Evaluating the Fast-track Transformational Teacher Training and Model Practice Classrooms in Ghana:

Improving Kindergarten Quality through Teacher Pre-service Training

DFID Final Impact Assessment Report

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Acknowledgements

Executive summary

International efforts to increase access to high quality early childhood education (ECE) have risen dramatically in recent years. Sustainable Development Goal 4, Target 4.2 calls for "ensur[ing] that all girls and boys have access to quality early childhood development, care and pre-primary education so that they are ready for primary education" (United Nations, 2015). For this target to be achieved, governments will need to focus on both access to pre-primary education (e.g., by incorporating it in to the basic education system) and ensuring the delivery of high quality education (e.g., by producing a well-trained teacher workforce). Ghana has been a pioneer in these efforts, expanding two years of pre-primary education—called kindergarten 1 (KG1) and kindergarten 2 (KG2)—as part of its free, compulsory, universal basic education system in 2008. With some of the highest enrolment rates in ECE on the continent (UNESCO, 2015), Ghana's government has turned its attention the issue of quality improvement, including developing a KG pre-service teacher training track. This report presents the final set of findings from an impact evaluation of a programme designed to improve mentoring and pre-service training for KG student teachers in the Western region of Ghana called the Fast Track Transformational Teacher Training (FTTT) programme.

The programme worked with student teachers during the third year of their pre-service training. Student teachers received in-service coaching and mentoring, attended intensive training workshops (14 days), top-up training sessions (8 days), and received in-classroom coaching (28 days). Trainings focused on developmentally appropriate practice and the national KG curriculum and techniques. A total of 135 student teachers of the Holy Child College of Education in the Western Region were selected to be part of the study and randomly assigned to one of two conditions: (i) a school that provided FTTT training, (ii) a control school. In addition, half of the treatment group student teachers were selected to be part of an additional treatment arm the following year when placed as full-time teachers. This included a sensitisation training for the head teacher in the placement schools. The 4-day training focused on similar topics as the FTTT training, with the goal of increasing the head teachers' receptiveness to these practices.

Four rounds of data were collected for the evaluation. A brief survey was administered to all student teachers before randomization occurred (baseline). The FTTT training and first follow up data collection (teacher level data) were conducted during the student teacher placement year in June of 2016 (follow up I). The following school year, 2016/2017, the student teachers graduated and became newly-qualified teachers and placed in schools across eight regions in Ghana. Data was collected at the school, teacher and children levels in the October and November of 2016 (follow up II) and the June 2017 (follow up III). The primary outcomes for this evaluation were implementation and knowledge of the KG-specific pedagogy, instructional quality, teacher professional well-being and children's learning and development.

The findings show that FTTT had large impacts on improving teachers' implementation of the KG curriculum and knowledge about developmentally appropriate ECE and KG-specific pedagogy. The programme had mixed impacts on teacher professional well-being, increasing sense of personal accomplishment and motivation but decreasing job satisfaction for NQTs, and mixed impacts on teaching quality, with increased in child-led learning but decreases in some other aspects of quality. Finally, there were no impacts on the learning outcomes of NQT students, and no impacts of the head teacher training on any outcomes.

The FTTT programme does improve implementation and knowledge of teachers, but further support and training for NQTs is likely needed for the programme to have sustained impacts on the KG teacher workforce in Ghana.

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Abbreviations

BED	Basic Education Directorate
COE	College of Education
DFID	Department for International Development
ECCD	Early Childhood Care and Development
ECE	Early Childhood Education
FTTT	Fast Track Transformational Teacher Training
GES	Ghana Education Service
ICERDA	International Conference On Education Research For Development In Africa
IDELA	International Development Early Learning Assessment
IPA	Innovations for Poverty Action
IRB	Institutional Review Board
KG	Kindergarten
MoE	Ministry of Education
NCTE	National Council for Tertiary Education
NIB	National Inspectorate Board
NQT	Newly Qualified Teacher
PAR	Pupil Achievement Record
PRINCOF	National Conference of Principals of Colleges of Education
RCT	Randomized Control Trial
TIPPS	Teacher Instructional Practices and Processes System
TMT	Teacher Monitoring Tool
TrMT	Trainer Monitoring Tool
UNICEF	United Nations Children's Fund

Introduction

The Government of Ghana's 2004 National Early Childhood Care and Development (ECCD) Policy highlights access to quality kindergarten (KG) education as central to improving early childhood development and learning, and a promising way to prevent development delays and foster early learning despite adversity. In 2007, two years of KG education—called Kindergarten 1 and Kindergarten 2, respectively—were added to the government's guarantee of universal and free education, which became practice in 2008. Ghana is one of the first countries in Sub-Saharan Africa to provide two years of pre-primary education, and has one of the highest preschool enrolment rates on the continent. Recent estimates suggest that net enrolment in KG was 80% in the 2015-16, and gross enrolment 124% (Ministry of Education, 2016), the second highest on the continent (UNESCO, 2015).

Despite remarkable progress in expanding access to and enrolment in school in Ghana, including in pre-primary, educational quality and learning outcomes remains low. Many children begin primary school unready to learn, and learn very little during their school careers (Banerjee et al., 2010; Ministry of Education, 2014). One of the most effective ways to improve educational quality and pupil learning outcomes is by improving the skills and capacities of teachers (Rivkin et al., 2005; Murnane & Ganimian, 2016). The 2012 Government Kindergarten Situational Report found that just over 27,000 teachers at the KG level have not received formal Early Childhood Education (ECE) training and the Ghana Education Service (GES) has stated it a priority to ensure that the KG teacher workforce becomes a trained workforce.

Developing a high-quality pre-service KG teacher training track is one of the primary ways the government intends to produce a skilled workforce. Currently, 7 (soon to be 8) of the 40 colleges of education in Ghana offer a track for kindergarten teachers. Developing and expanding a high quality and scalable pre-service training programme is one of Ghana Education Service's top priorities. Pre-service certification in Ghana includes two years of coursework and one year in a classroom as a student teacher. The colleges offer no specified training during the student-teaching year. One way to build pre-service training models is to offer rigorous and intensive experiential training and coaching to student teachers, a critical part of effective training.

The Fast-track Transformational Teacher Training (FTTT) programme does just that. The programme supports the Colleges of Education (COEs) in developing an appropriate model for the experiential component of pre-service teacher training. The programme takes place during the student-teaching year of training and consists of upgrading existing KG classrooms into model practice classrooms for KG1 and KG2, staff training and ongoing monitoring, coaching and feedback for KG student teachers. To evaluate the impact of the FTTT programme, a randomized controlled trial (RCT) was conducted with 135 student teachers from the Holy Child College of Education starting at their third year during which there are placed a KG classroom. Half of the

student teachers was placed in a school implementing FTTT model classrooms, while the other half was placed in a standard classroom. The study assessed the student teachers and followed them for one additional year after they became newly-qualified teachers (NQTs) and were assigned to placement schools across the country.

A report was submitted in March 2017 summarizing partial findings from the baseline and follow up I data that was collected during the student-teaching year. This report presents the final results of the evaluation for all three follow up waves of data collected, including the second and third rounds of follow up data collection. Thus, analysis of the data collected in this report was conducted between June 2015 and July 2017. The first section of this report provides contextual information on KG education and pre-service teacher training in Ghana and describes the interventions evaluated in this study. Sections 2 and 3 detail the empirical strategy adopted for the evaluation and the data collection process, respectively. Section 4 presents the findings of the evaluation. Section 5 presents the Cost Effectiveness Analysis of the FTTT programme. Section 6 and 7 respectively discuss the findings and their implications for policy decisions. The final section, Section 8, focuses on next steps in terms of programme development, as well as policy engagement and dissemination strategies.

Section 1:   Intervention

1.1.   Background

1.1.1.   Kindergarten Education in Ghana

Governance, Policy and Teacher Training

The Ministry of Education (MOE) is responsible for initiating and formulating education policies, developing and revising the national curriculum, overseeing teacher professional certification and implementing national education policy through its agencies, such as GES. GES is in charge of pre-tertiary education: it coordinates ECE activities in school through its Basic Education Division and liaises with Development partners in promoting ECE development in Ghana.

Ghana is one of the few African countries to have developed a national early childhood development policy aimed to promote the development of children from birth to 8 years old and to coordinate stakeholder activities in the sector. The policy, promulgated in 2004, establishes institutional roles and responsibilities for public and private partners and develops a costed implementation strategy. Among other things, the National ECCD policy highlights access to quality KG education as central to improving early childhood development and learning, and a promising way to prevent development delays and foster early learning despite adversity. In 2007, Ghana became one of the first sub-Saharan African countries to expend the Universal Free and Compulsory Basic Education (fCUBE) to kindergarten, stating that all children are to receive two years compulsory education at the age of four and five before entering primary one.

The main providers of kindergarten teacher pre-service training are the COEs, seven of which offer a diploma in basic education focusing on early childhood. The University of Education, Winneba also offers degrees in early childhood education and the University of Cape Coast offers specific courses on early childhood education as part of their degree in education.

Access to and Quality of Early Childhood Education

Following the launch of the National ECCD Policy, the preschool sector in Ghana went through a rapid expansion. From 2004 to 2010, the number of kindergartens in Ghana doubled, this increase being mostly accounted for in the public sector, though the private sector is growing rapidly in some parts of the country (EMIS, 2004; MOE, 2016.)

Yet the ECE sector in Ghana is beset with low staff qualification and in some cases untrained staff, especially in preschool. The 2012 Government Kindergarten Situational Report concluded that the 2004 curriculum established is sound, but that teacher behaviour has not yet adapted to reflect the new pedagogy. This is partly because only half of the teachers in kindergarten received

formal training[1] (EMIS, 2015) and that most teacher training institutions are yet to integrate and promote adapted teaching practises. Consistent with these observations, a 2013 exploratory study by Innovations for Poverty Action (IPA) in Accra revealed that the quality of classroom instruction in preschools was generally low and developmentally inappropriate across the public and private sectors (Bidwell et al., 2014).

1.1.2. Geographic Location and Sample Representativeness

FTTT was developed in response to the need to improve the quality of the KG education system via enhanced pre-service teacher training. This is the first rigorous evaluation of the programme's effectiveness to achieve these goals.

The programme was implemented in the Sekondi-Takoradi metropolis in the Western Region, where the student teacher of the Holy Child College of Education were completing their third year of education in a placement school. The student teachers then graduated to NQTs and were assigned to schools across eight regions in Ghana: Greater Accra, Eastern, Central, Western, Brong-Ahafo, Ashanti, Northern, and Upper East.

The sampling methods were designed to detect causal impacts of the programme on a set of teacher and child outcomes. Two issues are noteworthy: the sample is not representative of student teachers throughout the country or the region, only to those who graduated from Holy Child College of Education in 2016. In addition, the evaluation team did not have control over the region or district of the schools to which the NQTs would be assigned. Placements were conducted by GES.

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[1] This proportion was 61.7% in public schools and 5.1% in private schools in 2014/2015.

