

# Tanzania Life Skills Assessment

## Life Skills Findings Report May 2018

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## Acronyms

$\beta$	beta coefficient
CI	confidence interval
DSIS-C	Domain-Specific Impulsivity Scale for Children
EGMA	Early Grade Mathematics Assessment
EGRA	Early Grade Reading Assessment
ORF	Oral Reading Fluency
SE	standard error
SES	socioeconomic status
SSME	Snapshot of School Management Effectiveness
UNICEF	United Nations Children’s Fund
USAID	U.S. Agency for International Development

## Overview and Purpose of Life Skills

The Life Skills Questionnaire was designed to assess a student's knowledge of and proficiency in applying life skills, more specifically academic grit, self-control and problem solving. A growing body of research has shown that acquiring life skills can play a large role in determining a student's success in school and, more broadly, in life (Heckman and Kautz, 2012). In particular, academic grit and self-control have been shown to be strong predictors of a student's future success in life (Bandura et al., 2001; Duckworth et al., 2007; Tsukayama et al., 2013). Problem solving is central to performing mathematics and to identifying and overcoming challenges in extracurricular contexts.

Derived from well-established tools and protocols, the questions in the student-level Life Skills Questionnaire were all adapted from existing Life Skills Questionnaire instruments. By and large, the original assessments provided a description of a person performing a skill during a given situation to introduce a particular life skill, and then posed questions to students. The actual instruments are presented in *Annex A*.

This report describes how each of the three central Life Skills components to this study (i.e. academic grit, self-control and problem solving) were assessed in the 2017 study and presents the findings. Assessors collected the life skills data across Tanzania in late October to mid-November 2017 as part of the Tanzania National Early Grade Reading Assessment (EGRA), Early Grade Mathematics Assessment (EGMA), Snapshot of School Management Effectiveness (SSME) and Life Skills studies. The 2017 national study was a follow-up to a similar study conducted in early 2016. In both studies, the EGRA and SSME components were funded by the U.S. Agency for International Development (USAID), the EGMA component was funded by Global Affairs Canada and the Life Skills component was funded by the United Nations Children's Fund (UNICEF). The assessors used Tangerine software on tablet devices to administer the assessment and questionnaire instruments.

## The Life Skills as Assessed in Tanzania 2017

### Life Skills Sampling

As in the previous rounds of data collection, two students from every school were assessed in Life Skills. However, in 2017, all twelve sampled students from schools in the following five regions were assessed in Life Skills; Mbeya, Iringa, Njombe, Songwe and Zanzibar. This led to a larger sample of students assessed in Life Skills 2017, consisting of 2,590 Standard 2 students total. It should be noted that in the 2015(16) study, students were assessed at the beginning of Standard 3 due to the timing of the national elections. The 2017 sample of students was assessed at the end of Standard 2.

### Academic Grit

For our purposes, 'grit' is defined as 'perseverance and passion for long-term goals' (Duckworth et al., 2007). The academic grit questions were adapted from the 'Academic Grit Scale' developed by Rojas et al. (2013) at the University of Kentucky. In turn, the Rojas questions were derived from Duckworth's 'Short Grit Scale' (2009).

Duckworth's (2009) original questions were grouped into two categories: Perseverance of Effort and Consistency of Interest. Given the ages of the children being evaluated (Standard 2 students), the Research Team focused the items only on the Perseverance of Effort questions. The team eliminated the Consistency of Interest questions, which focused on long-term, multi-year interests and projects, because they believed that this time reference might not be appropriate for Standard 2 students.

The Research Team included eight adapted questions—five of which were phrased positively and three negatively. The questions explored how hard the students believed that they had worked, whether they tended to complete all of their tasks or chores and whether they persevered and

continued working on a task when experiencing challenges and/or previous failures (see *Annex A* for the Life Skills questions).

### Self-Control

Duckworth and Gross (2014) define ‘self-control’ as ‘the capacity to regulate attention, emotion and behaviour in the presence of temptation’. For this life skills instrument, the Research Team adapted the language and the response options from the Domain-Specific Impulsivity Scale for Children (DSIS-C) developed by Tsukayama et al. (2013). For this questionnaire, students are asked questions that are designed to measure self-control and/or a lack of impulsivity as it relates to interpersonal interactions and schoolwork (Duckworth and Gross, 2014). The original measure asked students about the frequency of the occurrence of specific impulsive behaviours (i.e. lack of self-control), which led to respondent bias in previous instantiations. However, for this study, the Research Team asked the students whether they related to these situations (e.g. ‘Doto got upset and lost her temper at school. How often do you behave like Doto?’). As with the academic grit items, five self-control items were phrased positively and three were phrased negatively.

### Problem Solving

The Research Team did not develop a separate task to assess problem solving. Instead, the team used the Word Problems subtask of the EGMA to gauge the problem-solving capabilities of students in the study. The focus of the Word Problems subtask was to assess the students’ ability to interpret a situation, make a plan and solve a problem. The six problem situations used in this subtask were designed to provoke the students to make different, progressively more complex plans and to conduct different mathematical operations. In addition to evaluating students’ responses to the Word Problems subtask items, the assessors described the problem-solving strategies used by students to complete this subtask. The assessors observed the students as they completed the problems and noted which resources the students used (i.e. solved the problem in their heads; used counters, tallies or their fingers; and/or used paper and pencil for calculations). The expectation was that better problem solvers would use a wider range of different strategies that were most appropriate for the problem.

### Health Knowledge and Practises

The Research Team also developed a scale of items that focused on applied health knowledge, including handwashing, safe water practises and important illnesses (e.g. diarrhoea, malaria and HIV). These questions are more direct than either the academic grit or self-control questions and ask students about their knowledge or health practises. *Table 1* shows examples of these questions.

**Table 1. Examples of Health Items in the 2017 Life Skills Questionnaire**

No.	2017 Life Skill Health Question	Response Options
1.	<p><b>Kwa nini watu wananawa mikono?</b></p> <p><b>[Usisome majibu. Onesha yanayohusika tu]</b></p> <p><i>Why do people wash their hands?</i></p> <p><b>[Do not read responses. Mark all that apply.]</b></p>	<p>Kusafisha mikono ili kuondoa uchafu / To clean their hands and remove dirt ..... 1</p> <p>Kunukia vizuri / To smell nice ..... 1</p> <p>Kujikinga na magonjwa / To prevent illness, disease..... 1</p> <p>Kujisikia vizuri / It feels good..... 1</p> <p>Kufukuza mashetani / To ward off evil spirits .. 1</p> <p>Mengine / Other ..... 1</p> <p>Hajui/amekataa / Don’t know/refuse ..... 888</p>

No.	2017 Life Skill Health Question	Response Options
2.	<p><b>Ni kabla au baada ya shughuli gani watu hunawa mikono?</b></p> <p><b>[Usisome majibu. Onesha yanayohusika tu]</b></p> <p><i>Before or after what activities do you normally wash your hands?</i></p> <p><b>[Do not read responses. Mark all that apply.]</b></p>	<p>Hanawi mikono / Does not wash hands ..... 1</p> <p>Kabla ya kula / Before eating ..... 1</p> <p>Kabla ya ukaguzi shuleni / Before school inspection ..... 1</p> <p>Baada ya kutoka chooni / After using latrine ... 1</p> <p>Baada ya kushika uchafu / After handling rubbish ..... 1</p> <p>Kabla ya kuandaa au kupika chakula / Before preparing or cooking food ..... 1</p> <p>Baada ya kushika mnyama / After handling an animal ..... 1</p> <p>Kupata udhu / Preparing for prayer ..... 1</p> <p>Mengine / Other ..... 1</p> <p>Hajui/amekataa / Don't know/refuse ..... 888</p>

## Instrument Adaptation Process for Life Skills

### Previous Adaptations of Life Skills in Tanzania

Life skills was first introduced as an area of exploration during a study conducted in three regions of Tanzania in 2014 with support from UNICEF. Based on existing literature<sup>1</sup>, the Research Team developed a student-level Life Skills Questionnaire that focused primarily on the following skills: academic grit (i.e., perseverance and passion for long-term goals), self-confidence (i.e., an individual's overall evaluation or self-appraisal, whether the students approve or disapprove of themselves and whether they like or dislike themselves) and problem solving. The questionnaire also focused on self-control (i.e., the capacity to regulate attention, emotion and behaviour in the presence of temptation) and empathy (i.e. the ability to understand and share the feelings of another). Such skills have been shown to affect and predict students' success in school and life.

Given the ages of the children involved (students were assessed at the end of Standard 2 during the 2014 study and were, on average, 9 years old), the Research Team used a three-point Likert scale, with the response options being 'Not like me', 'Sort of like me' and 'Like me'. The findings of the study showed significant correlations between academic grit, self-confidence and student performance. The findings also indicated that the self-control measure required additional development because it was unable to capture sufficient variance among students.

A subsequent study in 2016 focused on academic grit, self-control and problem solving because of the previously mentioned promising findings, which linked student performance with academic grit, as well as the recommendations for further development and testing of the self-control items. In terms of the robust findings, as previously discussed, academic grit was found to predict student performance, particularly among students in lower socioeconomic households. These significant findings could have implications for educational programming; therefore, it was important to attempt to replicate them. Regarding the self-control items, the skewed results discussed in the previous study

<sup>1</sup> Experts cited in this research include A.L. Duckworth, M.H. Davis, E. Tsukayama, J.P. Rojas, J.A. Reser, E.L. Usher, and M.D. Toland.

(Brombacher et al., 2015; Mulcahy-Dunn et al., 2016) may be an indication that the students were reluctant to report a lack of this skill; therefore, a change in response options might have helped to mitigate this issue. Brombacher et al. (2015) conjectured at the time that students who may be reluctant to say that they are “like” students who lose their temper in class may be more comfortable with admitting that sometimes they lose their temper in class. Following this thinking and guidance in existing literature regarding using frequency of incidence (rather than identity) might prompt more sincere responses from students (Tsukayama et al., 2013).

