EQUIP-Tanzania Impact Evaluation

Briefing Note 2: Early grade pupil learning in some of the most disadvantaged districts in Tanzania

January 2015

Introduction

"The key to ensuring that all children succeed at school is to enable them to attain critical foundational skills, such as reading and basic mathematics. Without these basic skills, many children will struggle to keep up with the prescribed curriculum, and learning disparities will widen for disadvantaged children".[1]

This warning from the latest UN Educational, Scientific and Cultural Organization (UNESCO) Education for All Global Monitoring Report highlights the need for robust evidence in all countries on the skills children are learning in the early years of primary school, and the extent to which disadvantaged children are falling behind. Armed with this information, policy-makers, implementers and other stakeholders can take better decisions to support teachers and pupils to "*ensure that all children and young people, especially the disadvantaged, receive the good quality education they need to realise their potential and lead fulfilling lives*".[2]

This briefing note presents the results of early grade learning in Kiswahili and mathematics in 17 of the most disadvantaged districts in Tanzania. The results come from a rigorous mixed-methods baseline impact evaluation (IE) study of the Education Quality Improvement Programme in Tanzania (EQUIP-T), conducted by Oxford Policy Management (OPM) in 2014. The overarching objective of EQUIP-T is to improve learning outcomes, particularly for girls. The 17 districts in the IE study are among the poorest in Tanzania, and they were purposely selected for the programme because they are known to have poor educational outcomes, including relatively low pass rates in the primary school leaving examination.[3] The districts have similar contextual characteristics to the remaining rural districts in the programme's five initial regions: Dodoma, Kigoma, Shinyanga, Simiyu and Tabora.[4]

The purpose of testing early grade pupils in the IE study is to measure changes in learning achievement over time, as a means of assessing the overall impact of EQUIP-T. The IE study also aims to guide interventions to improve teaching and learning by mapping pupil performance on to a scale of early grade curriculum competencies. This provides insight into whether pupils are performing at, above, or below the curriculum level expected, and gives detailed information on the skills different groups of pupils currently have. Scale-based performance scores give a better measurement of the learning gaps between different groups of pupils, and of changes over time, than standard approaches based on raw test scores. Further Information at the end of this report, gives more detail.

While two other large-scale studies of early grade pupil learning have taken place in Tanzania in the last three years: Big Results Now-3Rs (BRN-3Rs) and the third round of Uwezo (Uwezo-3), their purposes are different to this IE study (see Table 1).

Table 1: Overview of three studies of early grade pupil learning in Tanzania

Study feature	EQUIP-Tanzania IE	BRN-3Rs	Uwezo-3
Purpose	Baseline for IE of education improvement programme in disadvantaged districts (EQUIP-T)	Baseline for monitoring national education improvement programme (BRN)[5]	Catalyst for public action to improve quality of education[6]
Year[7]	2014 (March-May)	2013 (November)	2012 (June-July)
Type	School survey	School survey	Household survey
Frequency	Three rounds (2014, 2016, 2018)	Not known	Annual since 2010
Test group	Standard 3 pupils	Standard 2 pupils	Children aged 7 to 16
Content	Literacy (Kiswahili) and numeracy [Standards 1 and 2 level]	Literacy (Kiswahili and English) and numeracy [Standards 1 and 2 level]	Literacy (Kiswahili and English) and numeracy [Standards 1 and 2 level]
Instrument type	One-to-one oral administration	One-to-one oral administration	One-to-one oral administration
Sample	200 schools, incl. 100 control schools (3,000 children)	200 schools, no control schools (2,300 children)	55,000 households (105,000 children)
Representativeness of sample	17 disadvantaged districts	National	National

Sources: OPM (2015a), RTI (2014), and Uwezo (2013). See endnotes for full references.

The comparison of the three studies above shows that there are similarities across them, but also some fundamental differences – not least that the IE study is a study of disadvantaged districts while the other two are national studies. Accordingly, the results from BRN-3Rs and Uwezo-3 are not directly comparable to the results from the IE study, but they do serve as useful contextual information regarding the national picture. Key findings from these studies are cited throughout this briefing note.

The IE study tested pupils using an adapted version of the Early Grade Reading Assessment (EGRA) and the Early Grade Mathematics Assessment (EGMA) that was used in the BRN-3Rs study, and used many similar items.[8] A team of experienced Tanzanian subject and test design specialists, together with a team from OPM, followed the standard test development stages: they developed new items and a child-friendly protocol for administration, and they pre-tested, refined and piloted items before administering the tests. Trained enumerators, many of them educators, administered the tests on a one-to-one basis to the pupils. Great care was taken to ensure that the pupils felt comfortable with the testing procedure and were aware that their individual scores would be kept confidential. Boxes at the end of this note explain more about the test instruments, administration and data analysis, as well as giving an overview of the IE. The full results are available in a comprehensive baseline report.[9]

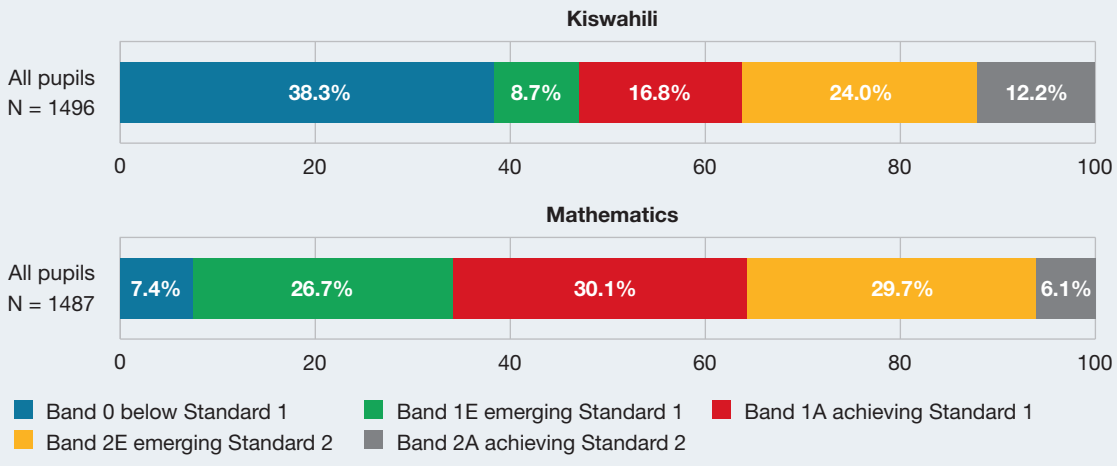
The rest of this briefing note is structured in three parts: the first part presents the overall findings on pupil learning in the disadvantaged districts, and then discusses the extent of learning gaps for different groups of pupils; the second part suggests some reasons for the findings on pupil learning, based on evidence from other parts of the IE study; the concluding part discusses some implications for future action to improve learning levels and reduce learning gaps in the disadvantaged districts.

