Quality indicators in Public and Private Pre-Schools: Evidence from Cote d’Ivoire

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10% of the children eligible for pre-primary education are currently enrolled in Cote d’Ivoire.
Pre-primary education quality
Structural & process quality

**Structural quality**: “Structural characteristics are more distal indicators of the quality of early childhood education and care. Structural characteristics tend to be aspects of the early childhood education and care system that are easier to regulate. These characteristics can often be measured through surveys or interviews at the classroom, setting or system level (OECD, 2019).”

Structural quality indicator examples: child to teacher ratio, class size, available resources, school infrastructure, etc…

**Process quality**: Process quality concerns the more proximal aspects of children’s daily experience. It includes the social, emotional, physical and instructional aspects of children’s interactions with staff members and other children (peer interactions) while involved in play, more structured activities or routines. (OECD, 2019)

Process quality indicator examples: peer relationships, child/teachers interactions, classroom supervision, etc…
Literature review & Motivation
There is growing evidence that better process quality is positively associated with learning outcomes, but most evidence is from developed countries (Hatfield et al., 2016; Li et al. (2016), Brinckman et al. (2016); Dobbie & Fryer, 2013; Hamre, 2014; Muijs et al., 2014).

Evidence in low and middle income countries:
- In Chile, Leyva et al. (2015) find positive associations between process quality indicators and learning outcomes in preschool.
- In Ghana, Wolf et al. (2018) find that better teaching quality is positively associated with learning outcomes.
- In Ecuador, Araujo et al. (2016) find positive relationship between process quality indicators and learning outcomes.

Literature has shown weak evidence that structural quality indicators are associated with process quality indicators and learning outcomes (Araujo et al., 2016; Bau & Das, 2017; Rockoff, 2004; Howes et al., 2003; Early et al., 2007).
- Slot et al. (2015) do not find associations between child-teacher ratio and process indicators.
- Weak association between structural (child to teacher ratio and class size) and process quality (Burchinal et al., 2002)

Literature has also shown the importance of teacher well-being:
- Teacher motivation has been found to be related to learning outcomes (Hamre, B. K., Pianta, R. C., 2004).
Motivation: theoretical model

Mechanisms driving pre-primary education quality are not well-understood in low income countries and, more particularly in the context of Cote d’Ivoire. We contribute to the literature by exploring undocumented channels that might influence pre-primary education quality in Cote d’Ivoire.

More specifically, this research seeks to understand which indicators influence process quality in this context. Our main analysis focuses on the relationships along the following paths:

How are teacher well-being and process quality indicators related? Wolf et al. (2018) recommends looking at teacher well-being as a predictor of process quality.

How are structural and process quality indicators related?

Are there any association between structural quality and teacher well-being indicators?
Motivation: theoretical model (1)
Background & context
Background

Providers’ type in Côte d’Ivoire
- Public: preschools registered under the jurisdiction of two Ministries
  - MENETDP: Ministère de l’Education Nationale, de l’Enseignement Technique et de la Formation Professionnelle
  - MFPES: Ministère de la Femme, de la Protection de l’Enfant et de la Solidarité
- Private formal: religious and secular preschools registered/regulated with the Government
- Private informal: preschools not registered with the Ministry and not receiving any subsidy/support from the Government (unregulated).

Indicators of pre-primary education quality analysed in the study (variables)
- Structural quality: school leader pre-primary qualification, school tenure, water supply, teaching hours, children to teacher/staff ratios, teacher experience, teacher pre-primary qualification, teacher age, teacher salary, Ivoirian pre-primary framework, class decoration, seating arrangement
- Teacher well-being: attachment to pre-primary education, job satisfaction, school leader support, perceived workload, perceived availability of resources, community value, adapted training, perceived education system (good or bad)
- Process quality:
  - child assessment variables: children supervision, peer relationship, behaviour in the classroom.
  - Observational assessment of structural and process quality: children engagement, group activities
- Learning outcomes: pre-primary level child assessment measuring early numeracy and literacy, motricity development, and socio-emotional skills.
Data
Mapping of 492 preschools
162 teachers surveyed
160 school leaders surveyed
145 observational assessments
2023 children learning outcomes
Mapping in Abidjan region

Mapping in Gbeke region

- Public
- Private formal
- Private informal
Empirical Strategy
Empirical Strategy

OLS model 1: Learning outcomes as Y
\[ Y_i = \alpha + \beta X_i + \delta \text{SchoolType}_i + \varphi \text{Schoolsize}_i + \pi \text{Geo}_i + \epsilon_i \]

OLS model 2: Process indicators as Y
\[ Y_i = \alpha + \beta X_i + \delta \text{SchoolType}_i + \varphi \text{Schoolsize}_i + \pi \text{Geo}_i + \epsilon_i \]

OLS model 3: Teacher well-being as Y
\[ Y_i = \alpha + \beta X_i + \delta \text{SchoolType}_i + \varphi \text{Schoolsize}_i + \pi \text{Geo}_i + \epsilon_i \]

Where:
- \text{SchoolType}_i: dummies for public, private formal, and private informal at the school level i
- \text{Schoolsize}_i: log enrolment at the school level i
- \text{Geo}_i: dummies for geographical location at the school level i (urban, peri-urban, rural). Urban is the largest group (see sample selection) and is therefore selected as reference group
- \epsilon_i: Residuals at the school level i

Construction of learning outcomes indicators (data collected at the individual level):
- Average individual score by topic (numeracy, literacy, fine motricity, social behaviour)
- Aggregated score per topic at the school level

Robustness checks: Using PCA, we construct a Socio-economic status (SES) index. All coefficients are robust to adding SES controls (see relevant slide for further results).
Results
Structural quality → Process quality → Learning outcomes → Teacher well-being → Process quality → Structural quality
Main results

We explore indirect channels of school level relationship that might explain process quality in Cote d’Ivoire.

