Opportunities for Equitable Access to Quality Basic Education (OPEQ)

Final Report on the Impact of the OPEQ Intervention in the Democratic Republic of Congo

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Executive Summary

The International Rescue Committee (IRC) and Global TIES for Children: Transforming Intervention Effectiveness and Scale at New York University (NYU) evaluated an initiative entitled, "Opportunities for Equitable Access to Quality Basic Education" (OPEQ) to enhance learning opportunities, academic attainment and social-emotional well-being for more than 480,000 girls and boys in three eastern provinces of the Democratic Republic of the Congo (DRC): Katanga, South Kivu, and North Kivu.[1] This initiative was implemented by the IRC in collaboration with the DRC's Ministry of Primary and Secondary Education and Initiation to New Citizenship (MEPS-INC), and funded by the United States' Agency for International Development (USAID).

The evaluation of LHC addresses a number of gaps in the evidence base about how to promote students' learning outcomes and well-being in low-income and conflict-affected contexts. First, to our knowledge, it is the only evaluation of a school-based program in a conflict-affected country to consider the program impact on both academic skills and social-emotional well-being. Second, it is also, to the best of our knowledge, the first rigorous test of the impact of a school-based program that infuses social-emotional learning into teacher training and curricular strategies in a conflict-affected country.

The Intervention

The OPEQ initiative consisted of four elements: (1) informing in-service teacher-training policy and systems on the national level; (2) community mobilization and engagement activities, including providing small grants to support school-improvement plans; (3) provision of alternative education and vocational training opportunities for out-of-school youth; and (4) an in-service teacher professional development and integrated curricular program. The evaluation focused on the in-service teacher professional development and integrated curricular program, called "Learning in a Healing Classroom". The other elements were implemented in all of the participating schools and communities starting in the first year of the program.

The Learning in a Healing Classroom (LHC) intervention consisted of two elements: (1) an Integrated Curriculum that incorporates IRC's approach to social-emotional learning (SEL) into high-quality reading and math curricula; and (2) a collaborative professional development system that provides continuous in-service training and coaching for teachers.

The Evaluation

The IRC and NYU conducted a three-year cluster-randomized trial of LHC that experimentally evaluated the effectiveness of this component of the OPEQ initiative compared to a wait-list control group that received all elements of OPEQ except the Learning in a Healing Classroom professional development and curriculum. Evidence from this trial will inform future efforts to improve students' academic skills and social-emotional well-being in the DRC and other conflict-affected and post-conflict contexts.

[1] The OPEQ program expanded into three additional provinces and reached over 760,000 children and youth after the evaluation was finished.

This evaluation answers a causal question: Did the LHC intervention change (a) students' reading and math skills; (b) students' social-emotional well-being, including perceptions of their classrooms as supportive and predictable as well as their mental health and victimization experiences; and (c) teachers' motivation and professional well-being?

In this report we describe the impact of LHC after one and two years, relative to a control condition, on teacher and student outcomes in two *cohorts* (groups) of schools, named Katanga 4 and Kivu+. These cohorts are defined by geographic location and timing of implementation. The Katanga 4 cohort has schools that received one year and two years of LHC located in Katanga province. The Kivu+ cohort has schools that received one year of the LHC intervention located in South Kivu and some parts of Katanga province.

To answer causal questions, we used data collected in school years 2010-2011, 2011-2012, and 2012-2013 in the provinces of Katanga and South Kivu.[2,3]

The Results

- **Receipt of one year of LHC during the initial year of LHC implementation in the Katanga 4 cohort** significantly improved students' reading and geometry scores compared to their control group counterparts. After one year, students in schools implementing LHC had higher perceptions of their teachers and schools as supportive and caring compared to control schools, but lower perceptions of their schools as cooperative and predictable. LHC did not on average change students' addition/subtraction scores, nor their reports of mental health and victimization.[4,5]
- **Receipt of one year of LHC during the initial year of LHC implementation in the Kivu+ cohort** resulted in significantly higher reading and addition/subtraction scores relative to students who did not receive LHC. After one year, students in schools receiving LHC had higher perceptions of their teachers and schools as supportive and caring and as cooperative and predictable. LHC did not change students' geometry scores, or their reports of mental health and victimization.
- **Receipt of LHC during a period of LHC expansion (2012-2013) in the Katanga 4 cohort** did not result in significantly higher reading, math, or social-emotional outcomes compared to students who did not receive LHC, regardless of whether schools had received one or two years of LHC intervention. This is not to say that students in schools who received LHC during this time did not improve, but they did not improve relative to control schools. Students in schools that received LHC from 2011-2013 showed important gains in their perceptions of their schools as cooperative and predictable, as well as significantly fewer mental health problems, less victimization, and higher reading/math

[2] North Kivu was included in the original design; however, security threats from M23 rebels and other armed groups suspended 2013 data collection. Thus, there are no causal impacts available for North Kivu, although descriptive data for the region is available from 2012.

[3] The experiment uses a wait-list control design, which means that all schools were assigned to one of three potential start years via public lottery. In school year 2011-2012, only schools in Katanga province received the pilot intervention. For this reason, impacts are assessed based on a partial (pilot) year and subsequent full year in Katanga province, and a full year in South Kivu.

[4] Aber, JL, Torrente, C, Starkey, L, Johnston, B, Seidman, E, Weisenhorn, N, Shivshanker, A, Annan, J. (2015, under review) Causal impacts of "Learning in a Healing Classroom" on Congolese children's reading and math skills: First year results". Submitted to Journal for Research on Educational Effectiveness.

[5] Torrente, C., Johnston, B., Starkey, L., Seidman, E., Shivshanker, A., Wisenhorn, N., Annan, J., & Aber, J.L. (2015). Improving the Quality of School Interactions and Student Well-being: Impacts After one Year of a School-based Program in the Democratic Republic of the Congo. *Journal on Education in Emergencies*. Manuscript accepted for publication.

scores. However, students in schools that did not receive LHC during this period also demonstrated commensurate improvements in those outcomes.

- **Regarding teacher outcomes**, LHC significantly improved teachers' sense of personal accomplishment during this period compared to the control group. There were no impacts found on teacher motivation, burnout, or dissatisfaction.

What these results may mean

The findings presented here provide clear evidence that LHC improves children's reading skills, domains of math, and perceptions of their schools as caring and supportive during the first year of implementation, but does not reduce children's mental health problems or experiences of peer victimization. The fact that the impacts detected in the Katanga 4 cohort during the first year of LHC implementation were largely replicated during the first year of implementation in the Kivu+ cohort increases our confidence about the robustness of these results. Yet, the findings from the Katanga 4 cohort also suggest that positive results from one year of LHC implementation are not sustained after the program was expanded. This could have been due to a number of factors:

- Fatigue and increased workload as the program expanded for master trainers, school directors, or teachers.
- Intensity of LHC program support may have decreased as the program expanded.
- External factors – such as conflict, migration, and displacement – impacted implementation, reception of treatment, and/or school composition.
- School improvement grants and PTA or school management committee trainings may have helped improve student and teacher outcomes in control schools as well as treatment schools.
- Social and emotional wellbeing instruction was not explicit enough in LHC.
- Teachers did not change their instructional practices and processes in the classroom.
- Teachers changed their instructional practices and classroom processes, but the content was too advanced for students to demonstrate much improvement.

Future analyses will seek to investigate some of these hypotheses using data from external sources, such as reports of conflict in the areas and geospatial location of the schools. Discussions with diverse stakeholders in the DRC and in the international community, as well as implementation data collected at the subdivision and provincial levels, will help facilitate and contextualize subsequent analyses.

Recommendations for policy, research, and practice

(1) LHC – delivered at scale to hundreds of primary schools in the DRC – can improve children's reading and math skills and the safety and supportiveness of their classrooms.

    - Efforts need to be redoubled to make LHC even more effective in improving children's reading skills, math skills, and the supportiveness of their learning environment.
    - This includes researching and targeting systemic factors that may be constraining the effectiveness of LHC, including the governance and financing of education in the DRC (Britto et al., 2013).

(2) It was disappointing that positive impacts on reading, math and positive school learning environments were not sustained during the second year of implement the LHC initiative.

- In order to make LHC even more effective and to sustain impacts over time, new efforts in mounting implementation research and Continuous Quality Improvement are needed.

(3) LHC was designed on the assumption that if we improved teachers' motivation and professional well-being and children's learning environments, it may be enough to improve children's mental health problems and experiences of peer victimization. It was not. Why?

- We recommend that future initiatives to mount LHC add brief, affordable, scalable and targeted interventions to specifically address mental health problems and peer victimization.