Pupil learning in disadvantaged districts

Based on their performance in the Kiswahili and mathematics tests, pupils in the IE study were estimated to be achieving at a level of one of five ordered performance bands. Each band is linked to a set of curriculum-linked competencies expected of children in standards 1 or 2 (e.g. being able to read a simple word in Kiswahili). The bands are labelled as: Band 0: below Standard 1 level; Band 1E: emerging Standard 1 level; Band 1A: achieving Standard 1 level; Band 2E: emerging Standard 2 level; and Band 2A: achieving Standard 2 level.

The vast majority of Standard 3 pupils are not achieving at the excepted curriculum level in Kiswahili or mathematics

Figure 1: Distribution of pupils by curriculum-linked performance band in Kiswahili and mathematics



Source: IE Baseline Survey.
Note: Weighted estimates.

Only about 12% of pupils in Standard 3 are currently achieving Standard 2 level skills in Kiswahili (falling into Band 2A under Kiswahili in Figure 1). These 12% of pupils are able to read a simple story fluently and answer reading comprehension questions; they can also spell and punctuate simple sentences. However, the overwhelming majority of pupils are far from achieving this level of performance. Close to 40% of pupils have yet to acquire even emerging Standard 1 level skills, and fall into the lowest performance band. These pupils have fallen two standards behind the expected level, and are unable, for example, to read a familiar word in Kiswahili.

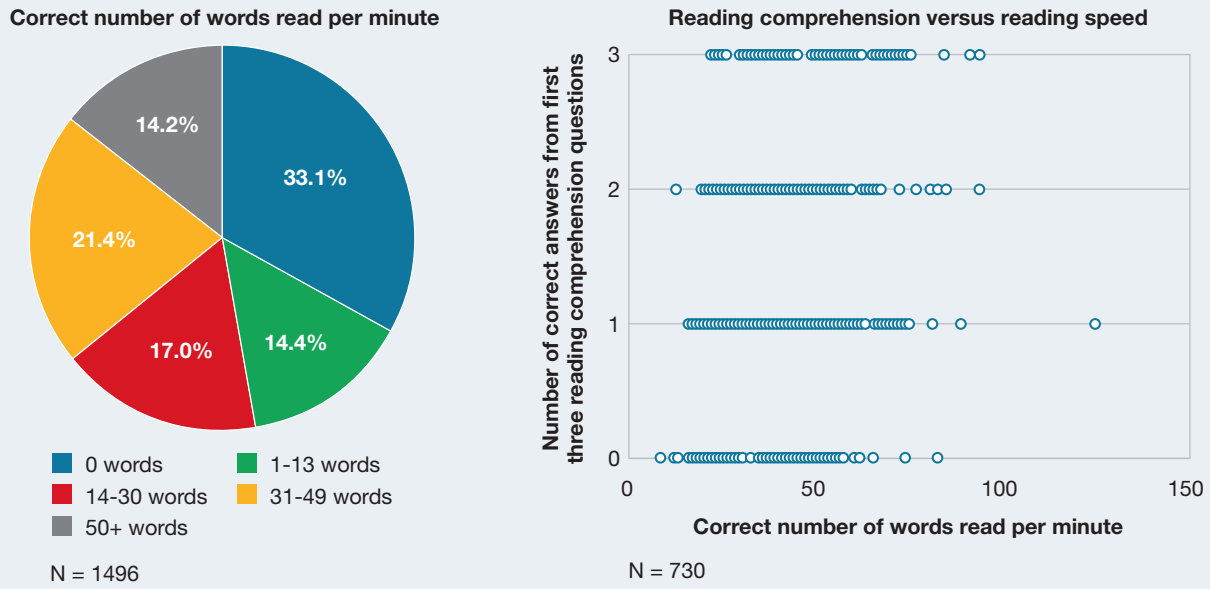
The pattern of pupil performance in mathematics is quite different to that for Kiswahili: the share of pupils falling in both the top band, and particularly the bottom band, is much lower than for Kiswahili. While it is good news that most pupils are achieving at least emerging Standard 1 skills in mathematics, the fact that only 6% are currently achieving Standard 2 level skills (falling into Band 2A under Mathematics in Figure 1) means that most have fallen behind the curriculum expectations. The top performing band of pupils are able to add and subtract three digit numbers, using carrying and borrowing methods, complete more complicated number sequences, and multiply whole numbers up to a product of 72.

The poor performance overall in literacy and numeracy in the disadvantaged districts is not surprising, as BRN-3Rs and Uwezo-3 report low performance nationally.

Some pupils are fluent readers but many more cannot read at all in Kiswahili, after more than two years of schooling

Some 14% of pupils can read a story passage at a speed of at least 50 words per minute (see pie chart in Figure 2). This is the draft benchmark for oral reading speed for Standard 2 pupils that was set as part of the government's BRN education programme.[10] At the other extreme, one-third of pupils are unable to read a single word from a story passage in Kiswahili. Both the BRN-3Rs and Uwezo-3 studies tested pupils on different Standard 2-level reading passages. Pupils in the BRN-3Rs study performed similarly to those in the IE study: 12% of pupils were found to be able to read at least 50 words per minute, while 28% could not read a single word. Uwezo-3 did not report reading speeds, but concluded that 26% of Standard 3 pupils could read a story fluently in Kiswahili, while 26% could not read a word.

