

# Impacts of Fursa kwa Watoto (FkW) on pre-primary student learning and social emotional outcomes

## INTRODUCTION

Quality pre-primary education plays an essential role in laying the foundation for improved school readiness and learning outcomes.<sup>1</sup> When quality education starts early, it maximizes children's critical developmental periods. As children master foundational cognitive, social, and developmental skills in early childhood, they are better prepared to acquire increasingly sophisticated skills from Standard 1 through adulthood. This phenomena "skills beget skills"<sup>2</sup> explains why investing in high quality pre-primary education in early childhood is both impactful and cost effective. Further, cognitive and social emotional skills are complementary. As children gain social emotional or character skills, they are better positioned to master cognitive skills with "greater impacts on achievement and life outcomes". Researchers contend that these character skills are important over the lifespan and drive lifelong success. Research also confirms that "quality matters" and "high quality programs produce high quality outcomes."<sup>3</sup>

### Fursa kwa Watoto (FkW) Opportunities for Children

Given the promise of quality early childhood education (ECE), the FkW collaborative set out to build an evidence-based pre-primary model that would be low-cost, effective, sustainable, and scalable in resource constrained conditions. The FkW model focused on specialized training and mentoring for teachers to acquire improved instructional practices. These include lesson planning, assessment, reflection and the daily use of child centered participatory approaches, learning areas, and supportive teaching and learning materials. The model also requires training for head teachers, school management committees, and education officers at the ward, district, and regional levels. (Visit <http://fkwlearningagenda.com> for more information on FkW components and evidence.)

The FkW collaborative worked together, beginning in 2013 to develop the model, incorporating intensive and ongoing monitoring, evaluation, and learning activities. Implementation lessons were compiled from 2014 through 2015 and swiftly integrated into the intervention to continuously improve the fidelity and efficacy of the FkW model. The collaborative planned for the FkW implementing organizations (Children in Crossfire (CiC), Aga Khan University (AKU), Maarifa Ni Ufunguo, and

Tanzania Home Economics Association (TAHEA) to conduct training and mentoring activities in rollout schools during the 2016 and 2017 school years.

### Tanzania context of pre-primary education

As the FkW model was in development, the situation of pre-primary education became increasingly tenuous. While Tanzania has successfully increased access to pre-primary, the march towards quality has not kept pace. Instead, Tanzania suffers from an extreme teacher and classroom shortage, overcrowded and congested classes, and insufficient financial resources allocated to pre-primary. Recent policies have exacerbated these deficiencies. For example, in 2016, Fee-Free Basic Education Policy increased access by abolishing fees and family contributions.<sup>4</sup> This led to a drastic enrollment increase of 38 percent. At the same time, an ongoing hiring freeze, complicated by increased teacher retirements, led to a 31.7 percent reduction in qualified teachers from 2017 to 2018.<sup>5,6</sup> A teacher certification verification activity in 2017 further reduced the teaching force. This drove the pupil to teacher ratio (PTR) to 1:215 and 1:249 for qualified teachers in 2018.<sup>5,6</sup> Additionally, the policy of "no forced contributions" was reiterated in 2018, which many Tanzanians interpreted to mean that parents and communities should not contribute to education. This reduced contributions for feeding programs, infrastructure, and learning materials.

### Key learning from early childhood education research

- Early learning matters because "Skills beget skills". In other words, children who learn foundational skills are better able to acquire additional skills over the lifespan.
- Early learning of cognitive, social and emotional skills makes later learning easier and more efficient.
- Cognitive and socioemotional skills are complementary. They lay the foundation for the future.
- "Quality matters." Pre-primary attendance alone will not yield the anticipated return on investment. The quality of the pre-primary classroom matters.
- Students need trained teachers, learning materials, safe classrooms, and school feeding.