- We also recommend that future research initiatives take steps to identify and test the processes that promote mental health and positive peer relationships.

Introduction

Limited resources, widespread corruption, and ongoing violent conflict have imperiled the quality of education – and as a result, children's ability to achieve essential learning outcomes – in the Democratic Republic of the Congo. As such, the IRC in collaboration with the DRC's Ministry of Primary and Secondary Education and Initiation to New Citizenship (MEPS-INC), mounted a systematic initiative to enhance learning opportunities, academic attainment, and social-emotional well-being for more than 480,000 primary-school aged girls and boys in three conflict-affected provinces of eastern DRC between 2010 and 2015.[6] Herein we report the results of the multi-year evaluation of one component of the OPEQ initiative, Learning in a Healing Classroom (LHC), on students' academic skills and social-emotional well-being and teachers' motivation and professional well-being. This evaluation sought to answer the following research questions:

(1) What is the impact of the Learning in a Healing (LHC) component?
    a. on student academic learning; specifically, reading and math skills?
    b. on student mental health and emotional well-being; specifically, student mental health symptoms and experiences of victimization by peers?
    c. On student perceptions of school and classroom learning environments; specifically, the extent to which schools are perceived as 1) caring and supportive and 2) cooperative and predictable?
    d. on teacher motivation and professional well-being?
(2) Do intervention impacts vary as a function of the number of years that students and teachers are exposed to treatment?[7]
(3) Do intervention impacts vary by selected individual, school and community factors?

Context: The Democratic Republic of the Congo

The Democratic Republic of the Congo, the second largest country in the African continent by area and the fourth largest by population, has a population of nearly 77 million people. The majority of residents have suffered the economic and political consequences of over three decades of armed conflict, political and social instability, and high levels of poverty (MEPSP, 2010b; Stearns, 2011). While relatively stable during the time of this study, parts of North Kivu, South Kivu, and Katanga provinces did have periods of insecurity including the resurgence of armed groups in some areas.[8] The education system is particularly troubled, and currently, the Ministry of Primary and Secondary Education and Initiation to New Citizenship (MEPS-INC) cannot afford to pay 31% of primary school teachers, resulting in many

[6] The OPEQ program after the evaluation finished expanded into three additional provinces, was extended until 2016, and reached over 760,000. This expansion was not linked to the evaluation.

[7] In the initial stages of planning, the evaluation sought to address whether the intervention impacts varied as a function of quality and level of implementation. However, we were able to collect implementation data at the subdivision and provincial levels only. Data collected above the school cluster level –the level of treatment randomization and delivery—does not permit examining questions about impact variation as a function of implementation. Hence, we only examine impact variation as a function of years of exposure.

[8] In North Kivu the March 23 Movement (M23) caused displacement between November 2012 and November 2013. In Katanga province the Mai Mai Kata Katanga rebel group caused displacement in 2013.

unpaid and unrecognized teachers (MEPSP, 2014b). Language diversity is also a challenge for the education system, as French is the official language of instruction in schools but only 47% of the population is proficient in French (OIF, 2014). Education quality, or lack thereof, is reflected in students' academic performance, particularly for language-minority students and for students in North Kivu, South Kivu, and Katanga provinces (World Bank, 2005).

Overview of Research: Improving Academic and Social-Emotional Learning Outcomes in Fragile States

A growing number of strategies have been developed and implemented to improve the reading and/or math skills of primary-school aged children in low-income countries. Relatively few of such programs, however, have been rigorously evaluated through the use of a randomly assigned control group, the gold standard in medical research to causally identify what works. A recent meta-analysis, for example, indicates that there have been 76 randomized experiments of three broad types of strategies – instructional interventions, health interventions, and incentive-based interventions – to improve student reading and math outcomes in primary schools in developing countries (McEwan, 2015). Some strategies have no average impact on learning to date (e.g., monetary grants, school-based deworming), while other strategies have proved more successful. In particular, teacher training and incorporation of instructional material strategies – elements of which are included in LHC – demonstrate the highest effects. We estimate, however, that only 10 percent of these rigorous experiments – that is, less than 10 experiments total – were conducted in countries recently or currently experiencing armed conflict.

Moreover, there is almost no evidence from either low-income or conflict-affected countries about the impact of such strategies on students' social-emotional well-being. We do know, however, that children can demonstrate remarkable resilience – including gaining or sustaining math and reading skills – when provided with educational opportunities that include social-emotional strategies to mitigate the negative effects of adversity and stress (Winthrop & Kirk, 2008). School-based universal social-emotional learning programs that teach children to recognize and regulate their emotions, establish and maintain positive relationships, and make responsible decisions have been shown across hundreds of studies in high-income countries to improve academic performance, social-emotional well-being, and reduce conduct problems and aggression (Durlak et al., 2011).

The evaluation of LHC addresses a number of gaps in the evidence base about how to promote students' learning outcomes and well-being in low-income and conflict-affected contexts. First, to our knowledge, it is the only evaluation of a school-based program in a conflict-affected country to consider the program impact on both academic skills and social-emotional well-being. Second, it is also, to the best of our knowledge, the first rigorous test of the impact of a school-based program that infuses social-emotional learning into teacher training and curricular strategies in a conflict-affected country.

Overview of Research: Improving Teacher Outcomes in Fragile States

In addition to a dearth of rigorous evaluations of programs designed to improve students' academic and social-emotional outcomes, evidence on the effectiveness of programs intended to promote teacher professional well-being is also scarce in low-income and conflict-affected contexts. Research in high-income countries indicates that professional development interventions can improve teacher job

satisfaction, self-efficacy, well-being, and performance (e.g., Jones, Brown, Hoglund, & Aber, 2010; Piper & Zuilkowski, 2015).

Teachers in conflict-affected contexts face additional challenges compared to teachers in low-resourced but stable environments. Schools in conflict-affected contexts can be vulnerable targets for insecurity, and conflict jeopardizes teachers' own social, emotional, and physical well-being (Frisoli, 2013; Mosselson, Wheaton, & Frisoli, 2009). Studies in these contexts highlight teachers' need for various forms of support to be effective teachers; these may include improving their social support, working conditions, content and pedagogical knowledge, and psychological well-being (Kirk & Winthrop, 2008; Wolf, Torrente, McCoy, Rashed, & Aber, 2015). The evaluation of LHC furthers our understanding of whether and how a school-based program that infuses social-emotional learning principles into teacher training and curricular strategies can improve teacher professional well-being.

The OPEQ Initiative and Learning in a Healing Classroom Intervention

What is the OPEQ Initiative?

The International Rescue Committee, in collaboration with the Democratic Republic of the Congo Ministry of Primary and Secondary Education and Initiation to New Citizenship (MEPS-INC), mounted a systematic effort to increase "Opportunities for Equitable Access to Quality Basic Education" (OPEQ) for children and youth in the eastern DRC. The OPEQ initiative consisted of four elements:

1. Informing in-service teacher training policy and systems on the national level;
2. Community mobilization and engagement activities, including providing small grants to support school-improvement plans;
3. Provision of alternative education and vocational training opportunities for out-of-school youth; and an
4. Collaborative, school cluster-based in-service teacher professional development and an integrated curricular materials.

This evaluation experimentally evaluated the teacher professional development program and integrated curricular program, referred to herein as "Learning in a Healing Classroom." The other three elements were implemented in all participating schools and communities starting in the initiative's first school year (school year 2011-2012) and were therefore not experimentally evaluated.

What is the Learning in a Healing Classroom Intervention?

Learning in a Healing Classroom consisted of two main components: (1) integrated curricular materials and (2) collaborative school-based in-service teacher professional development. We describe each of these components below.

Integrated curricular materials. Materials were developed for "Learning to Read in a Healing Classroom" and "Learning Math in a Healing Classroom." The materials integrate IRC strategies for creating student-centered, safe, predictable, and emotionally supportive learning environments with scaffolded pedagogical content and practices. These strategies are founded on 30 years of work in conflict, post-conflict, and crisis-affected countries, as well as four years of field-testing in Afghanistan, Ethiopia, Sierra Leone, and Guinea (Kirk & Winthrop, 2007; 2008; Winthrop & Kirk, 2008). Strategies include addressing students by name; using positive discipline; creating and following a regular classroom schedule; encouraging students to express themselves in their home language or in French; praising and constructively critiquing student work; using small group activities to encourage peer interactions; making connections between academic content and students' lives; asking open-ended questions; and employing multiple methods to promote student participation (e.g., turn to a partner, class voting, writing on a personal chalkboard, etc.). These strategies aim to equip teachers with content knowledge and pedagogical skills that respond to children's social and emotional needs, thus improving the quality of the learning environment while teaching math and French reading skills.

