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REPORT

DRAFT REPORT

Fursa kwa Watoto Learning Agenda Design Report

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CONTENTS

TABLES

FIGURES

ACRONYMS LIST

AKU	Aga Khan University Institute Educational Development
CiC	Children in Crossfire
CSR	Center for Social Responsibility Group Africa
DEO	District Education Officers
ESDP	Education Sector Development Plan
FGD	Focus Group Discussions
FkW	Fursa kwa Watoto, aka Opportunities for Children
GoT	Government of Tanzania
IECDP	Integrated Early Childhood Development Policy
MDIs	Minimum Detectable Impacts
MEL	Monitoring, Evaluation, and Learning
MELQO	Measuring Early Learning and Quality Outcomes
MELWG	Monitoring, Evaluation, and Learning Working Group
MoEVT	Ministry of Education and Vocational Training
MoU	Memorandum of Understanding
PDEP-III	Primary Education Development Plan III, 2012–2016
PDTs	Professional Development Tutors
PO-RALG	President's Office for Regional and Local Government
RCT	Randomized Controlled Trial
SC	Steering Committee
TAHEA	Tanzania Home Economics Association
TIE	Tanzania Institute of Education
ToC	Theory of Change
TRC	Teacher Resource Center
TTCs	Teacher Training Colleges
TWG	Technical Working Group
UNICEF	United Nations Children's Fund
VEO	Village Executive Officer
WECs	Ward Education Coordinators
WEO	Ward Education Officer

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I. TANZANIA EDUCATIONAL CONTEXT AND FURSA KWA WATOTO

A. Tanzania educational context

Quality pre-primary education is viewed as the cornerstone of an effective education strategy in Tanzania. The Tanzania Primary Education Development Plan III (PEDP) 2012–2016 and the new, draft Education Sector Development Plan 2016/2017–2020/2021, are the policy documents that articulate the core priorities and the overall strategic direction across the education sector for the next five years. These documents highlight the need for the education sector to improve quality and increase children's access to pre-primary classrooms.

Fursa kwa Watoto (Opportunities for Children, hereafter FkW) is a package of pre-primary education interventions. FkW was introduced in Tanzania in 2014 by a consortium of partner organizations and was designed to help the country achieve pre-primary education goals. The FkW collaborative sought to facilitate school readiness and better learning outcomes for Tanzanian children by developing an effective and scalable package of quality pre-primary education interventions. From 2014–2016, the collaborative designed the FkW package in line with Tanzanian policies and structures within the Ministry of Education and Vocational Training (MoEVT), the President's Office for Regional and Local Government (PMO-RALG), and the Tanzanian Institute of Education (TIE). The purpose of this Design Report is to articulate a Learning Agenda created to yield rigorous evidence on the progress, success, and challenges of FkW in order to inform and help guide Tanzania policymakers and implementers in their efforts to achieve the goal of delivering quality pre-primary education at scale.

Education Sector Development Plan

- **Teachers:** Update the strategy for the recruitment, deployment, retention and motivation of teachers; improve pupil-teacher ratio standards; expand teacher training college capacity. These goals also feature strongly in the 2014 Education Training Policy.
- **School Environment:** Ensure schools are adequately endowed with infrastructure, facilities, and equipment to be safe, inclusive and child-friendly.
- **Quality Assurance:** Provide regular school and teacher supervision and inspections, with feed-back to schools for implementation of improvement measures. Develop national standards for pre-primary. Again, these goals also feature strongly in the 2014 Education Training Policy.
- **Infrastructure/Distance to School:** Review, expand, and implement the school/classroom building program to meet rising demand.

Education in Tanzania. By 2007, Tanzania achieved 97 percent enrollment among primary-school aged children. However, although primary school enrollment is high, students' performance—albeit improving—remains poor. Over the last decade, pass rates for the Primary School Leaving Exam (PSLE), an exam taken at the end of Standard 7, have ranged from a low of 30 percent in 2012 to nearly 60 percent in 2011 (MoEVT 2015). In 2016, 67.8 percent of Tanzanian students passed the PSLE, suggesting that education reforms, teacher training, and other interventions may be effective. Still, students' early grade reading and math outcomes at Standard 3—although improving—remain poor and below government targets, indicating that students are not acquiring foundational academic skills. The 2016 Early Grade Reading Assessment (EGRA), for example, measured primary students' literacy, and the 2016 Early Grade Math Assessment (EGMA) measured numeracy (RTI 2016). The results show:

- Only 25.9 percent of students performed at benchmark on reading comprehension, falling short of the 2016 target of 37 percent. About one-quarter (26 percent) of students scored zero on reading comprehension (an improvement from 40 percent in 2013).
- For oral reading fluency, 16.1 percent met standards, falling short of the 2016 target to reach 26 percent. About 17 percent of students scored zero on this task, which is down from 28 percent who scored zero in 2013.
- For addition and subtraction, only 26.8 percent met standards, falling short of the target to reach 40 percent. About 32 percent scored zero, which again is an improvement from 2013, when 43 percent of students scored zero (World Bank, Big Results Now 2016).

Pre-primary education in Tanzania. Given students' underperformance in learning outcomes across the primary grades, Tanzania is striving to improve teacher quality and effectiveness, the learning environment, and other factors critical to student performance. Policymakers and implementers have increasingly focused on early childhood education (ECE) given the growing global awareness of the critical role that quality pre-primary education plays in laying the foundation for improved school readiness and learning outcomes. Further, there is persuasive evidence that investments in quality early childhood education yield an estimated return of 7 to 16 percent annually for programs that target vulnerable children. [1] Earlier investments in human development are cheaper and more impactful[2] than compensatory programs later in life, which are more expensive and less effective.

Despite the potential of pre-primary education, major challenges impede quality implementation of ECE. Two key challenges include (1) a teaching shortage that has resulted in an unfavourable teacher-to-pupil ratio and (2) the fact that much of the teaching force is untrained or underqualified in ECE. First, the national standard for the Pupil Qualified Teachers Ratio (PQTR) in Tanzania was set at 1:25 in pre-primary classrooms (students to certified teachers). However, in 2012, the PQTR in government schools was about one teacher to 676 pre-primary students, whereas the Pupil to Teacher Ratio (PTR) was 1:151 (GoT, PO-RALG 2016). By 2016, the PQTR was estimated at one teacher to 369 pre-primary students and the PTR at 1:135 (GoT, PO-RALG 2016). In 2016, the total number of pre-primary teachers in government schools country-wide was 10,994 teachers, but 59,538 teachers are required to reach the national standard of one teacher per 25 students. This means the country would need an additional 55,509 qualified pre-primary teachers to meet the PQTR, or 48,544 teachers if the qualification is relaxed.

To be qualified, teachers must have a "grade A" teaching certificate. However, pre-service teacher training colleges only recently began to offer the grade A certificate specifically for pre-primary education. This means that the vast majority of qualified teachers have no training in early childhood development and in the competencies required to teach pre-primary education. In practice, schools without qualified teachers often recruit and use trained teachers with lower level certificates, or they recruit paraprofessionals and community volunteers. Our FkW collaborative has found that paraprofessionals trained and supported with FkW methods demonstrate quality instructional practices on a par with those of certified teachers (Miller et al.

1 Naudeau, Kataoka, Valerio, Neuman & Elder, 2011.
2 Heckman, 2008.

2015). However, most paraprofessionals in Tanzania still lack access to in-service training. The Tanzania Institute of Education (TIE) has focused its training efforts on certified teachers, and as of 2017, few alternative teacher training programs for paraprofessionals exist in Tanzania.

Further challenges that undermine quality ECE likely stem from the low value placed on pre-primary education and the long-held belief that ECE is of little importance. Up until 2016, funding for ECE was not included in the governments' capitation grants to primary schools. Although capitation grants for primary schools have been unpredictable, and actual disbursements have been lower than the amount articulated in the original policy, still these investments provided some teaching and learning resources for standards 1 through 8. Neither schools nor parents provided monetary or other support to make up for the absence of national funding. As a result, pre-primary education has a history of being relegated to the lowest quality classroom spaces, with a lack of age-appropriate equipment and without the necessary teaching and learning resources. Further, with regard to curriculum and instructional practices, the pedagogy has long been developmentally inappropriate for young learners, lacking active and experiential learning activities and foundational content. TIE has now updated the Pre-Primary Education Curriculum and Syllabus to focus teaching and learning methods and activities to build students' competencies and foster physical, intellectual, social, and emotional development (GoT, TIE, 2016). The updated TIE training focuses on training teachers to implement active and child-centered instructional methods and practices.

