

Abstract Title Page
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Title: Cluster randomized trial of a large-scale education initiative in the Democratic Republic of Congo: Baseline findings and lessons

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Abstract Body
Limit 4 pages single-spaced.

Background / Context:

Description of prior research and its intellectual context.

Despite the growing body of domestic research suggesting that school-based interventions targeting children's academic achievement and socio-emotional well being can result in improved education outcomes and social functioning (Durlak et al., 2011; Alderman, Kim, & Orazem, 2003), very few studies have taken place in conflict affected and low-resource settings such as the eastern Democratic Republic of Congo (DRC).

The current study is part of OPEQ (Opportunities for Equitable Access to High Quality Basic Education), a 5-year project aimed at improving teachers' motivation and performance and elementary school children's numeracy, literacy and socio-emotional wellbeing in 3 provinces of the Democratic Republic of Congo (i.e., Katanga, North Kivu and South Kivu), through curriculum development, teacher training and community mobilization. The Cluster Randomized Trial of OPEQ presents a unique opportunity to make invaluable contributions to the knowledge base in the education sector in DRC and globally.

Purpose / Objective / Research Question / Focus of Study:

Description of the focus of the research.

The main purpose of the current paper is to describe and discuss the scientific and practical implications of pursuing rigorous developmental research in a low-income, war-afflicted country such as DRC. In addition, the paper aims to explore the individual, household and school correlates of children's academic performance and mental health and socio-emotional wellbeing in a large sample of 2nd to 4th grade children from Katanga province. Results from these analyses will serve to identify key correlates of children's outcomes, which may be useful for relevant stakeholders (i.e., OPEQ implementation team, DRC Ministry of Education) to improve their intervention strategies. In addition, estimation of intraclass correlations (ICCs) and of the amount of variance explained by the observed covariates will permit a calibration of our power analysis for the second wave of data collection. This is particularly important in a context in which there is a dearth of background information about children's academic, and especially, socio-emotional outcomes.

Specifically, we ask:

How are children's reading and math performance and socio-emotional well being related to:

1. children's individual characteristics (i.e., gender, grade, language);
2. household socio-economic risk and protective factors (i.e., assets, parent education, illness);
3. children's educational risk and protective factors (i.e., school attendance, lateness, distance from home to school)
4. Teachers' living conditions (i.e., assets, salary), education level, burnout and motivation; and
5. School and classroom size

Setting:

Description of the research location.

Data for the current study come from 84 schools spread across 6 educational sub-divisions in Katanga, one of the largest provinces of the DRC. DRC has the second lowest human development index in the world and has been afflicted by periods of violent conflict for the past three decades. Though education continues to expand thanks to community, religious and private investments, approximately 31% of school-aged children have never set a foot in school. Compared to national averages, children in Katanga and the other provinces served by OPEQ are less likely to be enrolled in primary school and are more likely to be orphaned or otherwise vulnerable (UNICEF, 2008).

Population / Participants / Subjects:

Description of the participants in the study: who, how many, key features, or characteristics.

Participants were 6,311 2nd (35.2%), 3rd (33.1%) and 4th (31.7%) grade children (54.1% boys), and 470 teachers (71.1% male; average age = 38) in 84 elementary schools located in six educational sub-divisions in the province of Katanga, DRC. Schools were randomly selected to participate in data collection for the evaluation from a total of 203 schools grouped in 54 geographically-defined clusters of 3 to 6 schools. School size ranged widely from 78 to 1,240 students. According to children's self-reports, about 14% had gone to bed hungry "often" or "sometimes" in the past month, 3.5% reported none of their parents has ever attended school, and 3.9% reported both of their parents are illiterate. An approximate 87.6% of children reported Kiswahili is spoken at home, and only 2.69% reported French, the official language of instruction in 3rd grade and onwards, is spoken at home. About 6% of children reported being "often" or "always" absent from school and arriving late to school.

The schools, children and teachers are part of an ongoing, longitudinal cluster-randomized evaluation of OPEQ. In this paper we explore the correlates of children's academic performance, mental health and wellbeing at baseline of this evaluation.

Intervention / Program / Practice:

Description of the intervention, program, or practice, including details of administration and duration.

The school-based cluster-randomized component of OPEQ consists on teacher professional development on a new reading, math and social-emotional learning curriculum. Teacher training is delivered by a group of 70 Master Trainers (MT) (one per cluster of 3 to 6 schools) composed of teachers, headmasters, pedagogical advisors, inspectors and key technical staff from the Ministry of Education. MTs are selected based on their successful completion of Training of Trainers workshops where they demonstrate competency in both knowledge content and delivery of in-service teacher training. MTs participate in the development of the teacher training materials and are responsible for carrying out cluster-based workshops for teachers and school principals.

During training, teachers are provided with a core package of print and interactive computer-based materials on three key content areas: *how to teach reading and math, how to ensure student wellbeing and how to assess students*. Materials on each content area will be provided for each grade level (i.e., 1-6) and integrate pedagogical techniques such as active learning methods, use of structured lesson plans and positive discipline within the content areas.