The integrated curricular materials were developed in collaboration with MEPSP curriculum experts, and they included a Teacher Guide and a Model Lesson Plan Bank for all six primary school grades. The content of the materials reflect the national standards for each grade level. The Teacher Guide includes foundational reading, writing, math, and social and emotional well-being content. The Model Lesson Plan Bank is a tool that provides teachers with model lesson plans for teaching reading, writing, math, and well-being to be used as inspiration for their own daily lesson plans. These integrated instructional materials were the main content tools for the teacher professional development program.

Collaborative, school-based in-service teacher professional development. Teachers participated in an intensive 10-day LHC initial training and subsequently took part in continuous in-service training, which used a teacher professional development approach known as Teacher Learning Circles (TLCs). TLCs are rooted in the MEPSP's *Cellule de Base de formation et encadrement* (Basic Unit for training and coaching), a practice that started in 1984 under the creation of the National Service for Teacher Training and has evolved over time to include a series of nested TLCs called *Forums d'Echange Pédagogique* (Pedagogical Exchange Forums). The TLCs included weekly teacher-led grade-level meetings, which were designed to provide teachers with opportunities to exchange information, collaborate, problem-solve, support, and motivate each other in learning and implementing the new instructional practices (Frisoli, 2014; IRC, 2010). TLCs also included monthly school-level meetings led by school directors and quarterly school cluster[9] meetings led by cluster coordinators or Master Teacher Trainers (i.e., school directors, school inspectors from the MEPS-INC). School- and cluster-level meetings were expected to facilitate on-going training, coaching, and receiving context-specific feedback.

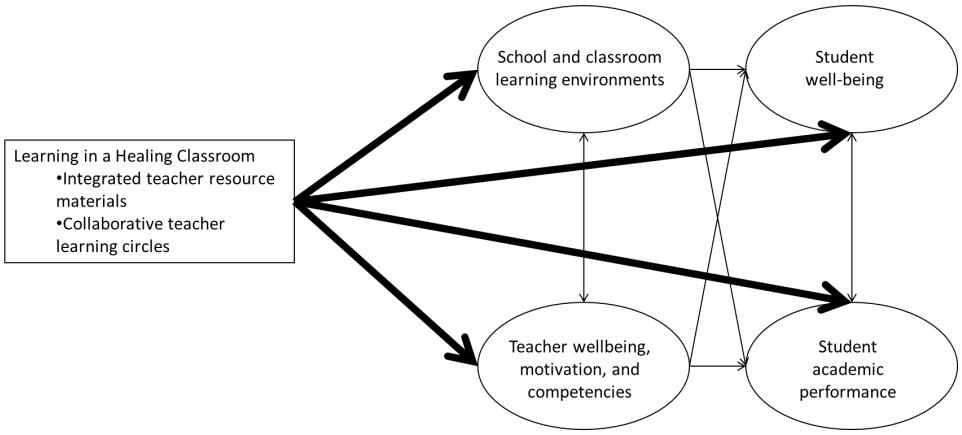
The LHC Theory of Change and Hypotheses

LHC is based on the theory of change represented in Figure 2. According to this theory, teacher training on the use of new curricular materials and teacher participation in TLCs were hypothesized to increase teachers' motivation and well-being and classrooms' social and pedagogical processes (Emerson, Deyo, Shoaib, & Ahmed, 2010; Frazier, 2009; Gaible & Burns, 2005). These changes, in turn, were expected to drive improvements in students' academic performance and social-emotional well-being.[10] Specific pathways examined for this report are highlighted in bold lines.

[9] School clusters are defined as a regrouping of primary schools from a group of official schools in geographical proximity. Schools are usually grouped together in clusters of 2 to 6 schools.

[10] This report does not specifically test whether changes in teacher well-being resulting from the intervention directly explain changes in student academic and SEL outcomes. Rather, it is a causal evaluation of whether LHC impacts student and teacher outcomes directly, without evaluating the relationship teacher and student outcomes may have with each other.

Figure 1. Theory of Change for Learning in a Healing Classroom



In accordance with the theory of change, we hypothesized that LHC will:

1. Improve students' perceptions of their school and classroom learning environments as a) caring and supportive; and b) cooperative and predictable;
2. Improve teachers' professional well-being and motivation;
3. Improve students' reading and math skills; and
4. Improve students' social-emotional well-being, specifically in lowering mental health problems and peer victimization.

LHC Implementation: Planned versus Actual Implementation

The actual roll out of LHC in the first year of implementation in the Katanga 4 cohort differed from the planned roll out. Due to delays in finalizing and producing training materials, the math resources were not ready until mid-school year. As such, teacher training on Learning Math in a Healing Classroom was postponed until the following school year (2012-2013). In addition, reports from the field indicated that in the first year the TLCs were not being implemented with the intended intensity or process. Therefore, teachers, school directors, and Master Teacher Trainers received additional training on how to conduct TLCs during the middle of the initial year of implementation. The IRC also wrote an additional planning workbook and guide to support the implementation of TLCs that was not part of the original intervention.

The Learning in a Healing Classroom Impact Evaluation

Research Questions Asked by the LHC Impact Evaluation[11]

The evaluation of LHC set out to test the impact of Learning in a Healing Classroom on (a) students' reading and math skills; (b) students' social-emotional well-being, including perceptions of their schools and classrooms as supportive and caring and cooperative and predictable, as well as their mental health and peer victimization experiences; and (c) teachers' motivation and professional well-being. Specifically, the evaluation addressed the following research questions:

(1) What is the impact of LHC
   a. on student academic learning; specifically, reading and math skills?
   b. on student mental health and emotional well-being; specifically, student mental health symptoms and experiences of victimization by peers?
   c. On student perceptions of school and classroom learning environments; specifically, the extent to which schools are perceived as 1) caring and supportive and 2) cooperative and predictable?
   d. on teacher motivation and professional well-being?

(2) Do intervention impacts vary as a function of the number of years students and teachers are exposed to treatment?[12]

(3) Do intervention impacts vary by selected individual, school and community factors?

The Evaluation Design: A Cluster-Randomized, Wait-List Control Impact Evaluation

Global TIES (Transforming Intervention Effectiveness and Scale) for Children at New York University (NYU), in collaboration with IRC, designed a cluster-randomized, wait-list control impact evaluation to answer questions about whether Learning in a Healing Classroom *caused* changes in students' and teachers' outcomes.

Briefly, **randomized control trial impact evaluations** – the gold standard in medical research that causally identifies what works– provide the highest standard of evidence that a program caused an impact. They do so by comparing the outcomes of people or places randomly assigned to receiving an intervention against the outcomes of people or places assigned to not receiving the intervention, what are commonly known as the treatment and control groups. A **cluster-randomized** impact evaluation randomly assigns groups of people (rather than individuals) to either the treatment or control group. To ease the delivery of LHC, we randomly assigned school clusters – as opposed to individual schools,

[11] Again, note that the current evaluation does NOT answer how the larger mechanism of change occurs; e.g., whether the intervention impacts students by first impacting teachers. Future research will investigate the mediational mechanisms by which OPEQ works.

[12] In the initial stages of planning, the evaluation sought to address whether the intervention impacts varied as a function of quality and level of implementation. However, we were able to collect implementation data at the subdivision and provincial levels only. Data collected above the school cluster level –the level of treatment randomization and delivery—does not permit examining questions about impact variation as a function of implementation. Hence, we only examine impact variation as a function of years of exposure.

teachers, or students – to receive LHC. The IRC outlined criteria for eligible schools (e.g., MEPSP official schools located in a secure zone) and grouped selected schools in clusters based on geographical proximity. The DRC Ministry of Primary and Secondary Education and Initiation to New Citizenship then approved each of the school clusters used in the implementation of LHC.[13]

The LHC impact evaluation also employed a **waitlist control design**. For our purposes, a waitlist control design means that instead of implementing LHC in all school clusters at once, we randomly assigned school clusters to begin receiving the LHC intervention in different school years. In this way, the schools that are on the waitlist serve as the control group – that is, the comparison group that is conducting "business as usual" – until they receive the intervention. This design enables the MEPSP in the DRC and the IRC both to provide LHC to all schools over the course of the project and to use a scientifically rigorous way to test the effectiveness of LHC.

