Understanding Complementary Basic Education in Ghana

Cycle 4 and 5 Value for Money Report

Department for International Development

October 2018

In association with:

This report was written by Richard Ponsford, with support from IMC Worldwide, University of Cambridge, University of Sussex, RTI International, JEAVCO and PAB. With thanks to Valsa Shah for earlier iterations of this work. The research wascommissioned under the Complementary Basic Education (CBE) Programme, funded by DFID and USAID and managed by the Management Unit (MU) at Crown Agents, in partnership with the Ministryof Education and Ghana Education Service**.**

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Abbreviations

CBE	Complementary Basic Education
CBF	Community Based Facilitator
CE	Cost effectiveness
DFID	The Department for International Development
DRIC	Directorate of Research Innovation and Consultancy
EGMA	Early Grade Mathematics Assessment
EGRA	Early Grade Reading Assessment
GBP	British Pounds Sterling
GES	Ghana Education Service
GILLBT	Ghana Institute of Linguistics, Literacy and Bible Translation
GHS	Ghanaian Cedi
GoG	Government of Ghana
IPs	Implementing Partners
LA	Learner Assessment
M&E	Monitoring and Evaluation
MoE	Ministry of Education
MU	Management Unit
NSP	National Service Personnel
OOSC	Out of School Children
QA	Quality Assurance
RTI	Research Triangle Institute
SFL	School for Life
TOR	Terms of Reference
USAID	United States Agency for International Development
VfM	Value for Money
WEI	World Education

Executive Summary

Introduction

The Complementary Basic Education (CBE) programme in Ghana is designed to provide 'second-chance' access to basic education for out-of-school children (OOSC) of primary school age. The programme has been in operation since 2012, implementing five nine-month cycles of learner enrolment, and has reached over 240,000 learners and their families. This report is part of a larger research programme to establish the impact of the CBE programme on learning outcomes and access to primary and junior secondary formal education.

This report assesses the cost-effectiveness of the CBE programme. This will be achieved by answering the following three questions posed in the Inception Report (IMC Worldwide 2016):

Calculate the unit costs for Cycle 4 and Cycle 5 of:

1. Access for CBE per learner per Learning Cycle
2. Graduation of CBE learners[1] per Learning Cycle
3. Learning:
    a. Cost per CBE learner graduating CBE who achieves the minimum grade in learning (scoring 50+/100 on learner assessment)[2] – minimally proficient learner
    b. Cost per CBE learner graduating CBE who achieves the highest grade in learning (80+/100 on learner assessment) – proficient learner

It is the findings related to question 3 on learning that should be viewed as cost-effectiveness, as learning is a key purpose of the evaluation and this report.

To answer the three main questions, the expenditure for the CBE Management Unit (MU) and the IPs was compared to enrolment, completion and a sample of learners' baseline and endline scores on learner Assessments (LAs). The analysis was conducted on the Cycle 4 (2016/17) and 5 (2017/18) cohorts.

To enable consideration of issues of equity, where data allowed, the findings are considered in relation to gender, socioeconomic status of the learner's household and whether the learner had prior school experience. Analysis was also done according to the IP and language of instruction (which can be related to geographic location). The IP and language findings are shown in terms of range (low to high cost) to indicate the influence of contextual factors.

Additional findings have been included on cost per transition, Cycle 1-3 cost per access, completion and transition, cost effectiveness comparison with public sector schools and the number of years in education that CBE adds per learner.

Limitations

The findings from this report need to be considered together with their limitations. As agreed in the Inception Report, this report's VFM is considered only in relation to cost per learner, graduate and proficient graduate (issues of economy of delivery and wider and longer-term costs and benefits were, therefore, not considered in depth[3]). Further, whilst cost-effectiveness is useful for *comparing* the cost-effectiveness of different interventions which have the same goal, it cannot make an overall determination of whether a programme is worthwhile in an absolute sense. Therefore, findings should be read in terms of comparisons (Cycle 4 vs Cycle 5, between Implementing Partners, CBE vs. public

[1] A 'Graduate' is a Learner who has completed the 9 months of CBE education, it does not relate to their grade on completion.

[2] As explained in section 2.2, these scores are from 0-100 and represent a Learner's average proficiency on literacy and numeracy.

[3] For economy, see the audit reports and MU Progress and Annual reports. For efficiency, see the MU Progress and Annual Reports, and Crown Agents Lesson Learning Paper (Crown Agents 2018a). For non-costed outcomes and process learning see Qualitative Research Report - Transition Experiences of CBE Students in Public Schools (Higgins 2018b), An Analysis of the CBE Pedagogy in Ghana (Higgins 2018a), Lesson Learning Paper (Crown Agents 2018a).

education), not in terms of the cost and worth of the programme in its own right. Therefore, the findings presented in this report should not be seen as comprehensive in relation to all aspects of VFM.

Findings

Table 1: Cost per learner

Category	Cycle 4:	Cycle 5	Combination of Cycle 4 and 5
Cost per learner all cohort[4]	£102.56	£107.62	£104.02
Cost per learner by IP (range)	£77.40 to £126.91	£105.60 to £121.95	£88.35 to £124.56

Cost per learner marginally increased for from Cycle 4 to 5, a trend similar since Cycle 1. In Cycle 4 and 5 there were notable differences between IPs, however, these were based upon challenges of and differences in local context, not differences in IP effectiveness. The range in cost per learner per IP narrowed considerably in Cycle 5, compared to the wider range in cycle 4 (more detail in section 4.6 on IPs).

The cost per learner calculations should be read with awareness that CBE education is often in difficult to access locations with learners typically harder to reach than those in public education. These factors will increase the cost per learner for CBE.

Taking 2015 data (from Jones 2015[5]) and then updating it, CBE cost per learner compares similarly to cost per learner of public education, however, data beyond the scope of this report is required to confirm this.

Data on how costs were allocated to enable girls' enrolment and completion were not recorded. This means that it is not possible to disaggregate costs by gender. However, in comparison to boys, girl enrolment rates increased gradually from 43.5% in Cycle 1 to 54.2% in Cycle 5.

Table 2: Cost per learner completing CBE

Category	Cycle 4	Cycle 5	Combination of Cycle 4 and 5
Cost per graduate all cohort	£ 105.22	£119.86	£109.36
Cost per graduate by IP (range)	£77.70 to £139.23	£107.74 to £124.95	£88.35 to £131.06

High completion rates (about 95%) for Cycle 4 and 5 meant the costs per graduate were only slightly above the costs per learner. Completion rates were consistently above 90% for all IPs and almost identical for boys and girls. The completion rates have increased since Cycle 1 which almost balances out the annual increase in cost per learner meaning that since inception of CBE the cost per graduate is almost stable.

Table 3: Cost per transition of CBE graduate to formal education

Category	Cycle 4[6]
Cost per graduate that transitions	£110.47
Cost per graduate that transitions by IP	£93.22 to £141.99

Almost all learners who completed Cycle 4 transitioned to formal school. The transition rates for male and female were almost identical. The majority of Cycle 4 transition rates for IPs were above 95%. This means the cost per learner transitioned is only slightly higher than the cost per learner and cost per completed learner.

The transition rates have increased for each Cycle so there is a general decrease from Cycle 1 to Cycle 4 for cost per transitioned learner.

[4] As enrolment rates between girls and boys were almost the same, the costs per male and female Learner are viewed as the same as the cost per Learner (see section 4.2).
[5] Jones (2015) *Ghana Complementary Basic Education: Cost-effectiveness analysis*. This report was commissioned by DFID earlier in the CBE programme's implementation.
[6] At the time of completing this Report the transition rates for Cycle 5 Learners were not known.

Table 4: Cost per minimally proficient graduate (50+)

Category	Cycle 4:	Cycle 5	Combination of Cycle 4 and 5
Cost per graduate for min proficiency (50+)	£ 176.25	£139.63	£165.63
Prior school experience	No: £182.35 Yes: £155.62	No: £137.47 Yes: £159.45	No: £169.33 Yes: £156.73
Implementing Partner	£141.77 to £450.36	£112.20 to £166.83	£137.04 to £357.92
Language of instruction	£110.35 to £266.69	£119.53 to £195.68	£110.35 to £235.69

The cost per proficient graduate decreased from Cycle 4 to 5 due to a much higher percentage of Cycle 5 graduates who scored 50+ on the learner Assessments[7]. Each Cycle had a similar percentage of learners scoring below 50 at baseline, which underscores the progress in Cycle 5.

Costs per minimum proficient learner for boys and girls were almost the same. For Cycle 4, boys and girls had a similar baseline situation but boys performed marginally better than girls on the endline learner Assessments. In Cycle 5, boys slightly out performed girls on the endline assessments, but because boys had a higher baseline position the actual extent of improvement was equal between boys and girls.

In Cycle 4 there was a wide range of cost per minimum proficient graduate amongst IPs. The range does not seem related to the level of inputs as there was no linear relationship between spend per learner and percentage of graduates at minimum proficiency. IPs with learners who scored well at baseline had graduates who scored high at endline. The Lesson Learning Report (Crown Agents 2018a) found differences in performance between IPs were related to differences in the monitoring and support given to CBE facilitators. This indicates the possible drivers of difference in cost per minimum proficient graduate between IPs were a combination of contextual factors related to access (mainly distance), learner proficiency at baseline and IP effectiveness

In Cycle 5 there was a smaller range in cost per minimum proficient graduate amongst IPs. Also, from Cycle 4 to 5, the order of IPs from low to high cost per minimum proficient graduate changed. This could be seen as the continued influence of contextual factors, however, more analysis of IP processes is needed to fully understand this.

