



Oxford Policy Management

EQUIP-T Impact Evaluation

Summary of the Pupil Learning Assessment (PB) and Teacher Development Needs Assessment (TDNA) Questionnaires and Description of the PB and TDNA Score Variables in the Public Use Dataset

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1 Overview

The Education Quality Improvement Programme in Tanzania (EQUIP-T) impact evaluation (IE) midline pupil learning assessment (PB) and teacher development needs assessment (TDNA) questionnaires used in 2016 were also used at the baseline in 2014 and will be used at the endline in 2018. Therefore the individual items (questions) from these two questionnaires must be kept confidential until the completion of the IE. For this reason the items used to assess pupil learning levels and teacher development needs with respect to subject knowledge have been removed from the PB and TDNA questionnaires (EQUIP-T IE pupil background and learning assessment (PB) midline questionnaire and EQUIP-T IE teacher development needs assessment (TDNA) midline questionnaire).

This summary note describes the pupil skill areas included in the PB questionnaire and the core curriculum topics covered by the TDNA as well as the constructed¹ variables included in the public use pupil- and teacher-level datasets (ml_v2_1_pupil and ml_v2_1_teacher) to allow for analysis of raw scores and/or item response theory (IRT) modelling.

For details on the design, development, results and analysis of the PB and TDNA questionnaires see OPM (2015a, 2015b).

2 Pupil learning assessment

2.1 Measurement of pupil learning

The IE survey measures learning in the early standards because given the EQUIP-T programme design it is reasonable to expect the greatest programme impact at this level. The IE baseline AND midline surveys therefore assessed standard three pupils in Kiswahili and mathematics at standard one and standard two curriculum levels, using an oral learning assessment that was administered on a one-to-one basis.²

The IE baseline Early Grade Reading Assessment (EGRA) and Early Grade Mathematics Assessment (EGMA) style instruments were developed in Tanzania specifically for the IE and adapted from the 3Rs-EGRA and 3Rs-EGMA (RTI 2014)³. Each of the pupil learning assessments (Kiswahili and mathematics) covers a number of different skill areas using subtests (see section 2.2.1).

2.2 Summary of the content of the pupil Kiswahili learning assessment

2.2.1 Skill areas

There are seven subtests in total and each subtest covers a different skill area:

- Four subtests are timed oral reading tests of syllables, familiar words, invented words and reading a short passage;

¹ These are variables constructed by the OPM impact evaluation team for the baseline and midline analysis.

² Standard three pupils were chosen because the IE baseline and midline surveys were conducted in March/April and it was not informative to use standard two pupils who would only have had one term of standard two lessons.

³ The 3Rs-EGRA and 3Rs-EGMA were recently used to collect baseline data for the Government's Big Results Now (BRN) programme that has similar aims to the EQUIP-T programme but will be implemented in different geographical areas.

- The remaining three subtests cover: reading comprehension (five items), listening comprehension (five items), and writing/spelling dictated sentences (two sentences).

2.2.2 Curriculum levels

Reading comprehension is a standard two level curriculum skill. The remaining subtests combine curriculum one and curriculum two level skills by including items of different levels within each subtest.

2.2.3 Pupil Kiswahili score variables in the EQUIP-T IE baseline dataset (ml_v2_1_pupil)

Table 1 shows which constructed indicators in the pupil-level dataset (ml_v2_1_pupil) correspond to each assessed skill area in Kiswahili. For example, for an assessed standard 3 pupil, n_p_fspped is the number of familiar words correctly read per minute and n_p_rctotal is the total number of reading comprehension items correctly answered.

Table 1 Kiswahili: Mapping of skill areas to pupil test score variables

Skill area	Variable name and description
Syllables (speed)	n_p_spped (total number of correctly read syllables per minute)
Familiar words (speed)	n_p_fspped (total number of correctly read familiar words per minute)
Invented words (speed)	n_p_ispdd (total number of correctly read invented words per minute)
Reading a short passage (speed)	n_p_pspdd (total number of correctly read words from a reading passage per minute)
Reading comprehension (5 items)	n_p_rctotal (total number of reading comprehension items correctly answered)
Listening comprehension (5 items)	n_p_lctotal (total number of listening comprehension items correctly answered)
Spelling dictated sentences (2 items) ¹	n_p_swrttotal (total number of spelling writing items correctly answered)
Punctuating dictated sentences (2 items) ¹	n_p_pwrtdtotal (total number of punctuation writing items correctly answered)

Source: OPM impact evaluation team. Note: 1) The same two sentences were used to measure both spelling and punctuation.