Through public lotteries carried out in eight subdivisions across three provinces, all school clusters selected to participate in the impact evaluation were randomly assigned to one of three possible start years: school year 2011-2012, school year 2012-2013, or school year 2013-2014. Using this approach, we are able to estimate the impact of LHC:

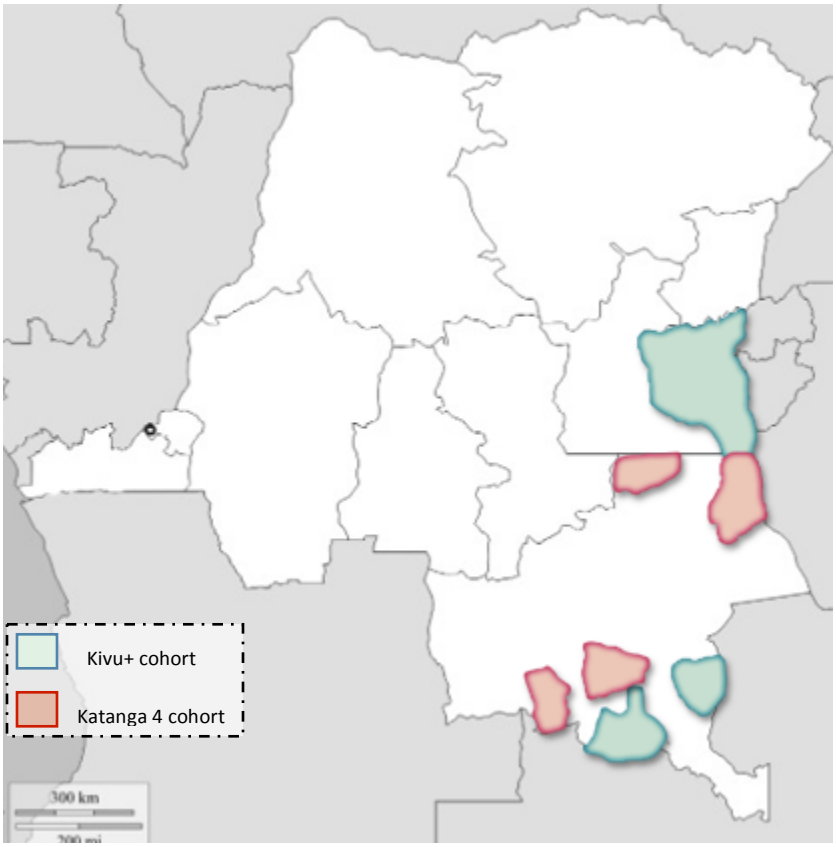
- After one year of treatment during the first year of LHC implementation in the Katanga 4 cohort (school year 2011-2012);
- After one year of treatment during the first year of LHC implementation in the Kivu+ cohort (school year 2012-2013);
- After one year of treatment during the second year of LHC implementation, called expansion, in the Katanga 4 cohort (school year 2012-2013); and
- After two years of treatment during the second year of LHC implementation, called expansion, in the Katanga 4 cohort (school year 2011-2012 and 2012-2013).

[13] See report on pilot year results for school targeting criteria and results from public lotteries (Shivshanker, 2012).

Cohorts and comparisons

To estimate the impact of the LHC intervention, we compare the results of students and teachers nested in schools within school clusters[14] that were randomly assigned to the intervention to students in school clusters that were randomly assigned to the control condition. The intervention was assigned to two different *cohorts*, or groups that are identified by location and timing of treatment conditions. These cohorts are labeled as Katanga 4 and Kivu+, and are described in more detail below. Figure 2 provides a color-coded map of the Katanga 4 and Kivu+ cohorts. Figure 3 describes the treatment conditions of the cohorts.

Figure 2. Map of Kivu+ and Katanga 4 cohorts in the DRC



Katanga 4 cohort. Schools in the Katanga 4 cohort are located in four subdivisions in Katanga province: Kalemie, Kongolo, Mutshatsha, and Lubudi. Implementation of LHC began in 2011 in these subdivisions; however, math materials for LHC were not completed until mid-school year, and so these schools focused on reading materials only in 2011-2012. Because this evaluation followed a waitlist control design, some schools in this cohort received LHC in 2011-2012 – which we refer to as having **one year of treatment during the first year of LHC implementation** for the Katanga 4 cohort – while other schools served as control schools. In school year 2012-2013, the LHC intervention was expanded in Katanga 4, increasing the number of treatment schools and decreasing the number of control schools. During the second year of LHC implementation, which we refer to as the expansion phase, school clusters that had previously received treatment in 2011-2012 continued to receive treatment, resulting in *two years* of treatment; and some clusters that served as controls in 2011-2012 received treatment for the first time (thus receiving one year of treatment in the expansion phase). Therefore, the Katanga 4 cohort consists of schools that received 1 year of treatment during the initial LHC implementation phase in 2011-2012, an additional year of treatment for these same schools during the LHC expansion phase in 2012-2013 (resulting in 2 years of treatment total), and schools that received their first year of treatment in the LHC expansion phase in 2012-2013.

[14] Clusters are groups of 2-6 schools defined by geographical proximity.

Kivu+ cohort. Schools in the Kivu+ cohort are located in South Kivu and in 2 subdivisions of Katanga province: Kambove and Kasenga. The Kivu+ cohort received one year of treatment in 2012-2013, which was also the first year of LHC implementation. Unlike the Katanga 4 cohort, the Kivu+ cohort did not have a period of expansion during the impact evaluation (expansion occurred starting in school year 2013-2014), and implementation of treatment occurred one year later than for schools in Katanga 4.

Figure 3. Map of cohorts, implementation timing, implementation maturity, dose of intervention, and geographic location

OPEQ starts LHC Implementation in Katanga 4 cohort only

OPEQ expands LHC in Katanga 4 cohort
OPEQ starts LHC in Kivu + cohort

School year 2011-2012	School year 2012-2013
Group A: Katanga 4 cohort, 1 year of LHC	
Group B: Katanga 4 cohort, 2 years of LHC	
	Group C: Katanga 4 cohort, 1 year of LHC
	Group D: Kivu+ cohort, 1 year of LHC

Group	Cohort	Years of LHC received	School years LHC implemented	Implementation maturity	Province: Subdivision
A	Katanga 4	1 year	2011-2012	Initial year of LHC implementation	Katanga: Lubudi, Kongolo, Kalemie, Mutshatsha
B	Katanga 4	2 years	2011-2013	Expansion: second year of LHC implementation	
C	Katanga 4	1 year	2012-2013		
D	Kivu +	1 year	2012-2013	Initial year of LHC implementation	South Kivu & Katanga: Kambove, Kasenga

The IRC led data collection in the DRC with technical assistance from NYU in 2011, 2012, and in 2013. A detailed description of the baseline results, overall design, and data collection procedures can be found in the 2011 baseline report.[15] Mid-line impact analyses can be found in the 2012 report[16] and the academic impact manuscripts completed to date.[17,18,19]

[15] Torrente, C., Aber, J.L., Shivshanker, A., Annan, J., & Bundervoet, T. (2011). Opportunities for Equitable Access to Quality Basic Education (OPEQ). Results from the Early Grade Reading Assessment, the Early Grade Math Assessment, and students' demographic data in Katanga Province, Democratic Republic of Congo. Unpublished Manuscript.

[16] Shivshanker, A. Opportunities for Equitable Access to Quality Basic Education (OPEQ): Report on the Impact of the OPEQ Intervention in its Pilot Year (School Year 2011-2012) in Katanga Province, Democratic Republic of Congo. Unpublished Manuscript.

[17] Torrente, C., Johnston, B., Starkey L., Seidman, E., Shivshanker, A., Annan, J., & Aber, J. (2015, in press). Improving school environments and student well-being: impacts after one year of a school-based intervention in the Democratic Republic of Congo. *Journal on Education in Emergencies*.

Ethical Approval

Ethical review of the research plans and procedures was provided both by NYU's Institutional Review Board (IRB) as well as the DRC's Ministry of Primary and Secondary Education and Initiation to New Citizenship (MEPS-INC). Ministry approval was requested at the national level and the provincial level. Letters of approval from the Ministry accompanied each field team during data collection. The IRC provided a copy of these letters to each school director when describing the evaluation and requesting permission to survey schools directors, teachers, and children. School directors provided written consent for their schools to participate in the survey. Teachers provided verbal consent and children provided verbal assent. In advance of the data collection, the IRC informed parent-teacher associations and school management, and they put up posters asking parents to inform the school if they did not want their children to participate.

Sample

The impact evaluation employed a stratified, random sampling strategy to select schools in each province from the universe of schools served by the broad OPEQ initiative (see *Annex 2* for more detail on sampling strategy). Data were collected from either one or two randomly selected schools per school cluster; the number of schools selected depended on the size of the school cluster. When the school cluster had three schools or less, one school was randomly selected; and when the cluster had four or more schools, two schools were selected. Then, students in the targeted grades (2^{nd} to 4^{th} grades in the baseline and midline years of the evaluation, and 3^{rd} to 5^{th} grades in the endline year) were randomly selected by field research staff from school rosters to participate in the evaluation. Finally, one teacher from each primary grade level was invited to participate. When a school had more than one teacher per grade level, one teacher was randomly selected to participate from those teachers in attendance that day.