In Cycle 4 there did not seem to be a strong association between language and cost per minimum proficient graduate. Whilst there were differences, many of these could be explained by the differences in Baseline. For Cycle 4 there was not a common overlap between IPs and language. IPs that had CBE centres teaching the same language had significantly different cost per graduate at minimum proficiency. For Cycle 5 there was a bit more overlap between IP results and the languages of instruction. The Lesson Learning Paper (Crown Agents 2018a) offers more detail in terms of differences between IPs and in language of instruction.

Table 5: Cost per proficient graduate (80+)

Category	Cycle 4:	Cycle 5	Combination of Cycle 4 and 5
Cost per graduate for Proficiency (80+)	£359.55	£271.20	£333.93
Prior school experience	No: £387.85 Yes: £348.34	No: £266.09 Yes: £319.87	No: £352.53 Yes: £291.00
Implementing Partner	£256.96 to £1,411.33	£146.24 to £522.52	£261.46 to £1,068.64
Language of instruction	£162.73 to £679.96	£176.73 to £577.03	£162.73 to £560.72

[7] This decrease in cost per minimum proficient graduate from Cycle 4 to Cycle 5 is slightly larger when the comparison between Cycle 4 and 5 considers only districts in which partners worked for both Cycles. See Stern and Pressley 2018 for more discussion on this.

It should be noted that the 80+ was a benchmark chosen to represent high proficiency in the Learner Assessment. When considering the cost per graduate achieving 80+ it needs to be understood that this represents the cost for the achievement of very high learner proficiency outcome and that the CBE programme did not aim to have all learners graduate at this 80+ level. Therefore, when looking to understand the cost-effectiveness of the CBE programme it is recommended that it is more useful to consider the Cost per minimally proficient graduate (50+). This 80+ section is useful in terms of understanding changes in cost-effectiveness for higher performing graduates between Cycles and the range for implementing partners.

As for minimum proficient graduates, despite having similar baselines, Cycle 5 learners outperformed Cycle 4 learners causing the cost per proficient graduate in Cycle 5 to be lower than that of Cycle 4. For proficient graduate scores of 80+ there was a higher percentage of boys than girls in both Cycles. In Cycle 4 this was because of boys doing slightly better, however, for Cycle 5 it seemed due to a higher percentage of boys starting in the 50+ category at baseline.

Compared to minimum proficient graduates, with Proficient graduates there was a much larger variation in costs, but these was mainly because two IPs had significantly lower percentage (<10%) of graduates in the 80+ category at endline. There was a clear relationship with the baseline situation for each IP. In Cycle 5 there was less variation between IPs as all IPs had at least 20% of graduates scoring 80+. In terms of Languages, for both Cycle 4 and 5, about half of languages saw the cost per graduate double whilst others saw increases of 1.5 or 3 times. However, there was no consistency in terms of better performing learners and languages between Cycle 4 and 5.

The Cycle 4 Tracker Report (Carter, Sabates and Rose 2018a) showed similar performance for CBE and non-CBE learners at the start and end of a year in formal education. Therefore, for a cost similar to that for a year of formal schooling, the CBE programme enabled children to catch up with learners in formal education in terms of performance on learner assessments, and that result is maintained from the start through to the end of the former CBE learners first year in the formal system.

The Tracer Study (Carter, Sabates and Rose 2018b) found that of the children who started CBE in 2013 and that could be traced in March 2018, 88.9% were still in school at end of the 2017/2018 school year. Whilst this study could only trace those easy to find and so may not be representative of all CBE learners, the finding does suggest that the CBE programme has sustainable outcomes in terms of continued education.

Conclusions

- Cost per learner, per graduate and per graduate transitioning to formal education decreased from Cycle 1 to 5 suggesting increased effectiveness on these metrics over the course of the programme.
- There were differences in cost per learner between IPs but these were due to contextual challenges like challenges of accessing locations and limitations of physical resources in the location. Regardless of contextual differences, all IPs had high percentage rates for completion and transition.
- Analysis based on limited data suggests the cost per learner and cost-effectiveness for CBE to be similar to public education, but more data and analysis is needed.
- Cost per minimum proficient and proficient graduate decreased from Cycle 4 to 5, again suggesting increasing effectiveness on this metric.
- Results seemed to be equitable as there was no significant association between cost per minimum proficient or proficient learner with prior school achievement. There was not the required data to make conclusions in relation to gender and wealth of learners, however, boys' and girls' completion and transition rates and learner scores were similar. This is a valuable outcome given the wider benefits of girls' enrolment and learning in education.
- From the data available for this report, the differences between the cost-effectiveness of IPs and languages were influenced by context and the baseline situation. Additionally, the findings from the Lesson Learning Paper (Crown Agents 2018a) suggests some high performing IPs provided extra training and support to their facilitators whilst lower preforming facilitators relied on outmoded rote learning approaches.
- The CBE programme has sustainable outcomes in terms of continuation in education. Nearly 90% of children who started CBE in 2013 and transitioned to formal school in 2014 were still in school at end of the 2017/2018 school year (Carter, Sabates and Rose 2018b).

- To obtain further useful findings it is recommended that further VFM studies could consider gender, comparison of cost-effectiveness between CBE and government schooling, extra years of education as a result of CBE and the wider benefits of CBE beyond scores learner assessments.

1. Introduction

The Complementary Basic Education (CBE) programme in Ghana is designed to provide 'second-chance' access to basic education for out-of-school children (OOSC) between the ages of 8 and 14. The programme offers literacy and numeracy instruction in the learners' mother tongue in community-based classes of a maximum of 25 participants for nine months. Community volunteers, and in some cases, National Service Personnel[8], serve as the instructors. The learners who graduate from the CBE programme after the nine months are enrolled into mainstream formal education, typically in either in primary 3 or 4 (P3 or P4). CBE was funded by the Department for International Development (DFID) and the United States Agency for International Development (USAID) from 2012 - 2018 and implemented in partnership with the Ministry of Education (MoE) and Ghana Education Service (GES) through Crown Agents' CBE Management Unit, Associates for Change and Education Development Trust. The programme reached over 240,000 learners and their families.

This report assesses the cost-effectiveness of the CBE programme. This will be done by answering the following three questions posed in the Inception Report (IMC Worldwide 2016):

Calculate the unit costs for Cycle 4 and Cycle 5 of:

1. Access for CBE per learner per Learning Cycle
2. Completion of CBE learners[9] per Learning Cycle
3. Learning:
    a. Cost per CBE learner completing CBE who achieves the minimum grade in learning (scoring 50+/100 on learner assessment)[10] – minimally proficient learner
    b. Cost per CBE learner completing CBE who achieves the highest grade in learning (80+/100 on learner assessment) – proficient learner

It is the findings related to question 3 on learning that should be viewed as cost-effectiveness, as learning is a key purpose of the evaluation and this report.

Whilst not in the planned scope of this report, further findings have been added:

- To aid comparison and understanding of historical comparisons, data from Cycles 1 – 3 and transition rates is provided when it was available from the MU Progress Report 16 (Crown Agents 2018b)
- To aid comparison, costs for formal education are included based on data from 2015 (Jones 2015).
- To demonstrate a different cost-effectiveness metric, the findings from the Tracer Study Report Carter, Sabates and Rose 2018b) which traced Cycle 1 learners and calculate the percentage still in education is used to make a basic calculation of extra years of education added by CBE for each learner per £100 / $100 spent.

2. Methodology

This methodology section focuses on the calculations done for analysis of steps 1 – 3 as set out in section 2.4 on estimating cost access, completion and effectiveness. This paper includes data from other sources and whilst effort has been made to include a summary of the methods used in these other sources, the reader is encouraged to seek these other sources for full explanation.

[8] Established in 1973, the National Service Scheme (NSS) is a Government of Ghana program under the Ministry of Education of Ghana with a National Secretariat in Accra, and offices in all administrative regions and districts across the country. The scheme is mandated to deploy a pool of skilled manpower drawn primarily from tertiary institutions to support development efforts of both the public and private sectors in Ghana. https://nss.gov.gh/home/who-we-are

[9] A 'Graduate' is a Learner who has completed the 9 months of CBE education, it does not relate to their grade on completion.

[10] As explained in section 2.2, these scores are from 0-100 and represent a Learner's average proficiency on literacy and numeracy.

2.1 Data Sources

- **Costs**: The programme Management Unit (MU) provided the actual costs expended by the MU and each IP for both Cycle 4 and Cycle 5. This data was converted from Ghanaian Cedi to UK Pound Sterling using an exchange rate as proposed by the MU and agreed by DFID.
    - Cycle 1 – 3 cost data was taken from Jones (2015) and MU Progress Report (Crown Agents 2018b).
- **Access, completion and transition rates:** The programme Management Unit (MU) provided this data for both Cycle 4 and Cycle 5. Access is based on CBE registration records, completion on CBE attendance records and transition on formal education registration records.
    - For Cycles 1-3 the data came from MU Progress Report (Crown Agents 2018b).
- **Learner assessment scores:** The CBE Research partner, RTI International, provided these using the methodology and sample described below in sections 2.2 and 2.3 (see Cycle 4 Endline Report 2017 and Cycle 5 Endline Report 2018).

Additional data came from research conducted as part of the wider evaluation of the CBE programme carried out from 2016 – 2018.

2.2 Learner Assessment Instruments

The learner Assessment instruments were used at the start (baseline) and end (endline) of Cycles 4 and 5. The instruments, which are similar to the Early Grade Reading and Mathematics Assessments (EGRA and EGMA), assess a learner's competency on different aspects of literacy and numeracy. Competencies tested for literacy include letter and word identification, writing and oral skills. Competencies tested for numeracy include number identification and different levels of addition and subtraction[11].

The instruments were applied in all four data collection events (baselines and endlines for Cycle 4 and Cycle 5) by two local evaluation partners, JEAVCO Associates and PAB Development Consultants. Data collectors spoke to children in their local language, data was collected using digital tablets and the process was overseen by National Quality Assurance Lead and the Data Collection Specialist.