Materials on *how to ensure student wellbeing* instruct teachers on how to integrate the teaching of social and emotional skills into their reading and math classes.

Research Design:

Description of the research design.

As mentioned above, a total of 203 schools, nested in 54 geographically defined clusters, were selected to participate in the OPEQ intervention in Katanga. The 54 clusters were randomly split into three groups of 20, 17 and 17 clusters. This year (2011-12), OPEQ will be piloted in the first group of 20 clusters. The remaining two groups of 17 clusters will receive the intervention in either 2012-13 or 2013-14, respectively. Thus, the impact evaluation study in 2012-13 uses an experimental wait-list control group design with 20 treatment and 17 control clusters. In 2013-14 (the second cohort intervention trial), OPEQ will be implemented in both the previous year's wait-list control group clusters and the previous year's experimental condition for a second year (34 clusters).

Data Collection and Analysis:

Description of the methods for collecting and analyzing data.

Out of the 203 schools targeted by OPEQ in Katanga, eighty-four representative schools were randomly selected for data collection as part of the impact evaluation study. Baseline data were collected from a randomly selected sample of 6,311 children in 2nd to 4th grades, and 470 teachers in grades 1 to 6. Children sampling was stratified within schools and grade levels. Sampling of teachers was conducted within schools.

Assent and consent were requested from all children and teachers at the time of data collection and refusal to participate was very rare. Parental consent for children's participation was not obtained because parents live very far from the schools and it would have been very difficult to obtain written consent from a representative sample of parents. Also, it is not common practice in DRC to obtain written consents for children to participate in assessments at school and children are accustomed to taking tests and answering questions without parental consent. The Ministry of Education and field team widely advertised the evaluation in each school and community to ensure that parents were fully informed and had the opportunity to ask any questions, raise any concerns and opt out.

Students were asked questions about their background and their school and home experiences, and were assessed on their math and reading skills and socio-emotional wellbeing. Students were randomized to complete different sets of assessments (e.g., math and reading or math and socio-emotional well being) with the aim of reducing participant burden. The maximum slotted time per child was 45 minutes.

Teachers were asked to answer a survey about themselves, including their educational background, livelihoods, job satisfaction, burnout, motivation and teaching experiences. The maximum time slotted for teacher interviews was 90 minutes.

Teacher and child interviews and assessments were conducted in French (the official language) and Kiswahili (the most common local language) by local staff trained in data collection procedures by the OPEQ team.

To accommodate the nested nature of the design, estimates of associations between child outcomes and child, household and school characteristics will be calculated using a series of 3-level hierarchical linear models with sub-division fixed effects in HLM 6.02. In these models,

Level 1 will represent children, Level 2 will represent schools, and Level 3 will represent subdivisions.

Findings / Results:

Description of the main findings with specific details.

Descriptive statistics for key children's demographic characteristics and reading and math performance are summarized in tables 1 through 3. Students were randomized to complete different sets of assessments; therefore, the effective sample for which descriptives are presented consists of 4,965 children who completed the demographic survey and were administered the Early Grade Reading Assessment (EGRA; RTI, 2009) or Early Grade Math Assessment (EGMA, RTI, 2010). Descriptives for the full sample will be presented at the time of the conference.

Overall, our preliminary findings indicate very low levels of performance in math and reading, better performance on math compared to reading, higher scores for older compared to younger children and for boys compared to girls. Analysis examining the associations between children's academic and socio-emotional outcomes and children's individual, household and school characteristics will be complete by January 2012.

(Please insert Tables here)

Conclusions:

Description of conclusions, recommendations, and limitations based on findings.

Descriptive results to date not only reveal very low levels of performance in both math and reading in our sample of 2nd to 4th grade children in Katanga province, but also hint at important gender disparities that will be further explored at the time of the conference. In addition, the fact that reading scores appear to be lower than math scores, coupled with the low percentage of children who reported speaking French at home, suggests that learning of French as a second language may be one of the critical challenges faced by Congolese children in schools. Practical strategies to support language learning could include earlier, more extensive and more intentional immersion in French, or more instruction (i.e., beyond third grade and/or with more supportive materials) in the mother tongue.

Preliminary results also raise questions about how best to set benchmarks against which to measure the success of interventions like OPEQ, in settings in which rigorous evaluations of interventions of this nature are rare or poorly documented. For example, OPEQ proposed to improve children's math and reading scores by 30%. However, considering what children gain during the primary school years in the absence of interventions, an increase of 30% seems rather ambitious. Alternative ways of operationalizing and setting benchmarks to assess the success of programs like OPEQ, as well as strategies to increase the probability of producing and detecting substantive changes in children's outcomes, will be discussed at the conference.

Finally, in addition to the presence and strength of what appear to be important differences in performance by grade, gender and geographic location, there may be large within-group differences to be described and understood. Identifying other sources of variation in children's performance, as proposed in the current paper, is a critical first step in fine-tuning and strengthening the strategies to improve children's outcomes.

Appendices
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Appendix A. References

References are to be in APA version 6 format.