The 2016 study adopted most of the methodology from the 2014 study with a few adaptations. First, to introduce the question to the student, the 2014 questions all began with the phrase, ‘Let me tell you about a child named \_\_\_\_\_’. For the 2016 study, this introductory phrase was only used for the first question in a series (e.g. the first of eight questions about academic grit). Second, the response options were changed from a three-point Likert scale to a four-point scale. The three-point scale consisted of ‘No’, ‘Sort of’ and ‘Yes’ options, and the response selected by the student depended on how closely he or she identified with a particular skill or behaviour. The four-point scale consisted of ‘Never’, ‘Sometimes’, ‘Often’ and ‘Every day’ options, and the response selected by the student depended on how frequently he or she displayed the behaviour (see *Table 2* for two examples).

**Table 2. Examples of 2016 Life Skills Questions and Response Options**

Final Life Skills Questions (2016)	Response Options
Let me tell you about a child called Bakari/Amina. He/she always works very hard. How often do you behave like Bakari/Amina?	Never ..... 0 Sometimes ..... 1 Often ..... 2 Every day ..... 3 Don't know/refuse ..... 888
Musa/Rosi often interrupts other children when they are talking. How often do you behave like Musa/Rosi?	Never ..... 0 Sometimes ..... 1 Often ..... 2 Every day ..... 3 Don't know/refuse ..... 888

Note: One name from the question is selected and read by the assessor based on the sex of the student.

Overall, the 2016 study revealed that additional item refinements, including testing of positively phrased questions rather than the currently negatively phrased questions, were necessary. The academic grit sub-scale produced a good distribution, with most students in the ‘moderate academic grit’ category. Self-control was negatively skewed. Although the modal student fell into the ‘moderate self-control’ category, approximately 40 percent of students reported ‘high’ self-control (i.e. they exhibited self-control behaviours every day). For the Problem Solving subtask, most students (72 percent) fell into the low category. We did not observe any significant correlations between student demographic indicators and the three life skills outcomes; there was a significant relationship between SES and academic outcomes, however. The main results of the analysis was that academic grit and self-control were significantly and positively associated with student performance on the Reading Comprehension and Missing Number subtasks. For example, a student who showed high academic grit or self-control performed better than their counterparts on the Reading Comprehension and Missing Number subtasks. This relationship held true when controlling for the student’s age, sex and SES in a linear regression model, suggesting that the correlation between life skills and academic achievement is not due to confounding factors, such as students having better life skills and higher academic achievement as they get older.

### Life Skills in the Current Study

Due to the previous results, the life skills items for the 2017 administration were altered in three ways. First, the Research Team amended the self-control scale to include five positively phrased items and three negatively phrased items (all items were negatively phrased in the previous scale). This change allowed the team to measure the behaviours associated with self-control, but in a manner that was more likely to elicit valid responses from the Standard 2 students. Second, the Research Team

introduced several opposite item pairs to the scales to determine whether the students tended to respond reliably to positive and negative items. For example, students who responded that they never performed a negatively phrased behaviour (e.g. giving up) should, in theory, respond that they often perform the opposite but positively phrased behaviour (e.g. not giving up). Lastly, to avoid social desirability bias, a short set of sentences was introduced to the assessor script before the life skills items to “normalise” behaviours that show low academic grit or low self-control. These sentences appear as follows:

‘Remember, there are no right or wrong answers, and no good or bad answers to these questions. Nobody is perfect all of the time. Sometimes it’s hard for people to admit that. Please be as honest as you can. Shall we begin?’

All items were subjected to a rigorous cognitive interviewing process in which 18 Standard 2 students responded to the life skills items and the follow-up questions and prompts.

## Life Skills Findings

### Performance of Instruments

The performance of the life skills instruments was assessed by two analyses. The internal reliability (Cronbach alpha) statistic indicated the level of agreement between different items in the same scale. High internal reliability suggests different questions on the scale measure the same construct. Factor analyses estimate the number of underlying constructs (factors) measured by each scale. We also examine the distribution of scores for each scale.

### *Academic Grit*

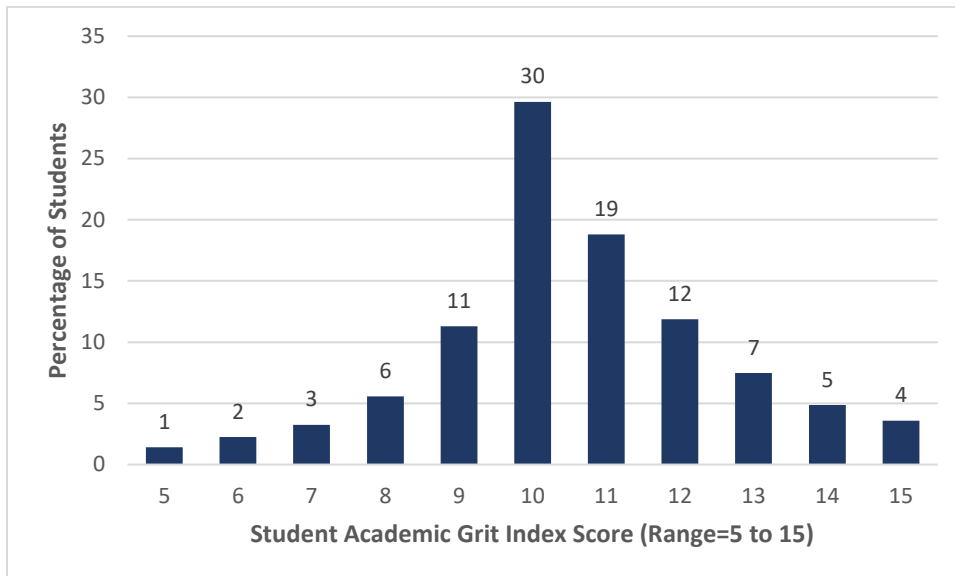
When the full academic grit scale was run through a reliability analysis, the Cronbach statistic was lower than that found in 2016, revealing low internal reliability. This was in part because significant discrepancies were observed between responses to items that described positive behaviours and those that described negative behaviours. Similar discrepancies had emerged from 2016 data. In the current study, when the scale was reduced to only include items describing positive behaviours, the Cronbach’s alpha was 0.71, which indicates acceptable levels of reliability for a five-item scale. Moreover, a factor analysis was run on the full academic grit scale and revealed that the positive and negative items loaded onto different factors. When using the reduced positive academic grit scale, the factor analysis model showed unidimensionality. This finding confirms that the reduced academic grit scale is likely measuring a singular construct and that all five of the remaining items are adding information to the model.

With the reduced scale, the Research Team placed the students (N=2,156) into low, moderate and high academic grit groups based on the sum of their responses. The team assigned between one and three points for each response (‘Never’=1, ‘sometimes or often’=2 and ‘every day’=3). Then, the team summed the points for all five academic grit items to obtain a raw academic grit score, which had a range of 5 to 15 and a mean score of 10.5 (see *Figure 1*). Although the distribution of scores differed significantly from 2016, for the purpose of continuity, the team used the same cut points for determining low, moderate and high academic grit, as follows:

- Low academic grit (24 percent of students): Students whose average score was less than 2 on each item (score range=5 to 9).
- Moderate academic grit (73 percent of students): Students who averaged at least a score of 2 on each item (score range=10 to 14).
- High academic grit (4 percent of students): Students who scored a 3 on each item (score=15).



**Figure 1. The Distribution of Student Academic Grit Scores.**



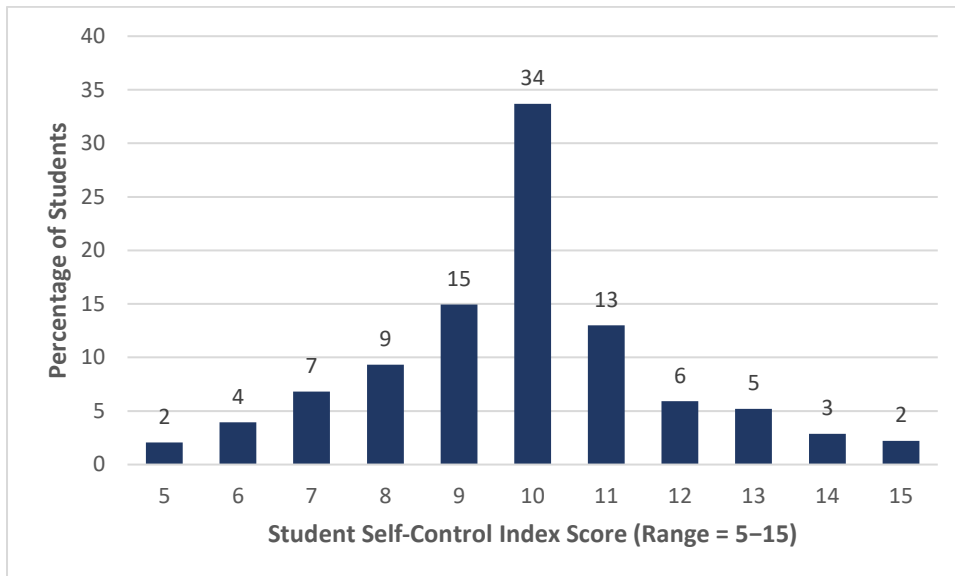
### *Self-Control*

Due to the changes implemented in the self-control items (five of eight items now described positive behaviours), the internal reliability statistics were notably lower than was the case in 2016, when all items described negative behaviours. This result is in line with findings in previous years that positive and negative items elicit different responses from young students. However, when the Research Team reduced the self-control scale to include only the five items that described positive behaviours, the Cronbach's alpha was 0.69, revealing marginally acceptable consistency for a five-item scale. As with the academic grit scale, a factor analysis of the full self-control scale showed that the positive and negative items loaded on two distinct factors. Another factor analysis run with only the five positive items confirmed unidimensionality. Thus, the five positive self-control items appear to measure a singular construct, and all items (on the reduced scale) were performing similarly.

The Research Team grouped the students (N=2,244) into low, moderate and high self-control categories and used the same method of summing the scores as was employed with the academic grit index. This scale ranged from 5 to 15 and a mean score of 9.8 (see **Figure 2**). Because the scale differed from that used in 2016 (the 2016 index used only four self-control items), the team did not use the same cut points. Instead, the team used the same cut points as the academic grit index, again for the sake of continuity.