Figure 1: Regional Repartition of Newly-Qualified Teachers (Initial Posting)
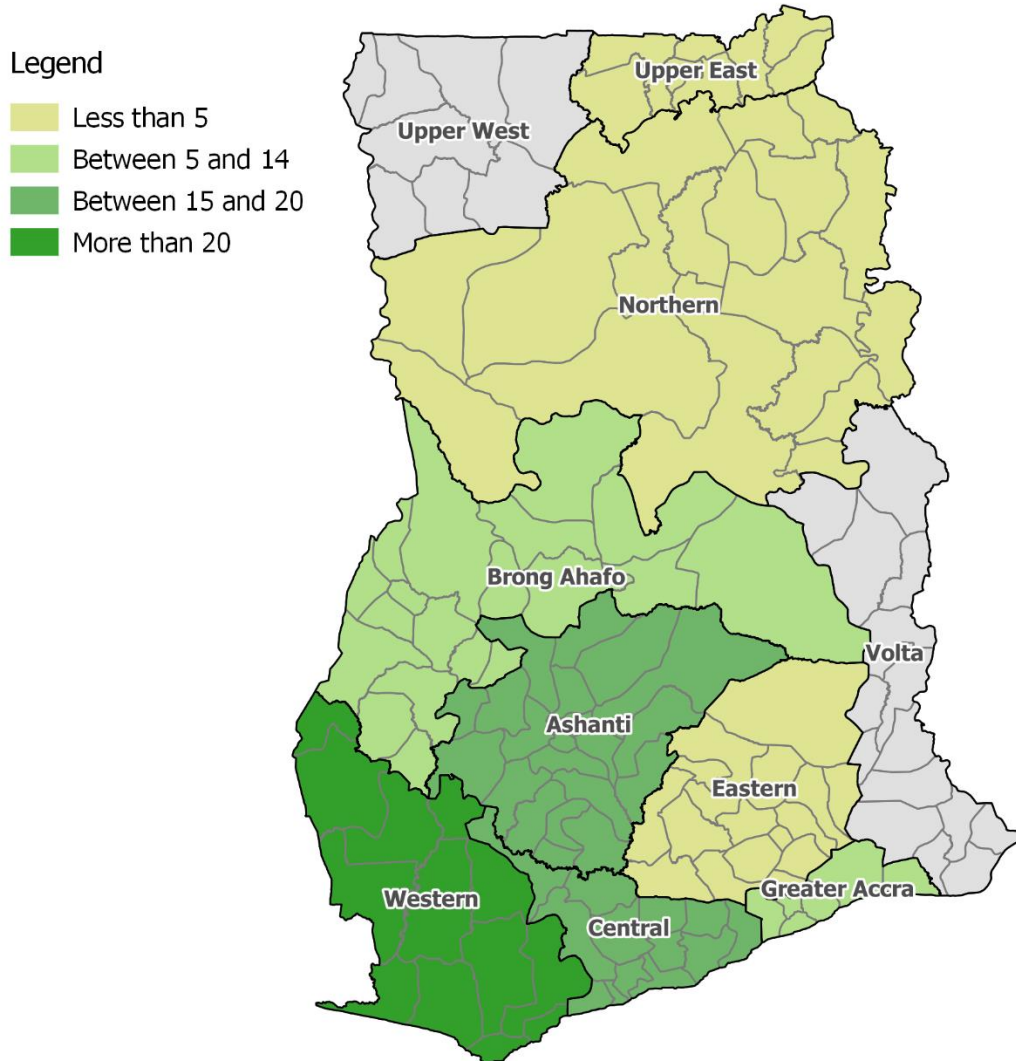
1.2. Intervention Design

1.2.1. Fast-track Transformational Teacher Training Programme

The FTTT programme addresses the issue of instructional quality of KG education in Ghana, particularly related to age-appropriateness of teaching methods and content, by promoting the adoption of developmentally appropriate child-centred practices through an innovative training. The training is developed based on the national KG curriculum.

The programme builds on the standard three-year certification programme, which includes placement in a standard KG classroom in the third year of training with mentorship from the teacher of that class. The FTTT augments the student teacher placement year with intensive and

guided in-service training and support. Student teachers are placed in schools with "model practice classrooms," which provide them with enhanced training, coaching and mentoring by FTTT trainers. The enhanced training services include intensive workshops, in classroom coaching, one-on-one feedback meetings with trainers, and a best practice forum for student teachers to share their experiences with each other.

Head teacher sensitization training

One potential barrier to the longer-term success of the FTTT programme lay in teachers experience the following year when placed as newly qualified teachers (NQTs). After being trained in the methods promoted in the FTTT programme as student teachers, NQTs may be discouraged from using these practices in their placement schools. Given that the methods promoted in the KG curriculum and the FTTT programme are quite different than those in primary school, parents and head teachers may discourage teachers from teaching in this style in favor of a more rigorous and academic focus (Bidwell et al., 2014; Choi, 2006; Kabay, Wolf & Yoshikawa, 2017).

In addition to testing the impacts of the FTTT programme, this study also tests the added value of a sensitization training and sensitization programme for the head teachers in NQTs' placement schools. The goal of this programme is to help head teachers become more willing and able to provide the support needed to enable the NQTs to establish effective child-centered activity based KG classroom than head teachers who have not received this sensitization. The programme evaluated was a 4-day retreat workshop and which included an introduction to and overview of early childhood development, the national KG curriculum, and the FTTT programme. Participants were also offered advice on how they could best support the NQTs in their schools.

The head teacher workshop highlights the alignment of the FTTT programme with GES Policy, emphasizes the importance of KG as the foundation of education, introduces the participants to an FTTT model classroom, and covers the teaching, assessment, and monitoring tools and materials used in the programme. Head teachers also have opportunities to discuss how they can more deeply engage parents, and how they can resolve challenges encountered while implementing the programme.

Thirty-four (34) head teachers were randomly selected from the total number of sixty-nine (69) head teachers whose schools nationwide received the newly qualified FTTT-trained teachers from Holy Child College of Education. Out of the 34 participating head teachers, 25 (73.5%) were male and 9 (26.5%) were female. The participants were drawn from six regions, namely: Ashanti, Brong Ahafo, Central, Greater Accra, Upper East and Western. Participant feedback forms were administered at the conclusion of the workshop to gather information on how useful the trainees felt the training was, how well it was facilitated, and to what extent the respondents felt they could support their own NQTs in implementing the pedagogy. All the participants responded very

positively to the content that they received and unanimously expressed a desire to see this training made available to KG head teachers across the whole of Ghana.

1.2.3. Logic Model

The logic model, provided by Sabre Trust, is illustrated in the figure below. Teachers from target classrooms participated in the programme to gain the knowledge and skills to implement the new pedagogy and transform their classrooms into model practice classroom, and gain mentoring skills to support future student teacher placements. This is expected to lead to improved educational outcomes for KG pupils in schools where NQTs are posted.

A threat to the success of the programme is associated with the level of acceptability of innovative teaching methods among actors in the education sector. Schools, teachers and parents might not assess KG quality on criteria related to age-appropriateness and classrooms interactions, and might consider play-based instructional practices as ineffective. Thus, they might display scepticism towards, and resist, the introduction of new teaching practices. Notably, in order to address part of this concern, we assess the impact of sensitizing the head teachers (of the schools in which the NQTs are placed) to the proposed teaching methods on the effectiveness of the programme.

Another potential concern is the availability of relevant and appropriate teaching materials to effectively apply the methods acquired during training, in an environment often characterized by weak infrastructures and resource constraints. To address this issue, the FTTT relies upon the use of low-cost teaching and learning materials and trains student teachers in designing and creating their own in the classroom.

Figure 2: FTTT Logic Model

Impact: SDG Goal 4: Ensure inclusive and quality education for all and promote lifelong learning, with particular reference to quality early childhood development, care and preprimary education, in Shama and Sekondi-Takoradi districts of Ghana's Western Region.

Outcome: Kindergarten (KG) children in Model Practice Classrooms (MPCs) within target schools benefit from improved active, play-based learning delivered by better qualified kindergarten teachers, and student teachers from Holy Child College of Education (CoE) graduate with the confidence and skills to replicate the pedagogy in their own posting classrooms

Output 1: Selected trainers have increased knowledge of Fast Track Transformational Teacher Training (FTTT) and are able to deliver this to Head Teachers, Practising Teachers and GES officers in target schools and districts.

Output 2: Practising Teachers and Head Teachers in target schools have increased awareness of and capacity to deliver improved active, play-based learning to early primary school children.

Output 3: Early Childhood Diploma Student Teachers from Holy Child CoE have greater skills, knowledge and confidence to deliver the new active, play-based pedagogy and teaching approach in their classrooms.

Output 4: Officials from Holy Child CoE and GES equipped with knowledge and skills to sustain the FTTT and network of MPCs after the completion of the programme.

Input 1: 49 days of Trainer Training, preparing trainers to deliver all training activities to the MPC teachers, head teachers and GES officers. Trainer Certification by a British University partner.

Input 2: 42 days of training including Intensive Training Workshops, Top-Up Training & In-Class Coaching. Classroom resource pack for every MPC. GES officers supported to make termly Teacher Monitoring visits to every MPC.

Input 3: 30 days of trainer support and quality assurance for the delivery of training to student teachers. Provision of training materials to all student teachers. Student teachers mentored by practising teachers in MPCs

Input 4: GES officers receive training and support to enact termly teacher assessments. Resource mobilisation training provided to GES and Holy Child College.

Issue: Poor quality practical placements for student teachers within the pre-service teacher training system in Ghana mean new teachers graduate lacking the confidence and skills to enact the new kindergarten pedagogy and as a result children's pre-primary learning remains low quality, leading to poor outcomes at primary school.

1.3. Intervention Implementation

FTTT was piloted from August 2013 to July 2015 by Sabre Trust and GES with Our Lady of the Apostles College in the Central Region, with the creation of 38 model practice classrooms and the training of 55 teachers and 135 ECE student teachers. In August 2015, the programme was replicated in the Western Region in partnership with GES and Holy Child College of Education in 23 schools which hosted model practice classrooms in the 2015-16 academic year.

Sabre Trust used three key monitoring tools which have been developed in collaboration with GES and the COE: the Trainer Monitoring Tool (TrMT), the Teacher Monitoring Tool (TMT), and the Pupil Achievement Record (PAR). The TrMT allows the project team to measure the capacity and effectiveness of the trainers. The TMT supports classroom observations and can be applied to mentors and student teachers. The TMT identifies all of the target skills that KG teachers should be displaying, and provides a strong basis for the mentoring process. The PAR provides teachers with a simple check list to track pupil development. Anonymised participant feedback forms are administered at each training workshop to gather information on how the trainees found the training, and also include element of pre- and post-training testing to gauge how far the content has been understood by the trainees.

2.   Evaluation Design

2.1.   Overview

2.1.3. Methodology and Research Questions

The FTTT study employs a randomized design at the student teacher level to assess the impact of the programme on teaching practices of NQTs once they have been posted as NQTs. RCTs determine the true impact of an intervention by comparing the outcome of the intervention to what would have happened without it. Using randomisation to select treatment and control groups ensures that the groups are identical at the outset. Individuals in these groups are likely to live through similar external events throughout the same period, and thus the only difference between the two groups as a whole is receipt of the treatment status.

The evaluation is designed to address the following questions:

- **Is the FTTT effective as a pre-service teacher training programme?** FTTT graduates and their control group counterparts are being tracked into their first year of work as full-time teachers. Two sets of outcomes are being assessed: (a) teacher classroom instructional practices and classroom climate assessed through classroom observations, and (b) teacher professional well-being and motivation (also a proxy for how likely they are to remain within the teaching force) assessed through a teacher survey.

- **Is the FTTT programme more effective when head teachers are trained in similar methods?** The effectiveness of a cross-treatment is being assessed where the head teacher in the FTTT student teacher's final posting schools underwent a short, in-service training focused on similar topics as the FTTT training. This component assesses the added value of increasing the receptiveness from the teacher's supervisor of the practices reinforced in the FTTT training.