Figure 2: Distribution of oral reading speed from a story passage and its relationship with reading comprehension[11]



Source: IE Baseline Survey.
Notes: (i) Weighted estimates; (ii) On the right hand chart, the estimates are based on a sub-sample of tested pupils who were able to read enough of the passage in one minute to answer the comprehension questions.

Reading speed is weakly correlated with reading comprehension

For pupils who are emerging readers and beyond, there is a positive correlation between reading speed and comprehension, but it is fairly weak (the correlation coefficient is 0.29). Put simply, pupils who can read faster are slightly more likely to answer questions correctly (see Figure 2, right chart). Widely cited research, based on cognitive neuroscience, proposes that children need to acquire a minimum reading speed of between 45–60 words per minute to be able to comprehend what they have read, due to limitations in working memory.[12] The results here show that in this context, many readers below this benchmark are able to answer comprehension questions.[13] It is also clear that fluency is not a good proxy for comprehension, since many children who can read more than 50 words per minute have poor comprehension.

Pupils find the reading subtests, which rely on phonics methods alone, much more difficult

As part of the Kiswahili test, pupils read a list of familiar words, a list of nonsense (made-up) words, and a short story.[14] On average, pupils were able to read nearly 50% more familiar words per minute than nonsense words. Reading nonsense words requires a decoding ability, which is about making connections between sounds and letter symbols (phonics). This is a pure test of phonic ability. In contrast, for the other reading subtests pupils can use complementary strategies, such as sight recognition of words, or contextual guessing. This suggests that pupils are specifically struggling with word decoding. Pupils in the BRN-3Rs study, who took comparable reading subtests, had even greater difficulty: managing to read 78% more familiar words per minute than nonsense words.

Pupils find mathematics problems requiring non-rote methods the most difficult

In line with the curriculum levels, pupils find arithmetic questions involving larger numbers comparatively difficult. There is also a clear distinction in difficulty between sums (addition or subtraction) that require pupils to 'carry' or 'borrow' units and the simpler sums which don't. Pupils find subtraction slightly more difficult than addition, but it is clear that pupils generally find the more complicated number sequence questions very difficult.

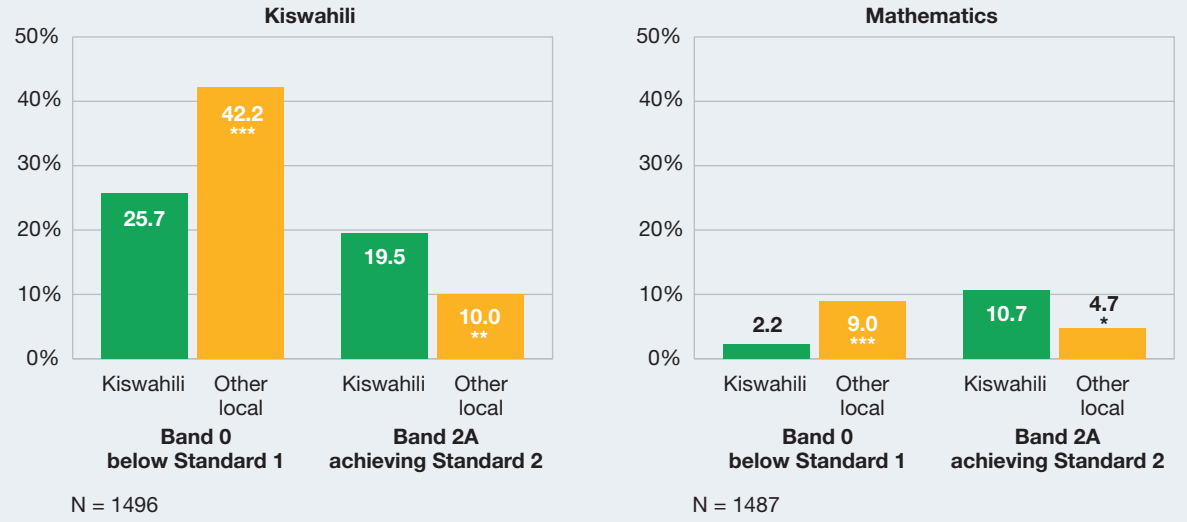
Only 4% of pupils were able to answer two or more out of four more complex sequence questions.[15] Answering these questions requires an understanding of foundational mathematical skills, as well as higher-order thinking skills to work out the patterns, not simply the ability to remember a fact or a rule. The BRN-3Rs survey found similar results and reached the conclusion that typically "*students are unable to apply their memorised knowledge of mathematics, and therefore, they are not well prepared to learn more complex mathematics at higher levels*".[16]

Learning gaps between pupils with different home languages

Most pupils do not speak the language of instruction (Kiswahili) at home

The official language of instruction in primary school is Kiswahili, yet the majority of pupils (77%) in these disadvantaged districts come from homes where Kiswahili is not the main language spoken. Nationally, the prevalence of non-Kiswahili speaking households is about 33%, according to Uwezo's 2011 survey.[17] This clearly illustrates how distinctive the 17 districts covered by EQUIP-T are. Given Tanzania's linguistic diversity, with more than 100 local languages spoken, there is likely to be considerable variation in the local languages that pupils in the IE study speak at home.

Figure 3: Proportion of pupils in top and bottom performance bands for Kiswahili and mathematics (by home language)



Source: IE Baseline Survey.
Notes: Weighted estimates. *Significant at the 10% level; **Significant at the 5% level; ***Significant at the 1% level.

