes are linked to better learning outcomes, particularly for younger ages and for children from disadvantaged backgrounds. In the United States for instance, the prescribed pre-school class size by the American Public Health Association (APHA) working jointly with the American Academy of Pediatrics (AAP) and on the recommendations of the National Association for the Education of Young Children (NAEYC) is 20 pupils.

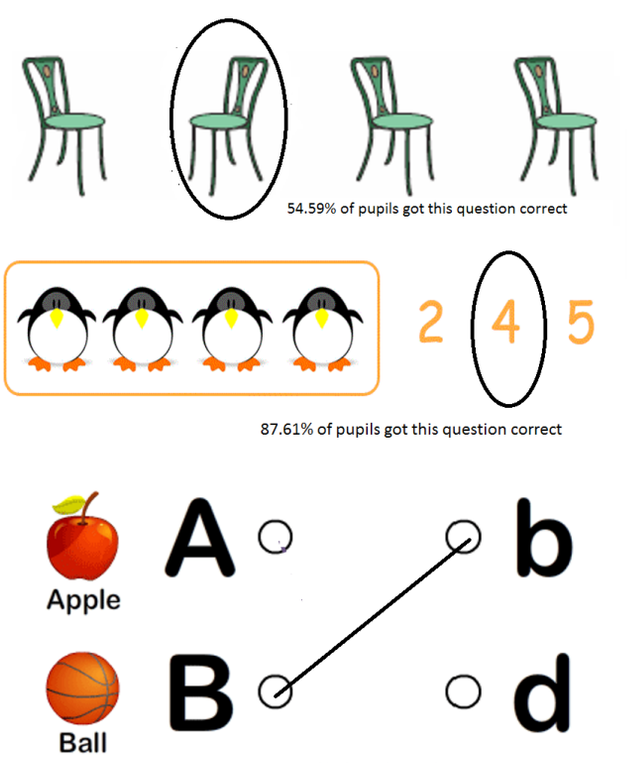
As expected, class size is negatively correlated with teaching outcomes. Class size is negatively correlated with time spent in class on participatory teaching such as group activities and exploring. Class size also negatively influences teacher attitudes/motivation and is correlated with the likelihood of teachers responding negatively to questions with answers such as they do not enjoy teaching, and they would prefer to be teaching other levels.

Kindergarten classes were at a disadvantage compared to P1 with respect to the physical learning environment. We found differences in the structural characteristics between kindergarten and P1 classrooms such as kindergarten classrooms are more likely to be in uncompleted structures or outside, more likely to be cluttered, less likely to have space for students

and teachers to move around, and less likely to have seating spaces for each child. In terms of sensory distractions, kindergarten classes were more likely to be located in classrooms not receiving enough sunlight and where there are audible background noises, uncomfortable temperatures, and unpleasant odors. Classroom spacing exerted a strong influence on teaching style with teachers less likely to engage in activities aside from lecturing to the class when classrooms were cluttered and had limited space.

From this finding, we conclude that schools discount the importance of kindergarten compared to lower primary even though structural environments exert a stronger influence on pupil performance in kindergarten compared with first grade.

Photo 1: Comparison of pupil performance inlLiteracy, numeracy and reasoning (pilot study)



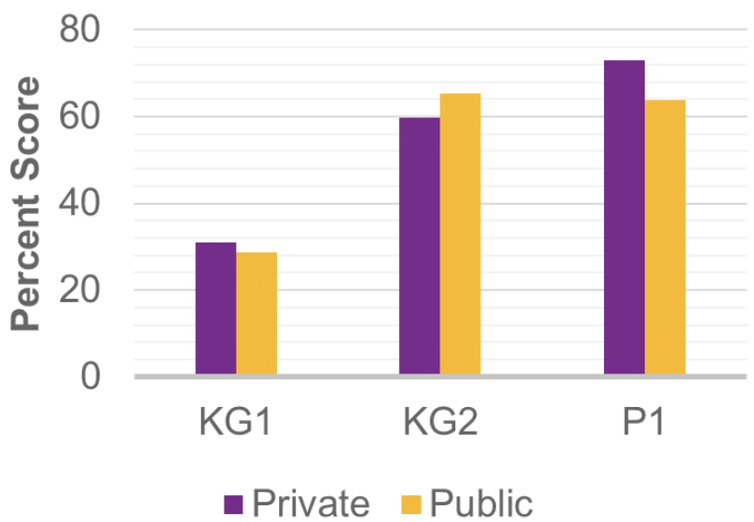
Pupils performed significantly better on reading and math questions compared to questions that asked them to match shapes/colours or identify patterns.