2.1.4. Ethical Considerations

Ethical review and approval was provided by IPA's Institutional Review Board (IRB), as well as the IRB of the University of Pennsylvania. This guarantees that the research protocols developed in the framework of this study respect ethical principles and guidelines for the protection of participating human subjects, especially for vulnerable participants including children. All the members of the evaluation team completed a recognized Human Subject training (either the National Institute of Health's Protecting Human Research Participants or the Collaborative Institutional Training Initiative's Certification in Human Protections.)

The anticipated risk due to participating in this study was minimal and sensitive questions were not included in the instruments. Informed consent was formally requested at the beginning of each interview with the teachers and the head teachers to ensure that all respondents were willing to participate in the study and were informed of the risks incurred in doing so. In the case of the kindergarten pupils, verbal assent was obtained before the administration of the assessment and surveyors were trained to carefully pay attention to the child during the assessment in order to identify any sign of distress or sign that the child wanted to stop the test.

Confidentiality of data and of participants is of the highest priority to the study team, while in the field and in the offices. Every effort was made to ensure confidentiality by holding surveys in private settings, and the study team members took great care in protecting data in both transport and storage. All digital data including personally identifiable information is encrypted and only accessible to team members approved by the IRBs.

2.2. Sampling and Treatment Arms

2.2.3. Teachers, Head Teacher and Pupils Sampling

In the Western region, all the 135 incoming third-year student teachers from the Holy Child College of Education during the academic year 2015/2016 were selected to be part of the evaluation. The student teachers transitioned to NQTs and were posted by GES to schools across eight regions of the country in September 2016. At follow up 2 and 3, the total number of teachers interviewed was 129 and 131, respectively. The head teachers of all schools where NQTs are placed were also surveyed. The table below shows the regional distribution of NQTs at

follow up 2 (initial placement) and follow up 3 (final placement, different if they were transferred or have moved).

Table 1: Regional Placement of Newly-Qualified Teachers

Region	Initial Placement	Final Placement
Ashanti	15	15
Brong Ahafo	5	4
Central	16	17
Eastern	4	4
Greater Accra	7	8
Northern	1	1
Upper East	1	1
Western	80	81
Total	**129**	**131**
Not interviewed	6	4

Note. 29 teachers were initially placed as NQTs in non-KG classrooms. We followed and observed teachers in the study regardless of the class in which they were placed. For teachers placed in lower primary (1-3), we conducted classroom observations. For teachers in primary 1, we also conducted child assessments. For the four NQTs who placed in upper primary or Junior High School classrooms, we only conducted the teacher survey.

Fifteen children were randomly selected from each teacher's class roster to participate in direct assessments. If a school had fewer than 15 kindergarten children enrolled, all children were selected, totaling 1524 children assessed at follow up 2. At follow up 3, if children enrolled in the school after the previous round of data collection in a classroom with fewer than 15 children, they were added to the sample, resulting in a total of 1618 children at follow up 3.

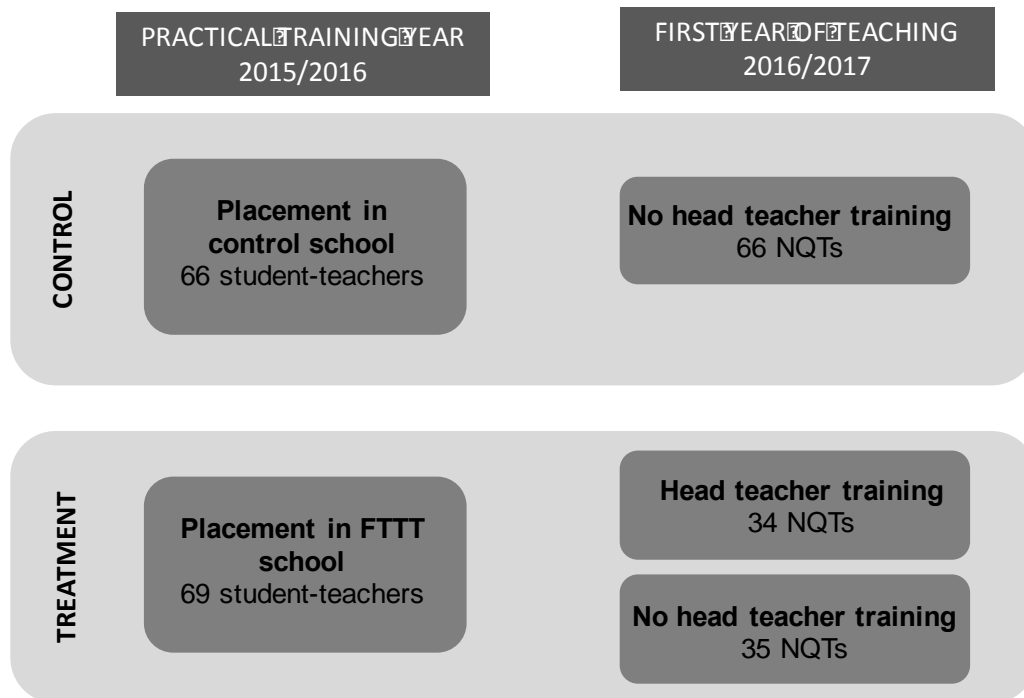### 2.2.4. Treatment Arms and Randomization

At the first stage, half (69) of the students-teacher were randomly selected to be placed in a model classroom while the others constituting the control group (originally 68 teachers, two of which dropped out of the certification programme before the student teaching year, leaving 66 in total), were placed in "business as usual" classrooms. Thus, the study includes two treatment arms, with an additional assessment of the impacts of a head teacher training. Impact are assessed on: (1) placement in a FTTT model classroom during the third year of teacher training, or (2) control (current standard operating) condition.

Table 2: Baseline Equivalency Across Treatment and Control Group Student Teachers

	Control	Treatment	*t-* or *F-* stat	p-value
	Mean			
Female (%)	100.0	100.0	0.00	1.000
Age (years)	23.2	23.6	-1.46	0.148
Highest level of education completed (%)			1.94	0.163
Secondary school	100.0	100.0		
Diploma	0.0	2.9		
Married (%)	7.8	4.4	0.71	0.401
English language proficiency (%)			1.35	0.510
Fluent	96.4	96.8		
Basic	3.6	1.6		
None	0.0	1.6		
School type preference after training completion (%)			2.67	0.445
No preference	0.0	1.5		
Private	1.5	0.0		
Public	84.9	79.7		
Religious	13.6	18.8		
Literacy knowledge assessment (% correct)	34.1	34.2	0.03	0.981
Sample size (total = 135)	66	69		

In addition, for the head teachers of the initial placement schools of the NTQs in the treatment group, 34 were randomly selected for their school to receive an additional intervention of head teacher training. The added impact of this treatment is also assessed.

Figure 3: Treatment Arms

	PRACTICAL TRAINING YEAR 2015/2016	FIRST YEAR OF TEACHING 2016/2017
CONTROL	**Placement in control school** 66 student-teachers	**No head teacher training** 66 NQTs
TREATMENT	**Placement in FTTT school** 69 student-teachers	**Head teacher training** 34 NQTs / **No head teacher training** 35 NQTs

2.3. Analytic Strategy

2.4.1   Missing Data Imputation

While 135 teachers were included in the first wave of impact data collection (i.e., as student teachers), some teachers left the sample for various reasons. At the second follow up (NQT-Fall), six teachers were not available for data collection for various reasons (e.g., one teacher did not post to her placement school, another passed away). At the third and final follow-up (NQT-Summer), four teachers were not available for data collection (e.g., one passed away from NQT-Fall, two refused to be surveyed, one could not be reach).

To account for any potential bias caused by the lack of all available data for all teachers, multiple imputation was used (with Stata's "ice" command) to handle missing data on all missing variables. Data from all four rounds of data collection (baseline collected before randomization, and all three follow-ups) was used in the imputation process. Using a rich set of teacher demographic and background variables, as well as outcome scores for professional well-being and classroom

quality across all three waves, 20 teacher-level datasets were imputed and used in all impact analyses. While the data are not missing completely at random (MCAR), if variables that strongly predict attrition are incorporated into the missing data strategy, the plausibility of a missing at random (MAR) assumption increases (Young & Johnson, 2015). In other words, in estimating multiple chains of models by including a large set of covariates, including those that predict differential attrition, assumptions of MAR have been shown to be robust

2.4.2 Impact Estimates

Separate models were fitted to estimate main intervention impacts on (a) teacher professional well-being (i.e., motivation, burnout, personal accomplishment, and job satisfaction), (b) classroom quality factors (i.e., implementation checklists, child-led learning, emotional support and behavior management, and supporting student expression), and (c) children's learning and development (i.e., school readiness domains).

Impacts are assessed using linear regression models. During the student-teaching year, standard errors were adjusted for clustering with in school, since student teachers were placed in groups of 2-3 teachers per school. Impacts assessed during the NQT year on teacher outcomes did not make any adjustment for standard errors. Finally, in assessing impacts on child outcomes, standard errors were adjusted for clustering within teacher, as there were about 15 children per teacher. All impact estimates were computed using the imputed 20 datasets (using Stata's "mi estimate" command).

Covariates included: teacher age and the presence of family nearby (for student teachers); teacher age, the presence of family nearby, a dummy indicator for if teachers were placed together in a school (N = 16 schools / 32 teachers), a dummy indicator for teachers placed in a primary 1-3 classroom (N = 9 teachers), and eight dummy variables controlling for region of the school (for NQTs). Finally, in assessing impacts on child outcomes, variables included children's fall score for each respective outcome (if a child was not in the sample in the fall, the average score for their class was used), a dummy indicator for if teachers were placed together in a school, a dummy indicator for teachers placed in a primary 1-3 classroom, and eight dummy variables controlling for region of the school.

In addition, for each outcome assessed in the final follow-up, a dummy for if the school was assigned to receive the head teacher training was included. This allowed for the assessment of the impacts of this training.