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Durlak, J.A., Weissberg, R.P., Dymnicki, A.B., Taylor, R.D., & Schellinger, K.B. (2011). *The Impact of Enhancing Students' Social and Emotional Learning: A Meta-analysis of School-based Universal Interventions*. Child Development.

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Appendix B. Tables and Figures
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Table 1. Percentages of boys and girls per grade and subdivision

Subdivision	Grade	2nd		3rd		4th	
		% Boys	% Girls	% Boys	% Girls	% Boys	% Girls
Kambove		55.06	44.94	50.60	49.40	58.33	41.67
Kasenga		55.92	44.08	55.56	44.44	63.98	36.02
Kalemie		50.00	50.00	47.69	52.31	53.17	46.83
Kongolo		50.92	49.08	59.33	40.67	58.75	41.25
Mutshatsha		50.48	49.52	51.99	48.01	59.72	40.28
Lubudi		50.27	49.73	54.02	45.98	51.00	49.00
Average across all subdivisions		52.11	47.89	53.20	46.80	57.49	42.51

Table 2. Percentage of children who speak each language by subdivision¹

Subdivision	Language	Lingala	Kiswahili	Tshiluba	French	Other
Kambove		0.20	95.13	0.78	1.95	33.72
Kasenga		0.00	39.51	0.00	3.40	87.04
Kalemie		1.90	99.53	0.35	0.47	14.87
Kongolo		0.20	98.45	0.72	0.52	63.12
Mutshatsha		1.10	99.23	2.20	4.30	43.39
Lubudi		1.00	93.48	2.79	5.49	47.67
Average across all subdivisions		0.73	87.55	1.14	2.69	48.30

¹ Note: percentages do not add up to 100 because some children speak more than 1 language and are thus represented in more than one language category.

Table 3. Reading and Math scores by gender, grade and subdivision

EGRA	n	Grade			Gender		Katanga Subdivisions***					
		2 Mean	3 Mean	4 Mean	<i>Girls</i> Mean	<i>Boys</i> Mean	1 Means	2	3	4	5	6
Vocabulary (20)	2939	6.56	8.04	9.58	7.69	8.29	7.82	5.69	8.91	8.57	8.31	8.10
Initial Sound Identification (10)	2951	0.68	1.04	1.32	0.89	1.10	0.15	0.06	2.90	1.66	0.33	0.49
Knowledge of graphemes (100)	2205	11.30	16.76	22.99	16.20	18.60	10.87	8.19	24.95	20.41	20.06	13.62
Familiar word reading (50)*	1900	-	3.44	6.99	4.22	5.96	2.47	1.72	10.95	6.52	5.21	2.64
Invented word decoding (50)*	1906	-	2.78	5.78	3.45	4.91	1.66	1.04	9.39	5.02	4.58	2.28
Oral passage reading (50)*	1898	-	3.98	8.75	4.79	7.53	3.02	1.91	12.98	8.95	6.21	2.75
Reading comprehension (5)*	1919	-	0.16	0.39	0.22	0.32	0.07	0.04	0.65	0.48	0.19	0.07
Listening Comprehension (5)	2951	0.45	0.63	0.90	0.61	0.69	0.28	0.31	1.03	1.02	0.53	0.53
Writing a complete sentence (3)**	940	-	-	0.81	0.65	0.92	0.63	0.58	1.44	0.67	0.83	0.60
EGMA	n	Grade			Gender		Katanga Subdivisions***					
		2 Mean	3 Mean	4 Mean	<i>Girls</i> Mean	<i>Boys</i> Mean	1 Mean	2	3	4	5	6
Number Identification (30)	2920	14.19	12.15	15.72	13.54	14.40	12.16	10.23	18.01	13.26	16.05	12.97
Quantity Discrimination (10)	2928	6.29	5.56	6.43	5.98	6.20	6.73	5.01	6.43	5.34	6.54	6.53
Missing Number (10)	2928	2.40	3.38	4.07	3.06	3.42	2.66	2.04	4.54	3.04	3.69	3.14
Addition (24)	2935	4.82	7.49	10.77	7.09	7.99	6.75	4.95	8.55	8.71	8.94	6.60
Subtraction (24)	2935	3.30	5.03	7.66	4.73	5.67	3.54	2.96	5.87	6.83	6.86	4.09
Multiplication (10)	1900	-	0.69	1.38	0.77	1.24	0.56	0.84	1.13	1.47	1.10	0.82
Word Problems (6)*	2923	2.02	2.35	3.06	2.33	2.57	2.23	1.29	3.07	2.04	3.31	2.48
Geometric Shape Identification (4)	2936	2.22	2.53	2.72	2.41	2.53	2.65	1.56	2.74	2.53	2.65	2.57
Geometric Shape Naming (4)	2936	1.24	1.58	1.79	1.45	1.59	1.34	1.25	2.37	1.39	1.50	1.27

* Sub-test not administered to 2nd graders, ** Sub-test not administered to 2nd or 3rd graders, *** 1: Kambove, 2: Kasenga, 3: Kalemie, 4: Kongolo, 5: Mutshatsha, 6: Lubudi