Pupils who do not speak Kiswahili at home are struggling far more to learn Kiswahili and mathematics than pupils from Kiswahili speaking homes

Pupils who come from non-Kiswahili speaking backgrounds are significantly more likely to be in the lowest performance band for Kiswahili and mathematics (below Standard 1 skills) than pupils who speak Kiswahili at home (see Figure 3), and the size of the gaps is alarming. The difference in the share of pupils falling into the bottom band is 17 percentage points for Kiswahili and seven percentage points for mathematics. The opposite pattern is evident for top performing pupils: of the pupils who speak Kiswahili at home, nearly 20% are achieving at Standard 2 level in Kiswahili and 11% in mathematics, while the share of pupils who speak other local languages at home performing at the top level is roughly half of these figures for each subject. Uwezo (2011) also found that Standard 3 children whose home language is the same as the language they hear in school (Kiswahili) are much more likely to be attaining Standard 2 level performance in Kiswahili, English and numeracy.[18]

Learning gaps between pupils from different socioeconomic backgrounds

One-third of pupils come from poor households

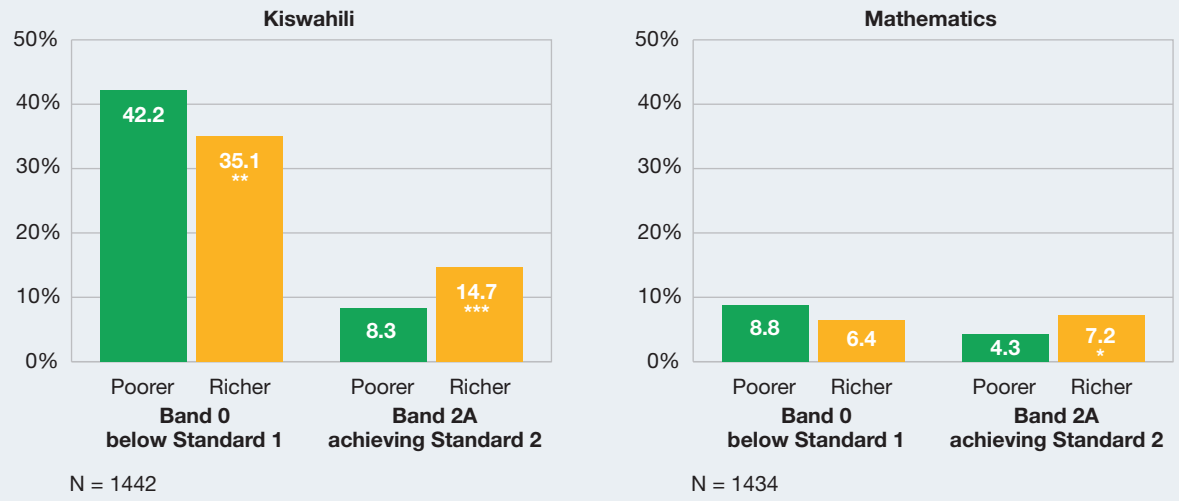
In the 17 disadvantaged districts, one-third (33%) of Standard 3 pupils belong to a household that is predicted to fall below the national poverty line.[19] In other words, a large proportion of pupils come from low socioeconomic backgrounds, which would be expected given the deliberate selection of remote and economically disadvantaged districts into the programme.

Pupils who come from poorer households perform much worse in Kiswahili than their richer peers, but, surprisingly, performance in mathematics is similar

Some 42% of pupils from poorer households lie in the bottom performance band (below Standard 1 skills) for Kiswahili, compared with 35% of pupils from richer households, and the difference is statistically significant (see Figure 3). A similar gap is found among top performers in Kiswahili, such that 15% of pupils from richer backgrounds are achieving at Standard 2 level (Band 2A), compared with 8% of pupils from poorer homes. The performance gaps are much smaller for mathematics. In fact there is no significant difference, based on poverty status, in the share of pupils falling in the bottom performance band for mathematics, and only a weakly significant and small difference (three percentage points) in the share of pupils reaching the top band (Standard 2 level skills).

Uwezo-3 also found stark patterns of learning disadvantage for pupils from poorer backgrounds. Their results show the learning gap in basic literacy and numeracy skills between non-poor and poor children is present when children enter school at age seven, grows in the early stages of primary education, and persists throughout their schooling life.[20]

Figure 4: Proportion of pupils in top and bottom performance bands for Kiswahili and mathematics (by poverty status)



Source: IE Baseline Survey.
Notes: Weighted estimates. *Significant at the 10% level; **Significant at the 5% level; ***Significant at the 1% level.

Learning gaps between boys and girls

Roughly equal numbers of girls and boys are enrolled in and attend school in the early grades

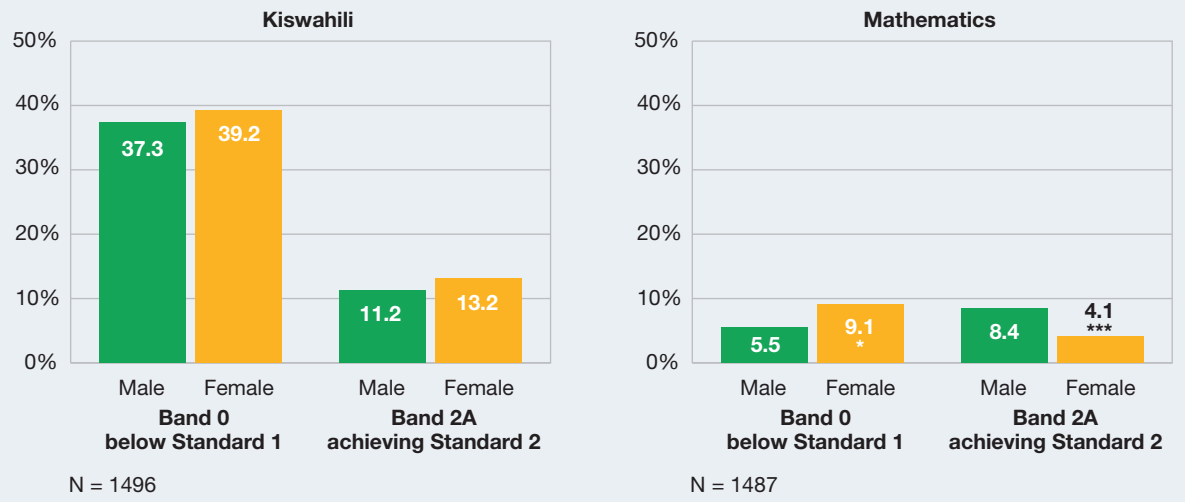
Just over half (52%) of the pupils enrolled in Standard 3 are girls, and there is little difference in school attendance rates in the early grades between boys and girls. On the day of the IE survey a head count found that 34% of boys in standards 1 to 3 were absent, compared with 32% of girls.