Figure 4: Impact Evaluation Theory of Change
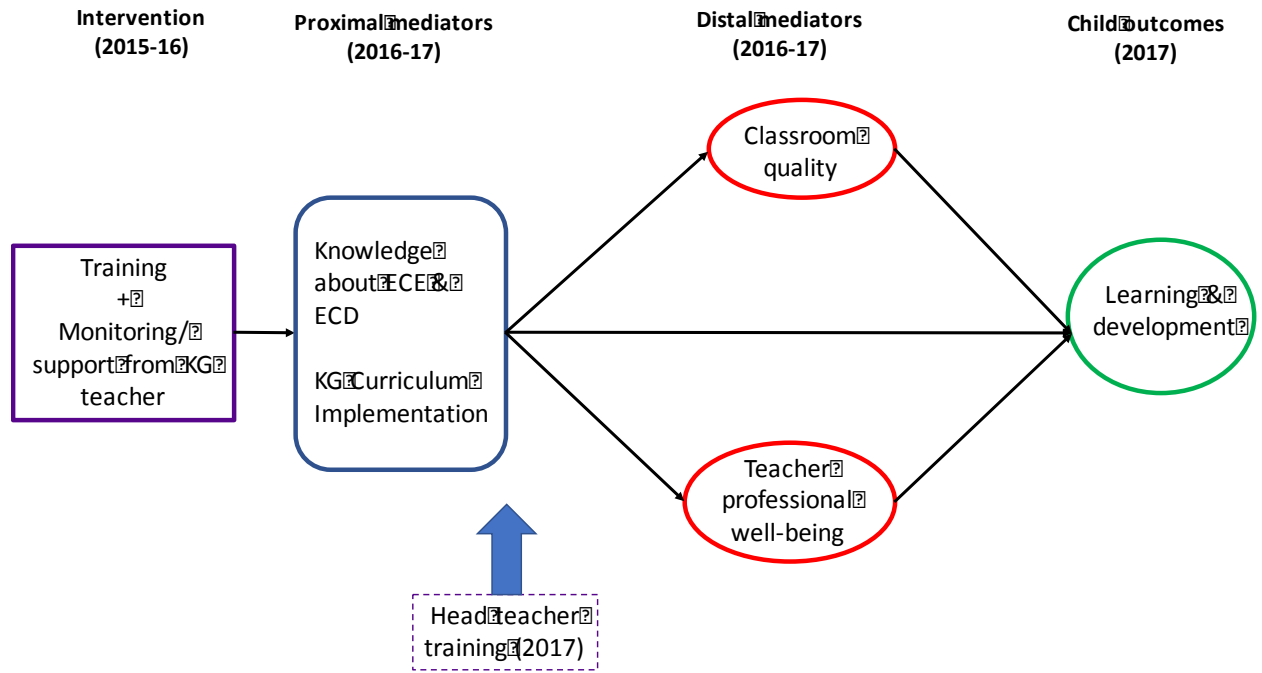
3. Data Collection

Data collection occurred in four rounds, and multiple sources of data were collected. The four rounds included (1) baseline, where basic demographics and teaching knowledge were assessed before student teachers were randomised to the treatment and placed in classrooms (i.e., when they finished their coursework); (2) follow up I with teachers at the end of their student-teaching year, (3) follow up II at the start of the 2016/2017 academic year when teachers were placed as full-time, NQTs and (4) follow up III at the end of the 2016/2017 academic year. The types of data collected at each wave are also depicted in Figure 5.

Table 3: Data Collected at Each Round of Data Collection

	Baseline (Jun 2015)	Follow up 1 (Jun 2016)	Follow up 2 (Nov-Oct 2016)	Follow up 3 (May-Jun 2017)
Demographics	X			
Implementation of curriculum		X	X	X
Early childhood education knowledge			X	X
Teacher-child interactions		X	X	X
Professional well-being		X	X	X
Student outcomes			X	X

3.1. Fieldwork Timeline

Fieldwork on the FTTT Study started in June 2015 and ended in July 2017. In total, four rounds of quantitative data collection were conducted over the study period – baseline, follow up I, follow up II, and follow up III. A detailed timeline from August 2016 can be found in Appendix B.

3.1.3. Baseline

Baseline data collection occurred in June 2015, before student teachers begun their placement year. Survey was conducted via a self-administered instrument. The survey took basic background information about the student teachers, measured their English and local language proficiency, reading knowledge and motivation. Student teachers were also asked to indicate their preference for region and district to be posted once they qualified as teachers.

3.1.4. Follow Up I (Student teachers)

The follow up I survey was conducted in June 2016 over a two weeks period, after student teachers had been placed in schools to undertake teaching practice. FTTT student teachers were placed in schools with "model practice classrooms," which provided them with enhanced training, coaching and mentoring by FTTT trainers. During this round, 135 teachers were reached and interviewed. Video recording and classroom environment scan for all respondents were also collected.

3.1.5. Follow Up II (NQT-Fall)

The midline II data collected round occurred between October and November 2016, after the NQTs were placed in their schools. During this round, the following data was collected (a) surveys of teacher well-being and demographics, (b) video recordings for classroom observations of teachers, (c) interviews with school head teachers (baseline) and (d) direct assessments of children's school readiness at school entry (baseline). Before data collection commenced, mobilizers had to visit all districts offices and schools where NQTs had been posted to deliver permission letters from GES and as well parent consent forms in relation to child assessments. Survey then visited the schools to administered the pupil assessments and collected information on teachers and instructional practices. During this round, 129 teachers were interviewed, 128 videos were recorded and 1524 pupils were assessed. In parallel, the head teacher interview was conducted on the phone, a total of 110 head teachers (covering 112 NQTs) were interviewed.

3.1.6. Follow Up III (NQT-Summer)

The third follow up data collection was conducted from May to July 2017, on the last term of the first year of placement of the NTQs. As during the second midline, the following data was collected: (a) teacher interviews, (b) video recording and classroom environmental scans, (c) head teacher interviews and (d) child assessments. Mobilizers were sent ahead of the survey teams to share permission letters from the GES with district and schools. The head teacher questionnaire was administered in-person, during the survey team visit in the school, along with the other instruments. A total of 131 teachers were interviewed, 119 videos recorded, 1618 children assessed. In addition, 117 head teachers were surveyed.

3.2. Instruments and Outcomes

A number of instruments were used and developed for the purpose of the study. Information was collected at the school level, the teacher and classroom levels, and the child level. All the follow up III instruments are attached in Appendix A.

3.2.3. School and Head Teachers Characteristics

School characteristics were assessed of the placement schools for the NQTs using an administered survey with the school's head teachers by treatment condition.

Head Teacher Survey. Items included basic structural information about the school, as well as information on education processes such as language of instruction and family and community outreach. In addition, questions included characteristics about the head teacher. Items were adapted from a scoping study of ECE in Accra (Bidwell et al., 2014) and piloted before use in the survey. The survey was administered at the second and third follow-up.

3.2.4. Teacher Characteristics

Teacher characteristics, ECE knowledge, and professional well-being were assessed using an administered survey that was collected at the first, second and third follow-up rounds of data collection.

Teacher Survey

Questions included basic demographic information, training and experience levels, reading knowledge, household and personal conditions, as well as a set of indicators of teachers' professional well-being (including perceived work conditions, motivation, burnout) and personal well-being (including mental health and anxiety). Items were adapted from existing measures and piloted before use in the survey.

ECE knowledge

*T*eacher's knowledge about developmentally appropriate practices in KG was assessed using three sub-scales of the Perceptions of Quality in Early Care and Education scale (Child Trends, 2014). All items from the were assessed on the following scale: 1 = not very important, 2 = not important, 3 = somewhat important, 4 = important and 5 = very important. These scales were administered only during NQT year.

Developmentally appropriate practice was measured using six items (α = 0.66 and 0.67 at rounds 3 and 4). Sample items for developmentally appropriate practice included "When you think about quality in a kindergarten setting, how important is it that KG teachers know about children's needs as they grow and develop" and "When you think about quality in a kindergarten setting, how important is it that KG teachers provide materials for play and learning?" (M = 4.80, SD = 0.34 at round 3; M = 4.79, SD = 0.33 at round 4).

Supporting social and emotional development was assessed using five items (α = 0.74 and 0.71 at rounds 3 and 4). Sample items for supporting children's social and emotional development included "When you think about quality in a kindergarten setting, how important is it that KG

teachers help children to build relationships with peers and adults?" and "When you think about quality in a kindergarten setting, how important is it that KG teachers help children resolve conflicts with other children?" ($M = 4.23$, $SD = 0.63$ at round 3; $M = 4.64$, $SD = 0.30$ at round 4).

Finally, knowledge about *family-sensitive caregiving* was measured using five items ($\alpha = 0.50$ and 0.75 at rounds 3 and 4). Sample items for family-sensitive caregiving included "When you think about quality in a kindergarten setting, how important is it that KG teachers be willing to work with parents about their work schedules?" and "When you think about quality in a kindergarten setting, how important is it that KG teachers be willing to care about the entire family, not just the child?" ($M = 4.59$, $SD = 0.38$ at round 3; $M = 4.17$, $SD = 0.68$ at round 4).

Motivation

Motivation was measured as a scale using five items adapted from Bennell & Akyeompong (2007) as reported in Torrente et al. (2012). These items were assessed on the following scale: *1 = false, 2 = mostly false, 3 = sometimes, 4 = mostly true, 5 = true.* Sample items for motivation include "I am motivated to help children develop well socially" and "I am motivated to help children learn math" ($M = 4.59$, $SD = 0.54$ at round 2; $M = 4.60$, $SD = 0.46$ at round 3; $M = 4.62$, $SD = 0.59$ at round 4) ($\alpha = 0.68$; 0.57, and 0.67 at rounds 2, 3 and 4).

Job satisfaction

Teacher's job satisfaction was measured at all three rounds using six items adapted from Bennell & Akyeompong (2007) as reported in Torrente et al. (2012). These items were assessed on the following scale: *1 = true, 2 = somewhat true, 3 = somewhat false, 4 = false.* Sample items for job satisfaction included "I am satisfied with my job at this school" and "Other teachers are satisfied with their decision to be a teacher in this school." Responses to each item were recoded so that higher scores would imply higher job satisfaction ($M = 2.00$, $SD = 0.41$ at round 2; $M = 2.26$, $SD = 0.38$ at round 3; $M = 2.13$, $SD = 0.40$ at round 4) ($\alpha = 0.53$; 0.72, and 0.70 at rounds 2, 3 and 4).

Burnout

Burnout was measured at all three rounds using eleven items from the Maslach Burnout Inventory (Maslach et al., 1996). Items asked teachers to use a scale from *1* ("never") to *7* ("every day") to indicate, for instance, how often "I feel emotionally drained from my work" and "I feel fatigued when I get up in the morning and have to face another day on the job" ($M = 2.31$, $SD = 1.08$ at round 2; $M = 2.25$, $SD = 0.98$ at round 3; $M = 2.21$, $SD = 0.94$ at round 4). ($\alpha = 0.77$; 0.71, and 0.68 at rounds 2, 3 and 4)

Personal Accomplishment.

Personal accomplishment was measured at all three rounds using eight items from the Maslach Burnout Inventory (Maslach et al., 1996). Items asked teachers to use a scale from *1* ("never") to *7* ("every day") to indicate, for instance, how often "I can easily understand how my school children feel about things" and "I feel excited after working closely with my school children" (*M* = 6.27, *SD* = 0.86 at round 2; *M* = 5.84, *SD* = 1.02 at round 3; *M* = 6.19, *SD* = 0.93 at round 4) (*α* = 0.69; 0.68, and 0.72 respectively).

3.2.5. Fidelity of Implementation – Structural and Processes

We assess the extent to which student teachers and NQTs implement the programme as intended through two measures incorporate key elements of the KG-specific pedagogy outline in the 2004 National ECCD policy. The *materials checklist* was collected at the school at the time of data collection. The *activities checklist* was coded by trained coders based on the video recordings of each teacher. Each practice was coded as either present in the video (a score of 1) or absent in the video (a score of 0). Items included:

Materials checklist

This checklist included 10 items pertaining to the KG curriculum regarding how teachers set up their classrooms and that are promoted in the FTTT programme. The practices related to how teachers set up their classrooms, including if there was at least one learning center, a daily plan/schedule displayed, classroom rules displayed, the classroom being physically clean and tidy, children's work displayed, and at least one story map visible. Each item was coded as either present in the classroom (a score of 1) or absent in the video (a score of 0) (*M* = 5.6, *SD* = 3.1 at follow up 1; *M* = 3.1, *SD* = 2.0 at follow up 2; *M* = 3.7, *SD* = 2.6 at follow up 3).

Activities checklist

This checklist included 13 items pertaining to the KG-specific pedagogy and taught in the FTTT programme year related to behavior management and instructional practice. related to behavior management and instructional practice. Each practice was coded as either present in the video (a score of 1) or absent in the video (a score of 0). Items included: "Teacher praises children for positive behavior", "Teacher threatens children with or used a cane on children at least once (reverse coded)"; "Teacher explicitly reminds children of the class rules"; "Teacher uses a signal to gain children's attention (e.g., drum beat, song, bell); "Children are seated in a way that children can see each other's faces (e.g., in a circle, or tables together in groups)"; "Teacher uses one or multiple songs to facilitate learning at some point in the lesson"; and "There is an activity that

facilitated the lesson objectives that involved manipulation of materials" ($M = 3.7$, $SD = 1.8$ at follow up 1; $M = 3.7$, $SD = 1.6$ at follow up 2; $M = 4.0$, $SD = 1.6$ at follow up 3).