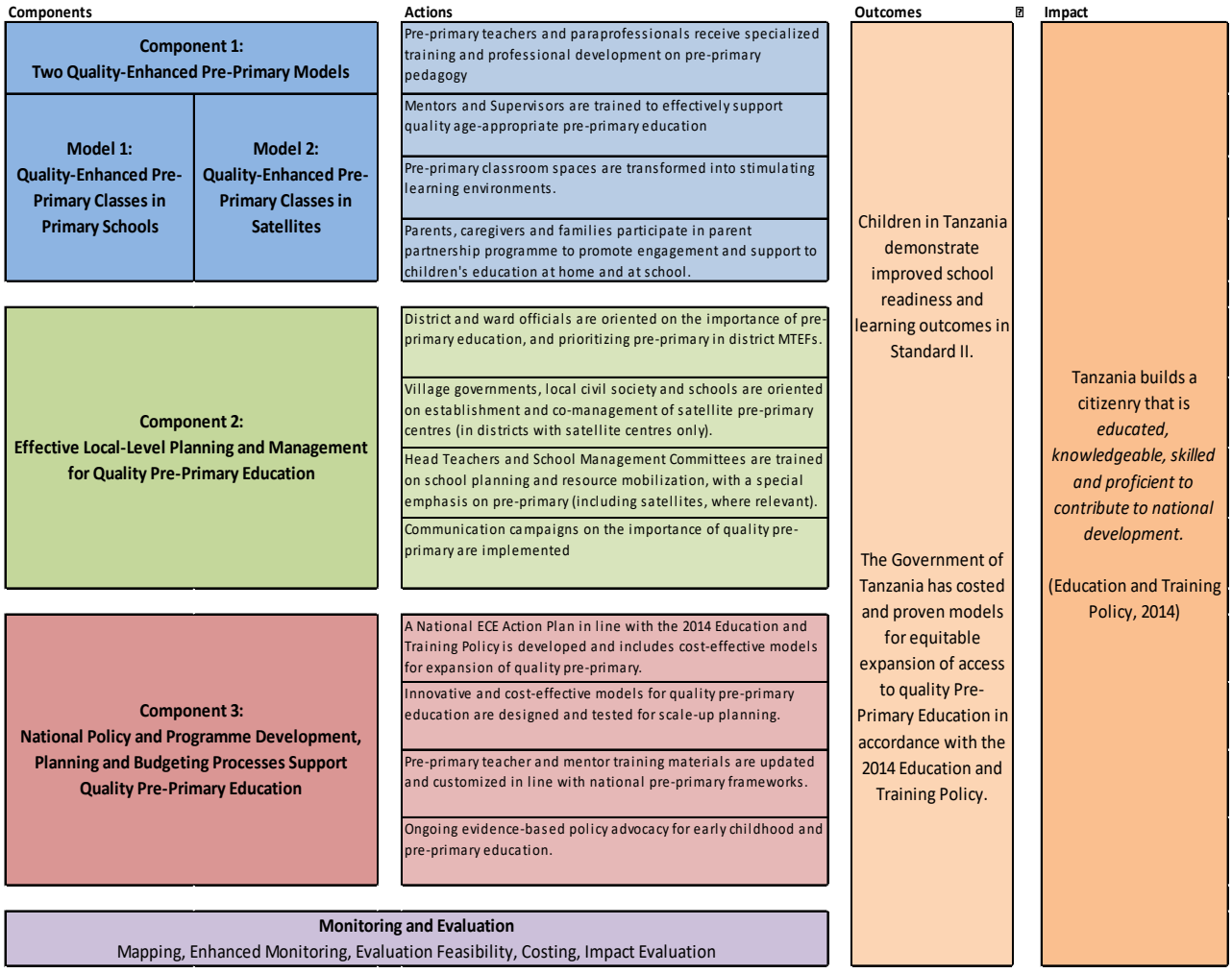
B. Fursa kwa Watoto: Pre-primary package of interventions

1. Background to Fursa kwa Watoto

In 2014, FkW was launched by a group of partner organizations in response to the government's goals of establishing high quality pre-primary education. The FkW learning collaborative includes Aga Khan University (AKU), Children in Crossfire (CiC), Corporate Social Responsibility Group Africa (CSR), Dubai Cares, Maarifa, Mathematica Policy Research, Tanzania Home Economics Association (TAHEA), and UNICEF Tanzania. The Hewlett Foundation provided support from 2014 to 2015.

The FkW collaborative designed a package of pre-primary interventions, which fully align with the ESDP priorities and strategies. FkW includes several interventions that take place at the school level (Component 1); at the local level (Component 2); and at the national level (Component 3). The FkW theory of change illustrates the programmatic components and the actions within each component that are theorized to yield the student learning and school readiness outcomes and impacts across Tanzania (Figure 1). In the medium term, the key outcomes include improved school readiness among students by the time of Standard II. The components of FkW are articulated below:

Figure 1. FkW theory of change



Component 1, Model 1 is the school-based pre-primary model, which is implemented with teachers and headmasters in existing government primary schools. The model has four pillars:

1. **Engaging and training head teachers to identify barriers to effective pre-primary education in their school.** Head teachers are trained to develop and implement action plans that improve the quality of the school, classroom, and teaching, and/or address other important factors affecting pre-primary education.
2. **Improving teachers' instructional and classroom practices through in-service training, mentoring, and feedback.** FkW supports ongoing behavior change for teachers to promote adoption by teachers of evidence-based approaches that can bring about better learning outcomes and an improved classroom environment.
3. **Improving the classroom learning environment by creating learning areas for reading, manipulation (for mathematics), writing, and board games.** The learning areas are an opportunity for teachers to use student-centered approaches and enable students to practice literacy, mathematics, writing, and social skills. Teachers are expected to make use of locally made learning materials in literacy and numeracy lessons, as well as sensitize and

engage parents to support pre-primary teachers and education at home. To support these areas, CiC provided learning kits with furniture, stationary, reading and writing materials, games, and supplies to develop locally made learning materials.

4. **Engaging parents or caregivers in partnership programs to establish a working relationship between families and the school, and thereby enhance children's learning.** Families are asked to collaborate with pre-primary teachers, school leaders, and representatives from the school management committee to improve the pre-primary learning environment, both in the classroom and at home.

Note that Component 1, Model 2 involves setting up community-based satellite schools to provide access to quality and cost-effective pre-primary and early primary education for children in hard-to-reach areas. Satellites should be located in communities where children are unable to reach the primary school. Satellite centres will be held to national standards and have active involvement and leadership from the GoT in collaboration with Civic Society Organizations (CSOs) and community governance and members (GoT 2016).

Component 2 of FkW involves interventions to motivate effective local-level planning and management for quality pre-primary education.[3] This includes improved capacity in both the local government and community in order to resource, manage, and monitor pre-primary education. This activity is also led jointly by CiC and UNICEF with local implementing partners at the district level.

Component 3 focuses on national policy, program development, and the planning and budgetary processes to support quality pre-primary education. It also includes regional and global dialogue and evidence on quality early childhood and pre-primary education in Tanzania. Outcome 3 has been implemented by UNICEF Tanzania at the national level. This activity is led by UNICEF, which also works closely with CiC to ensure coordination of advocacy messages at the national level under Component 3 with those at the local level under Component 2.

2. Monitoring, evaluation, and learning in FkW

The FkW collaborative conducted two years of monitoring, evaluation, and learning (MEL) activities in 2014 and 2015 to understand the strengths and weaknesses of Component 1, Model 1 at each stage of implementation (Steering Committee FkW 2015b; Miller et.al. 2016). In addition, Mathematica and partners conducted a full evaluability assessment which focused on Component 1, Model 1 of FkW, including teacher training, school leadership training, activities to improve the classroom environment, and the parent partnership program. Grounded in the range of MEL data and information collected and analyzed over two years, the pilot initiative yielded evidence of positive changes in teaching practices and learning environments (Miller et al. 2016). The MEL activities generated quantitative and qualitative evidence that teachers gained and applied skills, and classrooms were transformed into engaging and stimulating learning environments. Furthermore, respondents perceived important changes in children's learning outcomes, including enhanced literacy, numeracy, and social-emotional development. Teachers and parents thought these impacts were related to better instructional practices and learning environments. National, district, ward, and local education officers; school inspectors;

[3] The content and components of Outcome 2 were developed toward the end of 2015.

and school management committees were particularly receptive to the FkW approach once they were trained (toward the end of the pilot phase). Mathematica worked with partners in the collaborative to provide technical assistance on design instruments, develop an analytic plan, and analyze and present data. Once analyzed, the FkW MEL working group received and reviewed findings, which were later presented to and discussed by the FkW Steering Committee.

Changing context in schools: As the FkW pilot concluded activities at the end of 2015, the situation in pre-primary classrooms became even more difficult, when the Tanzanian government issued Circular 5 to instruct schools to implement fee-free education, essentially removing the requirement for parents to pay fees and make contributions and thus allowing children to attend school for free. This new policy had serious implications. Although the pre-primary enrollment rate was only 40 percent of pre-primary-age children (ages 5 and 6) in 2012, by the end of 2016, the net intake/enrollment rate for five-year-olds was 46.7 percent and the gross intake/enrollment rate was 102.6, demonstrating that schools were enrolling students under and over the ages of 5 and 6. In fact, from 2015 to 2016, pre-primary enrollment increased by 46.6 percent in government schools (GoT: PO-RALG 2017). When fees were removed, student enrollment rose rapidly and overwhelmed many classes, grades, and schools. Tanzanian classrooms, already characterized by the poor quality of their learning environments and the ineffectiveness of their teaching practices, were suddenly severely overcrowded as parents flocked to register their children for school.

Government partners, our FkW colleagues in Moshi and Mwanza, as well as many journalists, have documented the strain on schools, lack of materials and books, overcrowded classrooms, and use of unsafe learning spaces.[4] Our partners, particularly within schools in Mwanza, have observed drastic overcrowding in classrooms, as well as a severe shortage of teachers and paraprofessional teachers in the classrooms. As of July of 2016, the average teacher-to-student ratio in pre-primary classrooms in Mwanza was one teacher to 85 students (with a range of 32 to 156 students per class). The ratio was lower in Moshi at one teacher to 44 students (with a range of 20 to 80 students per class).

The FkW Steering Committee acknowledged that the dramatic enrollment increases in the majority of schools would likely prevent teachers from fully adopting the improved instructional practices, and that overcrowding would keep children from realizing the maximum benefit of the new practices. Consequently, the planned impact evaluation should not be implemented, because it is unlikely that FkW was effective as it actually was designed.

It would be prudent to instead develop approaches to help teachers effectively manage the large class sizes and continue to conduct monitoring, evaluation, and learning (MEL) activities designed to answer persisting questions about the implementation questions. This would be the best way to help the fidelity, scalability, and sustainability of FkW.

The Learning Agenda was designed to assess the FkW model, including teacher training and instructional practices, classroom management, and school leadership, in the changing context in schools based on whether they participate in FkW. The Learning Agenda was also designed to measure enrollment changes, track decisions and adaptations needed in the challenging context,

[4] See, for example: http://allafrica.com/stories/201602170818.html.

and crystallize key policy and programmatic issues to provide action-oriented, almost real-time recommendations to schools and education officials. Further, the Learning Agenda is designed to provide the information needed to achieve the goals of the ESDP given that Tanzania policymakers at all levels of government, the donor partners, and school administrators and staff do not necessarily have the information needed to improve quality in pre-primary. The country requires evidence and guidance to increase the speed at which the policy is operationalized at scale. A research and evaluation agenda focused on these issues is an excellent opportunity to directly contribute to the realization of this plan over the next decade. Building from the FkW pilot, we will continue to provide credible, timely, and rigorous evidence that guides stakeholders in the realization of the ESDP, the Education Training Policy 2014, the Primary Education Development Plan II, and the Literacy and Numeracy Education Support, and ultimately improves student learning across Tanzania.