The relationship between teacher well-being & process quality indicators:

Schools where teachers report lacking support (i.e., teaching resources) also show significantly poorer children engagement in the classroom.

Schools where poor teacher motivation (i.e. low levels of dedication to pre-primary level) are reported also to display poorer teaching supervision of children in the classroom. (Poor supervision can perhaps be used as a proxy for low teaching quality.)

Schools where teachers report being overwhelmed with work also have lower quality peer relationship behaviour in the classroom.
Structural quality → Process quality → Learning outcomes → Teacher well-being → Process quality → Structural quality
Main results (1)

1. Using process quality variables collected from observations in the same classroom where child assessments were conducted, we find direct relationships between process quality indicator & learning outcomes:
   
   Better peer relationship associated with better performance on literacy. It aligned with existing literature (Kiuru et al., 2015 find that better peer relationships combined with teacher positive learning can explain academic skills development)

2. The relationship between structural quality indicators and teacher well-being
   
   Schools with lower seating availability are also linked to teachers reporting being overwhelmed with work
   
   Teachers are more satisfied with their job in schools with better seating availability
Structural quality → Process quality → Learning outcomes

Teacher well-being
Main results (2)

3. The relationship between structural and process quality indicators

Classrooms where children’s work is exposed also display better integration of children.

Aligned with the existing literature, we do not find meaningful relationships between teacher experience/qualifications and process quality indicators (Burchinal et al., 2002)
Other results

1. Direct relationship between teacher well-being & learning outcomes:
- Schools where teachers that do not report being overwhelmed with work also display significantly better results in literacy and numeracy.
- Schools where teachers believe they work in a good education system also have better literacy results. We do not find any association between job satisfaction and learning outcomes as opposed to previous evidence (Michaelowa, 2002)

2. Direct relationship between structural quality & learning outcomes:
- Schools where classroom are decorated with children’s work also perform significantly better in the numeracy assessment.
- Schools where teacher salary is higher also display poorer literacy results
Internal Validity

Data collection

- Classroom for which observation data were collected (process/learning environment variables) are not systematically the same classroom where the children were assessed. In order to explore the association between process indicators and learning outcomes, we only use interaction data collected during the child assessment (peer relationships and children integration).

- Process indicators collected during classroom observation do not show any association with results from child assessment.

SES index

- Index constructed using Principal Component Analysis:
  - Differences across providers are not robust to
    - Controlling for SES using the index in OLS model 1 (learning outcomes as dependent variables)
  - Main coefficients are robust to adding SES controls
Robustness checks
Principal component analysis to create SES index

- Principal component score aggregated at the school level
- SES index constructed based on arbitrary cutoff points used in the literature (Filmer and Pritchett 2011):
  - Lowest 40% of scores in lowest SES category
  - Highest 20% of scores in highest SES category
Cote d’Ivoire socio-economic background
- Cote d’Ivoire is classified as lower middle income country (World Bank Group)

- 46.3% of population below national poverty line in 2015

- Poverty headcount ratio at $3.20 a day (% of the population living on less than $3.20 a day, 2015): 57.4% (vs 66.3% in SSA, 43.6% in lower middle income countries group)

Principal component selection
- Component loadings shows that pc1 and pc2 are orthogonal

- The second principal component showed weights are concentrated on transport (car, bike, motorbike)
  - Pc2 only explains a subgroup of variables

» Principal component 1
SES index across providers’ type

1. Using principal component 1
   - SES index constructed based on arbitrary cutoff points used in the literature (Filmer and Pritchett 2011):
     - Lowest 40% of scores in lowest SES category
     - Highest 20% of scores in highest SES category

2. Across providers’ type
   - Public providers captures most of low SES children
   - Private formal (most expensive providers) has the highest percentage of high SES children
   - Private informal schools which are the least regulated providers have a more equal distribution of SES
Discussion
The government is currently willing to increase preprimary enrolment to 25% by 2025.
Discussion

EPG works with government to strengthen education system

- Our research shows that teachers wellbeing is a key indicator.
  - When teachers feel overwhelmed or report low motivation, teaching performance decreases and has an impact on the classroom (poorer peer relationship) and on learning outcomes (lower literacy and numeracy results).

- Only 10% of the children eligible for pre-primary education are currently enrolled in the country. The government is currently willing to increase enrolment to 25% by 2025.
  - Access increase should be accompanied with appropriate reforms for teacher support.

- As the government needs to provide the long term support, EPG has started working on a accelerated school readiness program in partnership with communities which aim to address two objectives:
  - Increasing access to pre-primary in collaboration with communities to relieve pre-primary teachers’ workload
  - Better prepared children for primary education
Conclusion

While the literature has shown strong evidence on the influence of process quality in the classroom on children learning outcomes in preschool, we contribute to the literature by highlighting potential drivers of process quality and showing direct relationships between structural quality, teacher well-being and learning outcomes in Cote d’Ivoire:

- Structural quality indicators are associated with process quality
- Teacher well-being indicators are associated with process quality

Policy-makers should not underestimate the importance of structural quality indicators and teacher well-being alongside process quality to achieve better learning outcomes.

Further work should be undertaken to ensure that collected data captures process quality in Cote d’Ivoire. Additional work on data collection will help explore further our mechanisms theory and the linkages between indicators.

In Cote d’Ivoire, results are robust to controlling for socio-economic background. Differences across providers disappear once controls are added to the model.
Bibliography


Bibliography (2)

Appendix
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Standard errors in parentheses
* p<0.10, ** p<0.05, *** p<0.01

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