A learner's scores on the tests were then combined into a single figure and scaled from 0-100, for ease of interpretation. This was done separately for the competencies related to literacy and numeracy tests. Next, a learner's scores were classified into one of four categories for both literacy and numeracy (see Annex 2 for more information):

- **Non-performer**, comprising those who scored zero on a component score;
- **Beginner**, comprising those who scored greater than 0 but less than 50;
- **Minimum Proficiency**[12], comprising those who scored greater than 50 but less than 80; and
- **Proficient**, comprising those who scored greater than 80.

This enabled the percentage of learners in each of these four categories to be known for numeracy and literacy at baseline and endline. For example, the percentage of learners as non-performers, as Beginners, as Approaching Proficiency and as Proficient.

For the cost-effectiveness analysis, the percentage of learners in each of the categories for numeracy and literacy were then averaged into a composite indicator to simplify the analysis. This is in recognition that the costs spent cannot be separated by literacy and numeracy. For example, if it was found that 40% of learners were classified as a beginner (scoring greater than 0 but less than 50) at numeracy, and 60% were at literacy, the percentage calculated in the beginner group was 50%.

[11] Full details and justification for the use of the Learner Assessment instruments is provided in Cycle 4 Endline Report 2017 and Cycle 5 Endline Report 2018 (Stern and Pressley 2017 and 2018).

[12] In Cycle 4 Endline Report 2017 and Cycle 5 Endline Report 2018 (Stern and Pressley 2017 and 2018) this category is called 'Approaching Proficiency'. To be consistent with the terminology used in the VFM section of the Inception Report (IMC Worldwide 2016), the term 'minimum proficiency' is used in this report.

2.3 Sample Sizes

Sample for learners enrolled, graduating and transitioning

The samples for learners enrolled, graduating and transitioning are 100% of the children within a CBE cycle, therefore, the entire CBE population for that cycle. The information comes directly from IPs via the MU.

Sample for Learner Assessment

The samples from which Learner Assessment scores are calculated are a sub-sample of each year's CBE enrolment.

In Cycle 4, 2,401 learners were assessed at baseline. These learners were selected using a stratified random sampling approach intended to provide proportional representation of the sample by gender, language, region, district and centre. At Cycle 4 endline 2,002 of the same learner were assessed, with 399 learners not available (no reasons for this were recorded, it could be accessibility, absenteeism, or dropout). The Cycle 4 learner assessment report found that learners who dropped out of the programme tended to be those who were underperforming at the start of the school year. Attrition rates were random for many characteristics but that those who had previously been to school and/or showed greater levels of attendance at baseline were also more likely to be available for follow-up at endline.

In Cycle 5, a similar sampling approach was followed, but this time, there was only an attrition of 100 learners. The result is a total sample of 1,967.

As discussed in both learner Assessment Reports (Stern and Pressley 2017 and 2018) it was not judged necessary to make any alterations to the scores due to sample attrition. For consistency, the same approach is taken in this report.

Further information on the samples used in Learner Assessments is available in Annex 3.

2.4 Steps in estimating cost access, graduation and effectiveness

Cost per learner (enrolled)

1. $\frac{\text{Number of learners enrolled}}{\text{Total cost of Cycle}}$

The total cost of a Cycle is calculated by:

- Adding the cycle's total IP costs and 50%[13] of MU costs.
- To calculate the individual IP Costs, the 50% MU costs are added to IP costs in proportion to each IPs percentage of learners they enrolled against the total number of learners enrolled for that Cycle (see Annex 1 for more information).
- Note – for Cycle 5, the Government of Ghana enrolled approximately 20,000 learners under the Fund Management of Crown Agents. Twenty thousand is 49% of the total Cycle 5 learner numbers. However, as the Government of Ghana activities started slightly later than those of the IPs no data for the government activities is available for this evaluation. Therefore, for this report only 51% of the MU costs are considered for IPs (removing the 49% allocated to government activities). Then, 50% of this cost is considered in line with rationale explained above in the bullet above.

[13] Both the MU Team Leader and Jones (2015) estimated the percentage of MU costs that should be considered part of the total programme costs to be 50%. This 50% represents the costs spent on operational management tasks plus a small percentage of costs from other categories (see section 4.1 for MU cost breakdown). It is these operational costs that will have to be borne by any future implementer of the project, such as Government of Ghana. As a purpose of this report is to inform decisions on future implementation, the choice of 50% is seen as most appropriate. The other 50% of MU costs relate to fund management costs and are not seen as relevant for this analysis.

Cost per Graduation

2. $\frac{\text{Cost per learner}}{\%\text{ of learners graduating}}$

Cost per transition[14]

$$\frac{\text{Cost per learner}}{\%\text{ of graduated learners transitioning to formal school}}$$

Cost effectiveness

3. $$\frac{\text{Cost per graduated learner for the cycle}[15]}{\%\text{ of learners from the learner Assessment sample for that cycle that are in the relevant learner categories at endline (50+ or 80+)}[16]}$$

To enable consideration of issues of equity, the cost-effectiveness is disaggregated by gender and socioeconomic status of the learner's household[17]. Further disaggregating is done by Implementing Partner, language and the baseline scores of the learners to enable an understanding of the influence of contextual factors.

3. Limitations

The methodology used, as agreed in the Inception Report (IMC Worldwide 2016), focuses on costs of access, completion of cycle and proficient and minimally proficient learner scores. It is not within the scope of this report to provide estimates on other costs incurred or benefits experienced on wider and longer-term individual and social aspects. However, non-costed benefits of CBE have been considered in the Qualitative Research Report - Transition Experiences of CBE Students in Public Schools (Higgins 2018b). These benefits included confidence, sense of self-esteem and identity and parent and community support for education.

Cost-effectiveness is useful for *comparing* the cost-effectiveness of different interventions which have the same goal, it cannot make an overall determination of whether a programme is worthwhile in an absolute sense. Therefore, findings should be read in terms of comparisons (Cycle 4 vs Cycle 5, between Implementing Partners, CBE vs. public education), not in terms of the cost and worth of a programme in its own right.

Similarly, it is not within the scope of this report to make a detailed assessment of economy and efficiency. Economy is considered in section 4.1 (expenditure analysis) in terms of percentage of budget line allocations by MU and IPs, whilst in section 4.2 (cost per learner enrolled in CBE) and 4.3 (cost per learner Completing CBE) efficiency is somewhat considered in terms of cost per learner and cost per graduate. Aspects of more detailed analysis of economy and efficiency can be found in the MU progress report (see Crown Agents 2018b) and Lesson Learning Paper (Crown Agents 2018a).

Due to the way the learner assessments were analysed, whilst it was possible to know the percentage of learners with a baseline score of 0, it was not possible to know the distribution of learners within the 0 to 50 category (beginner). This meant that comparisons between IPs are slightly limited. This is because some IPs might have had a high percentage of their learners in the beginner category at

[14] Cost per transition calculation was not in the original Inception Report plan (IMC Worldwide 2016), however, in recognition that this data was made available by the MU, it has been calculated and included in this report. This data relates to enrolment in formal education and does not relate to continued attendance in formal education. For more information on continued attendance see Tracer Study Report (Carter, Sabates and Rose 2018b).

[15] In addition to cost effectiveness using cost per Learner completing, additional analysis is provided on cost effectiveness using the cost per Learner enrolled.

[16] For example, if cost per graduate is £100, and 50% of the graduates are assessed as scoring minimum proficiency (50+), then the cost of producing a minimum proficient graduate is 100 / 50% = £200.

[17] Learners were asked questions about their household's assets, food security and wealth compared to other village residents. Their responses were then placed against a wealth index. This index was split into quartiles of Low, Mid-Low, Mid-High and High. For full description, see Annex 5

baseline who were scoring very low (perhaps 1-10). Therefore, a high percentage of their learners had a to improve by at least 30 at endline to become minimally (50+) or fully proficient (80+). Other IPs who have learners in the beginner category at baseline might have had a high percentage of these learners in the 40-49 range. These IPs' learners only need to score a few more points at endline to become minimally (50+) or fully proficient (80+).

The cost per enrolled learner could not be disaggregated by any learner characteristic (gender, wealth, prior school experience). This was because the data on costs allocations to enable girl enrolment and completion were not recorded whilst the learner's wealth and prior school experience were not recorded at enrolment.

No qualitative data from IPs was collected as this was outside the scope of this report. However, the MU who provided key contextual information through discussions whilst wider learning on implementation can be found in the Lesson Learning Paper (Crown Agents 2018a).

The technical and logistical requirements combined with budget constraints meant that it was not possible to collect a sample of a size that would enable cost-effectiveness analysis of the intersectionality of learner characteristics. For example, whilst it is possible to disaggregate cost-effectiveness findings by gender and IP, it was not possible to understand how girls or boys performed for each IP. However, enrolment, completion and transition data was made available by IPs and the MU which showed that by Cycle 4 and 5 girls were enrolled, graduating and transitioning at almost identical rates to boys (Crown Agents 2018b).

As explained in an earlier VFM paper on the CBE project, Jones (2015), there are six different cost centres. In this study, only the Management Unit and Implementing Partners are considered. However, cost will have occurred for Donor, Ghana Education Service, District Assembly and Community. In line with Jones (2015) and for simplicity, these costs are not considered.

For the purposes of simplifying the analysis we have taken an average of the improvements in literacy and numeracy to create a single figure on proficiency. This is in recognition that the costs spent cannot be separated by literacy and numeracy, and that it was not possible to connect a learner's scores on literacy and numeracy.

It was not within the scope of this paper to seek data from the formal education sector. The data that was available was taken from Jones (2015) and extrapolated (see section 4.2). Therefore, the government costs are only approximations and should be improved through use of actuals for future comparisons.