SOURCE: <https://heckmanequation.org>

### **FkW Learning Agenda: Methods and data sources**

Despite the challenging context, the FkW model was rolled out to intervention schools in 2016 and 2017. The evaluating organizations in the collaborative (Mathematica and CSR Group Africa) conducted a range of Learning Agenda activities including a randomized control trial (RCT) of impacts on student learning, repeated observations of teachers' instructional practices, and school finances, student enrollment, and attendance tracking. Learning Agenda activities include 1) an assessment of learning outcomes among 1,500 pre-primary students conducted at three time points, 2) six rounds of classroom observations in 120 schools, 3) telephone surveys with head teachers to collect monthly enrollment, attendance, and capitation grant data, 4) qualitative in depth interviews with teachers, head teachers, ward, quality assurance, district education and executive officers, 5) focus group discussions with School Management Committees and parents, and 6) a costing study. (Visit <http://fkwlearningagenda.com> for a technical memo describing study methodology and analytics.)

Note that the collaborative had modest expectations for impacts on student learning given the severe shortage of teachers and sudden increase in enrollment. In addition to overcrowded classrooms, the staffing shortage reduced time on learning even though most schools only allocated two to three hours per day for pre-primary. Learning time was further reduced because teachers' often taught multiple grades and shared classrooms. Teachers also reported frequent student absences and low parental support. Many schools, particularly in Mwanza, lacked feeding programs, so that students were hungry during class on a daily basis. As a result, some schools further shortened the school day and reduced time on learning. Nevertheless the collaborative agreed it would be useful to assess students given the strong, positive improvements in teachers' practices.

### **Study design and sampling**

We conducted a randomized control trial in districts within the Kilimanjaro and Mwanza regions. This design allowed us to follow a cohort of students in intervention schools, along with a matched comparison group, over time to assess students' pre-literacy and pre-numeracy skills, social development, and executive function.

In 2015, we set up the study. First, we conducted a mapping of schools across two districts in the target regions. We gathered basic characteristics of the school, leadership, pre-primary teachers, classes, and students. Following the mapping, we stratified schools based on the district type (urban or rural) and performance measures (Standard 7 exam scores) in the two regions. Then, we selected schools in each district proportional to the size of the strata. We randomized schools (130 in total) to the intervention ( $n = 65$ ) and control groups ( $n = 65$ ) using a random number. Finally, we assessed balance on several

variables, such as the number of pre-primary teachers and student enrollment.

During field work, our data collection team worked with teachers to group students by age. In each of these schools, we listed the children's ages and randomly selected 12 students—ages five or six in May 2017—to participate in the assessment. We assessed the same students again in November 2017 and November 2018 ( $n=1,259$ ).

### **Assessment tools**

We used the National Pre-Primary Curriculum and Syllabus (2016) and the Basic Education Syllabus for Standard 1 (2018) to guide our selection of assessment tools. First, we assessed a cohort of pre-primary students using the Measuring Early Learning Quality and Outcomes (MELQO) tool, which takes about 35 minutes to administer and can be used with children ages 3 to 6 years. The tool assesses pre-literacy, pre-numeracy, socio-emotional skills, and areas that support learning across multiple domains, such as executive function, persistence, and self-regulation. We used the MELQO at baseline in May and midline in November 2017.

By November 2018, most students—now a year older—had transitioned to Standard 1. We updated our assessment to reflect students' advancing skills. We added items from the Early Grade Reading Assessment (EGRA) and the Early Grade Math Assessment (EGMA). MELQO items in which students already scored high and had limited room for growth were dropped from the assessment. Guided by the Basic Education Syllabus for Standard 1, and with input from Standard 1 teachers, we selected similar, but slightly more challenging items from the Early Grade Reading and Math Assessments to add to our tool. The assessment tool was pretested in Mwanza in October 2018 and subsequently finalized. We measured interrater reliability for all field assessors to ensure assessments were conducted in a systematic manner. Note that we only assessed outcomes aligned with the Basic Education Syllabus for Standard I, though we did not assess every outcome within the syllabus due to time constraints with each child.