Throughout this report, the sample size is represented in various ways: a) the *intended* sample size that we planned to collect during data collection; b) the *actual* sample size collected in the field; and c) the sample size used *in data analysis*. The difference between the intended and the actual sample size collected in the field occurred due to field conditions at the time of data collection (e.g., number of children or teachers at school). The difference between the actual sample size collected and the sample size used in data analysis occurred either because poor-quality data were excluded from the analysis or due to analytical requirements.

Student sample sizes in this report vary based on the outcome for each analysis: reading, math, and social-emotional well-being. (See Table 2 in the baseline report for sample sizes actually collected.) Given time and budgetary constraints, students were randomly assigned to complete either the Early Grade Reading Assessment (EGRA) or the Early Grade Math Assessment (EGMA). All students answered

[18] Aber, J.L., Torrente, C., Starkey, L., Johnston, B., Seidman, E., Halpin, P., Shivshanker, A., Weisenhorn, N., & Annan, J. (under review). Impacts of "Healing Classroom" on Children's Reading and Math Skills in DRC. Journal of Research on Educational Effectiveness.

[19] Wolf, S., Torrente, C., Frisoli, P., Weisenhorn, N., Shivshankar, A., Annan, J., & Aber, J. (2015, in press). Preliminary impacts of the "Learning to Read in a Healing Classroom" intervention on teacher well-being in the Democratic Republic of Congo. *Teaching and Teacher Education.*

questions related to their social-emotional well-being. Students who were administered the EGRA (n = 4,056) were nested in 116 schools and 74 clusters and students who were administered the EGMA (n = 4,135) were nested in 117 schools in 75 clusters. Students who were administered the social-emotional well-being questionnaire (n = 8,813) were nested in 125 schools in 75 clusters. Differences in sample size are a result of unreliable, discarded data in 2012.[20]

The teacher sample included 644 teachers in 123 primary schools in 76 school clusters.

Measurement: Assessing the Impact of the LHC Intervention on Students and Teachers

The LHC impact evaluation used two measures to assess the impact of the intervention on reading and math skills: the Early Grade Reading Assessment (EGRA) and the Early Grade Math Assessment (EGMA). Each of these measures contains nine subtests, some of which are timed and some of which are administered only in certain grades. Each measure takes approximately 15 minutes total to administer verbally to students. In accordance with the national policy regarding language of instruction in the DRC, for an answer to count as correct a student had to provide the answer in French. The use of these measures was a requirement by USAID.

Table 1 briefly summarizes all measures used in this analysis. Annex 3 summarizes the EGRA and EGMA subtests and relevant technical information, Annex 4 provides further detail about the remaining measures, and Annex 5 contains all individual questions from each measure. Annex 7 provides basic descriptive statistics disaggregated by subdivision, gender, and grade at endline.

Table 1. Description of measures used to assess LHC impact.

Measure	Description	# Items	Author
The Early Grade Reading Assessment	**The EGRA** consists of nine subtests: Vocabulary, Initial Sound Identification, Knowledge of Graphemes, Familiar Word Reading, Invented Word Reading, Oral Passage Reading Fluency, Reading Comprehension, Listening Comprehension, and Writing of a Complete Sentence.	See Annex 3.	RTI International (Piper, 2009)
The Early Grade Math	**The EGMA** consists of nine subtests: Number Identification, Comparison of Quantities, Pattern Completion, Word	See Annex 3.	RTI International, (Reubens, 2009)

[20] Some schools from South Kivu's initial year of implementation were excluded from EGRA (9) and from EGMA (8) due to either unreliable or missing data in 2012, therefore preventing us from controlling for prior year scores. For EGRA, 2 of these schools were from the same cluster, resulting in the loss of one cluster for EGRA. 4 of the excluded EGRA schools were in the one-year treatment group and five in the control group; 3 of the excluded EGMA schools were in the one-year treatment groups and 5 in the control group.

Assessment	Problems, Addition, Subtraction, Multiplication, Shape Identification, and Shape Naming.		
Demographics	**Student demographic questions** include: gender, the child's home language, and grade (2nd, 3rd, 4th, or 5th grade).	5	NYU
	Administrative data include: geographic location and cluster size, coded as either one or two schools per cluster.		
Social-emotional Well-being	**Supportive Schools and Teachers** includes: children's perceptions of (a) support and care from teachers; (b) the extent to which students feel welcomed, respected, and safe at school; (c) the extent to which students feel encouraged to actively engage in the learning process; and (d) the extent to which students find lessons intellectually stimulating.	17	AIR Conditions for Learning Survey (UNICEF, 2009) and Relationship with Teacher questionnaire (Blankemeyer, Flannery, & Vazsonyi, 2002)
	Cooperative and Predictable Learning Environments includes: (a) the extent to which teachers encourage cooperation; (b) whether peers are supportive and share activities and materials with each other; and (c) whether children have a sense of control over school activities.	10	NYU
	Victimization includes: children's relational and physical victimization by peers.	5	Aggression, Victimization and Social Skills Scale (Orpinas & Frankowski, 2001)
	Mental Health Problems includes: children's symptoms of hyperactivity, conduct problems and emotional symptoms.	12	Strengths and Difficulties Questionnaire (Goodman, 1997)
Teacher measures	**Motivation** measures: teachers' motivations related to professional goals and tasks (e.g., "I'm highly motivated to help children learn to read/write").	9	NYU based on the work of (Bennell & Akyeampong, 2007)
	Burnout measures: teachers' responses to chronic work stressors (e.g., "I feel mentally drained from work")	9	Maslach Burnout Inventory (Maslach, Jackson, & Leiter, 1996)
	Job dissatisfaction measures: sense of dissatisfaction with teaching (e.g., "I want to transfer to another school")	4	NYU based on the work of (Bennell & Akyeampong, 2007)
	Personal accomplishment measures: teachers' sense of professional self-efficacy (e.g., "I feel I am positively influencing people's lives")	6	Maslach Burnout Inventory (Maslach et al., 1996)

Descriptive Statistics

Statistics describing the clusters, teachers, and students included in various analysis are reported in Table 2 below. A majority of clusters (> 76 percent) in each sample have more than 2 schools participating in the evaluation. School sizes ranged widely from 78 to 1,240 students at baseline.

At the student level there are approximately equal numbers of boys and girls in the sample, and students are approximately evenly sampled across grades. In each sample approximately 13 percent of

students spoke a different language at home than the language spoken by the majority of students in the school.

Table 2. Student Covariate descriptive statistics.

Covariate	Covariate detail	EGRA Sample (n = 4,056)	EGMA Sample (n = 4,135)	Well-being Sample (n = 8,813)
% Subdivisions in Katanga 4 cohort* **	Kalemie	12.6	12.5	11.7
	Kongolo	13.6	13.9	12.8
	Mutshatsha	12.7	12.8	11.9
	Lubudi	15.9	15.7	14.8
% Subdivisions in Kivu Plus cohort* **	Kambove	7.6	7.6	7.1
	Kasenga	9.9	9.9	9.3
	South Kivu	27.6	27.5	32.4
Gender*	% girls in the sample	47	47.2	47.5
Grade*	% students in grade 3	34.3	34.8	34.7
	% students in grade 4	34.4	33.7	34
	% students in grade 5	31.2	31.5	31.4
Language discrepancy*	% students who spoke a home language different from the majority of the school	13.1	13.5	12.8
Teacher Statistics				
% women	24			
% Teaching grades:				
First	15.4			
Second	15.5			
Third	20.2			
Fourth	18.8			
Fifth	17.1			
Sixth	13.0			
Average Age	37.8			
Average years teaching experience	12.4			

% French-speaking	98.4

*student-level covariate **school-level covariate ***cluster-level covariate

Results: Impact of the LHC Intervention on Student and Teacher Outcomes

Analytic Strategy

EGRA/EGMA. Using the EGRA and EGMA as outcome measures in the impact evaluation posed several challenges. Specifically, the tests were too difficult for a majority of the children sampled, though the difficulty of the items corresponded to the national standards for that grade level. For example, USAID is interested in understanding the number of students who can read with comprehension at grade level, suggesting that the "reading a short story" subtest would be the most appropriate to analyze. Yet, 78.5 percent of fourth graders received a zero score on the "reading a short story" subtest in 2012-2013. This means that students who scored low on the reading comprehension scale would be measured with a substantial degree of error if we only analyzed that one subtest (Halpin, Torrente, & Aber, under review).