4. Findings

4.1 Expenditure analysis

Most costs for Cycle 4 and 5 are provided in GBP. The exchange rates were:

- Cycle 4 (2016/17): £1 = 4.65 GHS
- Cycle 5 (2017/18): £1 = 5.77 GHS

These exchange rates were provided by the MU and have been used to ensure the GBP expenditure agrees with the financial records provided to DFID. The MU feel that these rates are best described as the average exchange rate for each cycle.

MU Costs

Table 6: Management cost information provided by the MU

MU Costs	
Cost Categories	**% Breakdown**
Set-Up and Shutdown Costs	8%
Delivery Costs	10%

Operational Management Cost	41%
Capacity Building Cost	33%
Evidence Building	8%
Total MU Cost (£)	**100%**

The percentages used in splitting the MU cost across cost categories is based on projections for Cycles 3 to 5 in the CBE Cost-effectiveness analysis report of November 2015 (Jones 2015). These percentages were agreed upon after extensive consultations between the consultant (Jones), Crown Agents, and the Management Unit.

IP Costs

Table 7: Percentage of IP spend per category against their own expenditure in Cycle 4[18]

	Action Aid	Afri-Kids	Care	GILLBT	LCD	Oxfam / IBIS	Plan	ProNet	SFL	WEI	Total
Inception	4%	7%	3%	3%	4%	7%	8%	4%	3%	2%	5%
Local Staff	11%	14%	39%	13%	12%	9%	27%	24%	14%	31%	17%
Project Office Administration	1%	10%	5%	2%	6%	4%	4%	13%	8%	4%	6%
Other operating costs	23%	14%	11%	12%	16%	22%	14%	18%	16%	14%	18%
Facilitator training	29%	26%	12%	35%	25%	26%	15%	20%	17%	20%	22%
Lesson Learning and dissemination	5%	3%	1%	2%	3%	2%	3%	1%	2%	0%	2%
Engagement with local authorities	14%	10%	7%	10%	11%	15%	10%	7%	16%	2%	12%
Teaching and learning materials	4%	1%	1%	2%	5%	3%	0%	2%	1%	0%	2%
Monitoring and Evaluation	6%	7%	13%	8%	11%	7%	7%	7%	9%	7%	8%
Overheads	3%	7%	9%	13%	8%	7%	13%	4%	15%	21%	8%
Total %	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Table 8: Percentage of IP spend per category against their own expenditure in Cycle 5

	Action Aid	AfriKids	GILLBT	LCD	Oxfam / IBIS	Plan	ProNet	SFL	WEI	Total
Inception	4%	7%	3%	2%	4%	7%	3%	4%	1%	4%
Local Staff	14%	13%	20%	13%	16%	16%	29%	14%	32%	18%
Project Office Administration	1%	15%	0%	6%	3%	2%	9%	11%	7%	7%
Other operating costs	15%	16%	9%	16%	18%	10%	17%	15%	10%	15%
Facilitator training	36%	25%	38%	25%	24%	27%	22%	17%	25%	26%
Lesson Learning and dissemination	2%	2%	2%	4%	2%	0%	1%	4%	0%	2%
Engagement with local authorities	4%	2%	0%	6%	1%	0%	2%	2%	0%	2%

[18] See Annex 7.1 for absolute cost figures

Teaching and learning materials	15%	7%	7%	12%	16%	13%	8%	11%	2%	11%
Monitoring and Evaluation	4%	7%	13%	9%	5%	13%	6%	17%	8%	8%
Overheads	5%	6%	8%	8%	10%	12%	3%	7%	15%	7%
Total %	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

The budgets for each IP were agreed in discussion between the IP and the MU. The MU set learner targets for each IP and, based on the MU's contextual analysis, set the budget for this target. The variance in percentages per cost category across the IPs and between IPs for each Cycle is due to different approaches by each IP and the different challenges and physical materials available in each location and for that Cycle.

4.2 Cost per learner enrolled in CBE

Table 9: Cost per learner enrolled in CBE Cycle 4 and Cycle 5

Cycle	Total Cost	learners enrolled	Cost / learner	IP range (low to high)
Cycle 4	£5,233,599.11	51,030	£102.56	£77.40 to £126.91
Cycle 5	£2,243,875.76	20,813[19]	£107.81	£105.60 to £121.95
Combined	£7,677,149.87	71,843	£104.08	£88.35 to £124.56

The above table shows costs per learner to be similar between Cycles 4 and 5. Drawing on the MU Progress Report 16 (Crown Agents 2018b) data from Cycle 1-3 is also considered to show a trend of a small increase in cost per learner from Cycle 1 to 5 (Table 9: Cost per learner enrolled in CBE10 below).

As can be expected by the different contextual challenges of accessing locations and available physical resources, there is a range for the IPs in terms of cost per learner. Further, as IPs change locations between Cycles their costs per learner changed based on their new context. For example, from Cycle 4 to Cycle 5, two IPs' cost per learner increased by over £30, whilst another decreased by over £20.

The costs per boy and girl learner were, after discussion with the MU, modelled as the same because it was not recorded how costs were allocated in relation to enabling the enrolment of girls or boys, or teaching girls and boys However, it should be noted that IPs conducted community sensitisation and sought female facilitators to support girl learner attendance. Therefore, it is likely that the actual costs used for girls' attendance is higher than boys. Yet, thanks to efforts by the MU and IPs (see the Lesson Learning Report, Crown Agents 2018a), girl attendance was approximately equal to that of boys. If calculations for future budgets are made, the above cost per learner can be used if the intention is equal attendance for girls.

Table 10: Cost per learner per Cycle throughout the CBE programme[20]

	Cycle 1	Cycle 2	Cycle 3	Cycle 4	Cycle 5
	2013/14	2014/15	2015/16	2016/17	2017/18
GHS	339	398	-	476.90	561.69
GBP[21]	92	74	100.88	102.56	107.81
X/rate			-	4.65	5.21

[19] In Cycle 5 there were another 20,000 learners enrolled which are not shown or considered within this report. Therefore, for Cycle 5 40,813 is the full number of learners. However, these 20,000 was reached by the Government of Ghana. As this group started later than Cycle 5 the was no data available for analysis in this report. Therefore, this 20,000 are the MU costs related to them, are not considered in this report.

[20] For this table, the data, both GBP and GHS for Cycle 1 and 2 came from Jones (2015); for Cycle 3 the data is from Crown Agents/MU (2018) but no exchange rate record is available; and for Cycle 4 and 5, both financial and exchange rates, came direct from MU.

[21] The Cycle 1 and 2 exchange rates are based on those used in Jones (2015). The Cycle 4 and 5 exchange rates are based on those supplied by the MU for this report as sated in section 4.1.

Table 11: Approximate Government of Ghana formal education cost per learner

	2013/14	2014/15	2015/16	2016/17	2017/18
GHS*	479	514	602.15	707.27	794.78
Inflation rates		17.15%	17.46%	12.37%	

***** 2013/14 and 2014/15 are figures from Government of Ghana data as found in Jones 2015. 2015/16 onwards are estimates based on the inflation rates[22]

Table shows some basic estimations of cost per learner for formal education. There should be caution in interpreting these findings as only 2013/14 and 2014/15 are actuals calculated using data from the Education Sector Annual Report (taken from Jones 2015). The figures for 2015/16 and 2017/18 are not based on reported financial data, rather estimations have been calculated using the 2014/15 data and average annual inflation rates. Therefore, the true 2016/17 and 2017/18 cost per learner will be different and so need to be interpreted with caution.

However, as the cost per learner of CBE Cycle 2 are below those at the equivalent time for Government of Ghana and the CBE costs increase seems to be below inflation (Table), from this limited evidence it suggests the cost per learner for CBE is at least the same and has a good chance of being less than the cost per learner for Government of Ghana formal education.

As the cost per learner decreases against inflation, it suggests the efficiency of the CBE programme increased over its implementation.

4.3 Cost per learner Completing CBE

Table 127: Cost per learner completing CBE Cycle 4 and Cycle 5

	Total Cost	learners enrolled	learners completing	% Completing	Cost/graduate
Cycle 4	£5,233,599.11	51,030	49,738	97.47%	£105.22
Cycle 5	£2,851,050.76	20,813	20,386	97.95%	£110.07
Combined	£7,677,149.87	71,843	70,124	97.71%	£106.63

Completion rates in Cycle 4 and 5 are very high meaning that the cost per graduate were similar, albeit slightly higher, than the cost per learner. Boy and girl completion rates for both Cycle 4 and 5 were almost identical so for this purpose the cost per male and female graduates are seen as the same.

For Cycle 4 and Cycle 5 the completion rates for all IPs were 90% or above. This commonality meant the range for IPs for the combined Cycle 4 and 5 was similar the cost per learner, being £88.35 to £131.06.

The below table (Table Table) takes the findings from Table 12 and adds data from the MU progress report (Crown Agents 2018b) on the completion rates and cost per graduate for Cycles 1 to 3. This shows that completion rates have increased during the CBE programme. As the cost per learner had also slightly increased the result is that, with the exception of Cycle 2, the cost per graduate has remained fairly stable.

Table 13: Cost per learner completing CBE throughout programme

	Cycle 1	Cycle 2	Cycle 3	Cycle 4	Cycle 5
Completion rates	92%	93%	97%	97.47%	97.95%
Cost per graduate	£105.38	£80.37	£104.14	£105.22	£110.07

[22] Inflation rate between years taken from https://www.statista.com/statistics/447576/inflation-rate-in-ghana/

4.4 Cost per graduate transitioning to Formal Education

Table 14: Cost per graduate transitioning to Formal Education CBE Cycle 4

	Cost per graduate	% graduates transitioned	Cost/graduate transitioned	IP range
Cycle 4	£105.22	95.25%	£110.47	£93.33 to £141.99

Almost all learners who completed Cycle 4 transitioned to formal school. This means the cost per learner transitioned is only slightly higher than the cost per learner and cost per completed learner. The transition rates for male and female was almost identical and, therefore, there costs are the same as cost per learner transitioned. The transition rate of learners for majority of IPs were above 95%

At the time of writing this report there was no data available for Cycle 5 transition rates as the school term following Cycle 5 had yet to start.