2.3 Summary of the content of the pupil mathematics learning assessment

2.3.1 Skill areas

There are six subtests containing 60 items in total. These cover: number comparison/quantity discrimination (eight items), missing numbers in sequences (eight items), addition (16 items), subtraction (16 items), multiplication (8 items), and word problems (four items).

2.3.2 Curriculum levels

Except for multiplication which is a standard two level competency in the national primary curriculum, the other five mathematics subtests contain a mix of standard one and standard two curriculum level items. Over the whole mathematics assessment the balance is skewed towards standard one level material; about 60% of the items are at this lower curriculum level.

2.3.3 Pupil mathematics score variables in the EQUIP-T IE baseline dataset

Table 2 shows which constructed indicators in the pupil-level dataset (ml_v2_1_pupil) correspond to each assessed skill area in mathematics. For example, for each assessed standard 3 pupil, n_p_mistotal is the total number of missing number items correctly answered and n_p_multtotal is the total number of multiplication items correctly answered.

Table 2 Mathematics: Mapping of skill areas to pupil test score variables

Skill area	Variable name and description
Number comparison and quantity discrimination (8 items)	n_p_qdtotal (total number of quantity discrimination items correctly answered)
Missing numbers in sequences (8 items)	n_p_mistotal (total number of missing number items correctly answered)
“Easier” addition (8 items)	n_p_add1total (total number of level 1 addition items correctly answered)
“Harder” addition (8 items)	n_p_add2total (total number of level 2 addition items correctly answered)
“Easier” subtraction (8 items)	n_p_sub1total (total number of level 1 subtraction items correctly answered)
“Harder” subtraction (8 items)	n_p_sub2total (total number of level 2 subtraction items correctly answered)
Multiplication (8 items)	n_p_multtotal (total number of multiplication items correctly answered)
Word problems (4 items)	n_p_wrptotal (total number of word problem items correctly answered)

Source: OPM impact evaluation team.

2.4 Marking

When working with the pupil learning assessment raw scores such as mean test scores, mean reading speeds, and the proportion of pupils achieving more than X% of questions correct it is important to understand how the subtests were marked and how non-response was treated.

2.4.1 Marking of the Kiswahili subtests

The four reading subtests are marked using a simple reading speed indicator: number of words correctly read per minute. Each pupil was given exactly one minute to complete each reading test. If a pupil finished early, this was accounted for in the reading speed.

For the remaining subtests, marks are awarded as follows: reading comprehension (five marks: one per item); listening comprehension (five marks: one per item); writing (13 marks for spelling words and 8 marks for punctuation).

2.4.2 Marking of the maths subtests

One mark is given for each item answered correctly. The number of items in each subtest is given in Table 2.

2.4.3 Treatment of non-response

Item non-response is treated as incorrect on all subtests for the raw score analysis except the four reading speed subtests in Kiswahili because non-response does not affect the reading speed indicators.

Most non-response is due to instructions in the PB questionnaire to skip items if a pupil got a fixed number of prior items incorrect. The assessment designers sought to make the items in each subtest hierarchically difficult. In Kiswahili, for example, the writing subtests contained two sentences, if the pupil was unable to write any word correctly in the first sentence, then the second sentence was skipped. In mathematics, for instance, the addition and subtraction items were divided into two levels, with level two items designed to be more difficult than level one items. If a pupil did not get any level one items correct (one and two digit problems) then level two items (two and three digit problems) were skipped.

3 Teacher development needs assessment (TDNA)

3.1 Measurement of teacher subject knowledge

The IE survey measures teachers' subject knowledge in mathematics and Kiswahili.⁴ For this purpose the OPM impact evaluation team together with a national team of experts developed a teacher development needs assessment (TDNA).^{5,6} For more information on the development of the TDNA see OPM (2015b).

The TDNA is in the form of a mock pupil test that teachers mark, indirectly providing information on their subject knowledge, which can be used to help design teacher support programmes. It contains items (questions) linked to the national primary curriculum.

⁴ The original EQUIP-T programme design included activities to improve teacher subject knowledge in Kiswahili and mathematics through school-based in-service teacher training (INSET) but this activity was dropped before the start of programme implementation.

⁵ This is the first time a TDNA has been used in Tanzania.