- Low self-control (37 percent of students): Students with an average score of less than 2 on each of the items (score range=5 to 9).
- Moderate self-control (61 percent of students): Students with an average score between 2 and 3 on each of the items (score range=10 to 14).
- High self-control (2 percent of students): Students who scored a 3 on all items (score=15).

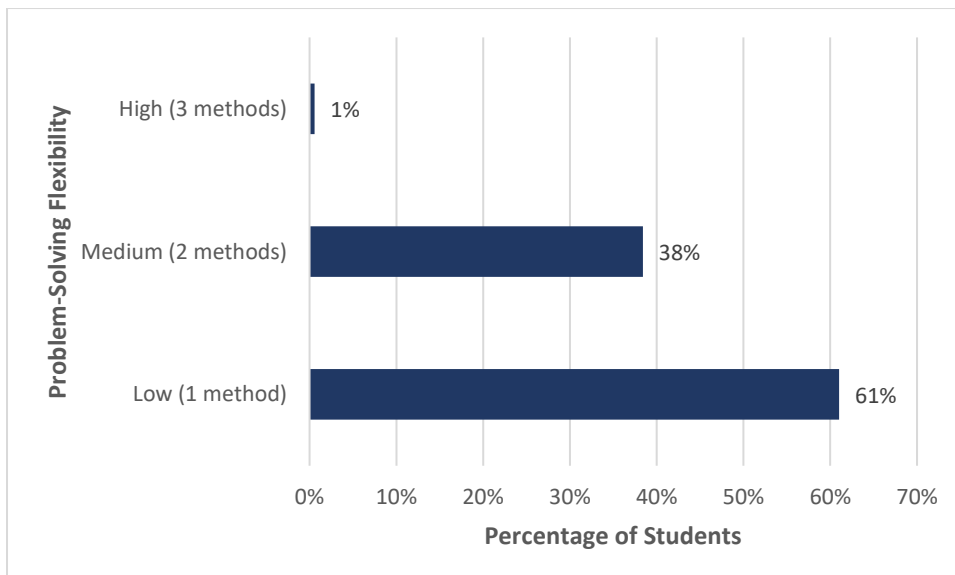
**Figure 2. The Distribution of Student Self-control Scores.**



### *Problem Solving*

During the Problem Solving subtask (the EGMA Word Problems subtask), the students were asked to demonstrate their problem-solving flexibility. That is, they were instructed to use more than one method for solving a given problem if they were able to do so. The methods included attempting to solve the problem in their head; using counters, tallies or their fingers; and/or using paper and pencil for calculations. During the subtask, the assessor recorded the total number of methods, or the problem-solving flexibility, demonstrated by each student. It was not possible to assess the internal reliability of this measure. Unlike with grit and self-control, problem-solving was not assessed using a scale with independent items that allow for the analysis of internal reliability. As can be seen in **Figure 3**, most students (61 percent) used one method to solve the problems during the Problem Solving subtask and approximately one-third (38 percent) were able to demonstrate two distinct methods. A small proportion (1 percent) of students were able to demonstrate three methods to solve the problems. This finding may indicate that teaching and learning in mathematics lessons focuses on identifying answers rather than strengthening students' problem-solving skills and flexibility.

**Figure 3. Proportion of Students Using Various Problem-Solving Methods.**



**Table 3. Proportion of Pupils at Each Level for Three Key Life Skills**

Life Skill	Percentage of Pupils in the Low Level	Percentage of Pupils in the Middle Level	Percentage of Pupils in the High Level	Percentage of Pupils in the High Level for All Three Skills
Academic grit	23.8%	72.7%	3.6%	
Self-control	37.1%	60.7%	2.2%	0.0%
Problem solving (EGMA)	61.0%	38.4%	0.6%	

*Table 3* summarizes the proportion of pupils for all three previously discussed life skills: academic grit, self-confidence and problem solving. Because the distributions are normally distributed, there are fewer students in the highest level for each life skill. No students were in the highest category for all three life skills at once, likely because there were so few students in the highest category for each life skill individually.

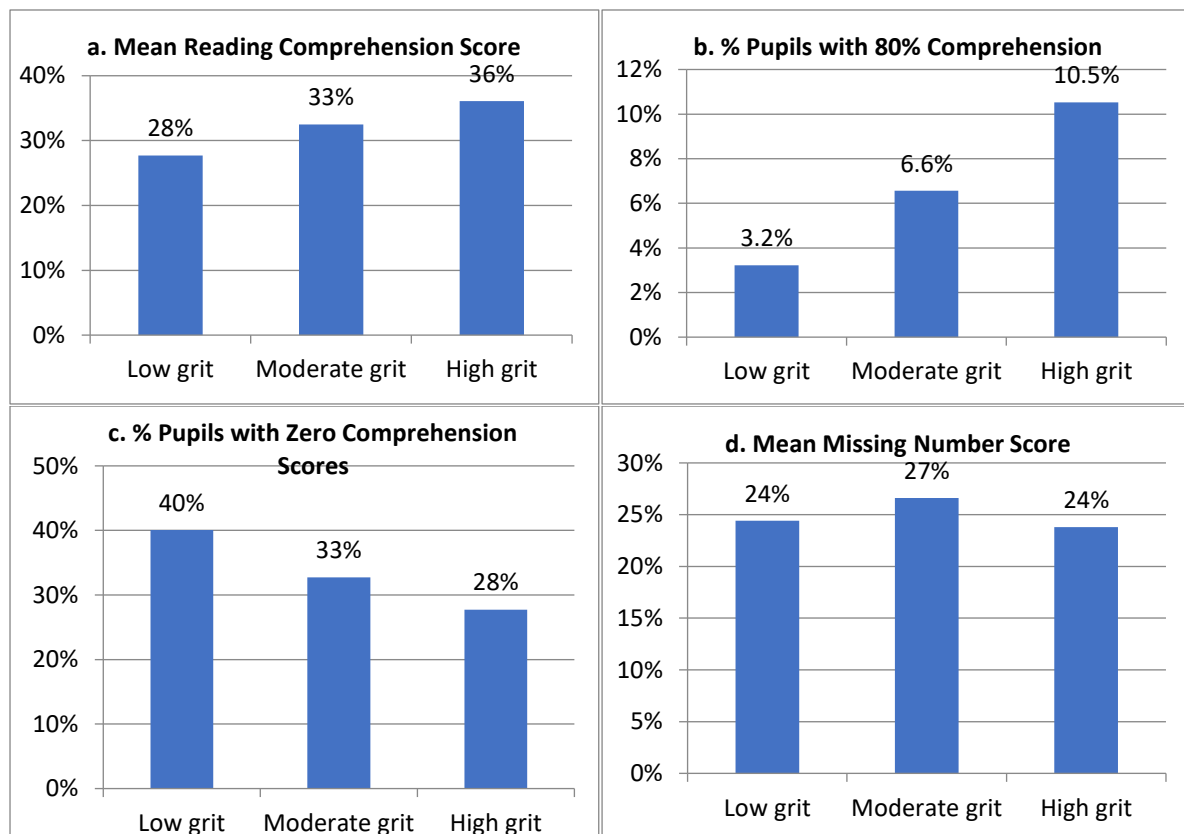
### Life Skills and Student Demographics

The Research Team examined the relationship between scores on the academic grit, self-control and problem solving scales on the one hand and student age, sex and SES on the other. The team did not determine any significant correlations between these student demographic indicators and these three life skills.

### Life Skills and Student Performance

The next set of analysis investigated whether students with good performance on the life skills assessments also had higher scores on tests of academic achievement. *Table 4* depicts how students with low, moderate and high levels of academic grit and self-control, as well as the number of problem solving methods a child use, respectively, performed on two EGRA subtasks (Oral Reading Fluency [ORF] and Reading Comprehension) and one EGMA subtask (Missing Number). *Table 4* presents the mean performance for ORF (number of correct words read per minute), reading comprehension (percentage of items correct) and missing number (percentage correct), as well as the proportion of students who obtained zero scores (did not get a single word or item correct). *Figure 4* and *Figure 5* each include four graphs; the first graph (*a*) displays mean reading comprehension score by group, the second graph (*b*) shows the percentage of pupils with 80% Reading Comprehension by group, the third graph (*c*) shows the percentage of pupils with zero Comprehension scores by group, and the fourth graph (*d*) displays the mean Missing Number score by group.

**Figure 4. (a) Mean Reading Comprehension Score; (b) Percentage of Pupils with 80% Reading Comprehension; (c) Percentage of Pupils with Zero Comprehension Scores; (d) Mean Missing Number Score; by Academic Grit Group**