The below table (Table 15: Cost per graduate transitioning to Formal Education Table) adds data from the MU progress report (Crown Agents 2018b) on the transition rates and cost per transition for Cycles 1 to 3. This shows that transition rates have increased during the CBE programme which, combined with the higher completion rates per cycle contribute to a reducing per cycle cost per transition (with the exception of Cycle 2).

Table 15: Cost per graduate transitioning to Formal Education throughout programme

	Cycle 1	Cycle 2	Cycle 3	Cycle 4
Transition rates	88%	90%	90%	95.25%
Cost per graduate transitioning	£119.75	£89.30	£115.71	£110.47

4.5 Cost per graduate achieving minimum learner proficiency (50+)

Table 16: Cost per graduate achieving minimum learner proficiency Cycle 4 and Cycle 5

	% Min Proficient 50+				
	Cost / graduate	**Literacy**	**Numeracy**	**Average[23]**	**Cost / Min Proficiency graduate**
Cycle 4	£105.22	51.0%	68.4%	59.7%	£176.25
Cycle 5	£110.07	68.3%	89.4%	78.8%	£139.63
Combined[24]	£109.48	56.0%	74.5%	65.2%	£165.63

For Cycle 4, the cost per graduate in achieving the minimum proficiency at end of the cycle was £176.25. With 60% of learners reaching the minimum proficiency, the costs required are noticeably higher than the cost per learner, completion and transition.

Of the learners who were *not* proficient at Baseline (74% of sample), 49.7% of the same learners completed with an average score of 50+. Therefore, of those that were not proficient at baseline, the cost per minumum proficiency graduate was £211.71.

[23] As stated in the methodology and limitations section, average of literacy and numeracy scores were used. However, if the lower score was used, in this case 51%, then the Cost/graduate rises to £258.94

[24] The combined learner assessment scores were calculated proportionately to the number of Learners each cycle represented in relation to the combined number of Learners. For example, as 71% of the combined sample came from Cycle 4, and 29% from Cycle 5, the combined literacy % at minimum proficiency is (51*0.71) + (68.3*0.29) = 56.0%

For Cycle 5, the cost per minimum proficient graduate was lower than Cycle 4 at £139.63[25]. Despite having a slightly higher cost per graduate, Cycle 5 learners significantly out performed Cycle 4 learners on the endline learner assessments. The better endline performance by Cycle 5 learners does not seem to be caused by the baseline status of the Cycle 5 learners compared to Cycle 4 learners as both Cycles have similar percentages scoring zero and under 50 at baseline[26].

Of the Cycle 5 learners that were not proficient at baseline (79% of sample), 75% of the same learners graduated with an average learner score of 50+. Therefore, driven by the improved learner assessment outcomes of Cycle 5 learners, of those that were not proficient at baseline, the cost per minumum proficiency graduate was £146.76, substantially below that of Cycle 4.

In relation to gender, as the limitations state, no data was collected on the cost per learner by different gender. However, as reported in the Cycle 4 and Cycle 5 learner Assessment Reports (Stern and Pressley 2017 and 2018), girls and boys performed very similarly on learner assessments. This suggests that once enrolled, the cost per minimum proficient girl and boy graduate are equal.

In relation to socioeconomic status, analyses conducted for the Cycle 4 Tracker Report (Carter, Sabates and Rose 2018a) provided evidence that there was disagreement between learner and adult responses to the questions used to determine a child's wealth status (i.e. level of household asset). For these reasons, the findings with respect to socioeconomic must be considered with caution and no definitive conclusions should be drawn based on the current wealth measure.

As explained in Cycle 4 and Cycle 5 learner Assessment Reports (Stern and Pressley 2017 and 2018), there was no variation in baseline learner Assessment performance by socieoeconomic status. Since the wealth index variables were not collected at Cycle 4 and 5 endlines, the variation remained what it was in the baseline. Accordingly, there was a similar lack of relationship between socioeconomic status and endline scores (as well as improvement). Therefore, no analysis have been included on this issue.

Previous School Experience of learner

Table 17: Cost per graduate achieving minimum learner proficiency Cycle 4 by prior school experience

School experience	Cost / graduate	% Min Proficient 50+ Endline			Cost / Min Proficiency
		Literacy	Numeracy	Average	
No Prior attendance	£105.22	48.6%	66.8%	57.7%	£182.35
Prior attendance	£105.22	60.4%	74.9%	67.6%	£155.62
All learners	£105.22	51.0%	68.4%	59.7%	£176.25

The Cycle 4 learner Assessment Report (Stern and Pressley 2017) findings that learners with prior school attendance performed better mean that the cost per minimum proficient learner is lower for those with prior school attendance. However, as stated in the Cycle 4 learner Assessment Report (Stern and Pressley 2017) "those learners in the CBE programme without prior school attendance narrowed the gap from baseline to endline", Therefore, in Cycle 4 the results for the learners with no prior school attendance were good value suggesting that the programme is able to produce considerable value for the investment made to provide basic skills for children who have never been to school. Similarly, the findings from the Cycle 4 Tracker Report (Carter, Sabates and Rose 2018a), which uses EGMA and EGRA assessments, suggests that those without prior school experience are making the most gains.

Table 18: Cost per graduate achieving minimum learner proficiency Cycle 5 by prior school experience

School Experience	Cost / graduate	% Min Proficient 50+ Endline			Cost / Min Proficiency
		Literacy	Numeracy	Average	
No prior experience	£110.07	70.5%	89.7%	80.1%	£137.47

[25] This decrease in cost per minimum proficient gradate from Cycle 4 to Cycle 5 is slightly larger when the comparison between Cycle 4 and 5 considers only districts in which partners worked for both Cycles. See Stern and Pressley 2018 for more discussion on this.

[26] Cycles 4 and 5 had 9.3% and 10.2% of learners scoring 0/100 at baseline, and 65% and 69% scoring 1-49 at baseline, however, the distribution of scores between 1 and 49 is not known.

Prior experience	£110.07	51.1%	86.9%	69.0%	£159.45
All learners	£110.07	68.3%	89.4%	78.8%	£139.63

As found in the Cycle 5 learner Assessments there was better endline performance amongst learners with no prior school experience (despite similar baseline performance). This translates to a lower cost per graduate with minimum proficiency with no prior school experience. This is cost result is different to that in Cycle 4, although is similar when extent of improvement of learners is considered.

This better performance for learners without prior school performance is maintained, and perhaps slightly strengthened when only learners who scored below 50 at baseline are considered.

Table 19: Cost per graduate achieving minimum learner proficiency Cycle 4 and 5 combined by prior school experience

School Experience	Cost / graduate	% Min Proficient 50+ Endline			Cost / Min Proficiency
		Literacy	Numeracy	Average	
No prior experience	£106.63	55.0%	73.4%	64.2%	£169.33
Prior experience	£106.63	57.7%	78.4%	68.0%	£156.73
All learners	£106.63	56.0%	74.5%	65.2%	£165.63

For the combined Cycles 4 and 5, influenced by larger learner numbers in Cycle 4, the cost per graduate at minimum proficiency shows lower cost for those with prior exposure to school. However, as mentioned, there is good evidence to suggest the CBE programme offers good cost-effectiveness for children without prior school exposure.

Implementing Partner

For Cycle 4, in contrast to completion and transition rates, there were notable differences between IPs in the percentage of learners achieving minimum proficiency at endline (range of 28% to 76%). Therefore, differences in learner achievement and cost per learner are both key drivers of the differences in cost effectiveness. There is a group of IPs around the £160 - £180 cost per minium proficient learner, but there are notable high and low costs leading to a total range of £141.77 to £450.36.

There was no relationship between cost per graduate and percentage of learners at minimum proficiency. There was some relationship between the percentage of learners below 50 at baseline and % above 50 at endline for the IPs. This suggests key drivers were contextual factors related to access and baseline learner proficiency.

For Cycle 5, for all IPs there was a high percentage of learners at minimum proficiency at endline (69% to 89%), all improving on their Cycle 4 percentages and all but one reducing their cost per minimum proficient graduate. The improvement in endline learner percentages means there are no comparatively high cost per proficient graduate IPs as in Cycle 4 and the range of cost per minimum proficient graduate was £112.20 to £166.83. Interestingly, the low to high order based on cost per minumum proficient graduate for IPs changed in Cycle 5 suggesting contextual factors might be more influential than IP effectiveness.

When Cycle 4 and 5 are combined there is a range of £140.32 to £361.73 per minimum proficient graduate across the IPs.

More information on IP delivery quality can be found in the Lesson Learning Report (Crown Agents 2018a). Of specific relevance to this report:

- The CBE Implementation Study (Crown Agents 2017) along with MU monitoring reports suggest that facilitators in low performing areas were relying on outmoded rote learning approaches to facilitate CBE literacy and numeracy. These approaches were not always addressed by the technical support provided by CBE supervisors conducting monitoring visits on behalf of the IPs and government.
- Some of the high performing IPs were providing extra training to the Community Supervisors and their own supervisors to augment their skills in literacy and numeracy coaching at the field level.

Language at CBE Centre

Cycle 4 cost per minimum proficient graduate in relation to language of learning had a range of £110.35 to £266.69, a smaller range than that of IPs. The languages with a low cost per minimum proficient graduate are somewhat explained by the higher % of learners at baseline who are at minimum proficiency and who are taught in these languages. Similarly, those with the highest cost per minimum proficient graduate and both had the highest % of learners scoring 0% at baseline, therefore, these learners had the furthest to travel to reach minimum proficiency.

