## WWW SNE ASSESSMENT REPORT

# Assessment Report on Literacy and Numeracy Skills assessment for Learners with Special Needs in Wasichana Wetu Wafaulu Project 

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ABBREVIATIONS AND ACRONYMS

| CEMASTEA | Centre for Mathematics, Science and Technology Education in Africa |
| :---: | :---: |
| EARCs | Education Assessment and Resource Centres |
| EDT | Education Development Trust |
| EGMA | Early Grade Mathematics Assessment |
| EGRA | Early Grade Reading Assessment |
| HI | Hearing Impairments |
| IEP | Individualized Education Program |
| KCPE | Kenya Certificate of Primary Education |
| KCSE | Kenya Certificate of Secondary Education |
| KEMI | Kenya Education Management Institute |
| KICD | Kenya Institute of Curriculum Development |
| KISE | Kenya Institute of Special Education |
| KNEC | Kenya National Examination Council |
| KSL | Kenyan Sign Language |
| MOE | Ministry of Education |
| PH | Physical Disabilities |
| SBTD | School-Based Teacher Development |
| SNE | Special Needs Education |
| TSC | Teachers Service Commission |
| TVET | Technical and Vocational Training |
| VI | Visual Impairments |
| WWW | Wasichana Wetu Wafaulu |

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## EXECUTIVE SUMMARY

Education Development Trust has been working in Kenya since 1992 and has over the years worked with governments and development partners to strengthen education systems in the other African countries. Wasichana Wetu Wafaulu (WWW - 'Let Our Girls Succeed') is a six-year (2018-2023) DFID-funded project implemented in Arid and Semi-Arid Lands (ASALs) and urban slum contexts. In accordance with the National Education Sector Strategic Plan (NESSP) 2018 2022 priority 2, WWW project is contributing to Policy Priority 2 which is to improve the quality and relevance of primary and secondary education. Specifically, the project is contributing in the improvement of the learning outcomes, in the delivery of competence-based education and in the integration of ICT in teaching and learning in primary and secondary schools. The project has a specific bias on improving learning among the cohort of girls in the project through in and out of classroom learning activities in regular and special needs settings.

Baseline results for the project indicate that majority of the learners in the schools are yet to attain proficiency in the Mathematics and English competences for their levels. To establish changes in learning outcomes as a result of the project interventions to date, Education Development Trust, through an external evaluator administered standardized EGRA/EGMA, SEGMA/SEGRA tests at mid-line June-September 2019. However, learners with disabilities were not targeted in the assessment and therefore the project is blind on the learning competences of learners of special needs. It is against this background that Education Development Trust, through Kenya Institute of Special Education used the adapted EGRA/EGMA, SEGMA/SEGRA tests to assess the literacy and numeracy levels of learners with disabilities in in five WWW project schools in Mombasa and Kilifi counties.

The assessment of learning gaps for learners with special needs in Wasichana Wetu Wafaulu Project revealed a strong relationship between basic literacy and numeracy skills for among learners with physical, visual and hearing impairments. Notably, the assessment indicated that learners with special needs who experience difficulties in reading familiar words also perform poorly in in numeracy tasks that require reading and comprehension (word problems). The assessment report also revealed that there is slow acquisition rate of literacy skills for learners with special needs as they transit from one class/grade to the next level; a maximum of 8 percent for learners with physical disabilities, 3 percent for learners with visual impairments and 5 percent for learners with hearing impairments. Based on the evidence presented in this assessment report for learners with SNE, actionable recommendations were made to the government of Kenya, teachers, parents, civil society organizations, development partners and other stakeholders on developing, enhancing and facilitating remedial strategies.

### 1.0 INTRODUCTION

### 1.1 Background

Education Development Trust, formerly CfBT Education Trust, is a not-for-profit international education services company with over 50 years' experience, working in more than 80 countries that specializes in primary and secondary education. Our vision is to provide outstanding, sustainable education solutions that transform and improve the school education and life chances of children and young people worldwide. We have specialist experience in strengthening education systems and supporting school improvement in post-conflict, transition, and earlyrecovery fragile states.