To address this issue NYU used a statistical technique called **factor analysis**. Factor analysis assesses the extent to which questions in a measure (like EGRA or EGMA) reflect the underlying concepts those questions are thought to represent (like reading and math skills) and then produces "factor" scores that reflect those concepts. These scores provide more reliable information about the impact of LHC on students' reading and math capacities than an average summary score or individual subtest. Factor analysis suggested a single reading score from the nine EGRA subtests and two math scores from the nine EGMA subtests. We refer to these scores as the reading score, the geometry score, and the addition/subtraction score, respectively.

Social-emotional wellbeing and teacher outcomes. As described above in Table 1, students and teachers answered questions pertaining to each measure on a scale of 0-3 (Supportive Schools and Teachers, Cooperative and Predictable Learning Environments, Mental Health, Victimization, Teacher Motivation, Teacher Job Dissatisfaction) or a scale of 0-6 (Teacher Personal Accomplishment, Teacher Burnout), and we averaged the scale questions to form a single scale score. These scores are not factor scores but rather average scale scores.

Data analysis strategies. We used a statistical method called multi-level modeling to account for the fact that student and teacher data are influenced by coming from the same schools, and school data are influenced by coming from the same clusters (i.e. the data are nested and non-independent). Annex 6 provides more information on this strategy.

How to Read the Results

In this report, we present results by outcome and by cohort. We state whether there is a significant difference in a particular outcome between students in schools that received LHC compared to students in schools that did not receive LHC. We also graph significant results. We use the following conventions:

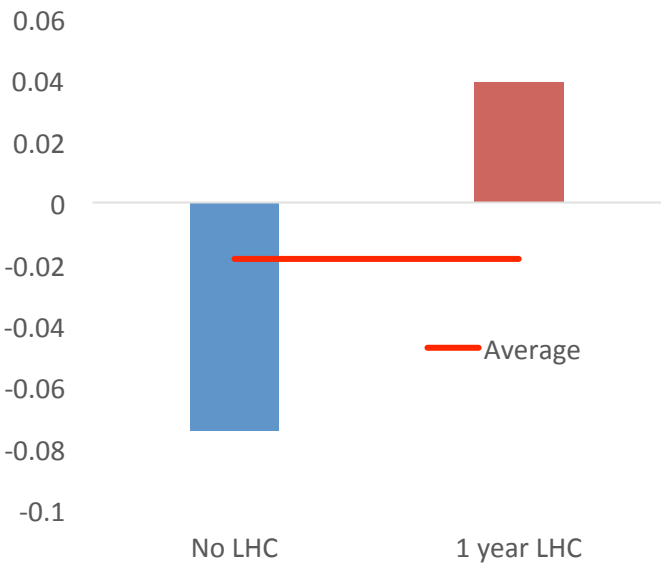
- *b* – Represents the unstandardized impact of LHC on an outcome variable. It does *not* represent a reading, math, or SEL score. The most important aspects of "b" are its magnitude and whether it is positive or negative.
    - For EGRA and EGMA, a positive value indicates a positive impact of LHC on reading and math scores (i.e., the scores for the students in the intervention schools is higher than the scores for the students in the control schools.). A negative value in this column indicates a negative impact (i.e., the scores are lower for treatment schools vs. control schools).
    - For Supportive Schools and Teachers and Cooperative and Predictable Environments measures, a positive value indicates a positive impact (i.e., scores are higher for treatment schools).
    - For Mental Health Problems and Victimization, a *negative* value indicates a *positive* impact (e.g., mental health problems are lower for students in treatment schools than control schools) and a positive value represents a negative impact (mental health problems are higher for students in treatment schools vs control schools).
- d_{WT} – Represents the effect size, which is a standardized number quantifying the magnitude of the intervention's impact. Typically an effect size smaller than 0.10 is considered a small effect on the outcome, and an effect size greater than 0.50 is considered a large effect; however, in the context of other effective educational interventions in low-income, conflict-affected countries, effect sizes have been found to range from .08 to .15 (McEwan 2015), and it is good practice to consider such benchmarks when judging effect size, rather than a one-size-fits all approach (Hill, Bloom, Black, & Lipsey, 2008).
- *p* – Represents statistical significance. In this report, we consider any *p*-value equal to or less than 0.10 to be statistically significant. Said another way, we want to be sure that we would obtain the same results 90 percent of the time if this intervention were conducted repeatedly.
- *Graphs*: Significant impacts are accompanied by graphs. The y-axis on the graphs represents a score on the outcome that includes the effects of covariates. In the case of EGRA and EGMA, these scores can run from negative to positive, because factor scores are scaled from negative to positive; a red line indicates the average score for these measures to clarify understanding.

Finally, all results are presented by outcome and then by cohort. We observed different patterns in the data based on the timing and location of program implementation. Thus, we decided to conduct separate analyses testing the impact of LHC in each cohort. Importantly, these additional analyses are post-hoc, which means these were not the originally planned analyses and have an increased risk of false positives (i.e., "showing" treatment effects by random chance that don't reflect actual treatment effects). We therefore must interpret these with extra caution.

Results: Reading

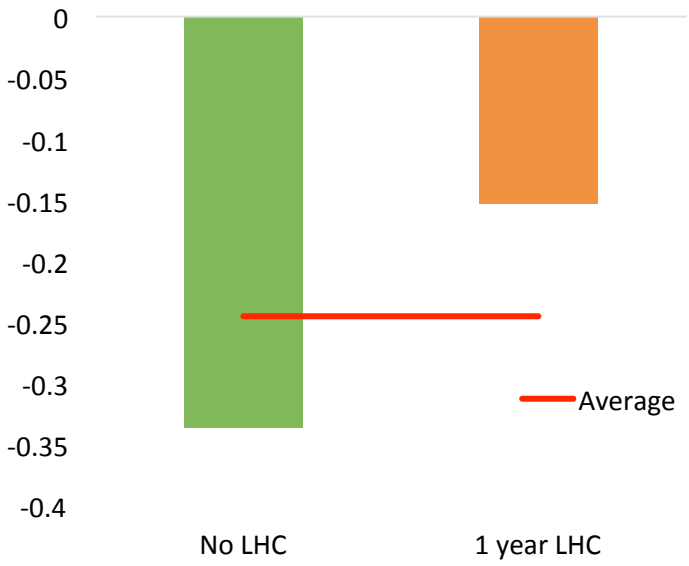
In the initial year of implementation in the Katanga 4 cohort (school year 2011-2012), receipt of 1 year of LHC significantly improved students' reading scores compared to their control group counterparts (b = 0.12, d_{WT} = 0.14, p = 0.10). Figure 4 shows that control schools (in blue) performed below average, while treatment schools (in red) performed above average. The effect size (d_{WT} = 0.14) is **similar to** the effect size that McEwan (2015) found in his meta-analysis of teacher training interventions and their impacts on student academic outcomes (ES=0.12). Girls in this cohort experienced a decrease in reading scores relative to boys.

Figure 4. Reading factor scores in Katanga 4 cohort: 1 year of LHC during the first year of LHC implementation vs. No LHC



In the initial year of LHC implementation in the Kivu+ cohort (school year 2012-2013), receipt of 1 year of LHC significantly improved students' reading scores compared to their control group counterparts (b = 0.18, d_{WT} = 0.21, p = .05). Figure 5 shows again that control schools (in green) performed below average while treatment schools (in orange) performed above average. The effect size (d_{WT} = 0.21) is **almost double** the effect size that McEwan (2015) found in his meta-analysis of teacher training interventions and their impacts on student academic outcomes (ES=0.12). Girls in this cohort exhibited greater increases in reading scores than boys.

Figure 5. Reading factor scores in Kivu+: 1 year of LHC during the first year of LHC implementation vs. No LHC

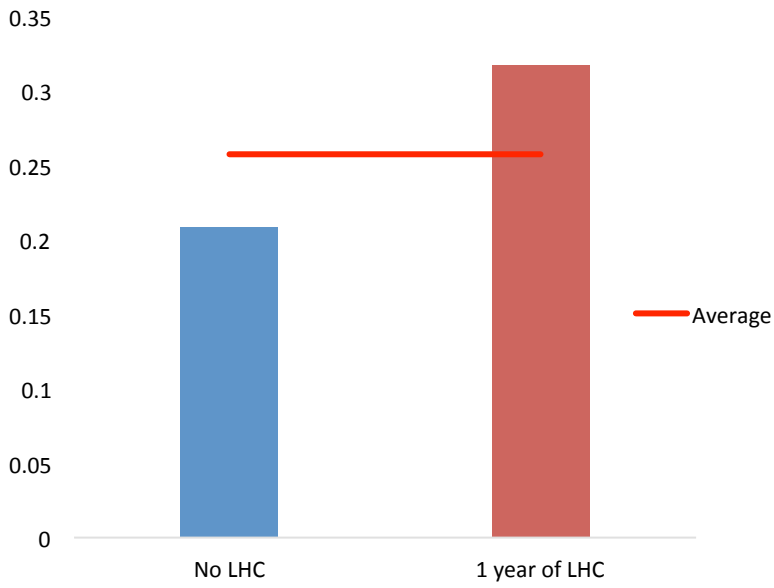


Receipt of one or two years of LHC during a period of program expansion in the Katanga 4 cohort did not result in significantly higher student reading scores compared to students who did not receive LHC, and thus are not depicted here.