For Cycle 4 there was not a common overlap between IPs and language. IPs that had cost centres teaching the same language had significantly different cost per graduate at minimum proficiency.

For Cycle 5 the range for cost of graduate at minimum proficiency was £119.53 to £195.68. Like the findings for IPs, for Cycle 5 there was less variation in costs. There was more overlap between language and IPs. For some, but not all, of the languages the baseline situation was repeated at endline (the languages with a high % of learners under 50 at baseline also had this at endline).

When Cycle 4 and 5 are combined the range is £110.35 to £235.69.

Relevant learning from the Lesson Learning Report (Crown Agents 2018a):

- Some variations in language match and mismatch across the districts and communities due to the constraining factors related to facilitator unavailability in the mother tongue language of learners therefore classes were sometimes conducted in the second language.

4.6 Cost per graduate achieving learner proficiency (80+)

Table 20: Cost per graduate achieving learner proficiency Cycle 4 and Cycle 5

		% Proficient 80+			
	Cost / graduate	**Literacy**	**Numeracy**	**Average**	**Cost / Min Proficiency graduate**
Cycle 4	£105.22	23.9%	34.6%	29.3%	£359.55
Cycle 5	£110.07	26.1%	55.1%	40.6%	£271.20
Combined	£106.63	24.5%	40.5%	32.5%	£333.93

It should be noted that the 80+ was a benchmark chosen to represent high proficiency in the Learner Assessment. When considering the cost per graduate achieving 80+ it needs to be understood that this represents the cost for the achievement of very high learner proficiency outcome and that the CBE programme did not aim to have all learners graduate at this 80+ level. Therefore, when looking to understand the cost-effectiveness of the CBE programme it is recommended it is more useful to consider the Cost per minimally proficient graduate (50+). This 80+ section is useful in terms of understanding changes in cost-effectiveness for higher performing graduates between Cycles and the range for implementing partners.

The cost per Cycle 4 graduate achieving learner proficiency as defined as an endline learner Assessment score of 80+ was £359.55. This is over double the cost per graduate of achieving *minimum* proficiency. This is not surprising because, at baseline most learners (74%) are below 50 and most learners improved by one 'level' from their baseline position (for example, from beginner to minimum proficiency). Therefore, it was unlikely for the increase in learners in the 80+ proficiency category to grow from its baseline of 6.8% by much more that the 19.2% of learners who were in the minimum proficiency category directly below it at baseline.

As for minimum proficient graduates, learners in Cycle 5 outperformed those in Cycle 4 meaning that the cost per proficient graduate was lower for Cycle 5.

In relation to gender, as the limitations state, no data was collected on the cost per learner by different gender. However, as reported in the Cycle 4 and Cycle 5 learner Assessment Reports (Stern and Pressley 2017 and 2018), compared to achieving minimum proficiency (50+), a slightly larger percentage of boys scored 80+ at endline. Therefore, if the cost of enrollment are equalised, the cost of male graduates reaching this level was less than for females. For Cycle 4 this finding does not seem to be affected by the baseline learner situation of male and females as the percentages per learner

category were very similar for males and females. However, for Cycle 5, at baseline there were more boys scoring 50+ and so it is possible that the extent of change from baseline to endline was similar for boys and girls.

In relation to socioeconomic status the limitations and findings were similar to those for graduates achieving minimum proficiency with no clear relationship.

Previous School Experience of learner

Table 21: Cost per graduate achieving learner proficiency Cycle 4 by prior school experience

School Experience	Cost / graduate	% Proficient 80+ Endline			Cost / Proficiency
		Literacy	Numeracy	Average	
No prior experience	£105.22	22%	33%	27%	£387.84
Prior experience	£105.22	33%	43%	38%	£279.21
All learners	£105.22	24%	35%	29%	£359.55

For Cycle 4 a higher percentage of learners with prior school experience achieve proficiency with 80+ scores than do the learners without prior school experience. Therefore, this leads to a lower cost per proficient graduate. The 11% difference between these two categories is the same as at baseline. Whilst those with no prior school experience outperformed those with prior school experience and closed the gap in terms of the % scoring 50-80, this was not the case for percentage scoring 80+.

Table 22: Cost per graduate achieving learner proficiency Cycle 5 by prior school experience

School Experience	Cost / graduate	% Proficient 80+ Endline			Cost / Proficiency
		Literacy	Numeracy	Average	
No prior experience	£110.07	26.6%	56.1%	41.4%	£266.09
Prior experience	£110.07	22.0%	46.9%	34.4%	£319.87
All learners[27]	£110.07	26.1%	55.1%	40.6%	£271.20

In Cycle 5, similar to the findings for graduates scoring 50+, a higher percentage of those without school experience scored above the threshold. Further, this is not the same as for the Cycle 4 findings.

Table 23: Cost per graduate achieving learner proficiency Cycle 4 and 5 combined by prior school experience

School Experience	Cost / graduate	% Proficient 80+ Endline			Cost / Proficiency
		Literacy	Numeracy	Average	
No prior experience	£106.63	23.1%	39.4%	31.3%	£352.53
Prior experience	£106.63	29.6%	43.8%	36.7%	£291.00
Combined	£106.63	24.5%	40.5%	32.5%	£333.93

Combined, influenced by larger learner numbers in Cycle 4, the cost per graduate at minimum proficiency shows lower cost for those with prior exposure to school. However, given the Cycle 5 results showed the opposite relationship it cannot be said that there is clear evidence that prior school experience is associated with attaining minimum proficiency.

Implementing Partner

For Cycle 4 completing at proficient level there was a wide range for IPs from £275.94 to £1,411.33. The range is higher than for cost per minimum proficient learner as two IPs had a significantly lower % of learners (<10%) scoring 80+ compared to the other IPs. Similar to the results for cost per minimum proficient graduate, those with the most learners in the zero category at baseline had the fewest in the 80+ category at endline. Therefore, the was clear influence of the baseline situation on the endline situation.

[27] The values are much closer to those with no prior exposure as this group dominate the sample with 90% of the sample).

For Cycle 5, like the finding for minimum proficiency, there is less variance between IPs for cost per proficient learner with a range of £146.24 to £522.52. The main reason for this reduced variation is that for Cycle 5 all IPs had at least 20% of graduates scoring 80+ meaning there were less extreme values. As for Cycle 4, there was an influence of the baseline situation on the endline situation suggesting this contributed towards the outcome as much as any difference in IP effectiveness.

Language at CBE Centre

For cost of proficient graduate for Cycle 4, like the findings for the IPs, half of the languages increased by around 2 times compared to the cost of minimum proficient learner. The other languages saw their cost per graduate increase by 1.5 or 3 times. There were cases of overlap with the IPs with lower costs per proficient learner having centres teaching the languages that had lower cost per proficient learner. However, this was not always the case with some IPs teaching in several languages, some of which were lower cost, some were higher cost. This indicates for Cycle 4 there is no clear relationship between IP and language.

For Cycle 5, like Cycle 4, half of the languages increased by around 2 times compared to the cost of minimum proficient learner. The other languages saw their cost per graduate increase by 1.5 or 3 times. However, the order of languages in terms of cost per proficient was not consistent between Cycle 4 and 5 suggesting other factors influence cost effectiveness.

Cost Effectiveness of National Service Personnel

Whilst outside the scope of this report, in Jones 2015 there was consideration of National Service Personnel (NSP) pros, cons and costs. Jones's analysis found that whilst NSPs were funded by the National Service Secretariat and better educated than community-based facilitators, they were four times more expensive, may not report to or stay in posts and may not have appropriate language skills.

5. Sustainability and comparison with Formal Education

The learner assessments were not conducted with learners in formal education and so a cost-effectiveness comparison using this approach is not possible. However, the Cycle 4 Tracker study (Carter, Sabates and Rose 2018a) did use EGMA and EGRA tools to compare CBE learners who transitioned with learners in formal education. The findings showed similar scores between both groups at the start and end of the school year. Therefore, using the findings from section 4.2 (cost per learner enrolled in CBE) which tentatively suggests the cost per learner for CBE and public schools to be similar it can be cautiously concluded that for a similar cost as a year of formal education, the CBE programme enables learners to catch up with learners in formal education in terms of performance on learner assessments and that result is maintained from the start through to the end of the former CBE learners' first year in the formal system.

It should be noted that in the Cycle 4 Tracker Report (Carter, Sabates and Rose 2018a), CBE learners, when making the transition to public school, were matched to students in public schools according to age, gender and grade in which students transited. So, for every male CBE learner, aged 9, who transitioned into grade 2, a similar male age 9 student from grade 2 was selected. In addition, propensity score matching was utilised to identify a 1 to 1 match between children in CBE and public schools. This reduced sample was used to estimate learning gains of CBE children during 1 year in public schools.

The Tracer Study (Carter, Sabates and Rose 2018b) found that of children who started CBE in 2013 and that could be traced in March 2018, 88.9% were still in school at end of the 2017/2018 school year. Whilst this study could only trace those easy to find and so may not be representative of all CBE

learners, the finding does suggest that the CBE programme has sustainable outcomes in terms of continued education.