Boys and girls perform similarly in Kiswahili but boys outperform girls in mathematics

There is no significant gender gap in the share of pupils falling in the lowest and highest performance bands for Kiswahili (see Figure 5). Given the gender balance in enrolment, this means that similar numbers of boys and girls are achieving Standard 2 level skills in Kiswahili. The same is not the case in mathematics. For this subject, 8% of boys demonstrate Standard 2 level skills, compared with only 4% of girls, and this gap is strongly statistically significant. For the poorest performing pupils in mathematics, those with worse than Standard 1 skills, the gender divide is smaller (three percentage points) and only weakly significant.

The BRN-3Rs and Uwezo-3 studies found inconsistent results in respect of gender gaps in performance. The BRN-3Rs survey found no significant differences between the performance of boys and girls in Kiswahili or mathematics.[21] By contrast, the girls in the Uwezo-3 study outperformed boys in literacy and numeracy, although the difference was small for numeracy.[22] Apart from differences in methodology the different results found in the IE study may be partly related to the distinctive characteristics of the 17 districts studied, and the fact that BRN-3Rs and Uwezo-3 tested pupils across the whole country.

Figure 5: Proportion of pupils in top and bottom performance bands for Kiswahili and mathematics (by gender)



Source: IE Baseline Survey.
Notes: Weighted estimates. *Significant at the 10% level; **Significant at the 5% level; ***Significant at the 1% level.

Learning gaps between over-age and other pupils in the same Standard

Nearly one in four Standard 3 pupils are over-age for their grade, and this group performs similarly to other pupils in Kiswahili and mathematics

Nearly three-fifths (57%) of pupils in Standard 3 are of the correct age for their grade (nine or ten years of age).[23] The remainder are almost all over-age (37%), with most being one or two years above the official age. Over-age pupils are significantly more likely than their peers to be boys, to be from a poorer household, and to be from a non-Kiswahili speaking background. Although the over-age pupils performed slightly worse on both the Kiswahili and the mathematics tests than their peers, the differences are small and not statistically significant. It is important to note that the age data was self-reported by pupils, and 16% is missing, which makes the findings on learning gaps less reliable. The pupils with missing age data have similar poverty and home language characteristics to over-age pupils.

Summary of key findings on learning in disadvantaged districts

A very large number of pupils in these 17 disadvantaged districts are not learning the foundational literacy and numeracy skills expected by the curriculum, after more than two years in school. The problem is particularly acute for literacy skills: nearly one in four Standard 3 pupils have less than Standard 1 level skills in Kiswahili. Basic mathematical skills are stronger, but still only 6% of pupils have the appropriate Standard 2 level skills.

Pupils' background characteristics matter for success in learning foundational skills. Compared with their peers, learning gaps are particularly large for pupils who don't speak the language of instruction (Kiswahili) at home, but they are also present for pupils from poorer households and for girls (in mathematics). These characteristics overlap in many cases, reinforcing the learning disadvantage.[24] This means, for example, that a typical pupil from a poorer and non-Kiswahili speaking household has lower attainment than a classmate with either one of these characteristics alone. Table 2 compares the background profiles of pupils who are achieving in the top and bottom performance bands for Kiswahili and mathematics, and the differences are stark. For both subjects, pupils in the lowest band are far more likely to come from a non-Kiswahili speaking home than pupils in the top band. Likewise pupils in the lowest performing group are more likely to be from a poorer household than pupils in the top group, and for mathematics the bottom band contains a much higher proportion of girls than the top band.

Table 2: Background profiles of pupils in the bottom and top performance bands for Kiswahili and mathematics

Pupil characteristic	Kiswahili		Mathematics	
	Bottom band (below Standard 1)	Top band (achieving Standard 2)	Bottom band (below Standard 1)	Top band (achieving Standard 2)
Share with non-Kiswahili home language (%)	84.3	62.6	93.1	58.9
Share from poor household (%)	37.3	21.8	40.6	22.8
Share female (%)	53.7	56.4	64.2	34.5

Source: IE Baseline Survey.
Note: Weighted estimates.

Some reasons for the findings suggested by the IE study

The IE study identified a range of factors which most likely contribute to the low overall levels of early grade learning found in the disadvantaged districts. There are three key findings:

- **Actual instructional time for early grade Kiswahili and mathematics lessons is well below official guidelines.** Typically pupils receive just one hour and 20 minutes per week of lesson time led by a teacher, for each subject (Kiswahili and mathematics), compared with the official guideline of three-and-a-half hours for mathematics and three hours for Kiswahili. The very high rates of teacher absence from classrooms when they are present in school and timetabled to teach (67%) is the main factor which reduces instructional time for pupils. High rates of pupil absenteeism further compound the problem.
- **Teacher performance and support constraints.** The main constraints on good teaching in the disadvantaged districts are: (i) inadequate curriculum knowledge and poor subject knowledge among a minority of teachers; (ii) lack of effective and inclusive pedagogy; (iii) high teacher absenteeism; and (iv) little effective monitoring or support for teachers. EQUIP-T IE Briefing Note 1 focuses on teachers and elaborates on these and other constraints.[25]
- **Shortage of textbooks and supplementary reading books.** Most pupils in early grade Kiswahili and mathematics lessons have something to write with and an exercise book (about 90% in both cases). But textbooks are used infrequently, and supplementary reading books are rarely available. In nearly two-thirds of lessons (64%), no textbooks are used, and more than three-quarters of Kiswahili classrooms (77%) have no supplementary reading books available for pupils to practise their reading skills.