### **Findings**

**School Characteristics:** First we present school characteristics by region (Table 1). For all measures, the data show a stark contrast between Mwanza and Kilimanjaro regions. Schools in Mwanza have higher student enrollment, teacher to pupil ratios, and a lower percentage of schools with adequate space, learning materials, and feeding programs compared to schools in Kilimanjaro. They are also more likely to have open latrines, rather than safe, hygienic toilets.

**Table 1. School characteristics in November 2018 in Mwanza (n = 65) and Kilimanjaro (n = 66)**

	Mwanza		Kilimanjaro	
	I	C	I	C
Average number of students enrolled per class in Nov 2018	102	108	46	56
Average number attending in Nov 2018	79	71	39	46
Average pupil to teacher ratio	1:84	1:82	1:40	1:46
Percent of schools with adequate classroom space for students	60	43	92	83
Percent of schools with adequate learning materials (available, age appropriate, durable, accessible)	65	42.5	75	7.5
Percent of schools with feeding programs	44	24	94	92
Percent of schools with open pit latrine	84	87	35	39

I-Intervention C-Control

**Table 2. School finances in November 2018 in Mwanza (n = 65) and Kilimanjaro (n = 66)**

Per pupil annual grant	Mwanza		Kilimanjaro	
	I	C	I	C
Average annual capitation grant (TSh)	6190	6220	4820	5170
Average annual capitation grant (US \$)	\$2.71	\$2.72	\$2.11	\$2.26
Average annual family contribution (TSh)	200	180	8190	7200
Average annual family contribution (US \$)	\$0.09	\$0.08	\$3.58	\$3.15
Official annual capitation grant per pupil (TSh)	TSh 10,000			
Official annual capitation grant per pupil (US \$)	US \$4.38			

I-Intervention C-Control

Head teachers from all schools reported receiving regular government capitation grants. While the official grant is TSh 10,000, (US \$4.38) per pupil per year, (Table 2), about one third of the grant is retained by district offices to purchase textbooks for upper grades. In Mwanza, head teachers reported receiving slightly higher per student grants per year (on average \$2.71 for intervention and control schools) compared to Kilimanjaro (\$2.19). However, Mwanza schools received both fewer and smaller average annual parent per pupil contributions (\$0.09 for intervention and control schools compared to \$3.37 in Kilimanjaro). Kilimanjaro schools operate with twice the resources as those in Mwanza.

Beyond the regional disparities, the differences between intervention and control schools likely result from the FkW intervention. In FkW, head teachers were trained to create action plans and partner with teachers, SMCs, and

community members to increase classroom space, obtain learning materials, and launch feeding programs.

**Student level impacts:** Next, we assessed numerous impacts in the domains of pre-literacy and early grade reading, pre-numeracy and early grade math, social emotional outcomes, health knowledge and executive function. (For a full list of outcomes and tables of scores across all outcomes, visit <https://www.fkwlearningagenda.com/childrens-learning-outcomes>.) We examined students' scores for all tasks in the above domains based on intervention and control group and geographic location. Across all tasks, students in Kilimanjaro scored higher than those in Mwanza.

Students' scores revealed diverse abilities and instructional needs. For example, on the letter name knowledge task, in Mwanza, students scored in every decile. About 13 percent of students scored 0 out of 20 while 24 percent scored 19 or 20. Teachers confirmed how challenging it is to teach large classrooms of students with different needs and abilities. In fact, in September 2017, the average teacher had a class with twelve 3-4 year olds, sixty-nine 5-6 year olds, and ten 7 year olds.

The pre-literacy results indicate that students struggle with sound identification, however they are mastering letter knowledge and name writing. Students struggled with the early grade reading tasks. The majority of students performed poorly on syllable reading, non-word reading, and sentence dictation tasks, while they had stronger performance on listening comprehension.

Similarly, the pre-numeracy results indicate that students are mastering tasks including verbal counting, producing a set, and spatial vocabulary. The mental transformation task (identifying a shape by combining pieces) remained a challenge and most students had low scores on the early grade numeracy tasks. Still, overall, the impressive gains in pre-numeracy from pre-primary to Standard 1 suggest that students would quickly acquire the early grade math skills if they had well trained teachers, adequate classrooms, and sufficient learning materials.