For example, on a comparison of a set of four questions asking students to match alphabets versus four asking them to match shapes: 11%, 49%, and 76% respectively in K1, K2, and P1 scored correctly on all four alphabet

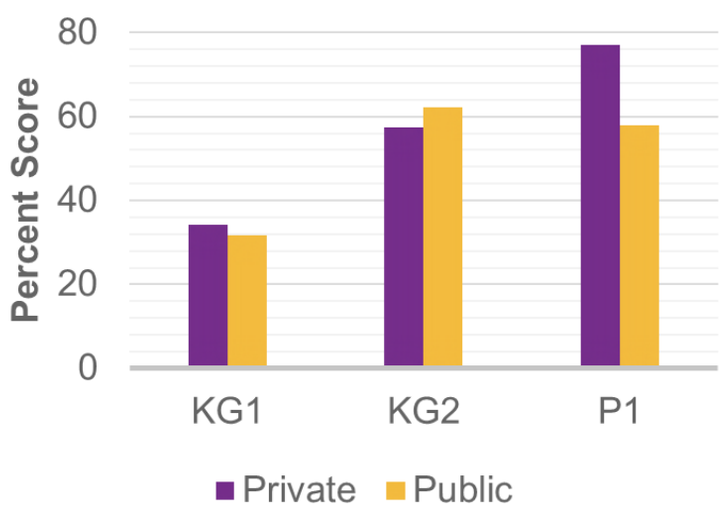
questions compared to 5%, 14%, and 62% scoring all four correctly for the shape matching.

The differences in public and private schools are driven mainly by a difference in performance on the reasoning questions and the disparity widens as children progress. By first grade, 56.5% of public P1 pupils scored correctly on all four shapes matching questions compared to 77.6% in private schools. These findings highlight the need to focus on developing more critical thinking skills in early childhood, particularly in public schools.

Overall performance



Reasoning questions



Policy recommendations

1. Reduce class sizes to encourage more participatory learning (group activities, collaborations, exploring etc.) in early grade classrooms. This can be done by building more kindergarten classrooms over time to accommodate the demand for seating and spacing. In addition, all classrooms must be assigned teaching assistants who can be National Service Personnel or teacher trainees. Less than one-third (12.9% in private schools and 30.5% in public schools) of teachers had an assistant. Teaching assistants will reduce the pupil-caregiver ratio in the classroom, making it easier for children to be engaged in participatory learning.

2. Improve the quality of the physical environment in existing kindergarten classrooms. This can be done by educating head teachers and class teachers on the importance of early childhood education for later academic outcomes and the role that the physical space plays in learning. Such sensitisation will ensure schools pay attention to the environment in the early grades, particularly to spacing, location, layout, and learning aids. We recommend ensuring that kindergarten classrooms are, at the very least, of the same structural quality as P1 classrooms.

3. Introduce space restrictions for early grade classrooms by instituting a classroom density limit in addition to the existing class size limits. These restrictions are necessary to support teaching in early grade classrooms, particularly those that encourage development of critical thinking skills.

4. Provide consistent in-service training (INSET) on early childhood to equip early grade teachers with the requisite skills. In addition, prioritise training teachers in teaching styles appropriate to the early grades.

5. Incorporate Early Childhood Development (ECD) principles into the P1-P3 curriculum. The proportion of classrooms with visual aids is significantly lower for P1 suggesting again that schools pay less attention to ECD once pupils start primary school. The likelihood of pupils sitting in traditional rows as opposed to clusters, which encourages interactive learning, increases significantly by grade. Less than half of KG1 classrooms are arranged in traditional rows compared to almost 100% of P1 classrooms again suggesting that ECD concerns are not prioritised in P1 classrooms.