Education Development Trust has been working in Kenya since 1992 and has over the years worked with governments and development partners to strengthen education systems in the other African countries including Somalia, Rwanda, Mozambique, Malawi, Uganda, Botswana, Namibia and Zimbabwe. Programmes in Sub-Saharan Africa are mainly geared towards improving efficiency, effectiveness and relevance of national education systems and school programmes to increase access, retention and quality of learning.

### 1.2 Wasichana Wetu Wafaulu Project

Wasichana Wetu Wafaulu (WWW - 'Let Our Girls Succeed') is a six-year (2018-2023) DFIDfunded project implemented in Arid and Semi-Arid Lands (ASALs) and urban slum contexts. For ASAL, we target the counties of Turkana, Samburu, Marsabit, Tana River, Kwale and Kilifi. For the slums, Nairobi, and Mombasa. Using an integrated approach to girls' education, we have put in place strategies that address the girl herself, girl at home, girl at school and the girl in the community. We are supporting an estimated 52,004 girls in about 500 Primary school, 60 secondary schools and 25 TVET institutions to complete their current phase of education with improved learning outcomes and successfully transit to a productive and positive next phase; having skills, qualifications, and confidence to take control of their lives.

The project is implemented by a consortium of five organizations who include Education Development Trust as the lead and, Ananda Marga Universal Relief Team (AMURT), Concern Worldwide, Pastoral Girls initiative and KESHO Kenya. The principal government partners are the Ministry of Education (MoE), the Teachers Service Commission (TSC), Kenya Institute of Curriculum Development (KICD), Kenya National Examinations Council (KNEC), Centre for Mathematics, Science and Technology Education in Africa (CEMASTEA), Kenya Education Management Institute (KEMI) and 8 County Governments.

### 1.3 Rationale for EGRA/EGMA TESTS in WWW Project

Improving learning has become a priority in the education sector worldwide. Despite the expansion of education in the recent past, many countries including Kenya have not realised desired learning outcomes. The progress of learning is typically slow and is marked with inequalities across different regions. Learners who make it out of primary school do not master adequate competency levels that ultimately equip students with skills that are needed to lead a healthy, productive and meaningful lives. About 60 percent of learners in Grade 2 in Kenya, for example, cannot perform two-digit subtraction according to Uwezo Assessment Reports (2015) (http://www.uwezo.net/). The KCPE results indicate a marginal realization of both literacy and numeracy skills. Given the learning challenges of children with disabilities and the general lack of special needs learning equipment and resources, it is expected that disabled children are likely to perform even more poorly than their counterparts at the same level. See Figure 1 below:


Figure 1: Average KCPE Performance 2010-2014
Such early learning deficits are magnified over time even into secondary school (World Bank 2018).

In accordance with the National Education Sector Strategic Plan (NESSP) 2018-2022 priority 2, Wasichana Wetu Wafaulu project is contributing to Policy Priority 2 which is to improve the quality and relevance of primary and secondary education. Specifically, the project is contributing in the improvement of the learning outcomes, in the delivery of competence- based education and in the integration of ICT in teaching and learning in primary and secondary schools. The project has a specific bias on improving learning among the cohort of girls in the project through in and out of classroom learning activities in regular and special needs settings.

WWW has been implementing the project from 2017. Baseline results for the project indicate that majority of the learners in the schools are yet to attain proficiency in the Mathematics and English competences for their levels. To establish changes in learning outcomes as a result of the project interventions to date, Education Development Trust, through an external evaluator administered standardized EGRA/EGMA, SEGMA/SEGRA tests at mid-line June-September 2019. Results of the evaluation were mixed with intervention performance at 50\% (literacy) and $72 \%$ (numeracy) of 0.25 Standard Deviation from comparison group, using Randomized Control Trial design. However, learners with disabilities were not targeted in the assessment and therefore the project is blind on the learning competences of learners of special needs.