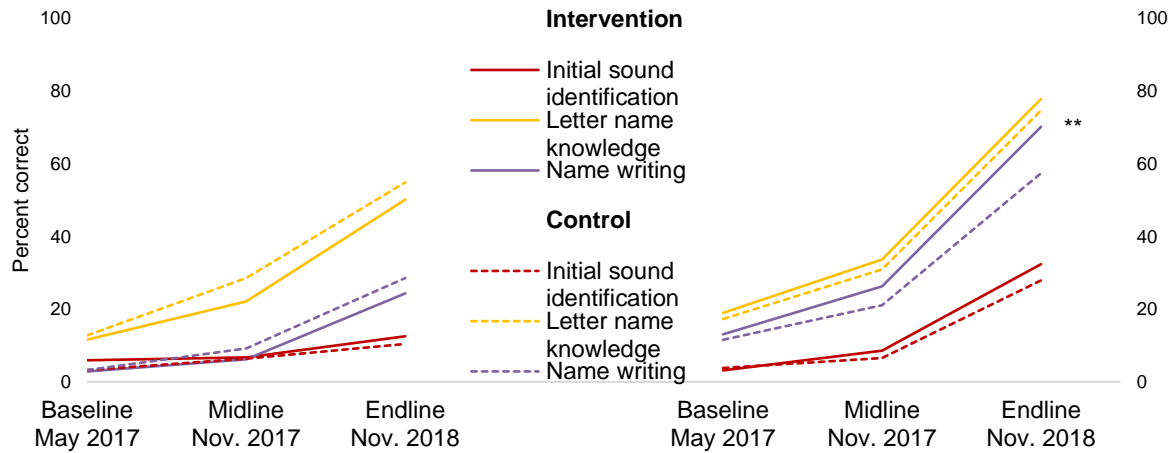
**Impact results:** We found positive impacts of the FkW intervention on students only in the Kilimanjaro region and only for three outcomes:

- **In the pre-literacy domain, we found a 13 percentage point impact for the name writing task (Figure 1, Table 3).**
- **In the social emotional skills domain, we found a 7 percentage point impact in understanding feelings (Figure 3, Table 5).**
- **In the executive function domain, we found a 6 percentage point impact in the backward digit span task (Figure 4, Table 5).**

We found no statistically significant positive impacts on numeracy in either region (Figure 2, Table 4, 5). We found no statistically significant negative impacts.

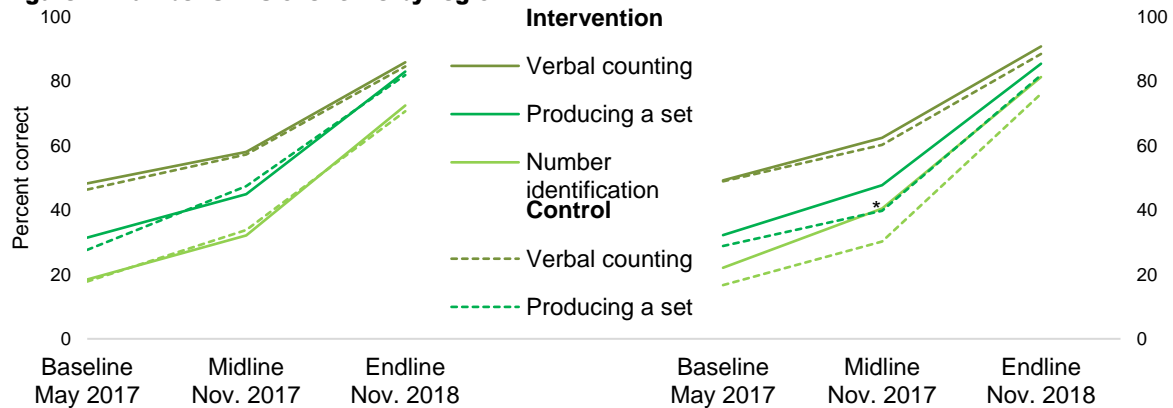
These figures illustrate average scores at three time points for students' literacy, numeracy, and social development skills. The differences between students in the intervention group (solid line) and control group (dotted lines) that were statistically significant (\* or \*\*) indicate FkW impacts. The impacts were only in Kilimanjaro for name writing, understanding feelings, and backward digit span.