II. PROPOSED RESEARCH AND EVALUATION QUESTIONS AND METHODS UNDERPINNING THE LEARNING AGENDA

During a consultative process with the Steering Committee, and after assessing the context and thoroughly reviewing several years of relevant MEL data, we developed the following priority questions for conducting research and evaluation; these questions underpin the Learning Agenda. The broad research questions are listed below, followed by specific questions listed in Table 1 that relate to each component of the FkW pre-primary package of services:

1. Which aspects of the **FkW model (Components 1–3)**, including instructional and management training, advocacy, and other activities, demonstrate potential in improving the quality of pre-primary education and student outcomes?
2. How are schools responding to the **overcrowding** resulting from the increased demand for pre-primary education? What strategies are schools, communities, and districts implementing that are improving the quality of pre-primary and may be scalable and sustainable?
3. What **policy, programmatic, and systemic recommendations are required** to help schools and teachers continuously improve quality and overcome the contextual challenges and persisting barriers?
4. How can **successful practices and activities be scaled and sustained in a cost-effective manner** across Tanzania? What challenges and barriers to quality pre-primary education at scale persist, and how can they be overcome?

In Table 1, we list specific questions posed by members of the Steering Committee. These specific questions fit within the umbrella of the questions listed above, and add specificity to the broad categories. The monitoring, evaluation, and learning activities outlined in the Learning Agenda were designed to generate the evidence needed to help answer these questions and provide targeted, iterative advice and guidance to policymakers and implementers. For example, we envision that a continuous feedback cycle connecting implementation to data and outcomes, and back to implementation, could improve instructional practices, teacher mentoring, and teacher training to achieve quality instruction across teachers. In Table 1, we also list a MEL approach to answering the questions.

Table 1. Emerging questions, considerations, and possible approaches

Question	Methods and approaches to answer the questions
FkW programmatic questions (big picture)	
• What are the most important and salient components of FkW? • Does FkW lead to improved student outcomes?	1. Student assessment using the Measuring Early Learning and Quality Outcomes (MELQO) tool in FkW "intervention" and "control" schools 2. Classroom observations in pilot and expansion schools 3. Teacher survey (telephone based) 4. Qualitative interviews with District Education Officers (DEOs), Ward Education Officers (WEOs), head teachers, teachers
Teacher training	
• Has the FkW teacher training and support adapted to prepare teachers for large classes? • How are teachers managing classrooms and behavior given overcrowding? • How can teachers sustain and build on training to use, maintain, and improve learning materials? • Are differences in instructional skills based on teaching status? Can paraprofessionals perform as well as certified teachers? • How does the training modality (moving to teacher training colleges (TTCs)) affect the uptake of FkW? How can TTC tutor turnover be reduced? • What do TTCs and Training Resource Centers (TRCs) perceive are the benefits of implementing FkW training? • Are teachers gaining skills in developing and implementing lesson plans? How can lesson planning and other practices be improved given the context?	1. Student assessment using the MELQO in FkW "intervention" and "control" schools 2. Classroom observations/school visits 3. Teacher survey 4. Qualitative interviews with: 5. DEO, WEO, teacher, head teachers, and teachers at pilot and expansion schools; 6. TTC leadership, TTC tutors, and quality assurance assessors 7. Stakeholders from the MoE, TIE, the PMO-RALG and other key offices.
Teacher mentoring	
• What works with mentoring approaches? (Who mentors, when, what activities, what is operationally feasible and realistic? Is it adequate?)	1. Teacher survey 2. Qualitative interviews with WEOs, teachers and head teachers
Classroom learning environment	
• What will improve the learning environment in overcrowded schools? What are the most expedient ways to create the best environment? • Given the context of overcrowded classrooms, what changes are needed in the FkW package of services?	1. Classroom observations/school visits 2. Teacher survey 3. Qualitative interviews with headmasters, WEOs, and DEOs, 4. Focus group discussions (FGDs) with School Management Committees (SMCs) and parents
School leadership	
• How are pre-primary teachers assigned to classrooms and how are they treated? Can teacher turnover be reduced to ensure sustainability of FkW training? • Do schools assess students before they enroll in standard 1? Are pre-primary and standard 1 teachers conducting separate assessments or working together? What is the content of assessments? • Are head teachers continuing to implement and revise action plans?	1. Qualitative interviews with DEOs, WEOs, head teachers, and teachers

Table 1: Emerging questions (continued)

Question	Methods and approaches to answer the questions
School Management Committees (SMCs)	
• How do SMCs improve and affect pre-primary education? What systems and processes are being implemented? Are SMCs adequately addressing pre-primary? What successes have been achieved, and what opportunities exist?	1. Qualitative interviews with head teacher, teacher 2. FGDs with SMCs
Families, parents and community engagement	
• What is known about community engagement specific to FkW? What are promising approaches worthy of investment? • What are community contributions to schools and classrooms and what can be replicated? • How do schools and FkW best engage families? How valuable is the Parent Partnership Program (PPP) to reaching quality pre-primary education?	1. Qualitative interviews with head teachers and teachers 2. FGDs with SMCs and parents in communities, in low, mid, high enrollment schools
Quality assurance systems and processes	
• How often do the QA Officers and WEOs assess teachers and schools? Is the assessment in aligned with best practices in ECE, and the TIE and FkW curriculum? Is financing adequate? What are the strengths, weaknesses, opportunities, and threats to this process?	1. Qualitative interviews with Quality Assurance Officers, WEOs, DEOs,
Student enrollment and attendance in the context of fee free education	
• What is actual enrolment and attendance in pre-primary across all the schools by age and gender? • What are the fluctuations and trends? Are the numbers leveling off or steadily increasing? • How is fee-free education evolving in schools? How has pre-primary been affected by the policy and what impacts has it had? Are student enrollment practices changing? Are schools focusing on students ages 5 and 6 or beyond? Are schools limiting the number of years that students remain in pre-primary?	1. Qualitative interviews with teachers, head teachers, WEOs, DEOs 2. Enrollment study to follow trends
Cost and financing of pre-primary education	
• What are the basic costs of pre-primary education? Given the FkW model, what is the cost per student per year at schools to implement quality pre-primary education? • Are capitation grants reaching schools and are resources being used for pre-primary? What other resources if any are going towards pre-primary?	1. Qualitative interviews with MoE, PO-RALG, DEOs, head teachers 2. Costing analysis

III. FKW MONITORING, EVALUATION, AND LEARNING ACTIVITIES

A. Methods and approaches

In this Learning Agenda, we will implement the following methods and approaches to answer the study's research and evaluation questions. Below we list each component of the study, and we describe our approach to each subcomponent. We will conduct:

1. **Student assessments, done by using the MELQO** tool with a sample of 12 students across 130 schools made up of 65 intervention and 65 control schools in Moshi and Mwanza, for a total of 1500 student assessments
2. **Classroom observations** in a sample of 20 FkW pilot schools and 80 expansion schools, including both FkW intervention and control schools. We will observe the full pre-primary class including circle time, instructional periods, and bye-bye time. We will also review teachers' lesson plans and conduct short interviews with teachers.
3. **An analysis of school enrollment data** at a number of different time points in the pilot and expansion schools where we conduct assessment using the MELQO tool. For this activity, we will collect enrollment and attendance data by age and gender through telephone conversations with headmasters at the study schools.
4. **Teacher surveys** to gain insight into teachers' practices, the contextual changes affecting pre-primary, challenges, and achievement. We will send the survey to 200 teachers, including all FkW pilot and expansion schools in the intervention and control groups.
5. **Qualitative interviews** with key informants to learn more about contextual changes, challenges, and the issues affecting pre-primary education. We plan to conduct semi-structured interviews with the following key informants:
    a) Teachers, including certified teachers and paraprofessionals (n = 40)
    b) Headmaster/teachers (n = 40)
    c) District Academic Officers, District Executive Officer, Ward Education Officers, Village Education Officers, and Quality Assurance Officers (n = 15)
    d) Representatives from the following:
        i) Ministry of Education and Vocational Training and President's Office of Regional and Local Government (n = 6)
        ii) Teacher training colleges and Training Resource Centres (n = 10)
6. **Focus group discussions** (FGDs) with parents, community members, and School Management Committees (SMCs) (n = 40).
7. **Costing analysis** using program cost data from partners including CiC, AKU, Maarifa, Tahea; and from a survey of schools and parents.

1. Student assessments

a. Background and design

The purpose of the student assessment is to gather preliminary evidence on student learning and development and explore whether FkW leads to improved outcomes among pre-primary students. We had initially planned to conduct a randomized control trial (RCT) to measure differences in student outcomes; however, because the intervention is still in development and an RCT is not recommended at this stage, we will not conduct a full impact evaluation.[5] Given the value of acquiring preliminary evidence on student progress throughout the school year, our revised approach is to use the RCT design with a reduced sample size of schools and students for the Learning Agenda. We will conduct a student assessment at two time periods and compare outcomes based on the intervention status of the school and school characteristics. This study will create a full picture of student's pre-academic skills and executive function, as well as allow us to assess trends in student learning and development based on the schools' intervention status. Although a full RCT with an adequate sample size would be needed to estimate impacts or conduct a subgroup analysis with statistical significance, this study will provide high quality exploratory data on students' foundational skills over time.

b. Assessment tool

We are using the Measuring Early Learning Quality and Outcomes (MELQO) tool to assess student learning and development. The MELQO Consortium—which includes UNESCO, UNICEF, the World Bank, The Brookings Institute, the Global Partnership for Education, and the World Health Education—developed and validated the tool. Most recently, the tool was used in a national study across Tanzania. The child assessment includes a set of 25–30 core items drawn from existing regional and international tools and was designed to assess child development and learning. The assessment takes about 35 minutes to administer and is appropriate for children ages 3 to 6. The items assess pre-academic skills such as language, pre-literacy and pre-numeracy, socio-emotional skills, and areas that support learning across multiple domains, such as executive function, persistence, self-regulation, and approaches to learning.