3.2.6. Instructional Quality

Classroom instructional quality was assessed by directly observing teachers at the end of their student-teaching year. All student teachers in the sample were video-recorded for one hour while they taught a lesson.

Teacher Instructional Practices and Processes System

The early childhood education version of the Teacher Instructional Practices and Processes Systems (TIPPS) was used to assess teacher-child interactions. The tool was adapted for the Ghanaian context through consultations with local teachers and educators, as well using videos collected in KG classrooms in Ghana as part of another research study (see Wolf et al., 2017). The assessment contains a total of 19 items, of which four have been dropped due to the lack of variability in their scores across classrooms. Item 2 – "Teacher structures learning activities to enable pupils to learn to work, play and share with others" – has been examined separately. Based on previous research in Ghana (citation after publication), a confirmatory factor analysis was run to assess if the same factor structure fit the data adequately in this sample. Items were grouped into the following three scales:

1. *Child-led learning:* Two items were averaged that included: "Teacher supports children's development through the use of free playtime" and "Teacher structures learning activities in a way that children learn to work, play and share with others." Both items pertain to teachers' support of child-led learning in terms of individually child-driven activities and children learning from their peers.

2. *Supporting Student Expression:* This scale is made up of 4 items that include: considers student ideas and interests; encourages students to reason and problem solve; connects lesson to students' daily lives; and models complex language. Specifically, the items are: Item 3: "Teacher uses pupils' ideas and interests to inform classroom activities and assignments", Item 4: "Teacher encourages pupils to reason and problem solve", Item 7: "Teacher connects pupils' studies to their everyday life experiences, showing the relevance of lessons outside the classroom" and Item 9: "Teacher models use of language to encourage students to be expressive and communicative of their ideas in the classroom" ($\alpha = 0.47$; 0.52, and 0.51 at follow up 1, 2 and 3 respectively).

3. *Emotional Support and Behavior Management: management:* This scale is made up of 7 items that include positive climate; negative climate; sensitivity and responsiveness; tone of voice; positive behavior management; provides

consistent routines; and student engagement in class activities. Specifically, the items are: Item 11: "Behavioral indications of positive environment between teacher and pupils and amongst peers", Item 12: "Teacher sensitivity and responsiveness to pupils' needs and learning", Item 13: "Behavioral indications of negative environment between the teacher and pupils and amongst peers", Item 14: "Teacher uses appropriate tone of voice and expression when interacting with pupils", Item 17: "Teacher manages pupil misbehavior through effective behavior management techniques", Item 18: "Teacher creates a consistent routine for the classroom that pupils can easily follow" and Item 19: "Pupils are engaged in classroom learning and activities". (α = 0.61; 0.52, and 0.70 at follow up 1, 2 and 3 respectively.

Reliability

Video coders were trained and had to achieve the pre-specified levels of reliability in order to pass the training. Raters were recruited in Ghana, had a bachelor's or master's degree, and attended a 5-day training session on the instrument. Each rater had to meet or exceed three TIPPS calibration criteria within three attempts to be certified as a TIPPS observer. TIPPS calibration criteria not only look at agreement but also the degree of deviation from master codes—both important aspects given that there are only four scale points and that understanding of the concept is critical for precise coding (see Seidman et al., 2013 for details on calibration cut-offs). Collectively, these three criteria enhance the likelihood of achieving acceptable levels of inter-rater reliability. Raters who achieved calibration were also required to participate in 30-minute weekly refresher sessions led by TIPPS trainers that included a review of different manual concepts, short practice videos, and time for questions and discussion.

To assess inter-rater reliability, 15% of videos collected at baseline were coded by three raters. We calculated the ICC of the final scores to assess how the partition of variance in scores breaks down into differences in individual raters and shared variance across raters. On average across items, 71.1% of the variance was shared across raters.

3.2.7. Student School Readiness Outcomes

Students' development was directly assessed in five areas relevant to school readiness: early numeracy, early literacy, social-emotional, and executive function. A fifth domain of children's approaches to learning was reported by the assessor. The instrument used was the International Development and Early Learning Assessment (IDELA), developed by Save the Children (Pisani et al., 2015). The tool was translated into three local languages: Twi, Ewe, and Ga. Surveys were translated, and then back-translated by a different person to check for accuracy. Any discrepancies were discussed and addressed. Finally, after being trained on the instrument, a group of surveyors read and discussed the translated version in their respective local language and made additional changes as a group.

Early Literacy

The domain of early literacy consists of 38 items grouped into 6 subtasks, and covers constructs of print awareness, letter knowledge, phonological awareness, oral comprehension, emergent writing, and expressive vocabulary. An example subtask on phonological awareness asked children to identify words that begin with the same sound. A sample item is: "Here is my friend mouse. Mouse starts with /m/. What other word starts with /m/? Cow, doll, milk" ($\alpha = 0.74$).

Early Numeracy

The domain of early numeracy consists of 39 items grouped into 8 subtasks and covers constructs of number knowledge, basic addition and subtraction, one-to-one correspondence, shape identification, sorting abilities based on color and shape, size and length differentiation, and completion of a simple puzzle. An example item assessing shape identification showed the child a picture with six shapes and asking the child to identify the circle ($\alpha = 0.72$).

Social-Emotional Development

The domain of social-emotional development consists of 14 items grouped into 5 subtasks, and covers constructs of self-awareness, emotion identification, perspective taking and empathy, friendship, and conflict and problem solving. An example item of conflict solving involved asking the child to imagine he or she is playing with a toy and another child wants to play with the same toy, and asking the child what they would do to resolve that conflict. "Correct" answers in the Ghanaian context as agreed upon by the assessors during training included talking to the child, taking turns, sharing, getting another toy ($\alpha = 0.69$).

Executive Function

The domain of executive function was assessed with ten items grouped into two subtasks focused on working memory (i.e., forward digit span) and impulse control (i.e., head-toes task). For the forward digit span, assessors read aloud five digit sequences (beginning with two digits and increasing up to six digits) and children were asked to repeat the digit span and marked as correct or incorrect. For the head-toes task, assessors asked children to touch their toes when the assessor touched his or her head, and vice versa in a series of five items ($\alpha = 0.83$).

Approaches to Learning

After the assessor completed the IDELA items with each child, they filled out seven items about the child's approaches to learning. Each child was rated on a scale of 1 to 4, with 1= "almost never" and 4="almost always". Assessors reported on children's attention (i.e., "Did the child pay attention to the instructions and demonstrations through the assessment?"), confidence, concentration, diligence, pleasure, motivation, and curiosity during the tasks ($\alpha = 0.94$).

Reliability

Inter-rater reliability on the child development outcome measure was assessed. Enumerators were paired and assessed and scored two children together. Cohen's kappa values were calculated for each pair across each item in the entire assessment, and values ranged from 0.67 to 0.97, with an average kappa value of 0.86.

3.3. Data Quality Protocols

All the instruments were programed on SurveyCTO. The programed instruments were administered using Samsung tablets to save time and enhance accuracy. Enhanced quality controls systems such as automatic skip patterns, relevance, and constraints were integrated into the programming to guarantee data quality. The programming was done by an IPA Programmer and the Research Associate.

Several strategies were implemented to ensure the highest data quality during field work. Survey accompaniments, where an assessor from the country office evaluation team or the field supervision team sits with the surveyor and observes them conducting a survey, were frequently conducted at the initial stage of the data collection to ensure that the questionnaire was appropriate understood and administered by the surveyors. Accompaniments were followed by immediate feedback and, if needed, in-field refresher trainings. As per IPA guidelines, 15% of all surveys were audited and results from the discrepancy checks were satisfactory. High frequency checks and data scrutiny were conducted regularly to identify and correct any mistakes in the data submitted by the field teams, potentially leading to follow-up visits to respondents to clarify specific answers. Random spot checks, when supervisors unexpectedly visit a surveyed community and observe the team operating, were regularly conducted during the survey period.

4. Findings

Issues with Placement

The eight regions in which NQTs were placed were: Ashanti (15 teachers), Brong Ahafo (5), Central (16), Eastern (4), Greater Accra (7), Northern (1), Upper East (1), and Western (81). While the majority of teachers were placed in KG classrooms, 29 teachers (21.5%) were placed in non-KG classrooms (four in junior high school, one in primary 4, one in primary 5, seven in primary 3, seven in primary 2, and nine in primary 1).

Teacher surveys assessing professional well-being and ECE knowledge were administered to all teachers regardless of placement. Classroom observations were conducted for teachers in KG and primary 1 to 3 classrooms. Child assessments were conducted for all KG teachers and primary 1 teachers.

Impact on Implementation of KG-Specific Pedagogy

The first question addressed is that of fidelity of implementation. Table 4 presents the impact estimates on implementation of the KG-specific pedagogy (measured at all three follow up points) and teacher knowledge (measured at follow up 2 and 3). Very large impacts are observed on both dimensions of implementation for student teachers ($d = 2.40$, $p < .001$ and $d = 1.14$, $p < .001$ for materials and activities, respectively). Said another way, control group classrooms implemented an average of 3.2 KG-specific pedagogical materials compared to 7.9 in model practice classrooms. Regarding KG-specific pedagogical activities, control group student teachers implemented 2.7 compared to 4.6 for FTTT student teachers.

The following year as NQTs, treatment and control group differences persisted but were smaller. In the fall, control group teachers implemented an average of 2.7 of the materials compared to 3.5 in the treatment group ($d = 0.39$, $p < .001$). In addition, control group teachers implemented an average of 3.5 the activities in the checklist compared to 4.1 for treatment group teachers ($d = 0.33$, $p < .001$). Notably, this measure was taken early in teachers' placement year as they may have still been setting in to their new classrooms. In the spring, these impacts persisted, with treatment teachers showing improvements in their use of materials over the year. Control group teachers implemented an average of 2.7 of the materials and compared to 4.7 in the treatment group ($d = 0.69$, $p < .001$). In addition, control group teachers implemented an average of 3.9 the activities in the checklist compared to 4.4 for treatment group teachers ($d = 0.32$, $p < .001$).

Impact on Knowledge of ECD and ECE Pedagogy

Table 4 also shows the impact estimates on teacher knowledge, which was only assessed at the second and third follow ups. There were moderate to large impacts of FTTT on NQTs' knowledge across three dimensions of early childhood development and ECE pedagogy in the fall: developmentally appropriate practice ($d = 0.47$, $p < .001$), supporting children's social-emotional needs ($d = 0.69$, $p < .001$), and family-sensitive practice ($d = 0.34$, $p < .001$). Impacts persisted in the spring with similar effect sizes.