**Figure 1. Pre-literacy skills: average student scores by intervention and control group and region**



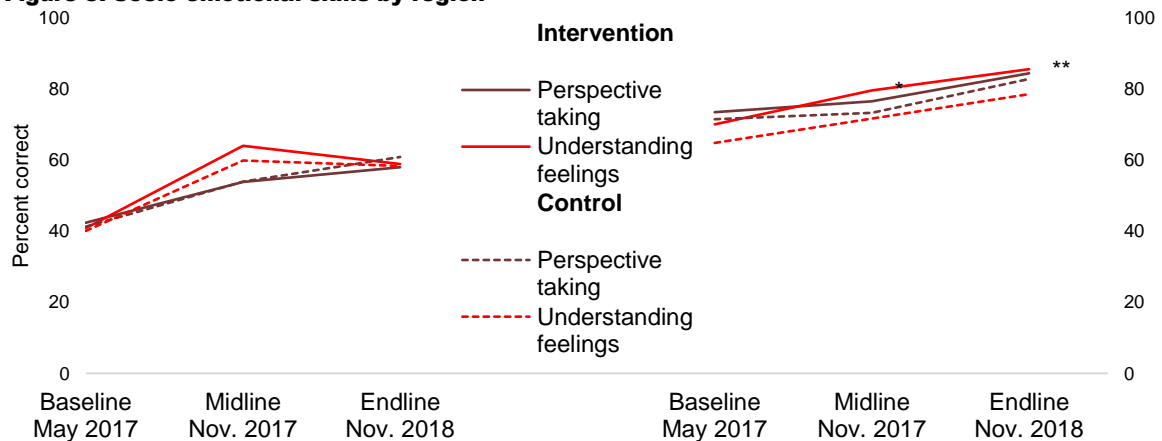
\* Between-group differences are statistically significant

**Figure 2. Number skills over time by region**



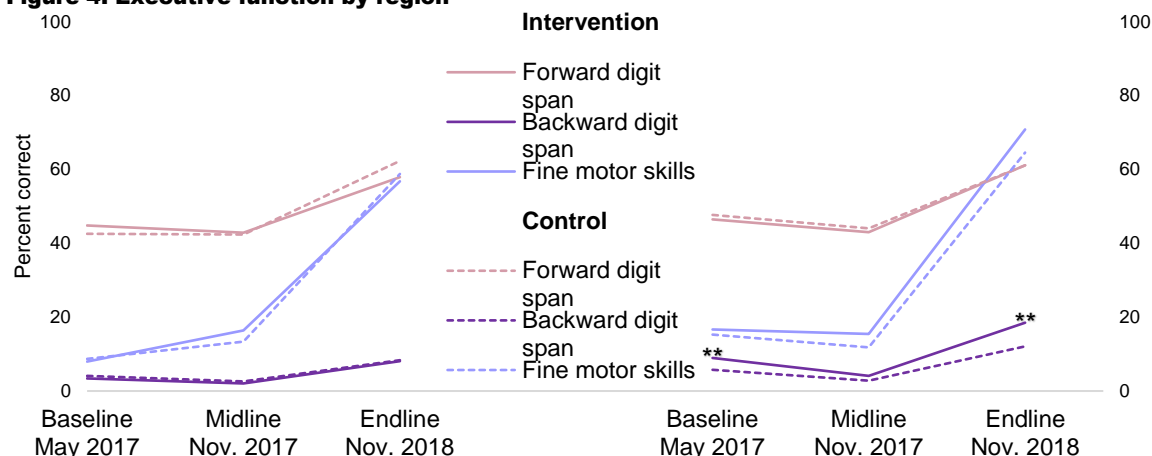
\* Between-group differences are statistically significant

**Figure 3. Socio emotional skills by region**



\* Between-group differences are statistically significant

**Figure 4. Executive function by region**



\* Between-group differences are statistically significant.