c. Sample

In 2015, assuming that we would conduct an RCT, the FkW consortium undertook a school-mapping exercise. The FkW Monitoring, Evaluation, and Learning Working Group (MELWG) determined the indicators that were to be collected, and CSR mapped the schools in the catchment areas in Moshi and Mwanza that had not participated in the pilot FkW program. Schools that were eligible and interested in participating in the study were visited. The mapping process yielded basic statistics on the school, school leadership, pre-primary teachers, and students. School information included the number of pre-primary teachers, resources allocated to pre-primary education, and the distance from the school to a central landmark, such as the district center. Teacher information included pre-primary teachers' qualifications, years of teaching, age, and other characteristics. Student information included Standard VII leaving exam scores for the latest available year, the number and ages of students, and students' primary

[5] Impact evaluations should only be conducted once stakeholders agree that the intervention has a high level of fidelity, is scalable, and sustainable. FkW has not yet achieved that standard given the recent and drastic increase in student enrollment.

language. Following the mapping, we implemented the following procedures to randomize schools to an intervention or control group for the expansion stage of FkW and to ensure balance between groups assigned to either intervention or control status:

1. In early 2016, using the 2015 mapping data, we excluded schools without pre-primary classrooms; schools where teachers weren't willing to participate; and schools located in Ilamela, which was deemed too far away for implementers to reach because it is located over 100 kilometers from Mwanza and accessible only along poor quality roads.
2. We created 11 strata by region and district (Misungwi, Nyamagana districts in Mwanza and Moshi rural, and Moshi urban districts in Kilimanjaro), and by performance based on standard 7 exam scores (Table 2). Performance was rated as low, medium, or high. In the urban region of Moshi, schools with low and medium performance were grouped together due to the small number of schools. The table below shows how strata were allocated among regions, districts, and student performance.

Table 2. Distribution of strata across the regions and districts based on student performance

Stratum		Student Performance		
	District	Low	Medium	High
Non-excluded schools in Mwanza	Misungwi	1	2	3
	Nyamagana	4	5	6
Non-excluded schools in Kilimanjaro	Moshi rural	7	8	9
	Moshi urban	11		11

3. Next, we selected schools across regions and districts—proportional to the size of the strata—to reach a sample of 240 schools. We then randomized schools from each stratum into intervention (n = 120) and control groups (n = 120) using a random number. Next, we assessed balance on several variables, such as number of pre-primary teachers and pre-primary enrollment.

   Note that, at this stage, the 120 intervention schools became “expansion schools” for the next stage of the FkW initiative. CiC, AKU, Maarifa, and TAHEA began implementing the FkW training and package of services including Component 1, Model 1; Component 2 at the level of the district, ward, school management committee, and schools; and Component 3 at the national level.

4. Next, in 2017, we used this larger group of 240 intervention and control schools to select the sample for most of the Learning Agenda activities. For the student assessment, we reduced the sample size from 240 schools to 130 schools (65 intervention schools and 65 comparison schools), with an even distribution across Mwanza and Kilimanjaro. Schools were selected proportionally by stratum based on the original assignment from the larger sample of 240 schools. Table 3 shows the number of schools selected from each stratum for the intervention and comparison groups, respectively. We used this sample of 130 schools for the MELQO student assessment and the study of student enrollment and attendance.

5. Further, for the student assessment, in the 130 schools we implemented a process to randomly select 12 students per school. Our field team worked with teachers to group students by age. We listed the children's ages and randomly selected 12 students—ages 5 or 6—to participate in the assessment. If the student refused to participate, we selected a replacement. Several times, in order to reach our target of 12 students, we had to include a seven-year-old.
6. For the classroom observation study, we further selected a reduced sample of 80 schools (from this larger sample of 130 expansion schools) in which to conduct observation study.[6] We also used this reduced sample to further select informants and participants for the qualitative study.

We are administering the MELQO student assessment tool to children and teachers in a *late* baseline in May 2017 and at the end of the school year in November or December 2017.

Table 3. Distribution of schools for the MELQO assessment (n = 130)

		Student performance			
Intervention schools	District	Low	Medium	High	Total
Mwanza	Misungwi	8	9	4	
	Nyamagana	2	4	5	32
Kilimanjaro	Moshi rural	11	7	9	
	Moshi urban	2		4	33
				Total	**65**
Comparison schools					
Mwanza	Misungwi	8	9	4	
	Nyamagana	2	4	5	32
Kilimanjaro	Moshi rural	11	7	9	
	Moshi urban	2		4	33
				Total	**65**

d. Training and field procedures

The field team of 18 assessors and 2 supervisors trained and piloted the tools over eight days in Mwanza. After two days of introduction to the tool and practice, we conducted the assessments in teams with children at seven schools. The teams of three observers jointly completed one assessment with each child. Following the assessment, observers individually entered the data into a tablet without discussing the student's performance with other observers. Once all data were entered each day, we examined the inter-rater reliability (IRR) for the pilot MELQO data between our observers. We debriefed on the assessments and methodically reviewed the IRR data item by item to understand agreement and disagreement in observer ratings. We clarified the questions, responses, and definitions related to items that had low reliability in order to improve overall reliability across enumerators. Across the piloting, we

[6] In addition to the expansion schools, we added 20 pilot schools for the classroom observation study as well. See section on classroom observation study.

achieved an average IRR of 96 percent. Data collection was conducted in May and early June 2017.

e. Ethical approval

The study was approved by the Tanzania Commission for Science and Technology (COSTECH). The application, including the study design, sampling procedures, instruments, and specific details about how children will be consented to participate in the study, was submitted in February 2017 and approved in March 2017.

Before conducting the student assessment using the MELQO tool, we worked with schools to inform teachers and parents about the assessment. On the day of the assessment, we obtained verbal assent from children before they participated. We ensured that all children knew their participation was voluntary, and they could refuse to participate at any time. We followed all established rules and guidelines for ethical practices in Tanzania. Following the assessments, student data will be kept confidential. We will aggregate student data to examine classroom-level trends. We will keep data about individual students confidential.

f. Analytic plan

For the baseline MELQO student assessment data, we will clean the data and calculate descriptive statistics to examine students' pre-academic skills, including language, pre-literacy and pre-numeracy, socio-emotional skills, and areas that support learning across multiple domains, such as executive function, persistence, self-regulation, and approaches to learning. We will explore differences based on intervention status, the location of the school, enrollment size, and teacher characteristics such as years of teaching, certification, and whether teachers participated in TIE training. We will also explore differences in outcomes based on students' characteristics, including age and gender. Because we conducted the student assessment in May and not at the beginning of the school year in February, we cannot eliminate the possibility that students demonstrated different levels of performance before our assessment. However, we employed a strong sampling approach to increase the likelihood of observing baseline equivalency between schools.

To analyze the endline student assessment, we will repeat the above procedures. We cannot be fully confident that there was baseline equivalence between the two groups of students before the school year given the timing of the baseline (in May; school started in February). Thus, we must be cautious in attributing any differences in students' abilities' to FkW. Further, we cannot produce statistically significant impact estimates due to the sample size. Still, we can explore differences and examine teachers' practices in these classrooms to gain preliminary insights into student performance. We will explore differences between students based on FkW using a DID approach that compares changes between baseline and endline for students in FkW schools over time. Specifically, we will use the following regression framework:

$$(1)\ y_{ijt} = \propto + Post_t + \pi Interv_j + \rho Interv_j * Post_t + \varphi X_{ij} + \vartheta Z_j + \mu_j + \varepsilon_{ijt}$$

where y_{ijt} is the outcome of interest for student *i* in school *j* in time *t*; $Post_t$ is a dummy variable where "1" represents the post-intervention period; $Interv_j$ is a binary variable equal to "1" if the school was assigned to receiving FkW and zero otherwise; X_{ij} and Z_j are vectors of

baseline student- and school-level characteristics, respectively, that can affect the outcome of interest but are unrelated to the project (for example, students' scores at baseline; gender; or school location); μ_j is a school-specific random error term; and ε_{ijt} is a student-specific random error term.

The parameter of interest in Equation (1) is ρ, the DID estimate, which is an estimate of the average impact of an FkW school adjusting for other factors. This is an intent-to-treat estimate because not all students will take advantage of the program (for example, students might attend classes infrequently). Therefore, it can be interpreted as the effect of attending an FkW assigned school. Because the unit of intervention is the school, we will account for the correlation in outcomes among students in the same school, district, and region when estimating the standard error for the estimate ρ.

2. Classroom observation

Description and design

The classroom observation is designed to provide detailed insights into instructional practices and learning environments across a range of dimensions over time, based on schools and teachers participating in FkW. The observations will enable us to better understand teachers' instructional practices, behaviors, and methods that are along the causal pathway between FkW training and student learning. The longitudinal approach enables an assessment of whether teachers who participate in FkW, both certified teachers and paraprofessionals, are in fact taking up the intervention as described in the theory of change—compared to teachers who have not participated in FkW—and whether they continue to implement the practices as they receive ongoing coaching. Although the links between training, instructional practices, and student learning are critical underpinnings to the theory of change for most in-service training and professional development programs, a literature review revealed relatively few rigorous evaluations that test these links or that test this overarching theory of change, especially in developing countries and among pre-primary teachers. We believe that teacher observations through FkW can help begin to fill an important gap in this literature.

Tool

The FkW Steering Committee partners developed the classroom and teacher observation tool and rubric in a collaborative and iterative process beginning in 2015, with a finalized tool developed in 2016. This first iteration of the tool was developed by Aga Khan University (AKU) as a way to assess teachers' instructional practices, the classroom learning environment, and other factors related to the AKU teacher training course. AKU administrators assessed the tool's face validity and approved the tool internally. At the same time, the FkW Technical Working Group (TWG), including staff at Maarifa and Tahea, developed and began implementing a second tool designed to capture concepts related to the learning environment that were not otherwise measured by the first tool, which focused more on instructional practices. Mathematica led the integration of these two tools, followed by approval from AKU and the TWG. This combined observation tool was used by AKU during classroom visits throughout 2016 and 2017. The tool assesses the quality of the learning environment and teacher performance in the following areas:

- Organization of the school day
- Lesson plan development and use
- Instructional strategies and skills
- Use of learning materials and classroom resources
- Appropriateness, quality, and quantity of learning materials
- Children's participation in learning
- Teacher interaction during play sessions
- Classroom management

For the classroom observations in the Learning Agenda, we added several items from the MELQO Classroom Observation Form to the latest version of the FkW Classroom Observation Tool. For example, we added items on specific instructional practices that teachers implemented during pre-writing, pre-reading, and pre-numeracy activities. We also added items on the school environment, such as physical space—both indoors and outdoors—water source, handwashing and toilet facilities, and feeding programs.