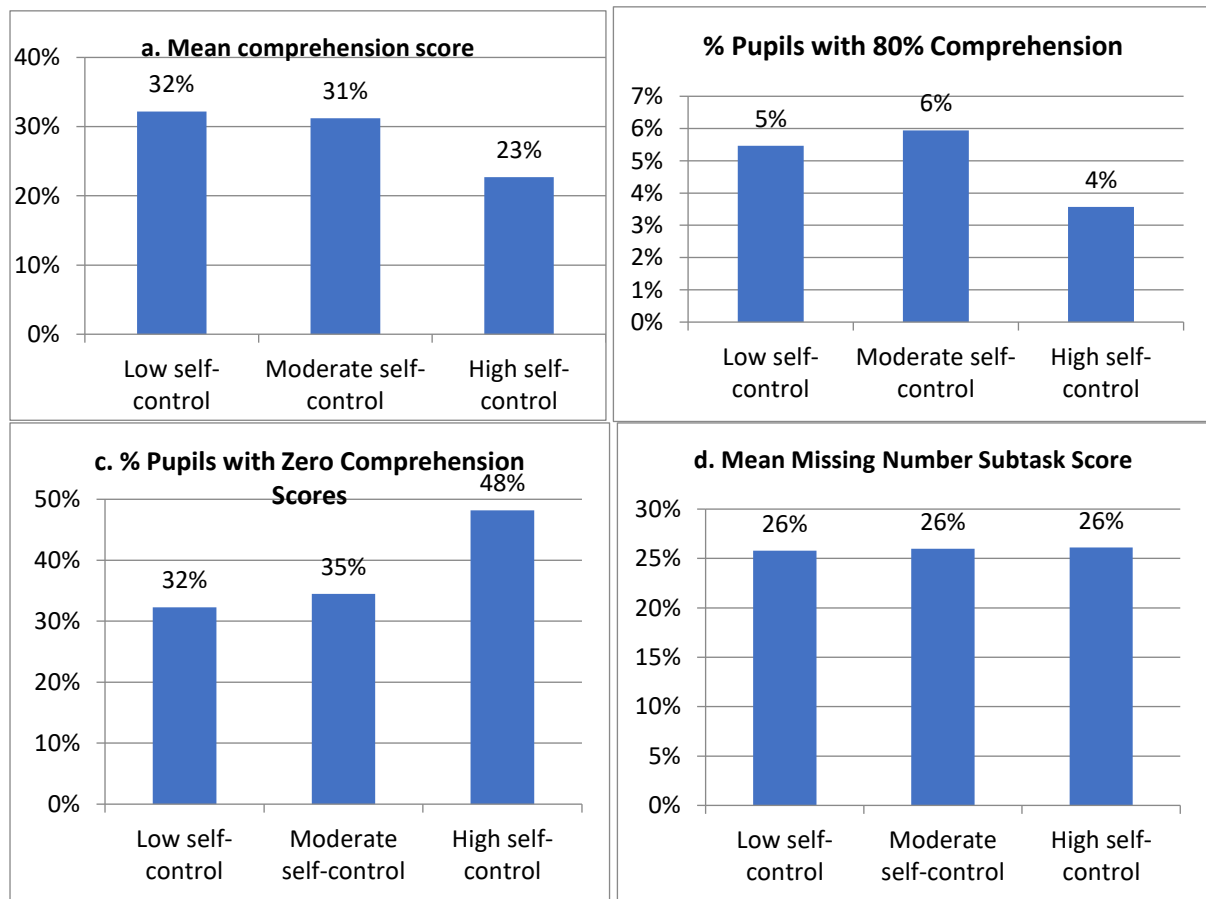
The performance patterns for the academic grit groups were roughly as predicted. That is, students who reported higher levels of academic grit tended to have higher mean scores in the three subtasks, and fewer students in moderate and high academic grit groups received zero scores. These findings make intuitive sense. The academic grit items asked students to report how often they continue working despite experiencing difficulty or how often they complete the work assigned to them. Such behaviours seem to link to enhanced academic performance in that students who tended to work hard, persevere and complete assignments would, on average, perform better than students who do not display these qualities. However, it should be noted that confidence intervals (CIs) for these estimates (see **Table 4**) overlap substantially. As such, many of the nominal performance differences observed between the low, moderate and high academic grit groups were not statistically significant. There were statistically significant differences on two outcome measures. Students with lower reported academic grit scores tended to perform more poorly than their “grittier” peers on two subtasks: the ORF (15 versus 19 correct words per minute,  $p < 0.05$ ) and Reading Comprehension (28% correct items versus 33% correct,  $p < 0.05$ ). As seen in **Figure 4(d)**, academic grit was not related to the Missing Number subtask score.

Similar patterns emerged for the number of methods a child used for problem solving. To arrive at the results seen in **Table 4**, the medium and high performing categories of problem solving were collapsed, since the highest performing category had an insufficient sample size ( $n = 13$ ) to stand alone. Therefore, the 2 categories are whether the student used 1 method or more for problem solving. This collapsed version of problem solving is used for the remainder of the analysis. There were statistically

significant differences on the two EGRA outcome measures. Students who only used one method of problem solving tended to perform more poorly than their peers using two methods: the ORF (16 versus 19 correct words per minute,  $p < 0.05$ ) and Reading Comprehension (27% correct items versus 33% correct,  $p < 0.05$ ). Students who only used one method were also more likely to score zero on both EGRA outcome measures. The relationship found here makes intuitive sense. Students who are flexible in using different problem solving approaches may also employed different strategies to decode text and infer its meaning. Thus, better problem-solvers may also be better readers.

Patterns for the low, moderate and high self-control groups are less consistent with predictions. Higher reported self-control was not linked to improved student performance on any of the three reading and mathematics subtasks listed in *Table 4*. In fact, the high self-control group had poorer performance on ORF and Reading Comprehension, and students had the same performance on Missing Numbers regardless of their level of self-control (see *Figure 5d*). It may be the case that the behaviours described in the positive self-control items (i.e. holding back from saying unkind words, controlling one’s temper, being respectful and waiting one’s turn to speak) are not directly related to student performance. However, academic grit and self-control were correlated with each other, with a correlation of 0.54.

**Figure 5. (a) Mean Reading Comprehension Score; (b) Percentage of pupils with 80% Reading Comprehension; (c) Percentage of Pupils with Zero Comprehension Scores; (d) Mean Missing Number Score; by Self-Control Group**



**Table 4. Life Skills and EGRA and EGMA Performance**

Academic Grit							
Subtask	Category	n	Mean	CI	n	% Zero	CI
ORF (correct words per minute)	Low academic grit	532	15.2*	(13.5, 16.9)	130	28.40%	(22%, 34.8%)
	Moderate academic grit	1544	18.8	(17.6, 19.9)	268	22.00%	(18.7%, 25.3%)
	High academic grit	78	20.6	(17, 24.1)	15	18.90%	(8.6%, 29.2%)
Reading Comprehension (percentage of items correct)	Low academic grit	532	27.7%*	(24%, 31.3%)	201	40.10%	(33.1%, 47%)
	Moderate academic grit	1545	32.50 %	(30.3%, 34.7%)	448	32.70%	(28.9%, 36.6%)
	High academic grit	78	36.10 %	(29.4%, 42.8%)	23	27.70%	(15.8%, 39.7%)
Missing Number (percentage correct)	Low academic grit	533	24.40 %	(21.7%, 27.1%)	61	13.30%	(8.3%, 18.3%)
	Moderate academic grit	1545	26.60 %	(25.4%, 27.9%)	148	11.20%	(8.7%, 13.7%)
	High academic grit	78	23.80 %	(19.9%, 27.6%)	8	11.90%	(2.8%, 21%)
Self-control							
Subtask	Category	n	Mean	CI	n	% Zero	CI
ORF (correct words per minute)	Low self-control	876	18	(16.6, 19.4)	171	21.10%	(16.7%, 25.5%)
	Moderate self-control	1314	18.1	(16.9, 19.3)	255	24.40%	(20.6%, 28.2%)
	High self-control	52	15.6	(11.2, 20)	13	27.70%	(11.8%, 43.5%)
Reading Comprehension (percentage of items correct)	Low self-control	877	32.20 %	(29.4%, 34.9%)	279	32.30%	(27.6%, 37%)
	Moderate self-control	1314	31.20 %	(28.8%, 33.6%)	407	34.50%	(30.2%, 38.9%)
	High self-control	52	22.70 %	(14.5%, 30.9%)	23	48.20%	(31.3%, 65.1%)
	Low self-control	878	25.80 %	(23.9%, 27.6%)	86	10.10%	(7%, 13.2%)

Missing Number (percentage correct)	Moderate self-control	1314	26.00 %	(24.7%, 27.4%)	137	12.10%	(9.2%, 15%)
	High self-control	52	26.10 %	(18.5%, 33.7%)	4	11.50%	(0.0%, 23.2%)
<b>Problem Solving</b>							
Subtask	Category	n	Mean	CI	n	% Zero	CI
ORF (correct words per minute)	1 Method	1593	16.1*	(14.9, 17.3)	399	30.46%*	(26.7%, 34.6%)
	2+ Methods	992	18.8	(17.6, 19.9)	166	17.89%	(14.8%, 21.5%)
Reading Comprehension (percentage of items correct)	1 Method	1593	27.2%*	(24.9%, 29.5%)	619	42.36%*	(38.2%, 46.6%)
	2+ Methods	992	33.2%	(31%, 35.3%)	292	29.53%	(26%, 33.3%)
Missing Number (percentage correct)	1 Method	1595	24.0	(22.6%, 25.5%)	215	15.53%	(12.8%, 18.8%)
	2+ Methods	992	26.4	(25.1%, 27.8%)	93	10.16%	(7.8%, 13.1%)

Notes: Moderate academic grit and moderate self-control were the reference categories for statistical tests. CI = confidence interval.

\*p<0.05.

To further test the relationship between academic grit, self-control, problem solving, and student performance, the Research Team developed a series of linear regression models. For each of the subtasks in **Table 4**, the team tested whether life skills (academic grit, self-control or problem-solving) were linked with the student performance when controlling for the students' sex, SES quintile, age and region. Results are presented in **Tables 5, 6 and 7**.

**Table 5. Academic Grit Regression Results**

Independent Variable	Category	ORF		Reading Comprehension		Missing Number	
		$\beta$	SE	$\beta$	SE	$\beta$	SE
Academic grit index	Low <sup>^</sup>	-	-	-	-	-	-
	Moderate	2.29*	0.90	2.74	1.93	1.57	1.47
	High	5.33**	2.02	7.93*	3.95	-0.78	2.44
Sex	Boy <sup>^</sup>	0.00	0.00	0.00	0.00	0.00	0.00
	Girl	3.23***	0.77	4.70**	1.46	-2.65	1.00
SES quintile	First (lowest) <sup>^</sup>	-	-	-	-	-	-
	Second	1.44	1.40	0.48	3.05	1.39	1.78
	Third	1.42	1.19	2.32	2.37	1.5	1.61
	Fourth	2.56*	1.09	5.13*	2.26	3.18*	1.53
	Fifth (highest)	5.21***	1.16	12.85***	2.28	7.25***	1.5
Age	[Continuous]	0.09	0.31	-0.75	0.66	0.43	0.49

Note: This model also controls for region, which is not displayed for space considerations.  $\beta$  = the beta coefficient from the regression model; SE = standard error of the beta coefficient. Additional models were also run using continuous versions of academic grit and the wealth index but did not affect the results; for interpretability, the categorical versions are displayed.

<sup>^</sup> Denotes the reference category; \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ .

R-squared for ORF model = 0.1325; R-squared for Reading Comprehension model = 0.1267; R-squared for Missing Number model = 0.0832

**Table 6. Self-control Regression Results**

Independent variable	Category	ORF		Reading Comprehension		Missing Number	
		$\beta$	SE	$\beta$	SE	$\beta$	SE
Self-control index	Low <sup>^</sup>	-	-	-	-	-	-
	Moderate	-0.33	0.81	-1.70	1.62	-2.92	2.78
	High	-2.56	2.34	-10.17*	4.43	-13.98*	7.04
Sex	Boy <sup>^</sup>	-	-	-	-	-	-
	Girl	3.63***	0.78	4.9*	1.43	5.99**	2.31
SES quintile	First (lowest) <sup>^</sup>	-	-	-	-	-	-
	Second	1.10	1.41	0.78	3.00	0.30	4.81
	Third	0.86	1.26	1.93	2.39	0.89	3.80
	Fourth	2.46*	1.15	5.52*	2.21	6.57	3.52
	Fifth (highest)	5.06***	1.15	12.44***	2.23	19.64***	3.68
Age	[Continuous]	0.27	0.31	-0.48	0.64	-1.55	1.04

Note: This model also controls for region, which is not displayed for space considerations.  $\beta$  = the beta coefficient from the regression model; SE = standard error of the beta coefficient. Additional models were also run using continuous versions of self-control and the wealth index but did affect the results; for interpretability, the categorical versions are displayed.

<sup>^</sup> Denotes the reference category; \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ .

R-squared for ORF model = 0.1267; R-squared for Reading Comprehension model = 0.1268; R-squared for Missing Number model = 0.0785

**Table 7. Problem Solving Regression Results**

Independent variable	Category	ORF		Reading Comprehension		Missing Number	
		$\beta$	SE	$\beta$	SE	$\beta$	SE
Problem Solving	1 Method	-	-	-	-	-	-
	2+ Methods	2.2**	0.72	5.41***	1.3	1.82	1.02
Sex	Boy <sup>^</sup>	-	-	-	-	-	-
	Girl	3.64***	0.73	5.07***	1.31	-2.0*	0.94



SES quintile	First (lowest) <sup>^</sup>	-	-	-	-	-	-
	Second	1.36	1.21	1.24	1.19	1.49	4.81
	Third	1.4	1.18	2.84	1.35	1.52	3.8
	Fourth	2.75**	1.01	5.76**	3.07*	1.39	3.52
	Fifth (highest)	5.35***	1.07	12.81***	7.84***	1.38	3.68
Age	[Continuous]	0.41	0.28	-0.14	0.61	0.59	0.43

Note: This model also controls for region, which is not displayed for space considerations.  $\beta$  = the beta coefficient from the regression model; SE = standard error of the beta coefficient. Additional models were also run using continuous versions of self-control and the wealth index but did affect the results; for interpretability, the categorical versions are displayed.

<sup>^</sup> Denotes the reference category; \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ .

R-squared for ORF model = 0.1370; R-squared for Reading Comprehension model = 0.1380; R-squared for Missing Number model = 0.0843

As can be seen in **Table 5**, the relationship between academic grit and reading performance as measured by the EGRA appears to hold, even when controlling for sex, SES, region and age. Students who reported moderate and high levels of academic grit tended to also read 2.3 and 5.3 correct words per minute more, respectively, than did students who reported low levels of academic grit. These linkages are more robust than those with sex (female students read 3.2 correct words per minute more than male students) or SES (students from the wealthiest households read 5.2 correct words per minute more than the lowest SES quintile). Students in the high academic grit group also scored approximately 7.9 percentage points higher on the Reading Comprehension subtask than did the students in the low academic grit group. This association was more robust than all other relationships save the highest SES quintile, which scored approximately 12.9 percentage points higher than students from the lowest quintile.

**Table 6** shows that the self-control index does not predict student performance as expected by the team. The only linkage between self-control and EGRA and EGMA performance was negative: students who reported high self-control tended to perform significantly worse on the Reading Comprehension and Missing Number subtasks. More exploration would be necessary to understand this lack of relationship, but as hypothesised earlier, it is possible that the assessed behaviours in the self-control scale do not directly relate to academic performance.

The results in **Table 7** indicate that the number of problem-solving methods a student uses is predictive of EGRA results. Students who were reported as using at least 2 methods were reading approximately 2.2 cwpm faster than students who were reported as using 1 method. Additionally, students who used 2 or more methods scored 5.4 percentage points higher in reading comprehension than students who used 1 method. Both relationships held true even when controlling for sex, SES, region and age.

## Health Knowledge and Practises

The health items were asked in order to understand students' knowledge of common health issues and hygiene practises. These health items are discussed in the following subsections. It was not appropriate to conduct an internal reliability analysis on this instrument because it was not designed to assess a single underlying construct.

### Handwashing

Students were first asked why it was important to wash their hands. Half of the students (50 percent) responded that washing hands removes dirt and makes them clean. One out of four students (25 percent) responded that washing hands prevents illness and disease. Some of the uncommon responses from the students were that handwashing makes your hands smell nice, it feels good or to ward off evil spirits (less than 1 percent each). However, it is a concern that approximately one out of every five students (19 percent) did not know why people wash their hands. It is important for all students to understand the linkage between washing their hands and reducing the spread of diseases.

A subsequent question asked the students when it was important to wash their hands. The most common response from students (61 percent) was that handwashing should occur before eating. Overall, less than half of the students said that it was important to wash hands after using the latrine (18 percent), after handling rubbish (9 percent) and before preparing or handling food (5 percent). Some of the uncommon responses from the students were that handwashing should occur before the school inspection, after handling an animal or preparing for prayer (less than 1 percent each). Despite the fact that the vast majority of students claimed to wash their hands, this behaviour seems to occur mostly before meals. It is important to note that 15 percent of students who responded were unable to identify when they should wash their hands. Therefore, more work could be done to give access to and encourage the use of hand-washing practises at other critical moments (e.g. after using the latrine or after handling food).

When asked what items they used to wash their hands, most students mentioned water and soap (53 percent); however, approximately one-third of them reported only using water (37 percent).

In addition to teaching children about the linkage between handwashing and diseases, it is important to provide lessons about how to wash hands and when to wash hands. Ensuring that schools make handwashing stations with soap available is also crucial. The findings highlight the need for more effort to educate all students about the importance of handwashing and general hygiene practises. In particular, hand-washing practises could be enhanced. Although most students reported that they wash their hands before meals, approximately 40 percent did not and very few washed their hands after using latrines.

#### Hygiene and Illnesses

Students were asked what practises they could do to ensure that water is safe to drink. The responses from the students were divergent, but the most common responses were to boil water (38 percent) or use cloth filtration techniques (17 percent). Less common responses included using a water filter (4 percent), checking with your eyes for dirt (4 percent), using chemicals (2 percent) and drinking bottled water (1 percent). Some students (5 percent) responded that there was nothing they can do to ensure that the water is safe to drink, and more than one out of in four students (28 percent) did not know what to do.

When asked what they should do when they have diarrhoea, the most common responses were clinical: 38 percent said that you should buy medication and 23 percent said that you should go to a clinic. Again, however, a significant minority of children (23 percent) reported that they did not know what to do to alleviate this common illness. Other actions (those to prevent the illness and those to treat the symptoms) were less commonly mentioned: 1 percent of students said that it is important to continue drinking water; the same proportion said handwashing should occur.

Students were asked whether they had heard of malaria. If so, the students were asked what they understood it to be. Nearly two-thirds of students (63 percent) had heard of the disease. Of these students, many correctly reported (42 percent) that it was a disease, and very few students (less than 1 percent) conflated malaria with tuberculosis or HIV. Some students (13 percent) claimed to have heard of malaria but were unable to say what it was.

Fewer students (51 percent) reported to have heard about HIV, and approximately half of those students correctly identified that it was some type of disease (1 percent specified HIV as an autoimmune deficiency). There appeared to be very few students who thought that HIV was parasitic worms, tuberculosis or an infection. Fourteen percent of students (more than one in four who had heard of HIV) did not know what it was.

These findings suggest that there is more work that needs to be done to enhance students' awareness of important illnesses. Only 63 percent of students had heard of malaria and only 51 percent had heard of HIV. In some cases students did not know what to do when an illness is contracted.

## Prevention of Illnesses and Diseases

Students were asked what could be done to prevent diarrhoea from occurring. Most students said that they were unaware of preventive measures against this common illness. However, some students (44 percent) said that they did not know what could be done and another group (19 percent) said that it was impossible to prevent diarrhoea. Overall, a small number of students could cite common preventive measures: handwashing with soap and water (5 percent overall), preparing food properly (4 percent), storing and treating water properly (3 percent), using latrines instead of open defecation (2 percent) and avoiding old or rotten food (2 percent).

The same question was asked about the prevention of malaria. While fewer students reported that they did not know how to prevent contracting malaria (22 percent), and another group (7 percent) claimed that it was impossible to do so. The most commonly cited preventive measure was the use of bed nets (17 percent), followed by taking medication (8 percent). Relatively few students mentioned that it would be useful to eliminate mosquito breeding sites (1 percent), use oil or herbs on skin (less than 1 percent) or use smoke (less than 1 percent). A few students appeared to confuse malaria with other illnesses and mentioned not drinking dirty water (2 percent), boiling water (1 percent) and washing their hands (1 percent).

These findings about preventive measures suggest that more work needs to be done to educate students about common illnesses and diseases and the proper measures to prevent them. The students should also be given time to practise the measures when appropriate.

## Comparison with 2016 Findings

There are a few similarities and several differences with the 2016 findings. As in 2016, we found a correlation between grit and academic achievement. The relationship between problem-solving and academic achievement is a new findings for 2017. The 2016 there was a relationship found between self-control and academic achievement but this relationship was not found in 2017.

In 2017, the distribution of scores for grit and self-control were normal, with most students in the middle of the distribution. This was an improvement on 2016 when scores were skewed to higher values, particularly for self-control. This suggests the revisions to the self-control tool in 2017 improved the quality of the instrument in terms of the capturing a range of scores. It also adds further evidence that the grit scale is effective at capturing a range of scores. However, the internal reliability for both scales was lower than in 2017.