Other findings from the IE study may help to explain the learning gaps experienced by the three groups of disadvantaged pupils identified in this briefing note:

- **Teachers rarely switch languages during lessons to support pupils who don't speak Kiswahili at home.** The vast majority of pupils whose home language is not Kiswahili only hear Kiswahili during lessons. Classroom observations show that only 4% of teachers switch languages during early grade lessons to help pupils who do not speak Kiswahili at home to understand. Corroborating this observation, a similarly low proportion of early grade teachers reported during interviews that they switch languages or teach entirely in a local language that is not Kiswahili. During follow-up interviews, teachers talked about using the direct (or 'natural') method of teaching whereby a pupil's mother tongue is not used at all, and their related concern that the pace of the curriculum makes it very difficult for pupils from non-Kiswahili backgrounds to acquire subject knowledge. Given this, it is evident that many primary school entrants do not have sufficient knowledge of Kiswahili to learn effectively.
- **Pupil absence rates from school are very high and further investigation suggests that this may be partly related to poverty.** On the day of the survey, one-third of pupils (33%) in early grades were absent. Many of the explanations given for this by multiple stakeholders during the follow-up research have their roots in the poverty constraints faced by households. It was commonly agreed across the nine communities chosen for in-depth analysis that school food programmes are an effective way of increasing daily attendance rates, which suggests that hunger may be a barrier for many children. Parents and community leaders also reported that children are commonly taken out of school for seasonal agricultural work in many communities. The use of money generated from income-generating activities to incentivise teachers or to buy teaching aids rather than food for the children is at times perceived by parents as a breach of a promise by school authorities. Parents largely want to see the schools provide food for their children from the maize cultivated on school farms.
- **Some head teachers and teachers have negative perceptions about the inherent capacity of girls to learn compared with boys.** When asked during the in-depth case studies to provide explanations for why many girls fail the national primary school leaving examination, teachers and head teachers typically cited community factors, such as girls' domestic workload. But the dialogue also reflected beliefs among some teachers and head teachers that girls inherently lack the capacity to learn. Officials from EQUIP-T suggested that this perception is particularly related to negative expectations of girls' performance in 'traditionally male' subjects, such as mathematics and science.

Implications for improving pupil learning in disadvantaged districts

The scale of the challenge in ensuring that all pupils in the 17 disadvantaged districts acquire foundational learning skills cannot be overstated. It will require a step-change in the standards of early grade teaching and learning overall, and particularly for disadvantaged groups of pupils. This calls for systemic and sustainable improvement in the quality of education – the targeted outcome of EQUIP-T. The findings on early grade learning from the IE study and other similar studies have implications for the emphasis of the programme's interventions, and also for policy-makers and implementers grappling with similar challenges in other parts of Tanzania.

To improve the learning experience of pupils in lessons, teachers need training and on-going support on pedagogy to support pupils who are not learning in their mother tongue, as well as some flexibility to adjust the pace of the curriculum to support the needs of different pupils. Sufficient and appropriate reading materials for pupils are also an essential feature of an early grade reading programme, and these are scarce at present.

The evidence regarding pupil learning in these disadvantaged districts could usefully feed into the design of pre-service and in-service training programmes for early grade teachers. One important finding is that reading fluency is not a good proxy for comprehension in these districts, suggesting that while strategies to improve children's reading fluency are important, other approaches to promoting comprehension need to be pursued at the same time. This is consistent with recent research that critiques models of early grade reading that focus largely on the sequential acquisition of discrete reading skills.[26] In mathematics there needs to be a shift towards pedagogical approaches which focus on an understanding of mathematical concepts and their application to non-routine problems.

Early grade pupils benefit from both support at home and at school in developing basic literacy and numeracy skills. The BRN-3Rs study found that controlling for household wealth, pupils from homes where parents listened to their children reading aloud each day had better test results. This corroborates other research in Africa and South Asia which found that home literacy environment is a strong predictor of reading skills of primary school pupils.[27] For poorer households and households who don't speak the language that their children are learning to read in, providing this type of support to their children is much more difficult. The importance of home-support and parental involvement should not be ignored in programming support for early grade learning.

Improving school-readiness for the majority of pupils in the disadvantaged districts who don't speak the language of instruction at home is a huge challenge. Early-childhood development interventions may be part of the solution, but these need to be considered as part of a holistic approach to supporting the learning of this group of disadvantaged pupils. Interventions to improve the provision of pre-school education will also need to take account of parental concerns about safety, relevance and cost.[28]

Concluding statement

This briefing note began with a warning from the Education Global Monitoring Report: learning disparities faced by disadvantaged children will widen unless they attain basic foundational skills in literacy and numeracy. Tanzania is committed to addressing this. The robust evidence base provided by this study will help the Government of Tanzania and its development partners build on existing initiatives and go further in ensuring equal learning opportunities for all the children of Tanzania.

Further information

Box 1: Measuring learning in the EQUIP-T IE

Here is a summary of the key features of the development, administration and analysis of the pupils tests:

Development of pupil tests

- *Design team*: Kiswahili and mathematics specialists from the University of Dar es Salaam, primary school teachers and a test design specialist from Tanzania working with a team from OPM.
- *Content*: New items adapted from the BRN-3Rs EGRA and EGMA tests covering key skills in the Standards 1 and 2 Kiswahili and mathematics curricula: (i) Kiswahili: reading speed (familiar words, nonsense words, short passage), reading comprehension and writing; (ii) Mathematics: number comparison, sequences, addition, subtraction, multiplication and word problems.
- *Comprehensive development process*: Three pre-tests with purposive sampling to check item difficulty and discrimination, clarity of wording, protocols for accurate measurement and child-friendliness.
- *Secure test items*, so they can be re-administered in next two rounds.

Box 1: Measuring learning in the EQUIP-T IE (continued)

Administration of pupil tests

- *Training*: Experienced enumerators, many of them educators, trained over a two week period to follow the test administration protocols; included repeated field practice, followed by a full piloting exercise.
- *Quality assurance*: Systematic follow up by supervisors during the fieldwork to check correct sampling of pupils and that test protocols were being followed.

Analysis of pupil test data

- *Data preparation*: Extensive data checking and cleaning process.
- *Data analysis*: Rasch analysis used to generate estimates of pupil 'ability' in Kiswahili and mathematics on an interval scale that is directly linked to criterion-referenced competencies in the national curricula. Rasch analysis is based on a probabilistic model of item response.
- *Weighted estimates*: Survey weights used to present quantitative results which are representative of the 17 districts in the sample.