Sample

We selected a sample of 80 expansion schools (as mentioned) and a sample of 20 FkW pilot schools for the classroom observation activity. The expansion schools participated in FkW between 2016 and 2017 if they were randomized into the intervention group, whereas control group schools did not participate in FkW. Pilot schools participated in FkW training and mentoring activities between 2014 and 2015. We implemented the following procedures:

1. First, for observations in the expansion schools, we used the same procedures and approach that we implemented to select the schools for the MELQO assessment. The only difference is that we planned to conduct the observations in 40 intervention and 40 control schools, rather than 65 schools in each study group. We randomly selected 40 intervention and 40 control schools across the strata of interest from the larger group of 65 intervention and 65 control schools that had been previously selected. The sample includes 20 intervention and 20 control schools in both regions, for a total of 40 schools in Moshi and 40 schools in Mwanza.

2. Second, for observations in the pilot schools, we randomly selected 20 schools that participated in the pilot study in 2014 and 2015. There was no control group in this sample. To select the sample, we grouped schools into three strata based on an earlier assessment of teachers' instructional practices by AKU and the TWG during the FkW pilot. At that time, teachers in pilot schools were assigned to categories of "strong," "average," and "weak," based on multiple assessments of their instructional practices. We selected several schools in each of these categories in both Moshi and Mwanza to observe at two time points in 2017. The sample includes schools in each stratum, for a total of 10 schools in Moshi and 10 schools in Mwanza.

Training and field procedures

The field team of 18 assessors and two supervisors trained and piloted the tools over eight days in Mwanza. After two days of introduction to the tool and practice, we conducted the observations in nine schools. We observed the full pre-primary session, from the beginning of circle time to the closing activities. We then conducted a post-pilot briefing section to modify the study tools based on challenges encountered during the pilot. After each observation, we assessed the pilot data for IRR among the three observers who visited a given classroom. We examined the IRR data and debriefed on the classroom visits. We discussed all items for which the IRR score was low and the item scores did not agree. We clarified and discussed the questions, responses, and definitions for items that had low reliability in order to improve overall reliability across enumerators. We achieved an average IRR of 96 percent during the pilot. Data collection in the expansion schools was conducted in May 2017, but data collection in the pilot schools was conducted in July 2017 because those schools closed for most of June.

Analytic plan

For the first round of data collection, we will calculate descriptive statistics and, whenever possible, compare mean composite scores to examine instructional practices and strategies, organization of the school day, the classroom environments and use of learning materials, children's participation, and classroom management. We will explore differences by subgroups based on intervention status and location of school, enrollment size, and teacher characteristics such as years of teaching, certification, and whether teachers participated in TIE training. Given that we are unable to observe these teachers before training, we cannot know whether teachers demonstrated different levels of effectiveness before training. Because of this, we will be cautious in attributing differences in instructional practices and classroom environments to FkW.

For the second round of data collection, we will replicate the first analytical plan, but continue the exploration to understand how instructional practices and the classroom environment change over the course of the school year. We will explore whether teachers' practices progress, remain steady, or regress and examine differences based on the intervention status, ongoing activities at the ward or district level or implemented by parents, and characteristics of the schools and teachers.

We will also explore teacher practices in relation to student learning outcomes as a preliminary investigation of the mechanisms by which FkW impacts student learning outcomes. We will develop figures that illustrate differences in average scores by time period, location, cohorts, teacher or paraprofessional status, teacher education and experience level, class size, per-pupil ratio, and teacher's age.

3. Enrollment analysis

Description and design

The purpose of the enrollment study is to track changes in students' enrollment and attendance at multiple time points in the expansion schools. For this activity, we will collect enrollment and attendance data by age, gender, and student's language from study schools. When we visit schools to conduct the MELQO student assessments and student observations, we will discuss the enrollment study with the headmaster. Using a template that captures the key areas of

inquiry, we will gather the latest statistics on pre-primary students. After the first round of data collection on enrollment, we may contact head teachers and classroom teachers by telephone to collect updated information. We will repeat this collection of enrollment and attendance data at regular intervals.

Sample

For the enrollment study, we will use the same schools that were randomly selected for the MELQO student assessment study because that sample is representative of the large regions. See the section on the sample for the student assessment for a full description of the selection process. Note that we will optimize our use of resources by collecting enrollment and attendance data during the visits we make to assess students. In addition, we will develop a relationship with staff at these schools so that we can telephone to collect data as needed.

Tool

We developed a form for our field team to capture enrollment and attendance information so we can track students by age and language. This data source will enable us to identify trends in attendance, student retention, and new student enrollment. We may also be able to identify whether policy changes take effect, such as limiting pre-primary education to five-year-olds if that policy decision is taken.

Field procedures

For the first round of data collection (assessment of students), our field team will ask the headmaster to review the school's pre-primary student listing to collect the enrollment and attendance data. Working with the teacher, the field team will determine the gender, age, and first language of the students. For subsequent rounds of data collection, we will contact teachers and head teachers by telephone to follow up on attendance. We will note any changes to the full roster and capture information on daily attendance as well as inquire about reasons for absenteeism.

Analytic plan

We will calculate descriptive statistics to examine enrollment and attendance over time. We will construct a run chart, which is a line graph that will allow us to plot the data to identify trends and patterns. We will explore differences by intervention status, the school's location (or region and district), school characteristics, and teacher and student characteristics. We will be able to make specific policy recommendations regarding the age of pre-primary students.

4. Teacher surveys

Description and design

The purpose of the teacher surveys is to gain insight into teachers' perceptions about teaching the pre-primary curriculum given the FkW intervention and the contextual changes affecting pre-primary. We will survey 200 teachers, including those at all FkW pilot and expansion schools in the intervention and control groups. In a brief survey, we will ask about key achievements, challenges, sources of support and mentorship, things the classroom needs, participation on the part of headmasters, School Management Committee, parent partnerships,

and other key issues. We will explore differences in teachers reports based on whether the teacher is certified or a paraprofessional, the teachers' level of education and experience, class size, per-pupil ratio, and teacher's age.

Tool

We will develop a brief one-page tool based on our assessment of the key questions relevant to pre-primary teachers. For example, we will focus on their recent successes, ongoing challenges, areas where they believe they need the most support, and other key issues. We will share the draft tool with steering committee partners for feedback and then incorporate their suggestions. Once revised, we will pilot-test the tool with teachers and then do a final revision of questions as needed before entering the tool into a digital device to streamline data entry.

Sample

The sample of teachers will include the teachers in the schools participating in the MELQO assessment and the classroom observations. In total, we plan to interview 200 teachers at several points in time.

Training and field procedures

First, the data collection team will participate in a short training at CSR in Dar es Salaam to review the survey and discuss study logistics. Next, the data collection team will conduct telephone interviews with teachers to complete these short surveys. The team collected teachers' names and contact information when conducting the student assessments, so interviewers can easily contact the teacher and arrange a convenient time for the short survey. The team will continue to follow up with teachers until they reach all the teachers in the sample and complete the surveys.

Analytic plan

For the first round of data collection, we will calculate descriptive statistics of the data gathered in the interviews with teacher. We will explore differences by subgroups based on intervention status and location of school, enrollment levels, and teacher characteristics, such as years of teaching, certification, and whether teachers participated in TIE training.

For the second round of data collection, we will replicate the first analytical plan and continue to explore teachers' perceptions about their teaching and the challenges they faced over the course of the school year. We will explore how teachers' perceptions change and if there are differences based on the intervention status, ongoing activities at the ward or district level or activities implemented by parents, and characteristics of the schools and teachers.

5. Qualitative interviews and focus group discussions

Description and design

The purpose of the qualitative portion of the study is to document and track stakeholders' perceptions and ideas about the broad study questions, such as which are the most salient aspects of the FkW model, what improvements are still needed in model components, and what new or persisting challenges undermine the quality of pre-primary education. We intend to investigate

and document the strategies that teachers, schools, communities, and districts are implementing to improve the quality of pre-primary and how to make those strategies both scalable and sustainable. We also plan to explore the stakeholders' views and recommendations on the policy, programmatic, and systemic improvements and adjustments needed to help schools and teachers continuously improve quality and overcome the contextual challenges across Tanzania. Finally, we will explore how successful practices and activities can be scaled and sustained in a cost effective manner country-wide. We plan to conduct qualitative interviews with key informants including teachers, both certified and paraprofessionals; head teachers; and the District Academic Office, District Executive Director, Ward Education Officers, Village Education Officers, and Quality Assurance Officers. We will also interview representatives from the Ministry of Education and Vocational Training, the President's Office of Regional and Local Government, and teacher training colleges and Training Resource Centres. Further, we will conduct focus group discussions (FGDs) with parents, community members, and School Management Committees (SMCs).

We plan to conduct qualitative interviews and FGDs at different times in order to track changes in opinions, achievements, and challenges over time. In most cases, we will contact the same informants to best track the evolution of processes, implementation, and perceptions.

Tools

We have developed tools to guide the qualitative activities with key informants. The tools will be shared with Steering Committee members for their feedback, and are customized for informants at the community, school, ward, district, and national levels. Below we describe the focus of each tool:

- The teacher interviews will focus on open-ended questions in which informants can articulate their perceptions of teacher training and mentoring, instructional methods, implementing the FkW approach and TIE curriculum, the school and classroom learning environment, use of learning materials, classroom management, student learning, enrollment and attendance, school leadership and support, parent partnerships, and community supports.
- The interviews with head teachers will focus on perceived changes in teachers' practices and the learning environment, and explore respondents' perceptions of leadership activities to support pre-primary education, support from education officers, capitation grants and the use of funds in pre-primary, implementation of school action plans, and teacher preparedness and instructional practices. We will also explore interactions between head teachers and SMCs, WEOs, VEOs, and other local actors, as well as perceptions of the sustainability, scalability, and cost effectiveness of FkW.
- The interviews with the District Academic Office and District Executive Director will focus on informants' perceptions of pre-primary education, contextual challenges and overcrowding in classrooms, and the roles and responsibilities of DAOs and DEDs in supporting education. We will investigate the financing of education in general and pre-primary specifically, as well as other potential sources of funding for pre-primary education. We will also inquire about the interaction between national, regional, and district offices with regard to education policies, the most salient aspects of the FkW model, and the sustainability, scalability, and cost-effectiveness of FkW. This may include, for example,

enforcing age-restriction policies to reduce overcrowding, or implementing child care programs targeted to children under age 5 who are not ready for pre-primary classrooms.