Direct comparisons of scores on the life skills scales are not appropriate because different sampling methodology were used in 2016 and 2017 and the 2017 sample was from the end of Standard 2 compared to the 2016 sample at the beginning of Standard 3. For grit and problem-solving the instruments were almost identical in 2016 and 2017, providing some degree of comparability. The proportion of students in the low, medium and high grit categories was 20.6%, 66.3% and 13.7% in 2016 and 23.8%, 72.7% and 3.6% in 2017. Given sampling differences between the two years we conclude conservatively that the proportions in the three categories are similar in 2016 and 2017. We draw a similar conclusion for problem solving where the proportions in low, medium and high categories were 72.3%, 26.9% and 1.0% in 2016 compared with 61.0%, 38.4% and 0.6% in 2017. The self-control scale was different in 2016 and 2017 and therefore not comparable. For example, in 2016, 40.2% of students received the maximum score on the scale required indicating that they did not engage at all in any of 4 negative activities. In 2017, only 2.2% of students received the maximum score indicating that they performed each of 5 positive behaviours every day. These findings suggest that abstaining from a negative behaviour every day is more achievable than engaging in a positive behaviour every day.

Overall, reading scores were slightly lower in 2016 than in 2017. This may have affected the potential to identify significant relationships between life-skills and reading scores.

## Life Skills Conclusions and Recommendations

### The relationship between life skills and academic outcomes

A key question of this research study concerns the relationship between life skills and academic outcomes. The study finds a positive correlation between grit and two of three academic outcomes. One possible implication from this finding is that academic achievement can be improved by developing student grit. Two additional research findings are required before this conclusion can be drawn. The first step is to establish that the relationship between grit and academic outcomes is a causal one. The current findings are correlational and several explanations for the correlation are possible based on confounding factors. For example, it may be that positive childrearing experiences or better nutrition leads to students being more gritty and have better academic outcomes. Our analyses statistically controlled for SES, age and gender, which provides some evidence against these background variables being confounding factors. The argument would be strengthened by controlling for a greater range of background variables and cognitive and non-cognitive outcomes. The second step is to demonstrate that grit can improved through an intervention. Both of these issues (the causality of the relationship between grit and academic outcomes and the potential to develop a child's grit) could be addressed through an experimental study where one group of students takes part in a program to develop their grit.

Similarly, this study found a positive correlation between problem-solving and reading skills, possibly because faster progress can be made in reading if students use a range of problem-solving strategies. As with the conclusions for grit, more work is needed to determine if there is a causal relationship between problem solving and academic achievement, and to determine if problem-solving can be improved by an intervention.

We found no statistical relationship between self-control and academic outcomes (and possibly a negative relationship). One possible explanation for this finding is that self-control, as measured by our instrument, does not help students succeed academically. It is possible that in more hierarchical, authoritarian culture external control of behaviour (e. g. discipline imposed by the teacher) is more important than self-control (Jukes et al, in press). Another possible explanation relates to the measurement of self-control discussed in the next section.

### Measurement of life skills

There are a number of findings and recommendations related to the measurement of life skills. For the self-control scale, students responded differently to positively and negatively phrased questions. As a result, we used only the five positively phrased questions rather than all eight questions. Reliability analysis from 2017 shows that negatively worded questions were internally consistent, as were positively worded questions. However, there was little agreement between positively and negatively worded questions resulting in poor reliability when. The two types of questions were combined in one scale. We have experienced similar difficulties with mixing positively and negatively phrased questions in other work in Tanzania (Jukes et al, in press). We recommend including only one type of questions (positively worded or negatively worded) in future questionnaires. Alternatively, cognitive interviewing could be used in future pilot studies to investigate the reasons for different responses to negatively and positive worded questions.

The self-control scale requires additional investigation in terms of its relationship with academic skills. The lack of relationship with academic skills in 2017 may be a result of poor reliability or validity of the scale. The results from 2016 suggest that negatively worded were more strongly related to academic achievement than the positively worded questions in 2017 and perhaps negatively worded questions have greater validity. We recommend conducting more extensive piloting of this instrument. In addition to reliability and validity issues discussed above, we recommend investigating the cultural relevance of the self-control concept, as captured by the current scale. Qualitative interviews with parents and teachers could be conducted to understand the perceived importance of

self-control for educational achievement and the behaviours that best exemplify self-control. Thus, the scale could include locally generated items as well as adaptations of items from other contexts. Recent work in Tanzania used such methods and found that ‘emotional regulation’ was a reliable construct that differentiated among children (Jukes et al, in press). The construct of emotional regulation has a considerable overlap with self-control and a revised self-control scale could usefully include some of the behaviours associated with emotional regulation in the Jukes et al study.

The reliability of both the academic grit and self-control scales were at the borderline of acceptability. We recommend that all future studies give ample time for at least two rounds of pilot data collection and tool revision to help increase scale reliability.

We also recommend that additional work is conducted with both scales to measure validity. This would involve assessing the relationship between the scales and other measures of academic grit and self-control. In the absence of validated measures of these constructs already in use in Tanzania, alternative assessments of academic grit and self-control could be developed using ratings by parents, teachers of fellow pupils. If the students who score highly on academic grit are seen by others as being the most gritty, this will increase the validity of the scales.

The problem-solving scale could also benefit from additional analysis of reliability and validity. This could include relating the number of strategies used in solving problems across different types of tasks (e. g. mathematics problems and visuo-spatial problems). External validity could be assessed by asking teachers to rate students on their problem solving ability and correlate scores on the problem-solving test with these ratings.

The health knowledge and practise questions appeared to be effective in gauging students’ knowledge about common health issues in Tanzania. Further work could assess the internal reliability and validity of questions. Improvements could be made to the questionnaire by investigating the relationship between reported behaviour and actual behaviour. Many of the questions were based on student recall. We would recommend assessing whether students’ failure to mention disease prevention methods is due to a lack of knowledge or a problem in recalling information. Interpretation of the questionnaire could be facilitated by having clear grade-level targets for the numbers of students able to correctly answer key questions.

For all scales reported in this study, it is difficult to assess progress over time and to know whether the development of the Tanzanian students’ life skills is appropriate for their age. The clearest recommendation for assessing progress over time is that the same sampling methodology should be used in successive years and that the sample should be powered to enable statistical comparisons over time. Second, targets should be set for the desired level of life skills achieved. Different targets could be set for each standard. Targets could be set by expert technical groups, where possible informed by data on current levels of student performance. However, if students and teachers become aware of the scales used and are familiar with the “correct” answer, it may lead to teaching to the test which would be problematic for the comparability of life skills scores – either from one year to the next or comparing a group of students against a target.

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# Annex A: Final Instruments Used During Data Collection

## Dodoso la mwanafunzi / Student Life Skills Questionnaire

INSTRUCTIONS FOR INTERVIEWERS: [Haya ni maswali ya mtu binafsi, kwa hiyo ni muhimu USIONESHE hisia zako wakati wanafunzi wanajibu.]

[As these are personal questions, it is very important that you do NOT show any emotion or reaction to any of the children's responses.]

INSTRUCTIONS FOR INTERVIEWERS: [Kwa kila swali katika hadithi tumia jina la jinsi ya mwanafunzi unayemhoji]

[For each question, use the name in the story that is the same as the gender of the student you are interviewing]

### Sehemu ya I: Ujasiri wa kitaaluma

#### Section I: Academic Grit<sup>2</sup>

**Say:** "In this section I'm going to read you descriptions of some different children. Please listen carefully and then in each case I want you to tell me how often you behave in the same way as that child. You will say if you are never like that child, if you sometimes act like that child, if you often act like that child, or if you act like that child every day. For example, I tell you that Anna/Fred is happy. If you are happy every day you would say: "I am like Anna/Fred every day." If you are often happy (but not all the time) you would say: "I am often like Anna/Fred." If you are sometimes happy (maybe a few times a week), you would say: "I am sometimes like Anna/Fred." And if you are never happy, you would say: "I am never like Anna/Fred." Is that clear"

Katika kipengele hiki nitakusomea maelezo juu ya watoto mbalimbali. Tafadhali sikiliza kwa makini kila maelezo, na kisha nitakuomba unijibu maswali yanayohusu watoto hao. Kwa mfano, utaniambia kama unafanana na mtoto huyu, unafanana kiasi na mtoto huyu, au hufanani nae. Kwa mfano nikisema Anna/Fred ni mwenye furaha kila siku, kama wewe pia ni mwenye furaha kila siku, utasema: "mimi nafanana na Anna/Fred kila siku." Na kama mara nyingi wewe ni mwenye furaha (si wakati wote) utasema: "mara nyingi nafanana na Anna/Fred." Na kama mara chache huwa na furaha, utasema: "mara chache nafanana na Anna/Fred." Na kama huna furaha kabisa, utasema: sifanani kabisa na Anna/Fred. Je umeelewa?

**Say:** "Remember, there are no right or wrong answers, and no good or bad answers to these questions. Nobody is perfect all of the time. Sometimes it's hard for people to admit that. Please be as honest as you can. Shall we begin?"

Kumbuka hakuna jibu sahihi wala lisilo sahihi wala jibu zuri na baya kwa maswali haya. Hakuna mtu aliye kamili wakati wote. Wakati mwingine ni vigumu kwa watu kukubali hilo, tafadhali jitahidi kuwa mkweli iwezekanavyo. Je, tunaweza kuanza?

3.	<p><b>Ngoja nikuambie kuhusu kijana anayeitwa Bakari/Amina. Bakari/Amina anafanya kazi kwa bidii kila mara. Je, kwa kiasi gani unafanya kama Bakari/Amina?</b></p> <p><b>Soma majibu.</b></p>	<p>Sifanyi hivyo / Never .....0</p> <p>Mara chache / Sometimes .....1</p> <p>Mara nyingi / Often.....2</p> <p>Kila siku / Every day.....3</p>
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<sup>2</sup> Questions 1, 2, 4–8 were adapted from Rojas, J.P., J.A. Reser, E.L. Usher and M.D. Toland. 2012. *Psychometric properties of the Academic Grit Scale*. Lexington: University of Kentucky. Used by permission.