Results: Math

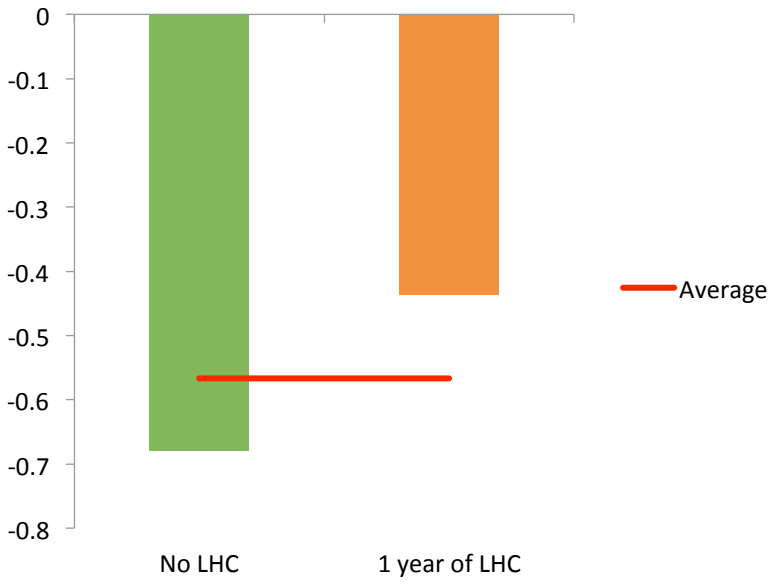
In the initial year of implementation in the Katanga 4 cohort (school year 2011-2012), 1 year of LHC significantly improved students' geometry compared to the control group (b = 0.11, d_{WT} = 0.14, p = 0.10). The effect size (d_{WT} = 0.14) is **similar** to the effect size that McEwan (2015) found in his meta-analysis of teacher training interventions and their impacts on student academic outcomes (ES=0.12). There were no differences between girls and boys in this cohort.

Figure 6. Geometry factor scores in Katanga 4: 1 year of LHC implementation in the first year of LHC vs no LHC



In the initial year of implementation in the Kivu+ cohort (school year 2012-2013), receipt of 1 year of LHC significantly improved students' addition/subtraction scores compared to their control group counterparts. (b = .24, d_{WT} = 0.32, p = .001). The effect size (d_{WT} = 0.32) is **just over 2.5 times bigger** than the effect size that McEwan (2015) found in his meta-analysis of teacher training interventions and their impacts on student academic outcomes (ES=0.12). There were no differences between girls and boys in this cohort.

Figure 7. Addition/Subtraction factor scores in Kivu+: 1 year of LHC intervention during the first year of LHC implementation vs no LHC

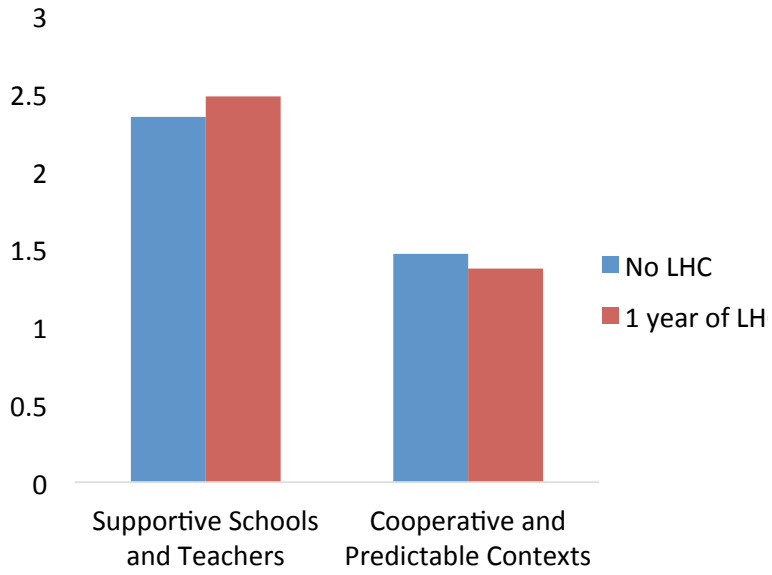


Receipt of one or two years of LHC during a period of program expansion in the Katanga 4 cohort did not result in significantly higher student addition/subtraction or geometry scores compared to students who did not receive LHC, and thus are not depicted here.

Results: Social and Emotional Well-Being

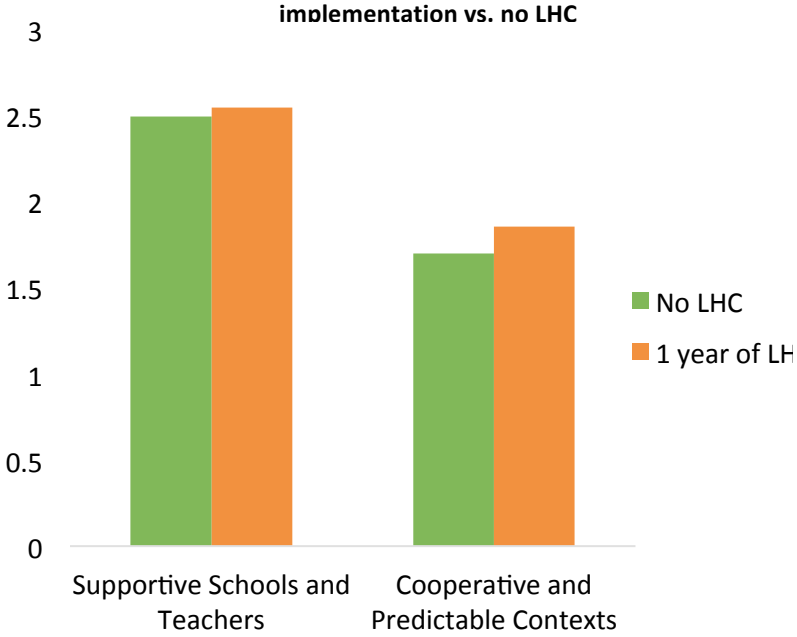
In the initial year of implementation in the Katanga 4 cohort (school year 2011-2012), 1 year of LHC resulted in significantly higher students' perceptions of supportive schools and teachers (b= .11, d_{WT} = .22, p = .01), but lower perceptions of cooperative and predictable contexts (b= -.11, d_{WT} = -.15, p = .09). There are no differences between girls and boys in this cohort. This is a similar effect size to the impacts found in the US context (Durlak et al. 2011).

Figure 8. Social-emotional wellbeing in Katanga 4: 1 year of LHC during the first year of LHC implementation vs no LHC



In the initial year of implementation in the Kivu+ cohort (school year 2012-2013), receipt of 1 year of LHC showed significantly higher student perceptions of supportive schools and teachers (b = .06, d_{WT} = .15, p = .07) and significantly improved student perceptions of cooperative and predictable contexts (b = .17, d_{WT} = .26, p = .001). There are no differences between girls and boys in this cohort. This is a similar effect size to the impacts found in the US context (Durlak et al. 2011).

Figure 9. Supportive Schools and Teachers and Cooperative and Predictable Contexts in Kivu+: 1 year of LHC in the first year of LHC implementation vs. no LHC



Receipt of one or two years of LHC during a period of program expansion in the Katanga 4 cohort did not result in significant treatment effects for any well-being outcomes. There were no significant improvements on mental health or victimization outcomes in any cohort.