- The interviews with the WEOs and VEOs, and the Quality Assurance Officers will focus on topics related to the oversight and implementation of pre-primary education, including supporting schools, improving the school and classroom learning environment, and efforts and challenges to ensuring quality in pre-primary. We will explore informants perceptions' of pre-primary education, the FkW approach, TIE curriculum, recent policy changes, teacher preparedness, teacher training, teacher recruitment and retention, and recommendations on how to improve quality in pre-primary classrooms. We will also inquire about informants' interactions or recommendations for SMCs and parent and community engagement.
- In interviews with the representatives from the Ministry of Education and Vocational Training, the Tanzania Institute of Education, and the President's Office of Regional and Local Government, we will ask informants about their perceptions of progress and challenges in policy implementation; short-term and long-term education priorities; the state of pre-primary education; plans for teacher and paraprofessional recruitment, training, and retention; filling the teacher shortage; and costing and financing in education, including capitation grants.
- During interviews with representatives from the teacher training colleges and Training Resource Centres, we will focus on their perceptions of both pre-service and in-service teacher training and activities related to teacher and paraprofessional recruitment, training, and retention, as well as short-term and long-term strategies designed to alleviate the teacher shortage. We will also investigate informants' perceptions on the value of the FkW model, including the TTC tutor training and implementation on the part of AKU, CiC, and the local education partners.
- The focus groups with parents and community members will focus on participants' perceptions of pre-primary education, FkW, the school management and leadership, teachers' instructional practices, the school and classroom environment, and overcrowding and safety. We will also ask about parents' and community members' perceptions of their successes and challenges in community engagement and contributions, as well as promising approaches to improving schools that might be replicated. Parents will be asked for their perceptions of the value of the Parent Partnership Program (PPP), how they would assess student's learning, and the role that parents play in ECE.
- The FGDs with SMCs will focus on participants' perceptions of pre-primary education, the SMCs' activities related to pre-primary, SMCs' supports and challenges, the school and classroom environment, the FkW model, and school financing and additional sources of support for pre-primary. We will also investigate SMC's perceptions of the teacher shortage, the use of paraprofessionals, enforcing national age guidelines for pre-primary students, and parent and community engagement.

Once the qualitative tools are fully developed, they will be shared with the FkW Steering Committee and we will get its feedback. We will revise the tools before they are translated into Swahili. For the field-based qualitative activities, the data collection team will pre-test the tools and practice conducting interviews and FGDs at schools. The tools will then be refined based on input from the partners and lessons learned from the pre-test.

Sample

We will select the sample for the school and community-based qualitative activities from the schools in the MELQO sample.

- We will interview 40 certified teachers and paraprofessionals. The sample will be split so that we select 10 teachers from intervention schools and 10 teachers from control schools in both Moshi and Mwanza. Using the MELQO sample, we will select teachers in schools across the strata to obtain a representative teacher sample. Likewise, we will conduct interviews with a sample of 40 head teachers from the same schools.
- We will select DAOs (n = 2), DEOs (n = 2), WEOS (n = 4), VEOs (n = 4), and QAOs (n = 6) within the same district, ward, and villages where the schools for the sampled teachers and head teachers are located. We will split the sample across Moshi and Mwanza.
- We will purposively select the TTCs and TRCs nearest to the Maarifa and TAHEA offices. We plan to interview TTC and TRC leaders (n = 6) and TTC tutors (n = 4) from organizations that have implemented FkW, as well as those that have not, to understand key differences in teacher training between these organizations.
- We aim to interview the focal points for pre-primary education at the MoEST (n = 1), PO-RALG (n = 4), and TIE (n = 1).
- Finally, we plan to conduct 40 FGDs: 15 with parents, 15 with SMCs, and 10 with community members. We will randomly select communities from the sample that we use to conduct the teacher and head teacher interviews. Once communities are selected, we will work with the schools and local leaders to recruit participants for the FGDs. For the parent FGD, we will seek to recruit at least some parents who have participated in the PPPs, however, in control schools, we will focus on parents of pre-primary students.

Training and field procedures

The field team will participate in a training session on collecting qualitative data. The training will include a thorough review of data collection guides and processes, a description of sampling and recruiting procedures, a discussion and review of high quality transcripts from interviews and FGDs, mock and practice interviews and FGDs, and tool piloting and debriefing. We will work to standardize the data collection approach of the entire team. The training will also be an opportunity to conduct practice interviews and FGDs and for the team to provide feedback on the tool length and content. Once the team pilots the tools, we will discuss the interviews and FGDs to identify areas of success and places to improve. Following the training, we will finalize the study tools.

During field implementation, we will closely monitor the entire data collection process. CSR will organize and monitor on-the-ground operations and ensure that Mathematica's data quality standards are met. The field researchers will follow the sampling guidelines and use the study's tools to conduct their activities. After the respondent grants consent, we will digitally record each interview and also take notes by hand or computer to ensure we do not lose any data. CSR will use the digital recordings to complete word-for-word transcription of the audio files. The Swahili word files will then be translated into English. We will strive to prevent any problems, but if

there are any challenges with audio recordings, the interviewer will write detailed notes and summaries capturing the full content of the interview.

Analytic plan

First, CSR will translate the Swahili transcripts into English using quality assurance checks to ensure accurate translations. Next, we will begin the analysis by reading and re-reading the English transcripts. In the initial reading, we will identify preliminary classification schemes based on the data. We will also identify concepts based on the study's research questions, the qualitative tools, and FkW's program logic. We will then develop analytic codes and a coding hierarchy that enables us to explore, sort, and organize key concepts that emerge from the data. Next, we will code the transcripts word by word according to key themes, using NVivo or a similar qualitative data analysis software. We will review, organize, and analyze the data based on themes that relate to the program logic and the evaluation questions. We will then compare responses by respondent type and location to identify similar and disparate themes across respondent groups.

The final analysis will involve analyzing the coded data, and then synthesizing and validating responses to extract the key findings related to the various study themes and concepts. We will repeat this analytical process until we have mined all of the rich content and nuances from the qualitative data. Once we have analyzed each data source, we will triangulate findings across the interviews, FGDs, and other relevant data sources and documentation, and integrate findings from the quantitative evaluation components. This process makes it easier to identify new trends and relationships, confirm or validate patterns, and detect discrepancies or disparate findings. In addition, our entire interview team will participate in a conversation to synthesize the themes by systematically discussing the respondents' perceptions of PPE and FkW and topics relevant to the evaluation questions.

Given that we will collect multiple rounds of qualitative data, we will present findings in an iterative manner, building on lessons learned and perhaps highlighting cases, if any, where challenges have been overcome. We will share both quantitative and qualitative results. First, the coding hierarchy will enable us to apply quantitative attributes to qualitative data so that, for example, we can report how many teachers had a given experience. In addition, we will present quotes to help the reader understand the themes in more detail. The quotes provide a sense of the stakeholder responses, as well as the varying perspectives of respondents with regard to different themes.

6. Costing analysis

Description and design

In addition to estimating the impact of the FkW program, we will estimate the cost of FkW and assess the overall merit of the FkW investment. These additional analyses will produce estimates that will allow comparison of the program with similar educational interventions elsewhere and other social investments. Impact estimates on key educational outcomes from our proposed evaluation design and analyses can be useful in assessing whether the FkW program is producing the desired effects. A cost-effectiveness analysis is needed to assess the effects on a per-dollar basis (McEwan 2012).

Cost-effectiveness of the FkW program can be estimated in three steps. First, estimate the costs associated with providing the program in the FkW schools. Second, estimate the *preliminary* impacts for the key outcomes (as described above). Third, obtain a cost-effectiveness measure for each outcome by dividing the estimated cost by the estimated impact for the outcome. In the case of pre-reading outcomes, for example, divide the costs by incremental improvements in pre-reading achievement. These estimates will rely on cost data from various components of the FkW intervention. The main categories of costs—staff, training, materials, volunteer time—should be collected from each partner and the schools through a consistent process that yields consistent data. The estimated cost-effectiveness measures using the data-based estimates on student outcomes under this scenario will yield preliminary insight into the relative cost-effectiveness of FkW compared to the status quo.

Procedures and data collection tools

Our primary goal is to capture all of the costs and investments associated with FkW in intervention schools, including items such as labor and staffing, materials, equipment, infrastructure, feeding, and ongoing support to pre-primary teachers. Costs will be estimated at the most appropriate level—either at the school, teacher, or staff level—and later converted to student-level costs using teacher/student ratios from administrative or evaluation data. We will work with CiC and other Steering Committee members, as well as the TTCs, MoEVT, and PMO-RALG, to assess the available cost data and coordinate the collection of financial data. We will strive to place minimum burden on implementers and government agencies by using existing financial data and limiting requests for supplemental information. We will collect data as follows:

First, we will collect and examine **administrative data** from Steering Committee partners to calculate and organize all costs associated with the FkW intervention in the schools participating in the evaluation. We will collect expenditure information on paid and volunteer labor, training, meetings and events, materials and equipment, and other costs. We will attempt to separate costs associated with the in-school component from costs associated with the parent and community component. We will use data on both expenditures and off-budget (donated) goods and services associated with (a) staff labor and salaries, (b) travel and events, and (c) materials or equipment associated with the intervention. To capture the value of donated goods and services, we will request or use existing administrative data on the number of volunteers associated with the intervention, the type of work they performed, the number of hours they donated, and locations where activities took place, as well as food, transportation, or housing provided to the project without cost. Further, we will conduct interviews with staff from Steering Committee organizations to help us understand the interventions' full range of investments and help understand the depreciation and potential future benefits of large up-front investments financed by the project.