6. Conclusions

- Cost per learner, per graduate and per graduate transitioning to formal education decreased from Cycle 1 to 5 suggesting increased effectiveness on these metrics over the course of the programme.
- There were differences in cost per learner between IPs but these were due to contextual challenges like challenges of accessing locations and limitations of physical resources in the location. Regardless of contextual differences, all IPs had high percentage rates for completion and transition.
- Analysis based on limited data suggests the cost per learner and cost-effectiveness for CBE to be similar to public education, but more data and analysis is needed.
- Cost per minimum proficient and proficient graduate decreased from Cycle 4 to 5, again suggesting increasing effectiveness on this metric.
- Results seemed to be equitable as there was no significant association between cost per minimum proficient or proficient learner with prior school achievement. There was not the required data to make conclusions in relation to gender and wealth of learners, however, boys' and girls' completion and transition rates and learner scores were similar. This is a valuable outcome given the wider benefits of girls' enrolment and learning in education.
- From the data available for this report, the differences between the cost-effectiveness of IPs and languages were influenced by context and the baseline situation. Additionally, the findings from the Lesson Learning Paper (Crown Agents 2018a) suggests some high performing IPs provided extra training and support to their facilitators whilst lower preforming facilitators relied on outmoded rote learning approaches.
- The CBE programme has sustainable outcomes in terms of continuation in education. Nearly 90% of children who started CBE in 2013 and transitioned to formal school in 2014 were still in school at end of the 2017/2018 school year (Carter, Sabates and Rose 2018b).
- To obtain further useful findings it is recommended that further VFM studies could consider gender, comparison of cost-effectiveness between CBE and formal schooling, extra years of education as a result of CBE and the wider benefits of CBE beyond scores learner assessments.

7. Annexes

7.1 Annex 1: Summary of Cycle 4 and 5 Expenditure

Cycle 4 Programme spend summary

	Total	50% MU cost									
MU Cost	£831,045.00	£415,522.50									
	ACTION AID	**AFRIKIDS**	**CARE**	**GILLBT**	**IBIS**	**LCD**	**PLAN**	**PRONET**	**SFL**	**WEI**	**TOTAL**
A. IP Expenditure Cycle 4	£693,977.53	£495,337.75	£352,145.93	£120,782.59	£1,040,419.39	£174,696.64	£174,211.89	£824,102.42	£786,085.97	£156,316.49	£4,818,076.61
MU Costs (Note 1)	£68,602.33	£39,899.28	£26,300.95	£8,281.14	£72,584.12	£16,383.13	£12,214.07	£67,380.93	£92,419.76	£11,456.79	£415,522.50
B. Total Overall Cost	£762,579.86	£535,237.03	£378,446.88	£129,063.73	£1,113,003.51	£191,079.77	£186,425.95	£891,483.35	£878,505.73	£167,773.28	£5,233,599.11
C. Number of learners	8,425	4,900	3,230	1,017	8,914	2,012	1,500	8,275	11,350	1,407	51,030
IP Cost Per learner(A/C)	£82.37	£101.09	£109.02	£118.76	£116.72	£86.83	£116.14	£99.59	£69.26	£111.10	£94.42
Overall Cost Per learner(B/C)	£90.51	£109.23	£117.17	£126.91	£124.86	£94.97	£124.28	£107.73	£77.40	£119.24	£102.56
learners % (IP's learners/ Total learners x 100)	16.51%	9.60%	6.33%	1.99%	17.47%	3.94%	2.94%	16.22%	22.24%	2.76%	100.00%

Note 1: Both the MU Team Leader and Jones (2015) estimated the percentage of MU costs that should be considered part of the total programme costs to be 50%. This 50% represents the costs spent on operational management tasks plus a small percentage of costs from other categories.

To calculate the individual IP Costs, the 50% MU costs are added to IP costs in proportion to each IPs percentage of learners they enrolled against the total number of learners enrolled for that Cycle.

Cycle 4 IP spend breakdown

Actual Expenditure for Cycle 4 in GBP	ACTION AID	AFRIKIDS	CARE	GILLBT	IBIS	LCD	PLAN	PRONET	SFL	WEI	TOTAL
Inception Expenses	£28,697.15	£36,866.55	£10,813.34	£3,031.17	£6,116.09	£68,738.93	£13,276.22	£35,339.61	£23,783.96	£2,513.31	£229,176.34
Local Staff Cost	£78,784.72	£70,737.56	£137,168.20	£15,800.80	£20,219.65	£90,923.77	£46,375.01	£198,918.12	£107,774.28	£48,710.99	£815,413.10
Project Office Administration	£8,031.54	£47,749.99	£16,070.10	£1,934.79	£10,678.12	£38,240.32	£6,138.45	£109,272.73	£60,659.43	£6,237.36	£305,012.82
Other Operating Cost	£156,675.13	£70,651.45	£38,931.45	£14,831.68	£27,943.98	£231,466.86	£24,635.72	£150,173.26	£128,707.72	£21,120.74	£865,137.99
Facilitators Training	£201,864.77	£127,098.64	£40,531.74	£42,522.42	£42,933.03	£266,933.49	£26,552.11	£163,636.30	£132,008.36	£30,651.61	£1,074,732.47
Lesson Learning and Information Dissemination	£33,692.25	£14,858.43	£3,431.03	£2,257.26	£4,557.51	£19,362.32	£5,010.25	£8,927.99	£11,879.62	£352.56	£104,329.21
Teaching and Learning Materials	£99,495.26	£50,962.15	£24,004.32	£11,869.84	£19,791.16	£151,690.74	£16,712.09	£58,996.65	£123,748.63	£3,102.12	£560,372.94
Cost of Engaging with Local Government	£26,528.14	£5,456.33	£2,934.44	£2,880.69	£9,044.51	£31,635.31	£0.00	£15,786.83	£10,073.82	£95.02	£104,435.07
Monitoring and Evaluation	£39,403.11	£34,264.99	£46,248.06	£9,899.68	£19,369.41	£73,362.83	£12,788.76	£54,138.70	£69,537.26	£10,359.86	£369,372.65
Overhead	£20,805.46	£36,691.67	£32,013.28	£15,754.25	£14,043.19	£68,064.82	£22,723.29	£28,912.24	£117,912.89	£33,172.91	£390,094.01
Grand Total	**£693,977.53**	**£495,337.75**	**£352,145.93**	**£120,782.59**	**£174,696.64**	**£1,040,419.39**	**£174,211.89**	**£824,102.42**	**£786,085.97**	**£156,316.49**	**£4,818,076.61**

Cycle 5 Programme spend summary

	Full Cost	51% cost of MU Cost	50% of 51% Cost							
MU Cost	£815,000.00	£415,650.00	£207,825.00							
	ACTION AID	AFRIKIDS	GILLBT	LCD	OXFAM	PLAN	PRONET	SFL	WEI	Total
A. IP Expenditure Cycle 5	£458,316.42	£237,510.00	£62,017.93	£50,079.29	£207,785.96	£175,649.31	£388,077.95	£384,962.29	£71,651.61	£2,036,050.76
MU Costs (Note 2)	£45,173.70	£23,465.56	£7,199.43	£4,992.67	£23,395.66	£17,474.35	£37,944.31	£39,941.38	£8,237.91	£207,825.00
B. Total Overall Cost	£503,490.12	£260,975.57	£69,217.36	£55,071.96	£231,181.63	£193,123.66	£426,022.26	£424,903.68	£79,889.52	£2,243,875.76
C. Number of learners	4,524	2,350	721	500	2,343	1,750	3,800	4,000	825	20,813
IP Cost Per learner(A/C)	£101.31	£101.07	£86.02	£100.16	£88.68	£100.37	£102.13	£96.24	£86.85	£97.83
Overall Cost Per learner (B/C)	£111.29	£111.05	£96.00	£110.14	£98.67	£110.36	£112.11	£106.23	£96.84	£107.81
learners % (IP's learners/ Total learners x 100)	21.7%	11.3%	3.5%	2.4%	11.3%	8.4%	18.3%	19.2%	4.0%	100.0%

Note 2: Both the MU Team Leader and Jones (2015) estimated the percentage of MU costs that should be considered part of the total programme costs to be 50%. This 50% represents the costs spent on operational management tasks plus a small percentage of costs from other categories.

For Cycle 5, the Government of Ghana enrolled approximately 20,000 learners under the Fund Management of Crown Agents. Twenty thousand is 49% of the total Cycle 5 learner numbers (20813). However, as the Government of Ghana activities started slightly later than those of the IPs no data for the government activities is available for this evaluation. Therefore, for this report only 51% of the MU costs are considered for IPs (removing the 49% allocated to government activities). Then, to calculate the individual IP Costs, the 50% of the 51% of MU costs are added to IP costs in proportion to each IPs percentage of learners they enrolled against the total number of learners enrolled for that Cycle.

Cycle 5 IP spend breakdown

Actual Expenditure for Cycle 4 in GBP	ACTION AID	AFRIKIDS	GILLBT	LCD	OXFAM	PLAN	PRONET	SFL	WEI	Total
Inception Expenses	£18,244.33	£15,849.68	£2,098.30	£1,022.12	£7,429.80	£12,224.28	£10,789.47	£14,779.22	£893.93	£83,331.14
Local Staff Cost	£62,229.48	£29,794.75	£12,096.58	£6,328.51	£32,490.92	£28,092.34	£114,079.45	£52,890.44	£23,080.64	£361,083.11
Project Office Administration	£5,792.03	£35,006.71	£0.00	£3,222.29	£6,530.27	£4,254.65	£36,320.06	£44,120.53	£5,112.28	£140,358.82
Other Operating Cost	£70,325.74	£38,956.62	£5,408.60	£7,898.07	£37,172.06	£16,757.74	£65,307.33	£55,899.80	£6,828.29	£304,554.25
Facilitators Training	£166,036.05	£60,435.29	£23,832.82	£12,689.07	£50,760.07	£47,800.90	£84,730.63	£64,151.29	£17,855.04	£528,291.16
Lesson Learning and Information Dissemination	£9,312.86	£4,622.08	£987.48	£1,907.73	£5,091.37	£615.48	£4,417.66	£14,862.33	£0.00	£41,816.98
Teaching and Learning Materials	£70,398.16	£17,619.19	£4,366.03	£6,051.98	£34,056.74	£21,957.39	£30,200.39	£42,650.30	£1,467.01	£228,767.19
Cost of Engaging with Local Government	£16,316.12	£5,400.45	£173.24	£2,794.21	£2,945.10	£0.00	£9,597.57	£5,931.41	£0.00	£43,158.11
Monitoring and Evaluation	£16,856.15	£16,379.97	£8,142.52	£4,331.03	£9,782.26	£23,154.31	£22,840.14	£64,208.81	£5,798.74	£171,493.93
Overhead	£22,805.50	£13,445.26	£4,912.37	£3,834.27	£21,527.36	£20,792.23	£9,795.24	£25,468.17	£10,615.68	£133,196.06
Grand Total	**£458,316.42**	**£237,510.00**	**£62,017.93**	**£50,079.29**	**£207,785.96**	**£175,649.31**	**£388,077.95**	**£384,962.29**	**£71,651.61**	**£2,036,050.76**