### 1.4 Objectives of the Consultancy

The project aims at assessing the literacy and numeracy levels of learners with disabilities in the project and against this, remedial strategies developed. Specifically, the consultancy is to:

1) Adapt existing literacy and numeracy test instruments to the various disabilities represented in the program
2) Facilitate assessment of learners with various special learning needs in grades 6, 7 and 8, Form 1, 2 and 3 in the WWW project-supported stand-alone special schools, special units and clusters of special needs children in Mombasa and Kilifi counties
3) Establish learning competency gaps and needs for learners with special needs in the two subjects and recommend remedial actions

### 2.0 ADAPTATIONS OF THE EGRA/EGMA TESTS FOR LEARNERS WITH SNE

### 2.1 Adaptations of the EGRA/EGMA Tests for Learners with Physical Disabilities

Learners with disabilities are a heterogeneous group whose motor difficulties are either due to Musculo-skeletal problems, neurological impairment or chronic health problems which affect vitality, strength, alertness as well as causing pain. Cerebral palsy is currently the most common physical handicapping condition is special schools for learner with physical disabilities having replaced poliomyelitis which was common in the 60s and 70 s .

Physical disabilities adversely affect movement, posture including sitting and standing, grasping/manipulating objects including writing tools and communication. Those with neurological condition like cerebral palsy may have cognitive difficulties, short attention span, motor planning difficulties, perceptual difficulties and language difficulties which may affect how they receive and process information received through senses. This may affect literacy, numeracy and other classroom skills and activities.

Accommodations during testing are measures put in place in order to give the learner equitable opportunity to demonstrate what they know and are able to do. During planning for testing, accommodations were instituted to address barriers that impede learner's ability to demonstrate what they know or can do without reducing learning expectations. The accommodations put in place mirror classroom assessment as well as national examination.

It was expected that the EARC or the child's school had conducted functional assessment and reassessment of each learner in order to give an accurate picture of each learner's current functioning level to facilitate individualized testing accommodation. Due to limited information on individual learners, accommodations were limited to:

- Setting accommodation
- Presentation accommodation
- Response accommodation
- Timing and scheduling accommodation
- Resource accommodation

Table 1: Summary of adaptations of assessment tools for learners with PH

| Area | Specification of accommodation | Reason for accommodation |
| :---: | :---: | :---: |
| Setting accommodation | - Accessible room <br> - Adequate space for equipment and to take the test <br> - Room free of distractors <br> - Preferential seating and individualization | - Learners with Physical disabilities have limited mobility, <br> - Some learners use assistive equipment that require adequate space when manipulating <br> - Some learners are easily distracted by clutter <br> - As per individual needs e.g. take test while seated on a mat, standing etc. |
| Test Presentation Accommodation | - Individualized Testing with test administrator present <br> - Large print <br> - Limited items on each page <br> - Adequate space to write on <br> - Repeat instruction <br> - Paper present according to individual learner's need <br> - Test taking position altered | - To address any unforeseen challenges <br> - To cater for those with low vision <br> - To cater for needs of those with poor head control, incoordination <br> - Some learners may need to work better with paper presentation in angle to allow for individual needs |
| Response accommodation | No penalty for articulation errors arising from uncoordinated of speech organs, allow to complete sentences without interruption, no penalty for writing errors due poor grip or lack of writing strength | Learners with neurological impairment are challenged in communication due poor coordination of speech organ to read, speak etc., limited strength for writing, to give each learner equal chance to demonstrate skills and knowledge and prevent undue disadvantage |
| Timing and scheduling Accommodation | - All test to be administered in the morning <br> - Give extra time to complete tasks e.g. provide short breaks between tasks if needed. | - Learner are fresh and have energy in the morning <br> - To allow learner reasonable time to complete tasks <br> - Some get fatigued easily, lack strength, experience pain, to relieve anxiety and tension related to disability and assessment |
| Resources Accommodation | Provision of adaptable writing tools e.g. Pens, pencil with adapted grip Allow use of assistive devices like wheelchair tray, adapted seat, adapted desk etc. | Adapted resources assist in performing task, facilitate mobility and reduce disadvantages arising from the disability |