During interviews **with MoEVT and other government staff**, we will ask about the ministry's full range of investments associated with pre-primary in the schools included in the evaluation. In addition to asking about direct labor and material/equipment costs, we will ask about any volunteers' investments associated with the ministry's ECE programs. These interviews will focus on the ministry's documented costs and off-budget activities and resource

utilization. We will ask MoEVT for the same information on all costs (outside of any teacher and infrastructure costs) that are uniform across intervention schools.

As part of the **head teacher and teacher interviews and teacher surveys,** we will ask how much schools must spend to provide quality pre-primary education. We will also ask head teachers and teachers to estimate the value of their donation of time, money, and goods (that is, provided without compensation or paid for with their own money). This information will be used to calculate the total amount of additional resources that teachers devoted to FkW, and the extent to which these resources may have been diverted from other activities.

Finally, during **FGDs with parents and communities**, we will ask questions to explore volunteers' labor and monetary investments associated with the intervention, as well as the average opportunity cost of each type of volunteer—that is, the monetary value of activities or work volunteers could have completed during the time they donated to the intervention or spent participating in community action meetings and events related to FkW. We will pose questions to volunteers in everyday language and translate their responses into a form that can be useful for the cost analysis. For example, if most volunteers say that volunteering their time did not interfere with income-generating activities, this will inform our assumptions about the average value of volunteers' opportunity costs. We will also gather information on parents' and caregivers' opportunity costs associated with these activities. This information will be used to calculate the total amount of additional resources that parents and caregivers devoted to FkW, and the extent to which these resources were diverted from other activities.

Analytic plan

We will estimate costs using an activity-based costing or "ingredients" approach (Levin and McEwan 2001; Tan-Torres Edejer et al. 2003; Dhaliwal et al. 2011). First, we will itemize the major investments associated with FkW, such as labor and materials needed for the intervention, including hours invested by teachers, trainers, administrators, and volunteers; teaching and learning materials; and equipment and space. Next, once we have inventoried the major program inputs, we will estimate the value or price of each component or ingredient. In the case of paid labor or purchased goods, this is simply the amount paid. However, determining the value of volunteer labor is more difficult, as it usually involves estimating what volunteers could have been doing during the hours they donated to the intervention.

Once we have estimated all programmatic inputs, we will calculate the total number of students receiving the intervention. We will convert total costs to costs per student so that costs are measured in the same units as the outcomes. Once we have all costs and benefits in the same terms—and corresponding to the same population and time period—we will divide the program's impacts on key outcomes (that is, increases in foundational skills) by per-student costs. This figure will be our basic measure of the cost-effectiveness of the FkW, and it will be expressed as the increase in pre-reading skills per dollar (or hundred dollars) invested.

We will account for the inherent uncertainty in the cost-effectiveness estimates by presenting results using a confidence interval. Cost-effectiveness estimates may be skewed due to sampling errors associated with student outcome data, particularly given that our sample size will likely yield preliminary insights rather than statistically significant impact estimates. So even a large impact that is not statistically significant would be treated by some researchers as

zero impact. However, for this study, we will translate the estimated outcomes/impacts, whether statistically significant or not, into cost-effectiveness estimates that use information on the variance of the impact estimates to calculate the standard error, calculate a confidence interval, or conduct a hypothesis test for the corresponding cost-effectiveness estimate. We will address other sources of uncertainty, such as the choice of a discount rate[7] or the shadow prices[8] for nonmarket goods and services, by presenting a sensitivity analysis that examines how the benchmark cost-effectiveness estimate varies when we vary the underlying assumptions over a range of plausible alternatives.

B. Timeline for the Learning Agenda

Next we present the tentative timeline for the Learning Agenda (Figure 2). We have agreed to keep a flexible approach to the study so we may be responsive should the policy process or key stakeholders require information that is different from our proposed plan or at a time we cannot foresee at the project outset. Note that we are planning two rounds of student assessments, teacher surveys, and interviews with district, ward, and national level stakeholders, as well as four rounds of classroom observations, enrollment data collection, interviews with teachers and head teachers, and focus group discussions. Note that we may remove one round of qualitative data collection if we have reached saturation; that is, we are not obtaining new and different information.

Figure 2. FkW learning agenda: proposed timeline of activities 2017–2018

[7] The discount rate is defined as the rate at which dollars in the future are brought back to the present. For example $100 one year from now is worth less than $100 today, provided that the money could earn interest in one year's time.

[8] The shadow price is the estimated price of a good or service for which no market price exists. For example, this would be the estimated price of bilingual reading materials developed specifically for the intervention, likely based on the value of comparable reading materials that are sold in stores.

IV. DISSEMINATION STRATEGY AND NEXT STEPS

A. Filling the knowledge gap

Leveraging and building on the previous project activities, the Learning Agenda will take a deeper dive into critical questions about the salient components of FkW, teacher training, instructional practices, changes in enrollment and attendance, school management and inspection, parent partnerships, and other topics that are timely and relevant to policymakers. We carefully selected the methods and activities and designed questions and tools to yield important contributions that help fill the knowledge gap in terms of how to implement quality pre-primary education at scale. These activities will yield evidence to potentially guide implementation efforts across Tanzania. We expect that the information generated by the Learning Agenda also will directly contribute to policy discussions and debates and inform decision making on how to achieve the ESDP goals and strategies. The evidence generated by the Learning Agenda will also inform global efforts to develop and implement effective low-cost interventions that bring about quality pre-primary education at scale.

B. Dissemination strategy and actionable Learning Agenda products

Our strategy to engage the country and disseminate our study's knowledge will maximize the likelihood that the study influences programmatic improvements, resource allocations, and policy reforms. The target audience of this analysis is the Ministry of Education, the PO-RALG, TIE, TTCs, other government and development partners and implementers in early childhood education, school administrators and teachers, as well as local level policymakers, funders, and researchers.

As we implement the Learning Agenda, part of our dissemination strategy is to position our Dubai Cares-funded collaborative as a key thought and evaluation partner in Tanzania's early childhood education sector. We envision an interactive, ongoing dialogue with policymakers at multiple levels of government, in which we make dissemination easier by building demand for our findings. Given that this project is responsive to emerging policy issues, and FkW presents the perfect opportunity to better understand how Tanzania can deliver quality, impactful education to Tanzania's youngest students, we believe we can efficiently build demand for our evaluation findings.

Over the next year, we expect to have repeated face-to-face interactions, and leverage these interactions to build interest in and demand for the evaluation products from this project. We will engage closely with stakeholders during the 2017 school year to build these close relationships and actively work to generate ongoing interest in our research findings that extends beyond the programmatic funding for FkW (which is slated to end in 2017) and continues during the course of the Learning Agenda project to be implemented throughout 2018. We will leverage existing interactions to discuss FkW Learning Agenda results, such as FkW Steering Committee meetings, planned consultations with UNICEF and government on the satellite project, and potentially, interactions with the World Bank's Early Learning Systems Research team given their efforts to map all early childhood actors and partners across Tanzania.

Over the course of the study, as data are analyzed, we will disseminate key lessons and actionable recommendations directly to stakeholders to quickly inform teachers, schools,

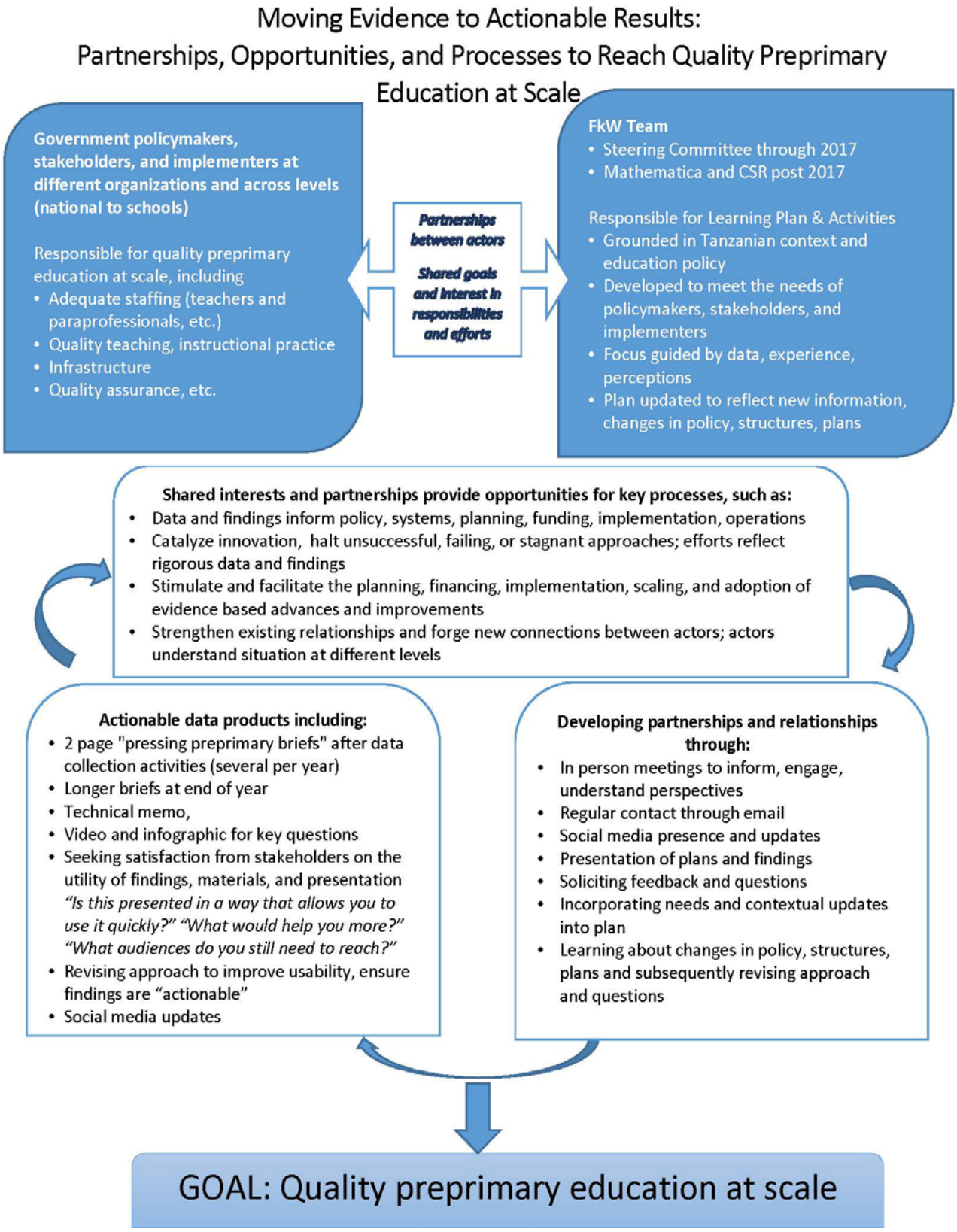
policymakers, and other stakeholders. Figure 3 illustrates the partnerships, opportunities, and processes that we envision will help us move toward the goal of achieving quality pre-primary education at scale. Each product will be carefully designed and translated into Swahili for easy consumption. Our dissemination strategy includes the following evaluation products:

- Two- to four-page policy-relevant briefs following each data collection activity
- PowerPoint presentations for policymakers, delivered each year
- Infographics that highlight key policy-relevant data, which can be shared on social media and in popular newspapers
- Short videos that describe findings and lessons learned, and include policy or programmatic recommendations
- A concise technical memo that succinctly describes the evaluation methods, summarizes findings across and within countries, communicates the technical details of the analysis, makes actionable policy and programmatic recommendations, and suggests further research and questions to consider in subsequent data collection rounds.