Impacts on Professional Well-Being

Impacts on four dimensions of teachers' professional well-being were assessed: motivation, burnout, job satisfaction, and personal accomplishment. These were selected because they have been shown to be important in predicting teacher turnover and the way teachers' interact with their students in the classroom. Impacts on professional well-being were mostly positive. As shown in Table 3, as student teachers, FTTT teachers displayed higher levels of personal accomplishment ($d = 0.42$, $p < .05$). These impacts persisted for NQTs throughout the school year ($d = 0.19$ in the fall, $d=0.32$ in the spring, $p < .001$), indicating that FTTT increased teachers feeling accomplished at their job. Treatment teachers also reported higher levels of motivation in the fall ($d = 0.24$, $p < .001$) and spring ($d = 0.12$, $p < .05$) and lower levels of burnout in the spring ($d = -0.09$, $p < .05$). However, as NQTs, FTTT teachers also reported lower levels of job satisfaction both in the fall ($d = -0.10$, $p < .05$) and in the spring ($d = -0.37$, $p < .001$). This may be the result of transition from a model practice classroom with ongoing monitoring and support to a full-time position with much fewer resources and support. Results are also presented in Table 4.

Impacts on Classroom Quality

FTTT also changed classroom processes in the short time teachers were observed during data collection. These impacts were mixed. In all three rounds of follow up data collection, treatment group teachers implemented significantly more child-led learning activities. However, this difference declined in size with time, with large impacts for student teachers ($d = 0.90$, $p < .001$), moderate-sized impacts in the fall for NQTs ($d = 0.38$, $p < .001$) and small impacts in the spring for NQTs ($d = 0.12$, $p < .05$). This indicates that teachers had difficulty sustaining practices taught in FTTT that were in direct contrast to traditional teaching approaches.

While the programme increased child-led learning activities, it decreased teachers' support of student expression during the observed period. This was most pronounced for student teachers ($d = -0.53$, $p < .05$), but persisted in the fall of the NQT year ($d = -0.07$, $p < .10$). By the spring, there was no differences between treatment and control group NQTs in these two dimensions of classroom quality. Results are also presented in Table 4.

It is worth noting that these estimates of classroom quality come from one 30-60 minute observation period that was video recorded and thus can only be generalized to this observation period. It would be interesting and useful to spend a school day with each teacher to see if / how these results generalize to teaching practice as observed throughout an entire school day.

Impacts on Student Outcomes

Impact on children's learning and developmental outcomes were considered at the end of the NQT year. As stated above, FTTT teachers were more likely to be placed in a KG classroom and in a KG1 (compared to KG2) classroom as NQTs. As a result, treatment group NQT students scored lower on learning assessments. However, by controlling for children's fall scores, this was accounted for when assessing impacts in the spring. As shown in Table 5, there were no impacts on any dimension of child outcomes assessed.

Table 4: Impacts on Implementation, Knowledge, Professional Well-Being, and Classroom Quality

	b	(SE)	d		b	(SE)	d		b	(SE)	d	
	Follow up 1 (Student teachers)				Follow up 2 (NQT-Fall)				Follow up 3 (NQT-Summer)			
Implementation[a]												
Fidelity structure checklist	4.78	(0.59)	2.40	***	0.77	(0.08)	0.39	***	1.92	(0.10)	0.69	***
Fidelity process checklist	1.83	(0.33)	1.14	***	0.54	(0.07)	0.33	***	0.49	(0.07)	0.32	***
Early Childhood Education Knowledge[b]												
Developmentally appropriate practice	--	--	--		0.16	(0.01)	0.47	***	0.18	(0.02)	0.55	***
Supporting child social-emotional needs	--	--	--		0.42	(0.03)	0.69	***	0.25	(0.02)	0.64	***
Family-sensitive practice	--	--	--		0.13	(0.03)	0.34	***	0.28	(0.03)	0.41	***
Teacher professional well-being[b]												
Motivation	0.12	(0.11)	0.23		0.11	(0.02)	0.24	***	0.06	(0.03)	0.12	*
Burnout	0.36	(0.03)	0.34	+	-0.05	(0.04)	-0.05		-0.09	(0.04)	-0.09	*
Job satisfaction	-0.05	(0.07)	-0.11		-0.04	(0.02)	-0.10	*	-0.15	(0.02)	-0.37	***
Personal accomplishment	0.36	(0.14)	0.42	*	0.20	(0.04)	0.19	***	0.30	(0.04)	0.32	***
Teacher-child interactions[a]												
Child-led learning	0.54	(0.12)	0.90	***	0.14	(0.02)	0.38	***	0.05	(0.02)	0.12	*
Supporting student expression	-0.31	(0.13)	-0.53	*	-0.04	(0.02)	-0.07	+	0.01	(0.03)	0.02	
Emotional support/ behavior management	-0.01	(0.08)	-0.02		-0.04	(0.02)	-0.08	+	0.03	(0.03)	0.05	

*** p < .001, ** p < .01; * p < .05, + p < .10. d = effect size (standard deviation units).
[a] Sample size = 129 teachers placed in KG or primary 1-3 classrooms.
[b] Sample size = 135 teachers placed in KG, primary, or JHS classrooms.
Covariates for ST regressions include: teacher age and close family nearby.
Covariates for NQT regressions include: teacher age, close family nearby, a dummy indicator for schools with more than 1 NQT, a dummy indicator for if the teacher is in a primary level class, and country region.
Estimates at follow up 2 and follow up 3 derived from 20 multiply imputed datasets.

Table 5: Impacts on Child Outcomes

	b	(SE)
	NQT-Summer (FU 3)	
Early numeracy	-0.001	(0.016)
Early literacy	-0.020	(0.020)
Social-emotional	0.003	(0.016)
Executive function	-0.006	(0.011)
Approaches to learning	0.060	(0.059)
Sample size = 1,618		

Notes. No estimates reach statistical significance. All estimates derived from regression analyses. Coefficients for covariates not shown. If children were not present at baseline, the mean baseline score for their classroom was used.

Head Teacher Training

Impacts of the head teacher training were assessed for all NQT-spring outcomes (follow up 3). No impacts were found on any outcome, indicating that the head teacher training did not affect FTTT NQT's teaching practice.

Moderation of Treatment Impacts by Primary School Classroom Placement

As stated above, 25 teachers were placed in primary school classrooms. Differential impacts of the treatment based on placement in a primary classroom (versus a KG classroom) was assessed. (Note that for this analysis, the four teachers placed in junior high school classrooms were excluded). If the interaction term in statistically significant, this indicates that treatment impacts were different for teachers placed in KG versus primary classrooms.

As shown in Table 6, significant differences in treatment impacts were found across a range of outcomes, including classroom instructional practices (implementation of curriculum, child-led instruction, supporting student expression, and emotional support and behavior management), ECE knowledge, and professional well-being (burnout, job satisfaction, and personal accomplishment). There were no significant interactions for student outcomes. The moderation effects indicate two patterns of results: (i) impacts on classroom instructional practices and ECE knowledge are concentrated in teachers in KG classrooms, and (ii) impacts on professional well-being are larger for teachers in primary classrooms.

Table 6: Moderation of Treatment Impacts by NQT Placement in a Kindergarten versus Primary Grade Classroom

	b	(SE)		b	(SE)	
	Follow up 2 (NQT-Fall)			Follow up 3 (NQT-Summer)		
Implementation						
Fidelity structure checklist						
Treatment status	1.05	(0.08)	***	2.22	(0.11)	***
Primary school placement	0.27	(0.13)	*	0.14	(0.15)	
Treatment X Primary school	**-1.99**	**(0.19)**	***	**-1.52**	**(0.12)**	***
Fidelity process checklist						
Treatment status	0.62	(0.07)	***	0.72	(0.08)	***
Primary school placement	0.06	(0.12)		-0.13	(0.11)	
Treatment X Primary school	**-0.35**	**(0.17)**	*	**-1.10**	**(0.16)**	***
Early Childhood Education Knowledge						
Developmentally appropriate practice						
Treatment status	0.16	(0.02)	***	0.20	(0.02)	***
Primary school placement	-0.06	(0.03)	*	-0.05	(0.03)	+
Treatment X Primary school	0.01	(0.04)		0.05	(0.04)	
Supporting child social-emotional needs						
Treatment status	0.43	(0.03)	***	0.20	(0.02)	***
Primary school placement	-0.09	(0.05)	*	-0.15	(0.03)	***
Treatment X Primary school	**0.12**	**(0.07)**	+	**0.28**	**(0.05)**	***
Family-sensitive practice						
Treatment status	0.13	(0.02)	***	0.33	(0.04)	***
Primary school placement	-0.19	(0.03)	***	0.01	(0.02)	
Treatment X Primary school	**0.09**	**(0.04)**	*	**-0.20**	**(0.07)**	**
Teacher professional well-being						
Motivation						
Treatment status	0.11	(0.02)	***	0.03	(0.03)	
Primary school placement	-0.03	(0.03)		-0.02	(0.02)	

Treatment X Primary school	0.03	(0.02)		0.09	(0.07)	
Burnout						
Treatment status	-0.06	(0.04)		-0.11	(0.05)	*
Primary school placement	0.359	(0.07)	***	0.19	(0.07)	**
Treatment X Primary school	**0.21**	**(0.10)**	*	0.01	(0.10)	
Job satisfaction						
Treatment status	-0.08	(0.02)	***	-0.09	(0.02)	***
Primary school placement	-0.10	(0.03)	***	0.20	(0.03)	***
Treatment X Primary school	**0.23**	**(0.04)**	***	**-0.21**	**(0.04)**	***
Personal accomplishment						
Treatment status	0.20	(0.05)	***	0.23	(0.04)	***
Primary school placement	0.32	(0.07)	***	-0.17	(0.06)	**
Treatment X Primary school	0.03	(0.11)		**0.38**	**(0.09)**	***
<u>Teacher-child interactions</u>						
Child-led learning						
Treatment status	0.11	(0.02)	***	0.09	(0.02)	***
Primary school placement	-0.17	(0.03)	***	0.00	(0.03)	
Treatment X Primary school	**0.15**	**(0.04)**	***	**-0.16**	**(0.05)**	***
Supporting student expression						
Treatment status	-0.11	(0.03)	***	0.00	(0.03)	
Primary school placement	0.04	(0.04)		0.07	(0.04)	
Treatment X Primary school	**0.36**	**(0.06)**	***	0.01	(0.06)	
Emotional support and behavior management						
Treatment status	-0.01	(0.02)		0.00	(0.03)	
Primary school placement	0.06	(0.04)	+	-0.16	(0.04)	***
Treatment X Primary school	**-0.23**	**(0.05)**	***	0.10	(0.06)	+

*** p < .001, ** p < .01; * p < .05, + p < .10. Coefficients for covariates not shown. Covariates include: teacher age, close family nearby, a dummy indicator for schools with more than 1 NQT, and country region. All estimates derived from 20 multiply imputed datasets.

5. Cost Analysis

The Unit Cost Data and the Cost-Effectiveness Analysis can be found in Appendix C.

IPA performs cost-effectiveness analysis using the methodology outlined in Dhaliwal et al. (2012). Unlike cost-benefit analysis, which aims to provide a comprehensive accounting of both costs and benefits—which are often hard to put in dollar terms—cost-effectiveness analysis aims to answer the question of how much of one particular outcome can be achieved at a particular cost. Typically, cost effectiveness analyses of education programs compare the impacts and costs of various programs by calculating the amount of cost required to achieve a given impact. This is usually the amount necessary to achieve one standard deviation gain in learning or attendance (i.e. test scores or additional years of schooling).

The FTTT program did not have significant effects on student learning outcomes, so the cost effectiveness of the program is 0: the current research finds no evidence that any amount of money spent on FTTT will improve learning outcomes for the student population studied in this project.

Of course, the program did have positive impacts on several intermediate outcomes, particularly ones involving curriculum implementation and early childhood education knowledge. As a result, we considered performing a cost effectiveness analysis on an intermediate variable that did see significant positive impacts: the frequency with which teachers keep appropriate materials in their classrooms that allow them to implement the curriculum as intended.