$\left.$| Area | Specification of accommodation | Reason for accommodation |
| :--- | :--- | :--- |
| Literacy | Give each learner a minimum <br> Accommodations <br> for classes 6, 7 <br> and 8 | inverted words reading, familiar <br> words reading, oral passage <br> reading (timed) and in reading <br> comprehension. <br> Repeat instructions and provide time <br> to answer oral questions | | experienced during timed |
| :--- |
| reading tests including lack of |
| coordination, pain, fatigue, |
| perceptual difficulties etc. |
| Some take time to process |
| information | \right\rvert\,

### 2.2 Adaptations of the EGRA/EGMA Tests for Learners with Visual Impairments

Visual impairment constitutes a heterogeneous group of learners the, blind and those with low vision. The blind are those whose sight is not enough to read or use print while those with low vision are those whose vision is so reduced that they can only access regular print if it is enlarged or magnified according to individual learner's needs.

The blind access written information (braille) through touch, it therefore requires that all visual information must be adapted to make it suitable for the two categories of learners with visual impairments.

Table 2: Summary of adaptations of assessment tools for learners with VI

| Test category | Adaptations done | Reasons for adaptations |
| :---: | :---: | :---: |
| Numeracy | Standard 6 <br> - The enumerator is required to tactually guide the learner's fingers to the reading material and demonstrate how the learners should proceed. <br> - The learner is tactually familiarized with the timer that is to be used to time the exercise <br> - The learner is prepared psychologically before taking the test <br> Standard 7,8 and forms 1,2 and 3 <br> - The printed tests are adapted to braille for learners with blindness and large print for learners with low vision <br> - Diagrams are presented in a narrative ensuring there is no change on the concepts being tested <br> - The angles in a triangle are also explained and not presented in the drawing of a triangle <br> - Where required to draw a graph the question is turned around so that the learner is to read and not draw the graph | - Learners with blindness access printed materials when presented in braille <br> - Learners with blindness have challenges reading diagrams and maps <br> - Explanations and descriptions give the blind a picture of what is in the drawing <br> - Learners with blindness have challenges with drawing and plotting graphs however they can read simple graph <br> - In line with Kenya national examination council guidelines the learners were allowed some extra 30 minutes to take the test <br> - To set the mood for taking the test. |
| Literacy | - Work with each learner independently sitting side by side <br> - The learner's fingers are guided on the reading material as the enumerator demonstrates the reading process <br> - The wording of the instructions to the learner are also modified <br> - Time is adjusted from 60 second for the regular learner to 80 seconds for the visually impaired | - To ensure that the learner is able to tactually follow the instructions to ready the texts. <br> - To fit the needs of the visually impaired |

### 2.3 Adaptations of the EGRA/EGMA Tests for Learners with Hearing Impairments

Learners with hearing impairment are a heterogenous group with varying degrees of hearing loss ranging from mild, moderate, severe to profound hearing loss. This diversity on the hearing loss categories required adaptations of test tools to enable accessibility of the test tools to diverse categories with focus on instructional modes, assessment on modes of responses, conducive test environment settings, standard time allocation on varying tasks and accommodating resources.

Generally, learners with hearing impairment exhibit the following communication difficulties in classroom settings;

- Difficulties in following verbal instructions.
- Difficulties with oral expressions
- Challenges in language structures
- Limited vocabulary.
- Challenges in understanding abstract concepts.