Figure 4 presents our project timeline, detailing when we plan to deliver policy briefs, the technical memo, infographics, and video materials. The timeline also illustrates when we expect dissemination meetings to take place. Please note that we budgeted travel costs and time to participate in partner meetings but not the costs of hosting an in-country meeting. We remain open to budgeting to accommodate meeting costs in 2018 if this is the best option to ensure adequate dissemination of important learning.

The results of the analysis will inform, empower, and guide each stakeholder to make policy, programmatic, or budgetary decisions as needed. At each stage of data collection and analyses, we will specifically target Learning Agenda products to the needs of policymakers at different levels and the needs of school-based administrators.

Figure 3. Evidence to actionable results



V. ROLES AND RESPONSIBILITIES

Mathematica Policy Research and the Corporate Social Responsibility Group Africa will partner to implement the Learning Agenda. As we did in the partnership we formed during the pilot study, Mathematica will provide overall project leadership and direction, be responsible for technical decisions, quality, and the timeliness of activities and outputs, and maintain communication with Dubai Cares on project activities. CSR Group Africa will be contracted through Dubai Cares, instead of subcontracting through Mathematica, as this precedence was established during the pilot phase, and proved successful.

Throughout the course of the project, Mathematica and CSR Group Africa will form a cohesive team that shares the vision and expectations of the project and achieves excellent performance. We have laid the foundation for this relationship in working together throughout the pilot and expansion stages of FkW. The strong relationship will serve us well from project startup to closeout. A key element of our success will be to communicate priorities and expectations and provide the support needed to ensure these are addressed in all work. We also understand the need to balance the benefits of collaboration with appropriate levels of management, given that as the project lead, we are ultimately responsible for the quality of all activities and deliverables.

Achieving the goals for this project requires a strong management approach executed by a dedicated project leadership team with experience completing work on time, within budget, and of the highest quality. Mathematica's approach will enable us to achieve the project goals. We will provide high quality products through our technical approach, and high quality service through our proposed project organization, timeline, and management processes. All of our deliverables will have a clear, engaging, and attractive design, and maximize the likelihood of resonating with policymakers and implementers throughout Tanzania and the developing world. The project timeline (Figure 2) and the accompanying work plan (Figure 4) reflect our proposed plan for completing the work on schedule.

Mathematica understands that the success of this project depends heavily on the trusted relationship we have with Dubai Cares and on regular and open communication among all team members. Our goal, therefore, is to ensure there are no surprises from Day One of the contract to closeout. We will involve Dubai Cares in all major decisions, including soliciting input and direction before finalizing deliverables. Communication will take place through various means, including telephone and email, during all project stages; face-to-face contact will take place at Steering Committee and dissemination meetings. We look forward to the opportunity to continue working with Dubai Cares, CSR Group Africa, the Steering Committee, government partners, and other stakeholders throughout Tanzania to help reach the goals of quality pre-primary education delivered at scale to children across the country.

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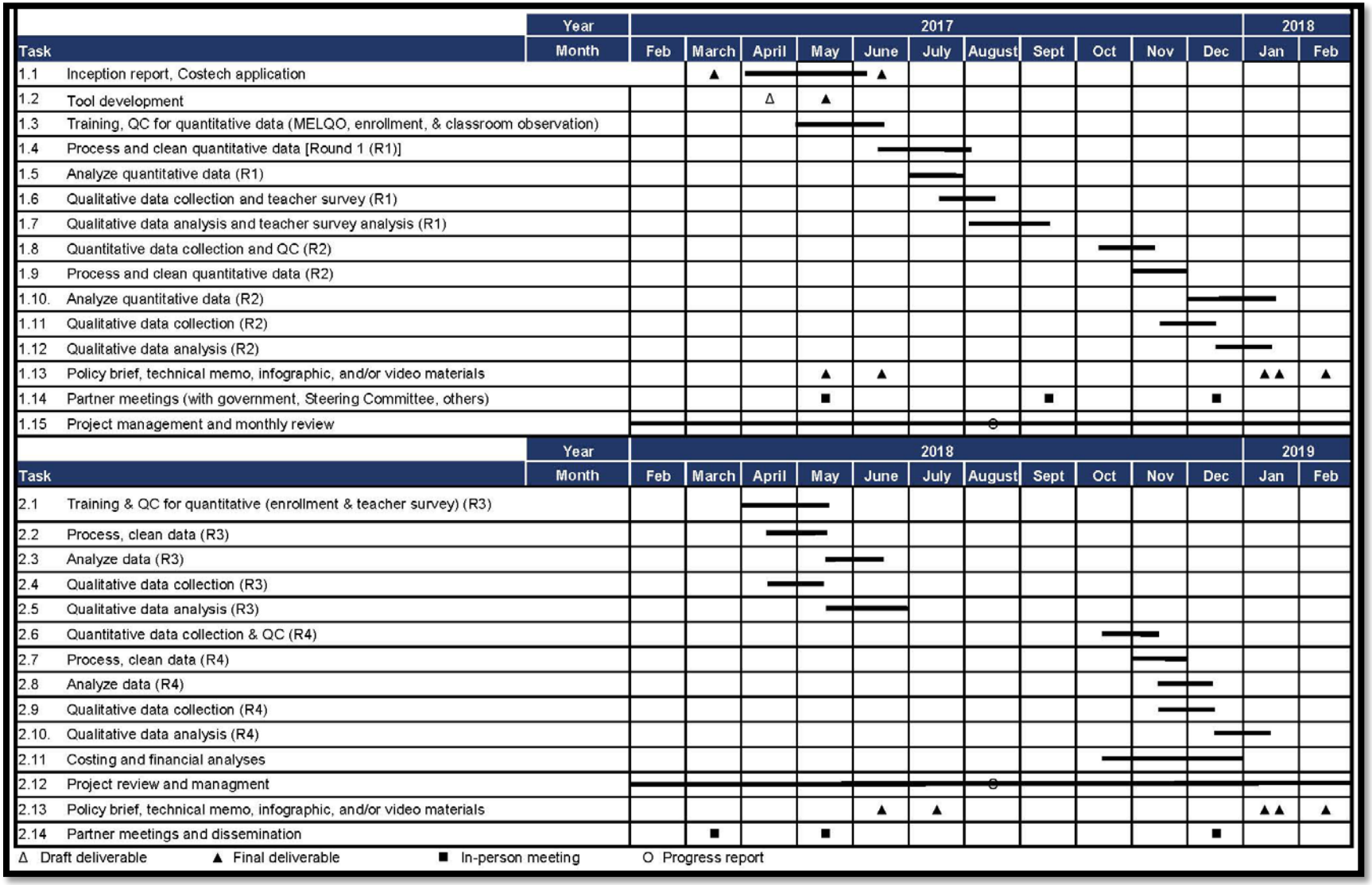
Figure 4. Work plan and project schedule



Task		Year	2017										2018	
		Month	Feb	March	April	May	June	July	August	Sept	Oct	Nov	Dec	Jan	Feb
1.1	Inception report, Costech application			▲			▲								
1.2	Tool development				Δ	▲									
1.3	Training, QC for quantitative data (MELQO, enrollment, & classroom observation)														
1.4	Process and clean quantitative data [Round 1 (R1)]														
1.5	Analyze quantitative data (R1)														
1.6	Qualitative data collection and teacher survey (R1)														
1.7	Qualitative data analysis and teacher survey analysis (R1)														
1.8	Quantitative data collection and QC (R2)														
1.9	Process and clean quantitative data (R2)														
1.10.	Analyze quantitative data (R2)														
1.11	Qualitative data collection (R2)														
1.12	Qualitative data analysis (R2)														
1.13	Policy brief, technical memo, infographic, and/or video materials					▲	▲							▲▲	▲
1.14	Partner meetings (with government, Steering Committee, others)					■				■			■		
1.15	Project management and monthly review								O						

Task		Year	2018										2019	
		Month	Feb	March	April	May	June	July	August	Sept	Oct	Nov	Dec	Jan	Feb
2.1	Training & QC for quantitative (enrollment & teacher survey) (R3)														
2.2	Process, clean data (R3)														
2.3	Analyze data (R3)														
2.4	Qualitative data collection (R3)														
2.5	Qualitative data analysis (R3)														
2.6	Quantitative data collection & QC (R4)														
2.7	Process, clean data (R4)														
2.8	Analyze data (R4)														
2.9	Qualitative data collection (R4)														
2.10.	Qualitative data analysis (R4)														
2.11	Costing and financial analyses														
2.12	Project review and managment								O						
2.13	Policy brief, technical memo, infographic, and/or video materials						▲	▲						▲▲	▲
2.14	Partner meetings and dissemination			■		■							■		

Δ Draft deliverable ▲ Final deliverable ■ In-person meeting O Progress report

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