However, this form of CEA does not allow FTTT to be compared to other programs unless those programs also perform CEA on the same outcome. We are not aware of other analyses that do this, nor do we find it likely that a policymaker would be likely to use this approach in deciding whether to invest in a program. As a result, we do not believe that performing CEA in this way adds much value.

Another reservation we have is that performing CEA on an intermediate outcome in this way will likely understate the benefits of the program. While it makes some intuitive sense to isolate learning outcomes or years of schooling since those may be the primary interest of policymakers, we worry about isolating any intermediate outcome since it is clearly part of a larger group of variables that, in the theory of change, work together to produce the final outcome. CEA here erroneously implies that all $1400 per standard deviation was in fact focused on that outcome.

Given these limitations, we do not feel that performing an analysis for an intermediate outcome in which significant positive impacts were found would be true to the goal of an accurate cost effectiveness analysis of the program.

6. Discussion

Given the findings of the FTTT evaluation described in Section 4, we can conclude that the FTTT programme can successfully improve teaching practices and professional well-being for student-teachers, but in the form evaluated in this study, there were no impacts for their students as they become NQTs. Notably, this study did not assess the impacts of the FTTT programme on student outcomes for those students attending the Sabre Trust model practice classrooms (that is, the kindergarten students of the student-teachers). This would be an important area for future research to continue to understand the range of effects of the FTTT programme, and the potential impacts for students if the programme were implemented to the intended fully by NQTs as in the model practice classrooms.

Many of the positive impacts found during teachers' student-teacher year persisted but declined in size when they were placed as NQTs. This suggests that pre-service training alone is not enough to transform teaching practices, and that at least during teachers' first year of placement teachers may need ongoing in-service support and professional development opportunities.

Additionally, it would be interesting to assess how NQTs adjust their practices the following year. Research suggests that the first placement year is the most difficult for teachers (Akyeompong & Lewin, 2002), and it is possible that FTTT NQTs will incorporate more of their trained practices as they become more comfortable in their position as teachers.

As part of the FTTT programme, head teachers were also sensitised through a 4-day in-service training with the goal of improving their mentorship and supervision for FTTT NQTs, as well as gain a better understanding of how to teach KG children based on the KG curriculum and KG-specific pedagogy. However, the intervention as tested was not effective. This indicates that the involvement of the head teachers in this programme may need to be more intensive (potentially adding more in-service trainings or regular refreshers for the head teachers). It would be interesting to explore whether or not those trainings should also include parents and caregivers.

Another important question would be if the impacts on professional well-being – both improvements in motivation and personal accomplishment and reductions in job satisfaction – affect teacher retention. Are trained teachers more (or less) likely to stay in the teaching profession? This will require a longer-term study of the NQTs. This data can likely be collected at relatively low cost with administrative data, and this is an area the team is considering pursuing.

Given the declines in the size of impacts on teaching practices by the spring of the NQT year, it may not be surprising that there were no impacts on student outcomes, given that these practices and processes are considered the "drivers" of student learning. A more sustained transformation of teaching practice would likely need to occur for this to be the case for FTTT to lead to impacts in NQT students' outcomes.

How can FTTT be strengthened? One of the key recommendations would be to provide an in-service teacher training (e.g., the Quality Preschool for Ghana teacher training programme implemented by the National Nursery Teacher Training Center) in the first and second year for NQTs. Such trainings, where the messages from the model practice classrooms are reinforced throughout the first NQT year, may increase the likelihood of the FTTT programme's methodologies to be sustained over a longer period of time.

Sabre Trust is also considering creating a FTTT Alumni network in which all teachers trained under the FTTT programme would be able to dialogue with each others in order to share best practices, lesson learned, and find common solutions to individual problems.

7.   Implications for Policy Decisions

7.1.   Sustainability of the FTTT Model

The programme was designed to enhance the existing student teacher practical placement year, and to create a sustainable network which can be used by the College and sustained by GES.

The programme's activity management and processes are integrated with and implemented through the MOE/GES systems. First, it builds on the existing pre-service training models offered by COEs: a three-year diploma course for trainee teachers comprising of two years of study in College and a third year of placement in a school student teaching. Second, the model is designed and delivered through tutors at the colleges of education as well as teachers, head teachers and district officers connected to the model schools, who are trained how to deliver all elements of the programme. The GES officers and the trainers from the COE have been fully involved in all programme planning activities, leading the delivery of training, and are responsible for much of the school based coaching and mentoring. This ensures that as the programme is being implemented, capacity is also being built at the district level to effectively monitor and support teachers, and within COEs to deliver it independently to student teachers.

The seven COEs that currently offer an ECE track are working with the University of Cape Coast to strengthen the two-year taught curriculum as well as the one-year in-school practice component. FTTT has already been implemented in two COEs. Following the study period, these two colleges should have the capacity to implement the programme independently.

7.2.   Conclusions and Implications

This results from this report inform the question of how to best improve the kindergarten teaching workforce to improve educational quality and learning outcomes through the pre-service training system. While the government has concluded that the kindergarten curriculum is sound (GES, 2012), in reality, what will transform teachers use of the curriculum to be effective practitioners will be the extent to which they are effectively trained and supported to use it.

The FTTT programme aimed to do so for student teachers training to be full-time kindergarten teachers. Results showed that the programme significantly changed teachers' professional well-being, resulting in increased motivation and sense of personal accomplishment. In addition, the programme changed teachers' knowledge about developmentally appropriate instruction for pre-primary classrooms, in line with the KG-specific pedagogy supported by the national curriculum. These changes lasted beyond the intervention year, as teachers were placed as full-time NQTs. The findings also indicate that NQTs continued to implement elements of the curriculum, though the extent to which they did so relative to the control group declined with time. The decrease in NQTs' implementation of structural elements of the curriculum (e.g., activity centers, clean water

for all children) could due to teachers not having adequate supplies or materials in their placement schools.

This, however, does not explain the reduced impacts in use of process-oriented activities to support learning specified in curriculum's KG-specific pedagogy (e.g., using songs and activities to facilitate learning, using child-led learning activities). These results indicate that more supports are needed during the first year of full-time teaching to successfully implement the pedagogical practices from the training year. Anecdotal evidence indicates that some head teachers discouraged teachers from using the KG-specific pedagogy because they did not know how to evaluate teachers on these methods. The head teacher training tested in this programme was designed to address precisely this issue of head teacher support. Yet it was not effective in changing teaching practices, indicating that a different approach to training head teachers and creating an enabling environment for NQTs is needed.

Impacts on measures of teacher-child interactions, considered the "driver" of student learning outcomes (Pianta et al., 2005), also showed that while teachers implemented more child-led activities, they used less support for student expression and positive emotional support and behavior management techniques. Teachers may need specific training in how to support student expression during child-led activities, as these two concepts are not mutually exclusive. This finding may also be an artifact of the way teacher-child interactions were measured. Teachers were videotaped teaching a lesson for 30-45 minutes at one point in time during each wave of data collection. Thus, these findings only pertain to this brief observation period. It would be interesting and useful to either observe multiple class periods over the course of a few weeks, or assess practice over the course of an entire school day with each teacher. Understanding if / how these impacts on interactions with students and pedagogical practices change if measured for longer periods of time is worthy of investigation.

Additional research is needed on how to improve teachers pre-service training experiences in ways that transform longer-term teaching practice. While the number of educational intervention impact evaluation studies in low- and middle-income countries has risen exponentially over the past decade (Conn, 2017), teacher training and professional development interventions have focused almost exclusively on in-service training. A recent meta-analysis on effective educational interventions in sub-Saharan Africa found that programs that alter teaching pedagogy and classroom instructional techniques had the largest effects on student learning outcomes (Conn, 2017). Yet the interventions evaluated were exclusively in-service training programs. Developing a more systematic rigorous research base on effective pre-service experiences for teachers in LMICs, and SSA specifically, is a critically needed area of future research.

Research on the Ghana pre-service teacher training system, after reforms in the 1990s, found that the positive attitude towards teaching deteriorated throughout the student-teaching year, and even more so as student teachers became NQTs in primary schools. When asked to speculate

about their career in five years, over 80% indicated they would most likely have gone on to further studies, and only 3% thought they would still be teaching in a primary school (Akyeompong & Lewin, 2002). This implies that additional professional development efforts are needed to support NQTs and full-time teachers. Indeed, pre-service training alone does not ultimately improve student achievement. Rather, content-focused teacher in-service professional development and teaching experience have positive effects on student learning outcome (Harris & Sass, 2011). Thus, pairing pre-service training with well-aligned in-service training may be key to ultimately improving student learning outcomes. A recent study in Ghana with kindergarten teachers found that in-service training paired with coaching and monitoring by district circuit supervisors and ECE coordinators impacted both classroom quality and student learning and social-emotional outcomes (Wolf et al., 2017a). This suggests that district education officers could be an important source of ongoing support to NQTs and full-time teachers, and possibly also for head teachers.

In Ghana, the establishment of a sound KG curriculum in 2004 was an important step in promoting high quality KG education in Ghana. Yet, teacher behavior and instructional practices have not significantly changed to reflect the new pedagogy of play based, child-centered approaches to learning. If Ghana can improve the quality of instructional practices at the KG level, teachers must be equipped through training and regular mentoring or monitoring support to promote fidelity of implementing the new pedagogy. The concept of teacher training here touches on both pre-service as well as in-service teacher training activities.

The FTTT study has implications on a) COE curriculum Review activity being implemented through the T-TEL programme with a particular focus on the one-year in-school teacher practice and teacher mentoring programme; b) teacher placement and teacher rationalization exercise currently being undertaken by the GES and USAID funded Learning Activity; c) In- Service Teacher Training programme for Newly Qualified ECE Teachers and d) teacher licensing and renewals based on the competences needed to progress from one level to the next.

To achieve this, there is the need to deepen engagement with government and other stakeholders to ensure the findings are incorporated in education reforms and new programmes to be designed on ECE. This will specifically include engaging and working closely with:

- MoE through the National Teaching Council (NTC) on In-Service Teacher Training programme that reinforces key ECE message and pedagogical approach for NQTs.
- GES Human Resource Unit on Teacher Postings and Placement Activity. Here, there is the potential to tap into the lessons from the on-going Teacher Rationalization Exercise being undertaken by the USAID funded Learning Activity.
- T-TEL and the National Council for Tertiary Education (NCTE) on the on-going Curriculum Revision Exercise of Colleges of Education in Ghana

Limitations and Conclusions

While this study had many strengths, there were also limitations that should be noted. First, the participants in this study were graduates from one college of education in one region in Ghana. Results cannot be generalized to teachers graduating from other colleges of education, or from the university-system in Ghana. Second, while student teachers were randomized to spend their training year in either a FTTT school or a control school, the schools selected to implement the FTTT programme were not randomly assigned. Schools had to be deemed sufficiently ready to incorporate the FTTT programme, both in terms of facilities and receptiveness of the head teacher and kindergarten teachers. As a result, the impacts of the FTTT programme cannot be disentangled from the differences between schools ready and not ready to implement the programme. Third, teachers were only observed for one class period at each wave. Not having a more comprehensive assessment of the teaching and classroom context is a major limitation of this study's ability to assess impacts on teacher-child interactions.