⁶ The IE baseline TDNA instrument is based on the format used by a TDNA instrument developed by Dr David Johnson for DFID Nigeria.

3.2 Summary of the content of the TDNA Kiswahili

3.2.1 Core curriculum topics

The TDNA Kiswahili covers a range of core curriculum topics: reading comprehension (10 items), grammar (five items), synonyms (five items), proverbs (five items), direct and indirect speech (three items), tenses (five items) and punctuation (nine items).

3.2.2 Curriculum levels

The content of the TDNA Kiswahili is relatively evenly balanced between items from lower and upper-primary levels in the national primary curriculum: 21 standard one to four level questions and 22 standard five to seven level questions.

3.2.3 TDNA Kiswahili score variables in the EQUIP-T IE baseline dataset (ml_v2_1_teacher)

Table 3 Kiswahili: Mapping of core curriculum topics to TDNA score variables

Core curriculum topic	Variable name and description
Reading comprehension (10 items)	n_t_kcmdnatotal (total number of comprehension items correctly answered)
Grammar (5 items)	n_t_kgrtdnatotal (total number of grammar items correctly answered)
Synonyms (5 items)	n_t_ksytdnatotal (total number of synonym items correctly answered)
Proverbs (5 items)	n_t_kprtdnatotal (total number of proverb items correctly answered)
Direct and indirect speech (3 items)	n_t_kdstdnatotal (total number of direct and indirect speech items correctly answered)
Tenses (5 items)	n_t_ktetdnatotal (total number of tenses items correctly answered)
Punctuation (9 items)	n_t_kputdnatotal (total number of punctuation items correctly answered)

Source: OPM impact evaluation team.

3.3 Summary of the content of the TDNA mathematics

3.3.1 Core curriculum topics

The TDNA mathematics covers eight core curriculum topics: whole numbers (seven items), fractions (four items), decimals (four items), percentages (three items), measurement (two items), geometry (six items), statistics (five items) and algebra (five items).

3.3.2 Curriculum levels

The contents of the TDNA mathematics is focused on topics from the upper standards of the national primary curriculum: three standard one to three level items, eight standard four to five level items and 25 standard six to seven level items. This is because some of the items based on the standard one to three curriculum levels were removed after pre-test results showed that the vast majority of pre-tested teachers found these items very easy.⁷

3.3.3 TDNA mathematics score variables in the EQUIP-T IE baseline dataset (ml_v2_1_teacher)

Table 4 Mathematics: Mapping of core curriculum topics to TDNA score variables

Core curriculum topic	Variable name and description
Whole numbers (7 items)	n_t_mwhtdnatotal (total number of whole number items correctly answered)
Geometry (6 items)	n_t_mgeotdnatotal (total number of geometry items correctly answered)
Statistics (5 items)	n_t_msttdnatotal (total number of statistics items correctly answered)
Algebra (5 items)	n_t_malgtdnatotal (total number of algebra items correctly answered)
Fractions (4 items)	n_t_mfrtdnatotal (total number of fractions items correctly answered)
Decimals (4 items)	n_t_mdetdnatotal (total number of decimals items correctly answered)
Percentages (3 items)	n_t_mpetdnatotal (total number of percentages items correctly answered)
Measurement (2 items)	n_t_mmetdnatotal (total number of measurement items correctly answered)
Source: OPM impact evaluation team.	

3.4 Marking

One mark is given for each item answered correctly. The number of items in each subtest is given in Table 3 and Table 4.

3.4.1 Treatment of non-response

If teachers left items in the TDNA blank, this non-response was treated as incorrect in the teacher TDNA person scores.

⁷ From the perspective of the IE, it is important to avoid ceiling effects or it will be difficult to detect change during IE follow-up survey rounds.

References

- OPM. (2015a). 'EQUIP-Tanzania Impact Evaluation: Final Baseline Technical Report, Volume I: Results and Discussion.' Oxford, UK: Oxford Policy Management.
- OPM. (2015b) 'EQUIP-Tanzania Impact Evaluation. Final Baseline Technical Report, Volume II: Methods and Technical Annexes.' Oxford, UK: Oxford Policy Management.
- RTI (2014) 'National Baseline Assessment for the 3Rs (Reading, Writing, and Arithmetic). Using EGRA, EGMA, and SSME in Tanzania.' Study Report. Draft. Washington, DC: USAID.