	<p><i>Let me tell you about a child called Bakari/Amina. He/She always works very hard. How often do you work hard like Bakari/Amina?</i></p> <p><b>Read the responses.</b></p>	<p>Sijui /Amekataa kujibu / Don't know/refuse.....888</p>
4.	<p><b>Jakaya/Zawadi anapoona kuwa kazi ni ngumu huiacha bila kujaribu. Je, ni mara ngapi wewe unafanya kama Jakaya/Zawadi?</b></p> <p><b>Soma majibu.</b></p> <p><i>When Jakaya/Zawadi finds that a task is hard, he/she gives up and stops trying. How often do stop trying like Jakaya/Zawadi?</i></p> <p><b>Read the responses.</b></p>	<p>Sifanyi hivyo / Never .....0</p> <p>Mara chache / Sometimes .....1</p> <p>Mara nyingi / Often.....2</p> <p>Kila siku / Every day.....3</p> <p>Sijui /Amekataa kujibu / Don't know/refuse.....888</p>
5.	<p><b>Daudi/Hawa anamaliza kufanya kazi zote za nyumbani. Je, mara ngapi wewe hufanya kama Daudi/Hawa?</b></p> <p><b>Soma majibu.</b></p> <p><i>Daudi/Hawa always completes all his/her chores at home. How often do you complete all your chores like Daudi/Hawa?</i></p> <p><b>Read the responses.</b></p>	<p>Sifanyi hivyo / Never .....0</p> <p>Mara chache / Sometimes .....1</p> <p>Mara nyingi / Often.....2</p> <p>Kila siku / Every day.....3</p> <p>Sijui /Amekataa kujibu / Don't know/refuse.....888</p>
6.	<p><b>Damasi/Maria akiwa na kazi za shule wakati mwingine huwa hazifanyi. Je,ni mara ngapi wewe unafanya kama Damasi/Maria?</b></p> <p><b>Soma majibu iwapo mtoto atahitaji tena.</b></p> <p><i>When Damasi/Maria has school work, Damasi/Maria does not always do it. How often do you behave like Damasi/Maria?</i></p> <p><b>Read the responses, as needed, to prompt the child.</b></p>	<p>Sifanyi hivyo / Never .....0</p> <p>Mara chache / Sometimes .....1</p> <p>Mara nyingi / Often.....2</p> <p>Kila siku / Every day.....3</p> <p>Sijui /Amekataa kujibu / Don't know/refuse.....888</p>
7.	<p><b>Linus/Hilda hamaliza kazi za nyumbani badala yake huenda kucheza. Je, mara ngapi wewe unafanya kama Linus/Hilda?</b></p> <p><i>Linus/Hilda does not finish his/her chores at home, instead he/she goes out and plays. How often do you go out to play before finishing chores like Linus/Hilda?</i></p>	<p>Sifanyi hivyo / Never .....0</p> <p>Mara chache / Sometimes .....1</p> <p>Mara nyingi / Often.....2</p> <p>Kila siku / Every day.....3</p> <p>Sijui /Amekataa kujibu / Don't know/refuse.....888</p>



8.	<p><b>Mashaka/Naomi hujaribu tena kumaliza kazi hata akiwa ameshindwa mara ya kwanza. Je mara ngapi wewe hujaribu kama Mashaka/Naomi?</b></p> <p><i>Mashaka/Naomi tries again to finish a task, even after he/she failed the first time. How often do you try again like Mashaka/Naomi?</i></p>	<p>Sifanyi hivyo / Never .....0</p> <p>Mara chache / Sometimes .....1</p> <p>Mara nyingi / Often .....2</p> <p>Kila siku / Every day.....3</p> <p>Sijui /Amekataa kujibu / Don't know/refuse.....888</p>
9.	<p><b>Isaya/Pendo hufanya kile anachotakiwa kufanya hata kama Isaya/Pendo hajisikii. Je mara ngapi wewe hufanya kama Isaya/Pendo?</b></p> <p><i>Isaya/Pendo always does what has to be done even if Isaya/Pendo does not feel like doing it. How often do you behave like Isaya/Pendo?</i></p>	<p>Sifanyi hivyo / Never .....0</p> <p>Mara chache / Sometimes .....1</p> <p>Mara nyingi / Often .....2</p> <p>Kila siku / Every day.....3</p> <p>Sijui /Amekataa kujibu / Don't know/refuse.....888</p>
10.	<p><b>Ignas/Hadija huendelea kujaribu hata kama jambo analofanya ni gumu sana kwake. Je, ni mara ngapi wewe hujaribu kama Ignas/Hadija?</b></p> <p><i>Ignas/Hadija keeps trying even when what he/she is doing is very difficult. How often do you keep trying like Ignas/Hadija?</i></p>	<p>Sifanyi hivyo / Never .....0</p> <p>Mara chache / Sometimes .....1</p> <p>Mara nyingi / Often .....2</p> <p>Kila siku / Every day.....3</p> <p>Sijui /Amekataa kujibu / Don't know/refuse888</p>
<p><b>Sehemu ya II: Kujitawala</b></p> <p><b>Section II: Self-Control<sup>3</sup></b></p>		
11.	<p><b>Ally/Naima hufanya bidii shuleni lakini jana alisahau kuja na penseli na akaazima kwa mwenzake. Je, mara ngapi wewe husahau kama Ally/Naima?</b></p> <p><i>Ally/Naima tries hard in school, but yesterday he/she forgot to bring a pencil and had to borrow one. How often do you forget like Ally/Naima?</i></p>	<p>Sifanyi hivyo / Never .....0</p> <p>Mara chache / Sometimes .....1</p> <p>Mara nyingi / Often .....2</p> <p>Kila siku / Every day.....3</p> <p>Sijui /Amekataa kujibu / Don't know/refuse.....888</p>
12.	<p><b>Musa/Rosi haingilii maongezi wakati wenzake wakiwa wanaongea. Je mara ngapi wewe unafanya kama Musa/Rosi?</b></p> <p><i>Musa/Rosi waits to start talking until other children have finished what they say. How often do you wait to talk like Musa/Rosi?</i></p>	<p>Sifanyi hivyo / Never .....0</p> <p>Mara chache / Sometimes .....1</p> <p>Mara nyingi / Often .....2</p> <p>Kila siku / Every day.....3</p> <p>Sijui /Amekataa kujibu / Don't know/refuse.....888</p>

<sup>3</sup> Questions 16–24 were adapted from Tsukayama, E., A.L. Duckworth and B. Kim. 2013. Domain-specific impulsivity in school-age children. *Developmental Science* 16:879–893. Retrieved from (1) <https://sites.sas.upenn.edu/duckworth/pages/research> and (2) <https://upenn.app.box.com/DSIS-C>

13.	<p><b>Huseni/Gloria anaweza kujizuia kujibu wenzake vibaya anapoudhiwa. Je, ni mara ngapi huwa unafanya kama Huseni/Gloria?</b></p> <p><i>Huseni/Gloria holds back from saying unkind words to other children even if they anger him/her. How often do you behave like Huseni/Gloria?</i></p>	<p>Sifanyi hivyo / Never .....0</p> <p>Mara chache / Sometimes .....1</p> <p>Mara nyingi / Often .....2</p> <p>Kila siku / Every day.....3</p> <p>Sijui /Amekataa kujibu / Don't know/refuse.....888</p>
14.	<p><b>Eriki/Anna hujibu maswali pasipo kunyoosha mkono kwanza. Je, mara ngapi wewe hufanya kama Eriki/Anna?</b></p> <p><i>Eriki/Anna talks in class without raising his/her hand first. How often do you behave like Eriki/Anna?</i></p>	<p>Sifanyi hivyo / Never .....0</p> <p>Mara chache / Sometimes .....1</p> <p>Mara nyingi / Often .....2</p> <p>Kila siku / Every day.....3</p> <p>Sijui /Amekataa kujibu / Don't know/refuse.....888</p>
15.	<p><b>Doto/Subira awapo shuleni akiudhiwa hakasiriki. Je, mara ngapi wewe hufanya kama Doto/Subira?</b></p> <p><i>Doto/Subira can control his/her temper at school even when he/she gets upset. How often do you behave like Doto/Subira?</i></p>	<p>Sifanyi hivyo / Never .....0</p> <p>Mara chache / Sometimes .....1</p> <p>Mara nyingi / Often .....2</p> <p>Kila siku / Every day.....3</p> <p>Sijui /Amekataa kujibu / Don't know/refuse.....888</p>
16.	<p><b>Joti/Lulu husikiliza darasani na hayumbishwi kwa kuwaza mambo mengine. Je, mara ngapi wewe hufanya kama Joti/Lulu?</b></p> <p><i>Joti/Lulu listens in class and does not get distracted. How often do you listen like Joti/Lulu?</i></p>	<p>Sifanyi hivyo / Never .....0</p> <p>Mara chache / Sometimes .....1</p> <p>Mara nyingi / Often .....2</p> <p>Kila siku / Every day.....3</p> <p>Sijui /Amekataa kujibu / Don't know/refuse.....888</p>
17.	<p><b>Walter/Rebeca anaheshimu wazazi wake hata anapokuwa amekasirika. Je, ni mara ngapi wewe unafanya kama Walter/Rebeca?</b></p> <p><i>Walter/Rebeca was respectful to his/her parents even when he/she was upset. How often do you behave like Walter/Rebeca?</i></p>	<p>Sifanyi hivyo / Never .....0</p> <p>Mara chache / Sometimes .....1</p> <p>Mara nyingi / Often .....2</p> <p>Kila siku / Every day.....3</p> <p>Sijui /Amekataa kujibu / Don't know/refuse.....888</p>
18.	<p><b>Jojo/Catherine hukasirika anapoudhiwa shuleni. Je mara ngapi wewe hufanya kama Jojo/Catherine?</b></p> <p><i>Jojo/Catherine loses his/her temper at school when he/she gets upset. How often do you lose your temper like Jojo/Catherine?</i></p>	<p>Sifanyi hivyo / Never .....0</p> <p>Mara chache / Sometimes .....1</p> <p>Mara nyingi / Often .....2</p> <p>Kila siku / Every day.....3</p> <p>Sijui /Amekataa kujibu / Don't know/refuse.....888</p>

**Section III: Health knowledge and practices (hand washing, drinking water, illness)<sup>4</sup>**

**Say:** “Now I’m going to ask you some questions about hand washing, water and health. There are no right or wrong answers to these questions either. Please just let me know what you know about this. I don’t need to know about any personal experience you or your family may have had. Let’s begin.”