Nonetheless, this study provides lessons and guidance that can support Ghana's Ministry of Education as it strives to fulfill the potential of its KG education system. The findings show that supplemental pre-service training during the student teacher placement year can induce large changes in teachers' motivations and perceptions about kindergarten education, but that additional support during the first placement year is needed for teachers to successfully translate their knowledge into improved practice and ultimately improved student learning outcomes. Ghana's Ministry of Education is currently working to improve and align its pre-service teacher training system nationally through the T-TEL initiative (Ministry of Education, 2017). This study suggests that for improvements to have lasting impacts on the teacher workforce, providing ongoing in-service support and professional development opportunities will be important. Given the low learning levels of primary and secondary students in SSA, and in Ghana specifically (Sandefur, 2016), these issues span beyond the pre-primary sector, and have implications for improving educational quality and student learning across education levels and countries.

8. Policy Engagement and Dissemination Strategy

8.1. Stakeholder Mapping

8.1.3. Governmental Partners

Ministry of Education and Ghana Education Service

Close to 10 years now, Ghana has legislated the provision of public early childhood education, and has focused highly on training teachers and raising pupils' enrolment in preschool grades. These efforts by the MOE are essential considering the high numbers of unqualified teachers and inappropriate teaching and learning methods at the preschool level. In addition, the GES position that teaching method in the kindergarten should take into account the cognitive development of children, be activity-based and stimulate children to reflect their own activities, coincides with the objectives of the FTTT study.

There is the potential for MOE and GES to formulate policies and influence donor partners in investing in ECE in Ghana. The prospect in evaluating other pipeline projects and build evidence to support decision making on the ECE landscape in Ghana is enormous. IPA has sustained engagement with the MOE, through its divisions, especially the GES. Other stakeholders and partners who will be critical in ensuring policy influence include the following:

Transforming Teacher Education and Learning (T-TEL)

T-TEL is a government programme to support the implementation of the new policy framework for Pre-Tertiary Teacher Professional Development and Management. T-TEL seeks to transform the delivery of pre-service teacher education in Ghana by improving the quality of teaching and learning in relevant national bodies, institutions and all 40 Colleges of Education. T-TEL works closely with MOE and the GES in consultation with national-level institutions such as the National Teaching Council, National Council for Tertiary Education (NCTE), National Accreditation Board, National Inspectorate Board, Universities of Cape Coast and Winneba and COEs.

With T-TEL being a key partner in shaping the curriculum in preservice teacher education in Ghana, IPA must involve T-TEL in IPA dissemination of findings with regard to how to best train preservice preschool teachers.

8.1.4. Training institutions

National Conference of Principals of Colleges of Education (PRINCOF)

There are 38 public COEs in Ghana currently. These are the institutions responsible for training teachers to teach in basic schools in the country. Only six of these Colleges are currently

accredited to run ECE programmes. However, the MOE plans to increase the number as time goes on.

The PRINCOF has the potential to ensure a fast-tracked accreditation of many more COEs to run ECE through engagement with the NCTE and other relevant authorities, and further adopt the creation of model practice classrooms and student teacher mentorship model as fashioned by the FTTT programme.

National Council for Tertiary Education

The NCTE is the body established to oversee the proper administration of institutions designated as institutions of tertiary education in Ghana. Among their numerous functions is to recommend national standards and norms for the approval of the sector Minister and to monitor the implementation of any approved national standards and norms by the institutions.

The impending upgrade of the COEs to tertiary institutions imply that their standards and norms would come under the ambit of the NCTE. IPA must therefore to engage the NCTE on the best practices in preschool teacher training.

8.1.5. Development partners and NGOs

Department for International Development (DFID)

The Department for International Development (DFID) was the main donor for this impact evaluation. DFID played a crucial role in funding the various waves of data collection by providing a funding of £199,569. DFID also facilitated the sharing of findings and linkages with T-TEL, which is a DFID funded programme.

Sabre Trust Charitable Trust

Sabre trust is the implementer of the FTTT programme which was devised as part of the new GES Operational Plan to Scale up Quality Kindergarten Education across Ghana. Sabre works in close partnership with GES and a couple of COEs in the Central and Western Regions.

IPA is evaluating the effectiveness of Sabre's intervention and has closely engaged with Sabre in the evaluation process.

Development partners

Development partners have been major donors to Ghana, providing government with funding support. They have the potential to significantly influence policy direction on low cost ECE training as well as investing significant funds to scale up the FTTT intervention. Specifically, USAID, The

World Bank, MASHAV, AfDB and UNICEF must be engaged extensively to leverage on their interests and strengths in ECE.

FHI 360

In partnership with GES, FHI 360 leads a consortium made up of prominent institutions and organizations in the implementation of USAID's Ghana Partnership for Education (Learning), USAID's flagship education project in Ghana. The emphasis is on children in kindergarten through grade three. Learning seeks to strengthen and support Ghana's human and institutional capacities within the education sector to improve pedagogical excellence in early grade reading; support education systems to improve, expand and sustain reading outcomes; and engage communities to promote reading. The project is being implemented in over 170 districts.

IPA's engagement with FHI 360 can stimulate their interest and focus on pre-service teacher training as an important way of achieving their objectives. This is even more necessary considering their regular dealings with a network of other high-level education stakeholders.

8.2. Outreach Activities

8.2.3. Stakeholder Engagement

IPA conducted regular engagement with project partners and other key stakeholders during the life to the project.

Project updates and study findings were shared with the project donors, DFID and the Marple Charitable Trust, and the implementing partner, Sabre Trust. In addition, IPA and Sabre Trust coordinated dissemination efforts, as illustrated below.

IPA also provided timely updates to governmental actors when the project reached a milestone or when significant activities are conducted to ensure that they were aware of the stage of the impact evaluation and key findings of the evaluation. For example, IPA sought the approval of GES before conducting data collection activities in schools and obtained permission letters to be distributed to the District Education Offices in the areas where the sample schools were located.

Once the results of the study is known, IPA will closely engage government, development partners, implementing organizations and Universities in moving the evidence to action. This strategy is geared towards ensuring the lessons from the study informs policy decisions and new programmes being designed or reviewed in the ECE landscape in Ghana.

8.2.4. Dissemination

During the second half of 2017, after data collection activities and analysis were concluded, IPA participated in several education conferences and events organized by partner organisations to

present the results of the study. A Policy brief and presentations summarizing the findings and policy implications of the evaluation were produced and shared during these events. Going forward, the PIs and IPA policy team will continue to disseminate the research findings at various education events and partner fora. Some of the platforms where the results have already been disseminated include:

Presentation at T-TEL Summit

Preliminary findings of the study were presented by IPA Ghana's Deputy Country Director during a Learning Summit for Teacher Education Practitioners on "Using evidence for impact in teacher education reform" hosted by T-TEL on August 11th, 2017. This presentation was overall a success and numerous stakeholders asked more in-depth information about the FTTT programme as well as about the finding of the impact evaluation.

IPA Early Childhood Education Dissemination Event

The IPA Early Childhood Education Dissemination Event took place on the 10th of October at the Oak Plaza Hotel on Spintex road. The study's PI, Dr. Sharon Wolf, was of attendance and presented the FTTT findings. Other studies were presented during this ECE Dissemination event such as Quality Preschool for Ghana (QP4G) and IPA introduced its newest ECE evaluation: Lively Minds Evaluation.

Numerous education and ECE stakeholders were present: Government agencies (MoE, GES, BED, NIB…) as well as T-TEL, World Bank, UNICEF, ECE regional coordinators, officials from Ghanaian universities of education.

This event lasted for a day and fruitful conversations during the Q&As and the panel discussions helped IPA and Sabre Trust better understand what possible next steps need to be taken in order to make the FTTT programme more effective.

Academic Dissemination

The results from the FTTT evaluation were already presented or have been submitted for present at several conferences. Specifically:

- *UKFIET Conference, Oxford, UK:* On September 5th, the FTTT programme and impact evaluation results were presented at the UK Forum for International Education and Training (UKFIET) International Conference on Education and Development conference. Sharon Wolf worked with Sabre Trust to put together a presentation titled "Scalable and Sustainable Preservice Kindergarten Teacher Training in Ghana".
- *Save the Children IDELA launch event, Washington, D.C. USA:* On September 6th, Sharon Wolf presented on the FTTT project as an illustration of how Save the Children's IDELA

tool is being used to evaluate and inform policy decisions at an international web-casted launch event about the IDELA tool.

- *Comparative for International Education Society (CIES) conference, Mexico City, Mexico*: The FTTT project was submitted as one of three papers in a symposium on evaluating early childhood development and educational programming and was accepted. The conference is in March 2018.
- *Society for Research in Education Effectiveness, Washington D.C., USA:* The FTTT project was submitted as one of three papers in a symposium on evaluating early childhood development and educational programming in low- and middle-income countries and was accepted. The conference is in February 2018.
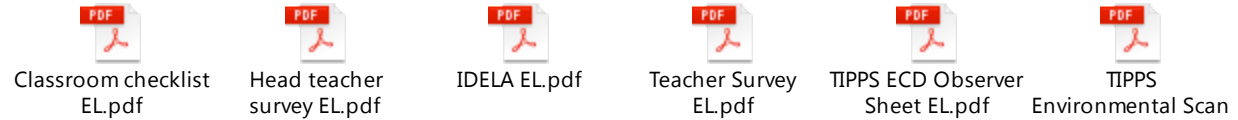
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Appendix A: Endline Instruments

Classroom checklist EL.pdf   Head teacher survey EL.pdf   IDELA EL.pdf   Teacher Survey EL.pdf   TIPPS ECD Observer Sheet EL.pdf   TIPPS Environmental Scan

*Note: The IDELA and TIPPS survey instruments cannot be shared publicly. However, the IDELA tool—and the translated versions to Twi, Ga, and Ewe conducted for this study—can be access freely once registered on the IDELA website (*HERE*). Furthermore, the TIPPS classroom observation tool instrument is the property of New York University. As such, researchers interested in viewing and/or using this instrument should contact New York University directly.*

Appendix B: Evaluation Timeline

FTTT Gantt
Chart.xlsx

Appendix C: Unit Cost Data and Cost Effectiveness Analysis

Cost Effectiveness
Analysis FTTT.xlsx

FTTT Unit Cost
Data.xlsx

Smaller qualifications and notes on the attached cost effectiveness analysis:

- The cost data available for this analysis was reported in 2017 cedis, with a few small costs reported in GBP (no year given). Typically in CEA, the goal is to deflate all costs to a base year when the program started, then take the present value of this cost stream, then inflate the costs back to a common year of analysis (in this 2017) to essentially create the conditions under which a policymaker would consider spending money on a policy. Since we do not have a breakdown of which costs were incurred when, we did not feel we could reasonably do that in this case. It's also not clear the ways in which Sabre Trust came up with these costs in 2017 cedis (they mention that these are roughly 10% inflated from the 2015-2016 costs, but it's not clear if they did that inflating themselves, or re-costed the ingredients based on current prices, etc.).
- Some of the costs are also ambiguous (as to whether they are per user or aggregate costs).
- The upshot: we don't doubt that the cost data provided is internally valid according to Sabre's standards. However, it does not easily lend itself to comparative cost analysis, where the goal is to standardize costing units so that they can be compared across studies.
- Typical cost effectiveness methodology uses average exchange rates for the given base year. Since the base year in this analysis is 2017, this analysis uses historical exchange rates from July 1, 2017.
- No discount rate: as noted above, because costs reported are not broken down by year, with some being incurred in 2017, we did not try to estimate a discount rate.
- CEA for training programs often includes the opportunity cost of training time. In this case, the opportunity cost to participants was 0 because this was an in-service program, which was completed as part of their usual job duties. Likewise, there were no measurable costs to students as a result of teachers' absence because they were simply taken into another teacher's classroom.