**Table 3. Pre-literacy skills (percent correct)**

	Mwanza			Kilimanjaro		
	Intervention mean n=317	Control mean n=304	FkW impact	Intervention mean n=317	Control mean n=304	FkW impact
Initial sound identification (out of 5)	13	11	2	32	28	5
Letter name knowledge (out of 20)	50	55	-5	78	75	3
Name writing (1 if correct, 0 if incorrect)	24	29	-4	70	57	13 **

\* Between-group differences are statistically significant. Randomly selected schools in Mwanza (n=65) and Kilimanjaro (n=65) Student assessment data collected May 2017 and November 2019. Note: The table shows regression-adjusted means for the intervention group and control group, respectively, and the corresponding impact estimate.

**Table 4. Early grade reading impacts by region**

	Mwanza			Kilimanjaro		
	Intervention mean n=317	Control mean n=304	FkW impact	Intervention mean n=317	Control mean n=304	FkW impact
Syllable reading (out of 100)	12	14	-2	32	32	0
Non-word reading (out of 50)	9	10	-1	26	26	0
Sentence dictation (out of 11)	12	16	-4	42	38	4
Listening comprehension (out of 5)	44	49	-5	68	67	1

\* Between-group differences are statistically significant. Randomly selected schools in Mwanza (n=65) and Kilimanjaro (n=65) Student assessment data collected May 2017 and November 2019. Note: The table shows regression-adjusted means for the intervention group and control group, respectively, and the corresponding impact estimate.

**Table 5. Pre-numeracy impacts by region**

	Mwanza			Kilimanjaro		
	Intervention mean n=317	Control mean n=304	FkW impact	Intervention mean n=317	Control mean n=304	FkW impact
Spatial vocabulary (out of 4)	63	61	2	79	78	1
Verbal counting (out of 30)	86	85	1	91	88	2
Producing a set (out of 2)	83	82	1	85	82	4
Mental transformation (out of 4)	38	40	-3	45	43	2
Number identification (out of 6)	73	71	2	81	76	5

\* Between-group differences are statistically significant. Randomly selected schools in Mwanza (n=65) and Kilimanjaro (n=65) Student assessment data collected May 2017 and November 2019. Note: The table shows show regression-adjusted means for the intervention group and control group, respectively, and the corresponding impact estimate.

**Table 6. Early grade math impacts by region**

	Mwanza			Kilimanjaro		
	Intervention mean n=317	Control mean n=304	FkW impact	Intervention mean n=317	Control mean n=304	FkW impact
Number discrimination (out of 6)	40	42	-2	42	39	3
Word problems (out of 7)	17	19	-2	22	19	3
Addition (out of 20)	20	22	-2	24	22	2
Subtraction (out of 20)	15	16	-1	19	18	2

\* Between-group differences are statistically significant. Randomly selected schools in Mwanza (n=65) and Kilimanjaro (n=65) Student assessment data collected May 2017 and November 2019. Note: The table shows show regression-adjusted means for the intervention group and control group, respectively, and the corresponding impact estimate.

**Table 7. Socio emotional skills and executive function by region**

	Mwanza			Kilimanjaro		
	Intervention mean n=317	Control mean n=304	FkW impact	Intervention mean n=317	Control mean n=304	FkW impact
Perspective taking (out of 3)	58	61	-3	84	83	2
Understanding feelings (out of 2)	59	58	1	86	79	7 **
Forward digit span (out of 3)	58	62	-4	61	61	0
Backward digit span (out of 7)	8	8	0	19	12	6 **
Fine motor skills (out of 6)	57	59	-2	71	65	6

\* **Between-group differences are statistically significant.** Randomly selected schools in Mwanza (n=65) and Kilimanjaro (n=65) Student assessment data collected May 2017 and November 2019. Note: The table shows show regression-adjusted means for the intervention group and control group, respectively, and the corresponding impact estimate.