**Sehemu ya tatu: Elimu ya afya (kunawa mikono, maji ya kunywa na magonjwa)**

**Sema:** Sasa nitakuuliza maswali yahasuyo kunawa mikono, maji na afya. Hakuna jibu sahihi au lisilo sahihi kwa maswali haya. Tafadhali jibu kama ujuavyo, aidha hatulengi kujua mambo yako ya kibinafsi wala ya familia yako. Naomba tuanze.

19.	<p><b>Kwa nini watu wananawa mikono?</b></p> <p><b>[Usisome majibu. Onesha yanayohusika tu]</b></p> <p><i>Why do people wash their hands?</i></p> <p><b>[Do not read responses. Mark all that apply.]</b></p>	<p>Kusafisha mikono ili kuondoa uchafu / To clean their hands and remove dirt ..... 1</p> <p>Kunukia vizuri / To smell nice..... 1</p> <p>Kujikinga na magonjwa / To prevent illness, disease ..... 1</p> <p>Kujisikia vizuri / It feels good..... 1</p> <p>Kufukuza mashetani / Ward off evil spirits ..... 1</p> <p>Mengine / Other ..... 1</p> <p>Hajui/amekataa / Don’t know/refuse ..... 888</p>
20.	<p><b>Ni kabla au baada ya shughuli gani watu hunawa mikono?</b></p> <p><b>[Usisome majibu. Onesha yanayohusika tu]</b></p> <p><i>Before or after what activities do you normally wash your hands?</i></p> <p><b>[Do not read responses. Mark all that apply.]</b></p>	<p>Hanawi mikono / Does not wash hands..... 1</p> <p>Kabla ya kula / Before eating ..... 1</p> <p>Kabla ya ukaguzi shuleni / Before school inspection ..... 1</p> <p>Baada ya kutoka chooni / After using latrine..... 1</p> <p>Baada ya kushika uchafu / After handling rubbish . 1</p> <p>Kabla ya kuandaa au kupika chakula / Before preparing or cooking food..... 1</p> <p>Baada ya kushika mnyama / After handling an animal..... 1</p> <p>Kupata udhu / Preparing for prayer ..... 1</p> <p>Mengine / Other ..... 1</p> <p>Hajui/amekataa / Don’t know/refuse ..... 888</p>

<sup>4</sup> Items in this section are adapted from the following sources. Items 19, 20, 22, 23, 24 and 26: UNICEF/Oxfam. (2013). 2013 Water, sanitation, and hygiene baseline study: A 2013 study on current community access to and practices on water, sanitation, and hygiene in select rural and urban settlements in Liberia. Liberia. RTI generated items: 18, 21 and 25.

21.	<p><b>Tunanawa mikono kwa kutumia nini?</b></p> <p><b>[Usisome majibu. Onesha yanayohusika tu]</b></p> <p><i>Please tell me what you normally use to wash your hands.</i></p> <p><b>[Do not read responses. Mark all that apply.]</b></p>	<p>Maji peke yake / Water only ..... 1</p> <p>Maji na mchanga/majani / Water and sand/leaves 1</p> <p>Maji na sabuni / Water and soap ..... 1</p> <p>Maji na majivu / Water and ash ..... 1</p> <p>Mengine / Other ..... 1</p> <p>Hajui/amekataa / Don't know/refuse ..... 888</p>
22.	<p><b>Je unaweza kufanya nini kuhakikisha kuwa maji ni salama kwa kunywa?</b></p> <p><b>[Usisome majibu. Onesha yanayohusika tu]</b></p> <p><i>What can you do to make sure water is safe to drink before drinking it?</i></p> <p><b>[Do not read responses. Mark all that apply.]</b></p>	<p>Sifanyi kitu / Do nothing..... 1</p> <p>Kuchemsha maji / Boiling..... 1</p> <p>Kunywa maji ya chupa / Drink bottled water..... 1</p> <p>Kuchuja kwa kitambaa / Cloth filtration ..... 1</p> <p>Klorini/kutumia kemikali/kuyatoa rangi / Chlorine/bleach/chemical treatment ..... 1</p> <p>Kutuamisha / Sedimentation ..... 1</p> <p>Chujio la maji / Water filter..... 1</p> <p>Kuangalia kwa macho ili kuona kama ni masafi / Look with your eyes to see if it is clean..... 1</p> <p>Mengine / Other ..... 1</p> <p>Hajui/amekataa / Don't know/refuse ..... 888</p>
23.	<p><b>Je huwa unafanya nini unapoumwa ugonjwa wa kuhara?</b></p> <p><b>[Usisome majibu. Onesha yanayohusika tu]</b></p> <p><i>What should you do when you have diarrhoea?</i></p> <p><b>[Do not read responses. Mark all that apply.]</b></p>	<p>Hafanyi kitu / Do nothing..... 1</p> <p>Kutumia miti shamba / Take herbs ..... 1</p> <p>Kutumia dawa / Buy medication ..... 1</p> <p>Kuacha kula / Stop eating ..... 1</p> <p>Kuacha kunywa maji / Stop drinking water ..... 1</p> <p>Kuendelea kula / Continue eating..... 1</p> <p>Kuendelea kunywa maji / Continue drinking water 1</p> <p>Kwenda zahanati/hospitali/kituo cha afya / Go to clinic or health facility ..... 1</p> <p>Kunawa mikono kwa maji / Wash hands with water ..... 1</p> <p>Kunawa mikono kwa sabuni/majivu / Wash hands with soap/ash..... 1</p> <p>Kusali / Prayer ..... 1</p> <p>Kwenda kwa mganga wa jadi / Go to a traditional healer ..... 1</p>

		Mengine / Other ..... 1 Hajui/amekataa / Don't know/refuse ..... 888
24.	<p><b>Unafikiri unawezaje kujikinga na ugonjwa wa kuhara?</b></p> <p><b>[Usisome majibu. Onesha yanayohusika tu]</b></p> <p><i>How do you think you can protect yourself from diarrhea?</i></p> <p><b>[Do not read responses. Mark all that apply.]</b></p>	Huwezi kujikinga / You can't protect yourself ..... 1 Kufunika chakula / Covering food ..... 1 Kusali / Prayer ..... 1 Kunywa maji safi / Drink clean water ..... 1 Kuyatibu maji / Treating water ..... 1 Kutunza maji / Store water safely ..... 1 Kutumia choo vizuri / Latrine use (no open defecation) ..... 1 Kuandaa chakula kwa usafi / Prepare food properly (cooking, washing) ..... 1 Kunawa mikono kwa naji na sabuni / Washing hands with water and soap/ash ..... 1 Kwenda kwa mganga wa jadi / Go to traditional healer ..... 1 Kutumia dawa / Take medicine ..... 1 Kutumia chandarua / Use bed nets ..... 1 Kutokula nyakukula vilivyochacha ua kuoza / Don't eat old / rotten food ..... 1 Mengine / Other ..... 1 Hajui/amekataa / Don't know/refuse ..... 888
25.	<p><b>Je umewahi kusikia juu ya malaria? Kama ndio malaria ni nini?</b></p> <p><b>[Usisome majibu. Onesha yanayohusika tu]</b></p> <p><i>Have you ever heard of malaria? If so, what is malaria?</i></p> <p><b>[Do not read responses. Mark all that apply.]</b></p>	Hajawahi kusikia / Never heard of it ..... 1 ➔ <b>Kama hapana, nenda swali la 0 / If no, skip to 0</b> Ugonjwa, maradhi / A disease, sickness ..... 1 Kifua kikuu / TB ..... 1 UKIMWI / HIV/AIDS ..... Wadudu/minyoo / Bugs/worms ..... 1 Mengine / Other ..... 1 Hajui/amekataa / Don't know/refuse ..... 888

26.	<p><b>Unafikiri unawezaje kujikinga na ugonjwa wa malaria?</b></p> <p><b>[Usisome majibu. Onesha yanayohusika tu]</b></p> <p><i>How do you think you can protect yourself from malaria?</i></p> <p><b>[Do not read responses. Mark all that apply.]</b></p>	<p>Huwezi kujikinga / You can't protect yourself ..... 1</p> <p>Kutumia mafuta/mitishamba / Use oil/herbs on skin ..... 1</p> <p>Kutokula wala kunywa vitu vichafu / Do not drink dirty water or food ..... 1</p> <p>Kuondoa mazalia ya mbu / Eliminate mosquito breeding site ..... 1</p> <p>Kutumia moshi / Use of smoke ..... 1</p> <p>Kuacha uchawi na ushirikina / Stop witchcraft/black magic..... 1</p> <p>Kutumia chandarua / Use of bed nets ..... 1</p> <p>Kwenda kwa mganga wa jadi / Go to a traditional healer ..... 1</p> <p>Kutumia dawa / Take medicine..... 1</p> <p>Kuchemsha maji ya kunywa / Boil drinking water .. 1</p> <p>Kunawa mikono / Wash hands ..... 1</p> <p>Mengine / Other ..... 1</p> <p>Hajui/amekataa / Don't know/refuse ..... 888</p>
27.	<p><b>Je umewahi kusikia juu ya UKIMWI? Kama jibu ni ndiyo, Je UKIMWI ni nini?</b></p> <p><b>[Kama mwanafunzi amekupa kirefu cha UKIMWI muulize tena: UKIMWI ni nini?]</b></p> <p><b>[Usisome majibu. Onesha yanayohusika tu]</b></p> <p><i>Have you ever heard of HIV? If so, what is HIV?</i></p> <p><b>[If the child tells you what HIV stands for, ask again: What is HIV?]</b></p> <p><b>[Do not read responses. Mark all that apply.]</b></p>	<p>Hajawahi kusikia / Never heard of it ..... 1</p> <p>Ni ugonjwa / A disease ..... 1</p> <p>Kifua kikuu / TB ..... 1</p> <p>Ni laana / A curse ..... 1</p> <p>Maambukizi / Infection ..... 1</p> <p>Virusi / A virus ..... 1</p> <p>Wadudu/minyoo / Bugs/worms ..... 1</p> <p>Upungufu wa kinga ya mwili / Immune deficiency . 1</p> <p>Mengine / Other ..... 1</p> <p>Hajui/ amekataa / Don't know/refuse ..... 888</p>
<p><b>Asante sana!</b></p> <p><b>Thank you very much!</b></p>		