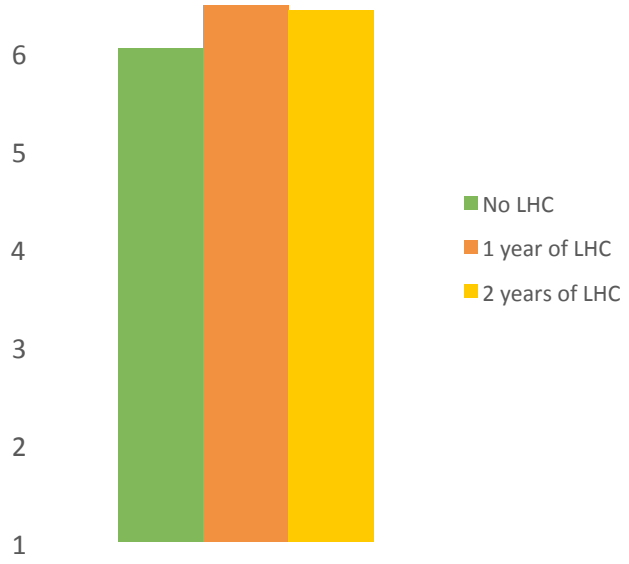
Results: Teachers

Receipt of one and two years of LHC during a period of program expansion in the Katanga 4 cohort resulted in significant impacts on sense of personal accomplishment for teachers after one year (b = .44, d_{WT} = .55, p = .017) and after two years (b = .39, d_{WT} = .49, p = .022) of treatment. Teachers with the fewest years of teaching experience appeared to have the largest impacts.

There were no significant main impacts during expansion for teachers in the Kivu+ cohort.

Receipt of LHC did not result in any significant treatment impacts for job dissatisfaction, burnout, or motivation for either cohort for any cohort.

Figure 10. Teachers' sense of personal accomplishment in Katanga 4: 1 and 2 years of LHC during LHC expansion vs. No LHC



Comparison of Results and Hypotheses

Hypothesis	Results		
	After 1 Year of LHC Implementation		After 2 years of LHC Implementation (LHC Expansion)
	Katanga 4 (1 year treatment)	Kivu+ (1 year treatment)	Katanga 4 (1 or 2 years treatment)
Hypothesis 1: Student reading outcomes will improve.	**Reading** improved marginally	**Reading** improved	Reading did not improve after either 1 or 2 years
Hypothesis 2: Student math outcomes will improve.	**Geometry** improved. No impacts on **addition/subtraction**.	**Addition/subtraction** improved. No impacts on **geometry.**	Geometry or addition/subtraction outcomes did not improve after either 1 or 2 years
Hypothesis 3: Student perceptions of school and classroom learning environments will improve.	Students' perceptions of **supportive schools and teachers** improved Students' perceptions of **school as cooperative and predictable** worsened	Students' perceptions of **supportive schools and teachers** improved Students' perceptions of **school as cooperative and predictable** improved	No improvements in students' perceptions of **supportive schools and teachers** or **schools as cooperative and predictable** after either 1 or 2 years
Hypothesis 4: Student well-being will improve; specifically, mental health problems and peer victimization will be lower	No significant impacts on mental health problems or peer victimization		
Hypothesis 5: Teacher well-being and motivation will improve.	No impacts on **teacher burnout, motivation, job dissatisfaction, or sense of personal accomplishment.**	No impacts on **teacher burnout, motivation, job dissatisfaction, or sense of personal accomplishment**	Teachers' sense of **personal accomplishment** improved after both 1 and 2 years. No impacts on **teacher burnout, motivation, or job dissatisfaction.**

Summary of the results and potential explanations

After one year of the initiative, students in schools implementing LHC showed the following improvements compared to students in schools that did not implement LHC:

- Improved reading scores on the Early Grade Reading Assessment
- Improved math scores on the Early Grade Math Assessment
- Greater perceptions of the safety and supportiveness of their teachers and schools

These results were obtained first in 2011-2012 in the Katanga 4 cohort of schools, covering four subdivisions in Katanga Province. They were then replicated in a second cohort of schools that first implemented LHC in 2012-2013 in South Kivu and two remaining subdivisions in Katanga Province.

However, two years into the initiative in the four Katanga subdivisions, the impacts of LHC on reading, math, and school supportiveness "faded out."

Unfortunately, in neither cohort of schools did LHC: (a) reduce children's mental health problems or experiences of peer victimization or (b) improve teacher motivation and professional well-being.

We may see these results due to a number of factors:

- **Fatigue and increased workload as the program expanded for master trainers, school directors, or teachers.** In the Katanga 4 cohort the LHC intervention ran for two years. In the second year perhaps teachers, school directors, and master trainers became fatigued due to the program length.
- **Intensity of LHC program support may have decreased as the program expanded.** The IRC implemented LHC via community-based and provincial staff. Though the number of community-based staff increased, it may not have increased enough, which would have decreased the intensity of support that each school cluster received.
- **External factors – such as conflict, migration, and displacement – that impacted implementation, reception of treatment, and/or school composition.** It is possible that high levels of internal displacement and migration during the 2012-2013 school year meant that students were not in school long enough to benefit from a second year of LHC.
- **Overlap with the other components of the OPEQ initiative.** As mentioned OPEQ had two other components that IRC implemented at the school level: school improvement grants and training and coaching for parent-teacher associations or school management committees. 2012-2013 was the second year these components were implemented. It is possible that the 2-year "dose" of the school improvement grants and PTA or management committee trainings improved scores in the Katanga 4 control groups as well as the treatment groups.
- **Social and emotional wellbeing instruction was not explicit enough in LHC**. For children in a conflict-affected or post-conflict context, the integrated approach to SEL wellbeing instruction

may not have been explicit enough to counteract the chaos, stress, or violence they experienced outside of school.

- **Teachers did not change their instructional practices and processes in the classroom.** The intervention provided weekly lesson plans and invested in materials that would guide teachers in the development of their own lesson plans, but did not provide daily lesson plans or provide instructional materials directly. Teachers may not have had the materials needed to support daily change in the classroom, especially for reading. For example, it may be easy for a teacher to create letters to teach the alphabet, but having no books to teach reading is a significant barrier. Teachers may not have actually created or implemented lessons plans following the LHC curriculum.
- **Teachers changed their instructional practices and classroom processes, but the content was too advanced for students to demonstrate much improvement.** Students started from very low levels of literacy and may not have been able to benefit from any improved instructional practices that covered content that was too advanced. For example, a student who is in grade 4 but has grade 2 reading skills may not be able to benefit from improved teaching in the classroom when it covers content that is at a grade 4 level.
- **A mixture of the above factors** (i.e., external factors in these areas impaired both the ability of the team to administer treatment and the schools to engage in treatment while the broader OPEQ intervention created the conditions for improvement in the control clusters).

Future analyses will seek to investigate these hypotheses. The IRC and NYU will use implementation data, data generated by the project (like field reports), as well as externally available data, such as reports of conflict in the areas and geospatial location of the schools, to inform interpretations and explanations of these findings. Discussions with diverse stakeholders and the broader international community will help facilitate subsequent analyses.

Implications of these findings for programming, monitoring, and research

As the IRC and NYU investigate these hypotheses we do have specific recommendations for research, measurement, and program design for other school-based interventions that aim to improve outcomes for student and teachers in conflict-affected contexts.

(4) LHC – delivered at scale to hundreds of primary schools in the Eastern DRC – can improve children's reading and math skills and the safety and supportiveness of their classrooms.

- The size of the impact is as good as or better than other successful interventions designed to improve academic achievement in low-income countries (McEwan, 2015).
- But the size of the impacts are still too small to meet the needs of Congolese children.
- **Efforts need to be redoubled to make LHC even more effective in improving children's reading skills, math skills, and the supportiveness of their learning environment.**

- **This includes researching and targeting systemic factors that may be constraining the effectiveness of LHC, including the governance and financing of education in the DRC (Britto et al., 2013).**

(5) It was disappointing that positive impacts on reading, math and positive school learning environments were not sustained during the second year of the initiative.

- There are a variety of factors that could contribute to this fade out: a decline in the quality of implementations, turnover of teachers, or fatigue of the implementation staff.

- **In order to make LHC even more effective and to sustain impacts over time, new efforts in mounting implementation research and Continuous Quality Improvement are needed.**

(6) LHC was designed on the assumption that if we improved teachers' motivation and professional well-being and children's learning environments, it may be enough to improve children's mental health problems and experiences of peer victimization. It was not. Why?

- Perhaps improvements in teachers' motivation and well-being – which LHC did not produce – is a necessary condition to improve children's mental health and experiences with peer victimization.

- Perhaps the positive changes in children's school environments were not big enough to lead to changes in children's mental health and peer victimization.

- Or perhaps the design of LHC was incomplete. It might not have adequately accounted for and targeted all of the factors that improve mental health and peer relationships.

- **We recommend that future initiatives to mount LHC add brief, affordable, scalable and targeted interventions to specifically address mental health problems and peer victimization.**

- **We also recommend that future research initiatives take steps to identify and test the processes that promote mental health and positive peer relationships.**

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