Table 3: General test adaptations of assessment tools for learners with HI

| Area of adaptation | Adaptations done | Reasons for adaptation |
| :--- | :--- | :--- |
| Medium of <br> instruction | Adaptation from oral/aural <br> (spoken, speaking and <br> listening) to fingerspelling, <br> signing, pointing and total <br> communication <br> Manual modes including <br> signing fingerspelling with <br> total communication. | To accommodate diverse categories <br> of learners with hearing impairment. <br> The deaf require sign- language as <br> a mode of manual communication; <br> Hard of hearing require total <br> communication oral-aural <br> instructional mode; and those with <br> post lingual deafness speech reads <br> therefore requires total <br> communication. <br> Manual modes will enhance <br> observation visually for scoring <br> purposes |
| Response mode | Manually including signing <br> /sign reading, fingerspelling <br> or use of total <br> communication. | Learners due to lack or limitation of <br> speech may not provide effective <br> feed back |
| Test environment | The test to be to be <br> administered in well lighted <br> rooms <br> Low ambient sounds to be <br> ensured <br> Sitting positions to be done <br> with enough space <br> The scorer positioned to <br> observe read and score <br> without drawing attention of <br> the learner | Learners needs good lighting visual <br> to express and receive signs for <br> understanding and interpret signed <br> responses. <br> Low ambient sounds will control <br> distractions for the hard of hearing. <br> Enough spacing allows easy <br> performance in signing and <br> minimizes distractibility. <br> Observe one learner at a time while <br> signing invented words and sign <br> reading or answering questions and <br> scoring professionally without <br> causing test anxiety |
| Timing | Additional time provided to <br> accommodate time spent in reading <br> internalizing and responding using <br> manual modes as finger spelling |  |


| Area of adaptation | Adaptations done | Reasons for adaptation |
| :--- | :--- | :--- |
|  |  | signs and sign language. <br> Extra seconds will cater for <br> internalization of material or content <br> read and choice of signs. |
| Resources | Large print for invented <br> words | For ease of reading while signing <br> and to cope with timed speed |

Table 4: Specific adaptation for literacy tests for learners with HI

| Area of adaptation | Adaptations done | Reasons |
| :--- | :--- | :--- |
| Invented words | Words to be finger-spelt in <br> response | Invented words lacked <br> corresponding signs and <br> were more abstract in nature. |
| Familiar words/Oral <br> reading; | Use of signs instead of <br> speech while reading by <br> sign reading | To enable the scorer to <br> observe on the correct use of <br> vocabulary for scoring |
| Reading oral passages | Sign reading by learners <br> Answering comprehension <br> questions correctly | To enable scorer observe <br> and count number of words <br> read and signed correctly |
| The scorer to read and <br> ask the learner questions <br> using signs, sign <br> language, fingerspelling <br> and total communication <br> Limit on the English <br> language structure of <br> answering <br> comprehension questions <br> using signs to <br> accommodate use of <br> limited signs | To enable the learner to <br> comprehend and <br> understand the questions <br> for correct response <br> To score correctly for <br> comprehension questions |  |

Table 5: Specific adaptation for numeracy tests for learners with HI

| Area of adaptation | Adaptation done | Reason |
| :--- | :--- | :--- |
| Instruction medium | -Learners point and sign <br> the numbers instead of <br> saying the words in test <br> tool for class six <br>  <br>  <br> -In identifying missing <br> numbers, learners wrote <br> the numbers in the boxes <br> provided.Learners lack speech and <br> oralism. |  |

### 2.4 Teacher Training Workshop on Tests Adaptation and Administration

A training workshop for teachers was done on 7th and 8th March 2020 at the Pride Inn hotel, Mombasa. The aim of the workshop was to train teachers on test adaptation and administration. Teachers were placed in two groups; primary school teachers and secondary school teachers.

On 7th March the primary school teachers from Likoni school for learners with VI, PortReitz school for learners with PH, Gede special school for learners with HI and Kakuyuni special school for learners with HI were trained on test administration. On the other hand, teachers from secondary schools were trained on 8th of March 2020. They were drawn from Pwani school for learner with HI and Likoni school for learners with VI were trained.

The teachers were taken through the training manual, observation checklist, specific adapted tools according to the specific categories of disabilities and simulation of test administration.

In a plenary the participants gave reports for their respective groups and concerns which were further discussed for clarification.

### 3.0 METHODOLOGY

### 3.1 Sampling methodology

Mixed sampling methods were used where the stream, sex and degree of severity was taken into consideration through stratification. Purposive sampling of the respondents was done to ensure that only learners with special needs and disabilities were included in the sample. Complete enumeration was done for all the selected schools except for Pwani secondary/vocational for HI where $50 \%$ of the learners were sampled. The sampling frame was provided by the Trust.