Box 2: Overview of the EQUIP-T IE study

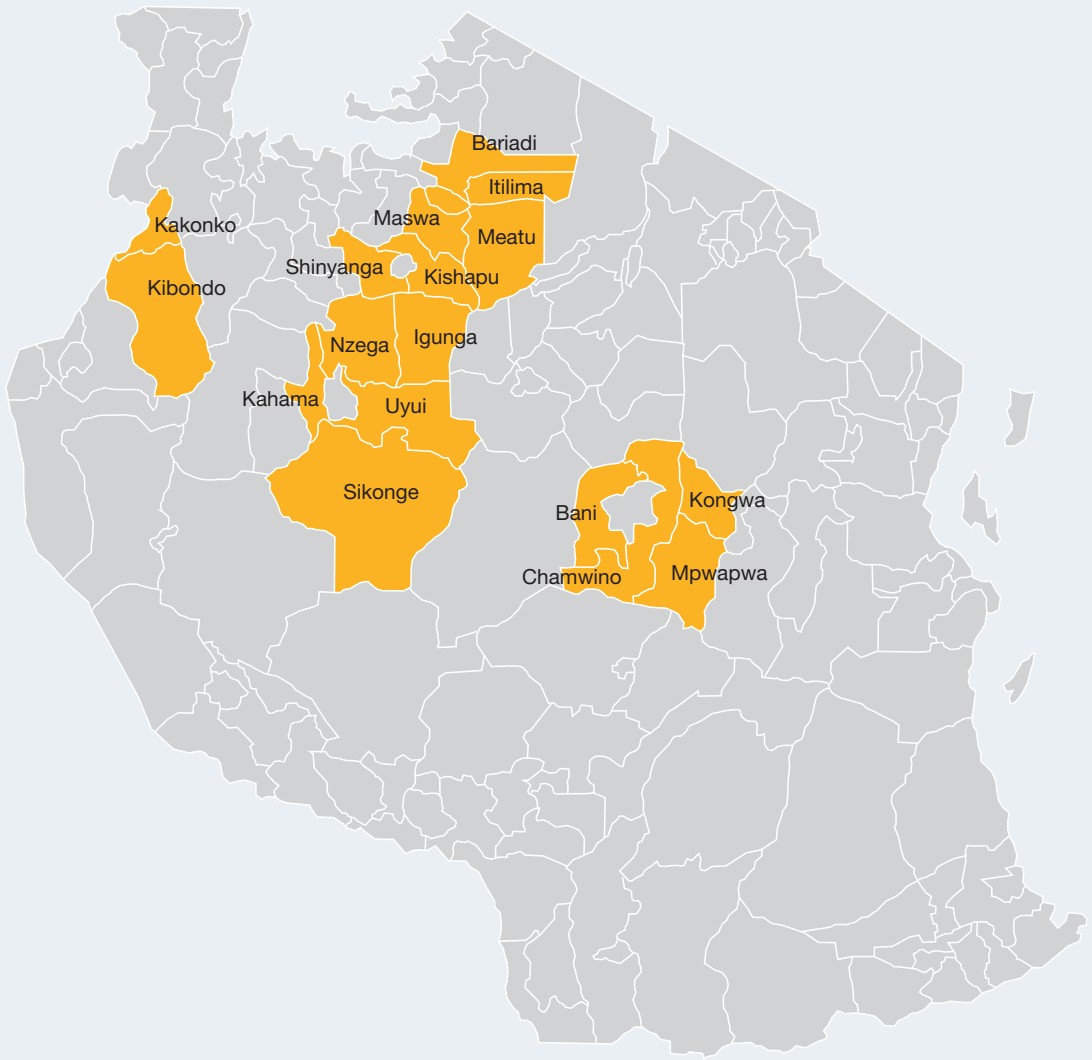
The IE baseline study applied a mixed-methods approach, with qualitative and quantitative methods integrated so as to strengthen the robustness and depth of the findings. For the programme districts the baseline results are based on:

- **A quantitative survey of 100 government primary schools in 17 programme districts** (see map below) covering:
  - 1,497 Standard 3 pupil tests;
  - 329 interviews with teachers of standards 1 to 3;
  - 247 Teacher Development Needs Assessments (TDNAs) in Kiswahili administered to teachers of standards 1 to 3, and 529 TDNAs in mathematics administered to teachers of standards 1 to 7;
  - 100 head teacher interviews and school record checks; and
  - 199 Standard 2 lesson observations in Kiswahili and mathematics.
- **Qualitative fieldwork in nine research sites that overlap with a sub-set of the quantitative survey schools**, consisting of key informant interviews and focus group discussions with head teachers, teachers, pupils, parents, school committee members, community leaders, and region, district and ward education officials.

The quantitative survey used a quasi-experimental design with multi-stage sampling, while the qualitative research used a small purposive sample to collect the baseline data.

The mixed methods research will be repeated in 2016 and 2018, to enable a robust estimate of programme impact on pupil learning, as well as evidence on the channels of programme influence.