7.2 Annex 2 Calculation of learner proficiency

Taken from Leaner Assessment Report 2017 (Stern and Pressley 2017):
learners scoring zero (i.e. non-performers) in both the basic and advanced reading categories were unable to answer a single item correctly on the respective subtasks that make up the composite scores. Those in the beginner categories (score up to 50) were able to answer about one-fifth to one-quarter of the questions correctly (showing they were just starting out in the reading process). Those who were approaching proficiency (50–80) averaged about 60–70% correct (meaning that based on most standards for mastery, they were not scoring high enough to be considered proficient in those skills). For those who were proficient (≥80), the averages were approximately 90% (which is a high but reasonable standard for claiming that learners have mastered the skills and are ready to move on to the next, higher-order skills).

While arguments could be made about proficiency/mastery not needing to be as high for certain subtasks, it was decided that it would be highly preferred to have consistent cut-points across scales for ease of interpretation and reading (once again keeping in mind that these scores are meant to be estimates, as opposed to targets or standards). Lastly, the four categories offer intuitive and easily interpretable results for all audiences: Nonperformers (unable to answer a single question correctly); beginners (with a score above zero but less than 50 – i.e. able to answer some questions correctly but unable to obtain a score of more than half the scale); approaching proficiency (with a score of at least 50 but still below proficiency); and proficient (with a score of 80 or above – which is a high but attainable upper threshold). Composites were created using an approach similar to how it is done for any other index (much like the Programme for International Student Assessment [PISA], Trends in International Mathematics and Science Study Understanding Complementary Basic Education in Ghana: Endline Report 11 [TIMSS], etc.). Accordingly, there is nothing in particular that says that proficiency needs to be 80+. These cut-points were mainly chosen for ease of interpretation – 0, 50, and 80 are relatively intuitive numbers in terms of 'can't read', 'can read some', and 'seems to be doing really well'.

7.3 Annex 3: Samples for Learner Assessments

Cycle 4

IP	Sampling Size	Region	District	Language	Gender: Girls/Boys	No. of centres
Action Aid	210	Northern	Gushegu	Dagbani/Likpakpaln	85/125	14
IBIS	243	Northern	Sawla-Tuna-Kalba	Brifo	108/135	13
ProNet	383	Brong Ahafo	Pru	Ewe	48/49	5
		Northern	West Gonja	Gonja	28/41	3
		Upper West	Daffiamah	Dagaare	22/33	3
		Upper West	Wa West	Dagaa/Brifo	44/77	6
		Upper West	Sissala West	Sissala	23/18	2
CARE International	189	Brong Ahafo	Tain	Twi	21/27	3
		Brong Ahafo	Nkoranza	Twi	19/11	3
		Northern	West Mamprusi	Mampruli	44/67	6
School for life	364	Northern	Yendi	Likpakpaln/Dagbani	104/159	13
		Northern	Nanumba South	Dagbani	63/38	5
GILLBT	76	Northern	Mamprugu-Moaduri	Mampruli	37/39	5
AfriKids	315	Northern	Karaga	Dagbani	50/55	5
		Upper East	Bawku	Kusaal	84/73	7
		Upper East	Bongo	Gruni	11/20	1

		Upper East	Talensi	Gruni	13/9	1
LCD	82	Ashanti	Sekyere Afram Plains	Twi	17/21	2
		Upper East	Kasena-Nankana	Kasem	31/13	2
Plan Ghana	95	Northern	North Gonja	Gonja	21/17	2
		Upper West	Lawra	Dagaare	25/32	3
World Education	45	Northern	Tolon	Dagbani	28/17	3
Total	**2002**				**926/1076**	**107**

Cycle 5

IP	Sampling Size	Region	District	Language	Gender: Girls/Boys	No. of centres
Action Aid	414	Northern	EAST MAMPRUSIE	Mampruli/Likpakpaln	48/38	5
		Northern	GUSHEGU	Dagbani/Likpakpaln	99/77	8
		Northern	NANUMBA NORTH	Dagbani/Likpakpaln	47/44	4
		Brong Ahafo	TAIN	Twi	24/37	4
IBIS	237	Northern	BOLE	Dagaare/Gonja	56/38	4
		Northern	KPANDI	Likpakpaln	71/72	6
ProNet	416	Brong Ahafo	NKORANZA NORTH	Twi	48/43	4
		Upper West	JIRAPA	Dagaare	49/35	4
		Upper West	NADOWLI	Dagaare	52/47	4
		Upper West	SISSALA EAST	Sissala	42/27	3
		Upper West	SISSALA WEST	Sissala	34/39	3
School for life	385	Northern	KUMBUNGU	Dagbani	29/13	2
		Northern	MION	Dagbani	42/60	5
		Northern	NANUMBA SOUTH	Likpakpaln/Dagbani	72/71	5
		Northern	SABOBA	Likpakpaln	53/45	4
GILLBT	61	Northern	MAMPRUGU MOADURI	Mampruli	31/30	3
AfriKids	192	Northern	KARAGA	Dagbani	72/42	6
		Upper East	PUSIGA	Kusaal	40/38	4
LCD	40	Upper East	BAWKU WEST	Kusaal	21/19	2
Plan Ghana	150	Northern	NORTH GONJA	Gonja	41/28	3
		Upper West	LAMBUSSIE	Dagaare	25/21	2
		Upper West	LAWRA	Dagaare	15/20	2
World Education	72	Northern	TOLON	Dagbani	34/38	3
Total	**1,967**				**1,045/922**	**90**

7.4 Annex 4 Enrolment and Completion rates

Cycle 4

IP	learners	% Female learners	% Completion rates	% Female completion rates
Action Aid	8,425	55.60	95.58	95.56
AfriKids	4,900	53.61	98.63	99.77
CARE	3,230	48.24	98.88	99.94
GILLBT	1,017	52.51	91.15	94.46
Oxfam/IBIS	8,914	51.23	97.17	96.47
LCD	2,012	58.00	93.09	93.32
Plan	1,500	49.93	89.60	90.65
Pronet	8,275	52.22	98.15	98.15
SFL	11,350	51.47	99.61	99.50
WEI	1,407	51.17	99.15	98.89
Total	**51,030**	**52.46**	**97.47**	**97.39**

Cycle 5

IP	learners	% Female learners	% completion rates	% Female completion rates
Action Aid	4,524	54.00	97.41	97.38
Afrikids	2,350	59.19	97.74	97.20
GILLBT	721	50.07	100.00	100.00
Oxfam/IBIS	2,343	51.86	98.59	98.60
LCD	500	59.00	99.20	99.32
Plan	1,750	48.97	96.00	95.57
Pronet	3,800	55.68	99.45	99.15
SFL	4,000	53.28	97.03	96.72
WEI	825	57.09	98.79	98.49
Total	**20,813**	**54.16**	**97.95**	**97.74**

7.5 Annex 5 Wealth Categories

The below text is taken directly from Baseline Report (Stern, Pressley, and Harden 2017)

Socioeconomic Status assignment

learners were asked questions related to their household economic situation. Many of these questions focused on family possessions, but the learners were also asked about what source of light their family uses, how often they may have to go without food, and the learner's perception of how much money their family has compared to other families in their village. These questions were purposely limited to those that learners were expected to be able to answer accurately—and since these questions were asked in schools, it was not possible to ask questions of parents/household heads. We deliberately did not include or use household survey instruments such as those used in the Ghana Living Standards Survey (GLSS) or the Core Welfare Indicator Questionnaire (CWIQ) because these have items that are best administered to adults in households and would not be appropriate to administer to children. Responses to the questions used in the child survey are detailed in ***Table 5*** (see Report)**.** These responses were used to create a wealth index as a proxy for socio-economic status. We created this wealth index using tetrachoric correlations for all binary variables and then split it into quartiles by region. These quartiles are Low, Mid-Low, Mid-High, and High. We used them to help differentiate among learners who were relatively richer and relatively poorer than others in the sample. The percentage of sampled learners belonging to each socioeconomic status quartile ranged from 22% to 27%.

	Number of learners	Percentage of learners
Does anyone in your house own:		
A Mobile Phone	1,696	71.2%
A Bicycle	1,659	69.3%
A Motor Bike	889	37.2%
A Radio	1,343	56.3%
A Television	423	17.8%
During the night, which of the following do you mainly use to give you light?		
Light Bulb	689	28.7%
Kerosene Lamps	189	7.9%
Candles	26	1.1%
Torch Light	1,322	55.1%
Firewood	46	1.9%
Solar Lamps	129	5.4%
How often does your family have enough food?		
Everyday	1,161	48.4%
Some days we go hungry	1,135	47.3%
Most days we go hungry	105	4.4%
Compared to other families in your village, do you think your family has:		
More money	133	5.5%
The same money	735	30.6%
Less money	1,533	63.9%
By District: Quartiled wealth index of household items		
Low	636	27.35%
Mid-Low	603	25.94%
Mid-High	566	24.34%
High	520	22.37%

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