Test administration was done in two schools in Mombasa county and three in Kilifi county. The following schools were sampled for the administration of the literacy and numeracy tests:

| County | school | category | No. of respondents |
| :--- | :--- | :--- | :--- |
| Kilifi | Kakuyuni special school | HI | 15 |
|  | Gede special school | HI | 20 |
|  | Pwani secondary | HI | 57 |
|  | Likoni school for the blind | VI | 38 |
|  | Likoni secondary school for the <br> blind | VI | 48 |
|  | Port Reitz | PH | 31 |

### 3.2 Procedures of Test Administration

The test administrators were teachers from the respective schools, EDT coaches and KISE officers who also took the role of team leaders in the various schools. The test administrators worked as a team. The sampled learners were expected to take numeracy and literacy test and each test was accompanied by an observation check list which the test administrator was to fill. The exercise was monitored by KISE and EDT officers.

Test administrators were expected to familiarize themselves with the test instructions beforehand. There was a team leader in each school to coordinate the test administrators. Head teacher/school principal's offices was the entry point for test administrators.

Tests were administered to learners with special needs in special schools. Selected teachers from special primary and secondary schools were trained and assigned the responsibility of administering the test. The tests were administered to learners in class 6,7 and 8 and those in form 2, 3 and 4 and it addressed two subjects, English and Mathematics. Two teachers per class per subject i.e. two teachers of Maths and English in class 6,7and 8 and two from form 2,3 and 4 were engaged in the test administration.

On arrival at the school the test administrator ensured the following:

- a conducive atmosphere was established for test taking in consideration of the individual learners needs.
- learners to take the test were identified using the stipulated guidelines. In schools with large population of learners i.e. Pwani secondary school 50\% sample was used.
- two tests were administered to learners individually (mathematics and English).
- Only learners with disabilities were selected to take the test.


### 3.2.1 Before Test Administration.

Before commencing the administration, a thorough training of the test administrators on the test adaptations was done and the instructions to be followed and the instructions to be given to learners before and during the test. In addition, the following quality checks are established: Teachers to conduct the test are identified and trained to ensure that they have thorough knowledge of the test administration procedures; Before embarking on test administration; each test administrator is required to do a simulation of test administration to familiarize with the instructions and some of the adaptations done considered the following aspect; Presentation of the test items; Response mode; Timing; Setting and Test scheduling.

### 3.2.2 During Test Administration

All tests were adapted for the specific disabilities. The test administrator administered the test, each paper at a time to individual learners according to the instructions given. Tests were done in the morning only and marking of the tests in the afternoon.

The test administrator ensured that the environment was conducive for testing i.e. had no distractors; Created rapport with the learner to ensure no test anxiety; Sought the learners consent verbally before the start of the test and let the learners freely agree to do the test; Explained to learners what the exercise was all about to call for informed consent. Each test administrator had a stop watch for timed tasks.

### 3.2.2.1 English Test

The test administrators ensured that all details were correctly filled before starting the test. Emphasis was on the test instructions and prompts were given where necessary. The learner was timed in some of the tasks and others are not timed. In EGRA test the learner was expected to do the oral reading passage within 80 seconds. The test administrator was required to have a stop watch and instruct the learner when to start the test and when to stop. The test administrator was required ensure the learner understood the instructions before starting the test. The learner gave oral response for English. The test administrator was expected to do some examples together with the learner. The test administrator noted the learner's response in English and record. In case the learner was not able to read a word, the test administrator would read for the learner and ask him or her to continue. If the learner was not able to read any word in the sentence correctly, reading was discontinued. The test administrator indicated time remaining on
stop watch at completion for those who finished reading correctly early and those who were stopped after the first line.

### 3.2.2.2 Maths Test

The learner was instructed to write all the required details before starting the test. The test administrator ensured that the learner understood the test instructions before starting. The learner worked and answered the questions in the spaces provided.

### 3.2.3 After Test Administration

The tests were administered and marked jointly by the teachers, coaches and the KISE officers. The coaches guided the marking and the scoring since they had a prior knowledge of the scoring sheets. They had used them previously. After marking the marks were entered in the mark list which were provided by the EDT together with the scoring sheets. The marked scripts, mark lists and observation check lists were well packaged and taken to Nairobi for analysis.