Figure 6: Programme districts included in impact evaluation



Notes

[1] UNESCO (2014) "Education For All Global Monitoring Report 2013/4: Teaching and Learning: Achieving Quality for All", UNESCO Paris.
[2] Ibid.
[3] The five initial EQUIP-T regions had among the lowest 2014 Primary School Leaving Examination pass rates in the country.
[4] The shared characteristics include: percentage of households with electricity, percentage of children in school, and pupil to teacher ratio.
[5] This study is also a baseline for the national 3Rs initiative and, related to this, the national Literacy and Numeracy Education Support Programme (LANES).
[6] Uwezo is citizen-centred, with an emphasis on a broad communication of the results.
[7] The primary school year in Tanzania runs from January to December.
[8] The main reason for adapting existing tests rather than developing new tests is that, from a sector-wide perspective, it is useful to have some common indicators of progress of large-scale education improvement programmes in Tanzania.
[9] OPM (2015a) "EQUIP-Tanzania Impact Evaluation: Final Baseline Technical Report, Volume I; Results and Discussion" and "EQUIP-Tanzania Impact Evaluation: Final Baseline Technical Report, Volume II; Methods and Technical Annexes", Oxford.
[10] RTI (2014) "National Baseline Assessment for the 3Rs (Reading, Writing and Arithmetic). Using EGRA, EGMA, and SSME in Tanzania", Section 5.2, Study Report, Draft, Washington, DC: USAID, pp. 70–71.
[11] To prevent pupils feeling uncomfortable during the test, pupils were only asked comprehension questions relating to the parts of the passage they managed to read. The chart to the right is based on a sample of pupils who were able to read enough of the story passage (in the time allowed) to be given the opportunity to answer three comprehension questions.
[12] Abadzi, H. (2006) "Efficient Learning for the Poor: Insights from the frontier of cognitive neuroscience", World Bank, Directions in Development Series.
[13] These results are based on a timed test where pupils were only asked comprehension questions on the parts of the passage that they managed to reach in one minute. It is possible that if the test was untimed children with even slower reading speeds could have answered comprehension questions correctly.
[14] The nonsense (made-up) words use forms which are legal for the language, use letters in legitimate positions, use consonant-vowel combinations that are typical, and are not homophones of real words. These guidelines follow: RTI (2009) "Early Grade Reading Assessment Toolkit", Report prepared for the World Bank, pp. 30-31.
[15] The four more complex number sequence questions asked pupils to fill in missing numbers in a sequence of whole numbers going up in steps of two and five, and going down in steps of two and 10.
[16] RTI (2014), pp. 41–44.

Notes (continued)

[17] Uwezo (2011) "Are Our Children Learning? Annual Learning Assessment Report 2011", Dar es Salaam: Uwezo Tanzania, p. 28.

[18] Ibid.

[19] Parents of sampled standard three pupils answered questions about their household characteristics using an existing poverty scorecard that was developed using Tanzania's 2007 Household Budget Survey (See: Schreiner, M. (2013) "A Simple Poverty Scorecard for Tanzania", Kansas City: Microfinance Risk Management, L.L.C., Available at: www.microfinance.com/#Tanzania). The resulting poverty score was used to estimate the likelihood that a household is below a given poverty line. In this case, a pupil is considered 'poor' if he/she comes from a household that has a greater than 50% chance of being below the Tanzania national poverty line, and 'richer' otherwise.

[20] Uwezo (2013) "Are Our Children Learning? Annual Learning Assessment Report 2012", Dar es Salaam: Uwezo Tanzania, p. 33.

[21] RTI (2014), pp. 19, 35.

[22] Uwezo (2013), pp. 15, 24.

[23] The age of entry for Standard 1 at primary school is seven years, but the exact rules are not readily available. If children have to be seven years before they enter primary school then nine or 10 year olds would be expected in Standard 3. On the other hand, if children can turn seven during Standard 1 then eight or nine year olds would be expected in Standard 3.

[24] Although poverty and home-language variables are strongly correlated, both are independently correlated with pupil performance. This means that pupils from non-Kiswahili homes perform worse on the tests than those from Kiswahili speaking homes, even taking poverty into account, and vice-versa. Taking an example from the reading passage test: holding the poverty variable constant, pupils who come from a non-Kiswahili speaking household read on average eight words less per minute than pupils from Kiswahili speaking homes. Similarly, holding the home language variable constant, pupils from poorer homes read on average four words less per minute than their peers from richer homes.

[25] OPM (2015b) "Teachers' knowledge, behaviour and support in some of the most disadvantaged districts in Tanzania", EQUIP-Tanzania Impact Evaluation: Briefing Note 1.

[26] Bartlett, L. et al (2014) "Problematizing early grade reading: Should the post-2015 agenda treasure what is measured?" *International Journal of Educational Development* (2014), Article in Press [http://dx.doi.org/10.1016/j.ijedudev.2014.10.002]

[27] Dowd, A et al (2013) "Literacy Boost Cross Country Analysis Results", Save the Children, Washington D.C.

[28] As part of the IE study, this emerged as a common theme in parental discussions across the in-depth case studies.

About the authors and other contributors

This briefing note was written by Georgina Rawle and reports on the work on the baseline IE study of EQUIP-T that has been conducted by OPM. Paud Murphy read all drafts and provided valuable comments. The note draws on the OPM Impact Evaluation Baseline Report Volumes 1 and 2 (OPM, 2015a **http://www.opml.co.uk**). Readers are encouraged to quote and reproduce material from this briefing note in their own publications. In return, OPM requests due acknowledgement and for quotes to be referenced. OPM cannot be held responsible for errors or any consequences arising from the use of information contained in this publication. Any views and opinions expressed do not necessarily reflect those of UK Department for International Development (DFID). For more information contact **georgina.rawle@opml.co.uk**

The quantitative survey results presented in this note are based on fieldwork conducted by the OPM Dar es Salaam office, using state-of-the-art computer-assisted personal interviewing (CAPI) technology. The data management and processing system allows real-time uploading and data sharing as well as continuous feedback to enumerators, to reduce errors in data capture. Validation and cleaning of the data occurs within a few days of completion of the interview. For more information contact **info.tanzaniaoffice@opml.co.uk**

About the project

EQUIP-T is a Government of Tanzania programme, funded by UK DIFD, which seeks to improve the quality of primary education, especially for girls, in seven regions of Tanzania. It focuses on professional capacity and performance of teachers, school leadership and management, systems that support regional and district management of education, community participation in education, and learning and dissemination of results. For more information see: **http://www.equip-t.org**

The independent IE study of EQUIP-T, being conducted by OPM, is a four-year study funded by UK DFID. It is designed to: i) generate evidence on the impact of EQUIP-T on primary pupil learning outcomes, including any differential impacts for girls and boys; ii) examine perceptions of the effectiveness of different EQUIP-T components; iii) provide evidence on the fiscal affordability of scaling up EQUIP-T post-2018; and iv) communicate evidence generated by the IE to policy-makers and key education stakeholders.

Oxford Policy Management