**Qualitative results:** During interviews with teachers, head teachers, ward education and quality assurance officers, respondents explained that students are gaining foundational skills, however many students struggle with the basics. Teachers reported that congested classrooms, hunger, absenteeism, students with different abilities, and a shortage of materials undermines education (Table 8). They also reported a lack of time to meet the needs of all students and that they may push forward regardless of whether students master material.

**Table 8. Qualitative findings**

<p><i>"I am still struggling because these classes are supposed to be taught by two teachers. It is difficult for me sometimes. Today I was teaching and a child got sick. You find that sometimes the children fight and sometimes they play, so there should be another teacher teaching the class."</i></p> <p style="text-align: right;"><i>Teacher, Moshi</i></p>
<p><i>"My challenge is the improvisation of materials. When you prepare a lesson, the materials have to be available. If they are not there, then you have to improvise. So when it comes to the teaching of the children they don't reach the goal because the class is too big. It must be taught by two teachers. Then when you teach alone some of the children cannot get the materials in the right time."</i></p> <p style="text-align: right;"><i>Teacher Moshi</i></p>
<p><i>"The challenge is I have so many students is children with different abilities. The challenge is when one child is a fast and another slow learner. What I do? I make sure I teach the uniform thing as required."</i></p> <p style="text-align: right;"><i>Teacher Moshi</i></p>
<p><i>"[Teachers] provide quality education but what I can say is it depend on the number of students. It's difficult to provide quality education depending on the big number of children."</i></p> <p style="text-align: right;"><i>WEO, Mwanza</i></p>
<p><i>"Most of the children here use their native language so this is a problem. By using learning tools and pictures, the children have begun to understand what they are being taught. Although most of them do not understand Swahili."</i></p> <p style="text-align: right;"><i>Head Teacher Mwanza</i></p>
<p><i>"...preprimary education is unable to succeed. Its success is minimal because of the infrastructure as well as resources. We do not have funds to manage preprimary education, therefore it is not effective."</i></p> <p style="text-align: right;"><i>Head Teacher Mwanza</i></p>

## SUMMARY

This study yields somewhat encouraging findings in a context where there is an extreme teacher and classroom

shortage, overcrowded classes, and insufficient resources for early childhood education.

First, in Kilimanjaro, the data revealed several positive impacts in cognitive (name writing) and social emotional outcomes (understanding feelings), and executive function (backward digit span). These outcomes are complementary and key to academic achievement and lifelong success. However, only several impacts were statistically significant in Kilimanjaro. At the same time, there were no positive, statistically significant impacts in Mwanza, where admittedly the schools face graver challenges—namely more students, and fewer teachers, classrooms, and family contributions.

While we know that it is difficult to translate quality teaching into improved student outcomes, a few factors may have reduced the impact of FkW. Foremost, the FkW intervention aimed to improve quality instruction during a time when enrollment skyrocketed and the teacher and infrastructure shortage worsened. Additionally, pre-primary classes received no formal financing and capitation grants per school were far below the official per student allocation. Head teachers reported that the grants did not account for the number of pre-primary students.

Further, we may have seen greater impacts had there not been such widespread spillover of FkW approaches from intervention to control schools. In both Mwanza and Kilimanjaro, District and Ward Education Officers reported implementing FkW components district-wide because the model represented a promising and tested approach to quality pre-primary. While intervention teachers were more likely to demonstrate quality instructional practices, we observed and respondents reported improved instructional practices in both study groups.

Respondents also reported that other programmes were operational, including the Global Partnership for Education Literacy and Numeracy Education Support programme as well as teaching and learning materials distribution for the lower grades. Given that we had intervention and control schools in each region, we do not believe this impacted our comparison, however there may be differences between the regions that can at least partly be attributed to these programmes.

Finally, respondents reported that the serious contextual challenges undermined their ability to provide quality pre-primary.

## POLICY IMPLICATIONS AND RECOMMENDATIONS

Given the limited but promising findings, we urge the Government of Tanzania, and education officials at the regional, district, ward, and school level prioritize actions to improve pre-primary quality. To achieve quality pre-primary education, we recommend the following priorities:

- **Prioritize continuous teacher training and mentoring using FkW model components.** Given teachers' success in implementing the FkW model including demonstrating improved instructional strategies, lesson planning, classroom management, child centered learning approaches, and the use of learning areas and materials: We recommend the GoT prioritizes and funds continuously training teachers on approaches as part of School Based-Continuous Professional Development (SB-CPD) In-Service Training Modules (INSET). At the district, ward, and school levels, we recommend that officials prioritize and plan for continuous knowledge transfer, setting up communities of practice, and promoting ongoing professional development
- **Prioritize reducing the teacher shortage.** Given the extreme contextual challenges, the teacher shortage (1:215 PTR in 2018) and hiring freeze, and that teachers have insufficient mentoring and support: We recommend that the GoT takes immediate action to relieve the teacher shortage by recruiting and placing qualified teachers. We recommend the government avoid moving untrained secondary teachers given respondents' reports that these teachers do not have adequate instructional practices for young children. Rather officials should ensure all new pre-primary teachers are adequately trained and can demonstrate appropriate instructional practices for pre-primary students. At the district, ward, and school levels, we recommend identifying co-teachers to free time for lesson planning, implementation and individual student support. We also recommend reducing the teacher workload to enable pre-primary teachers to focus on one grade. Officials should also organize and build communities of support and identify master trained teachers, head teachers, WEOs, QAOs to mentor.
- **Prioritize funding pre-primary.** Given the extreme lack of resources for pre-primary education and the fact that, according to head teachers, pre-primary students are not yet included in capitation grants: We recommend that the GoT prioritize timely inclusion of pre-primary students in capitation grants so resources can be allocated to learning areas and materials, building safe classrooms with adequate space, and other infrastructure. Pre-primary needs its own unique item line in the national and school budgets.
- **Prioritize collaborations and community engagement.** Education officials and schools should work closely to educate communities on the need for contributions for infrastructure, materials, and feeding programs. We recommend that stakeholders at the district, ward, and school levels should share lessons, build and expand successful collaborations among teachers, head teachers, SMCs, WEOs, QAOs, VEOs, and parents. Collaborations may focus on creating securing classroom space, funding feeding programs (to alleviate hunger, inability to concentrate, and absenteeism), engaging parents on the importance of pre-primary education, learning material development, reinforcing lessons at home, improving attendance; and community education and parent communication on registering students at the right age and developmental stage for pre-primary.

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<sup>1</sup>The Lancet. "Advancing Early childhood development: from science to scale." October 4, 2016. <https://www.thelancet.com/series/ECD2016>

<sup>2</sup> Heckman, J. and Tim Kautz. (2013). "Fostering and measuring skills: Interventions that improve character and cognition." NBER Working Paper No. 19656. November 2013. Available online at <https://heckmanequation.org/www/assets/2013/12/Fostering-and-Measuring-Skills.pdf>

<sup>3</sup> Heckman, J. "Early childhood education: Quality and access pay off." The Heckman Equation. Available online at <https://heckmanequation.org/resource/early-childhood-education-quality-and-access-pay-off/>

<sup>4</sup> UNICEF. Education Budget Brief 2018, Tanzania. <https://www.unicef.org/esaro/UNICEF-Tanzania-2018-Education-Budget-Brief-Mainland.pdf>

<sup>5</sup> Ministry of Education, Science and Technology. "A report of the joint education sector review working sessions 18th - 21st September, 2017. Dodoma. <https://www.globalpartnership.org/sites/default/files/2019-06-report-2017-joint-education-sector-review-tanzania-mainland.pdf>

<sup>6</sup> Government of Tanzania. "Education Sector Performance Report 2017/2018". <http://siteresources.worldbank.org/INTTANZANIA/Resources/Educ-Sector-Perf-08.pdf>