### 3.3 Data Analysis

The data collected on mark lists and scoring sheets was digitized on excel worksheets. Descriptive data summaries were generated.

### 4.0 FINDINGS

### 4.1 Introduction

Table 6 presents the distribution of 191 learners who took part in this assessment. There were 95 (49.7\%) learners in primary school, and 96 (50.3\%) learners in secondary school. In terms of disability categories, there were 90 (47\%) learners with hearing impairment, 70 (37\%) learners with visual impairment, and 31 (16\%) learners with physical disabilities. All disability categories except physical disabilities were represented at primary and secondary level. There were 69 ( $36 \%$ ) male and 122 ( $64 \%$ ) female learners.

Table 6: Distribution of learners in with SNE in the study sample

|  | Class 6 | Class 7 | Class 8 | Form 1 | Form 2 | Form 3 | TOTAL |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Primary | $\mathbf{3 3}$ | $\mathbf{2 7}$ | $\mathbf{3 5}$ |  |  |  | $\mathbf{9 5}$ |
| HI | 13 | 6 | 14 |  |  |  | 33 |
| PH | 11 | 10 | 10 |  |  |  | 31 |
| VI | 9 | 11 | 11 |  |  |  | 31 |
| Secondary |  |  |  | $\mathbf{2 5}$ | $\mathbf{4 3}$ | $\mathbf{2 8}$ | $\mathbf{9 6}$ |
| HI |  |  |  | 15 | 26 | 16 | 57 |
| VI | $\mathbf{3 3}$ | $\mathbf{2 7}$ | $\mathbf{3 5}$ | $\mathbf{1 0}$ | 17 | 12 | 39 |
| TOTAL |  |  | $\mathbf{2 5}$ | $\mathbf{4 3}$ | $\mathbf{2 8}$ | $\mathbf{1 9 1}$ |  |

### 4.2 Learners with Physical Disabilities

As presented in Table 6, there were 9 learners with physical disabilities in class 6, 11 in class 7 and 10 in class 8 . Thus, this section presents results for 31 learners with physical disabilities in class 6 , class 7 and class 8 .

### 4.2.1 Numeracy scores for learners with physical disabilities

Figure 2 presents average scores in the seven skill areas; the results suggest that on average, leaners with physical disabilities performed better in quantity discrimination, number identification and addition where they posted an average score of 78 percent, 72 percent and 62 percent respectively. On the other hand, these learners scored average marks in missing numbers, subtraction and written exercises and scored poorly in word problem at 32 percent. The results suggest that learners with physical disabilities in class 6 experience significant difficulties in word problem.


Figure 2: Average scores in numeracy for learners with PH in class 6
The distribution of scores across the seven skill areas is presented in Table 7. The results suggest that class 6 learners with physical disabilities experience profound difficulties in word problem where 55 percent of learners could not score anything. It was also found that 27 percent were unable to score anything in written exercises and 18 percent of learners did not score anything in numeracy tasks on subtraction. On a positive note, it was found that learners with physical disabilities performed better in quantity discrimination and number identification.

Table 7: Distribution of numeracy scores for learners with PH in class 6

| SKILL AREA | SCORE RANGE |  |  |  |  |
| :--- | :---: | :---: | :---: | :---: | :---: |
|  | $\mathbf{0}$ | $\mathbf{1 - 4 0}$ | $\mathbf{4 1 - 8 0}$ | $\mathbf{8 1 - 1 0 0}$ | TOTAL |
| Number Identification | $1(9 \%)$ | $1(9 \%)$ | $3(27 \%)$ | $6(55 \%)$ | $11(100 \%)$ |
| Quantity Discrimination | $0(0 \%)$ | $0(0 \%)$ | $6(55 \%)$ | $5(45 \%)$ | $11(100 \%)$ |
| Missing Number | $0(0 \%)$ | $3(27 \%)$ | $5(45 \%)$ | $3(27 \%)$ | $11(100 \%)$ |
| Addition | $1(9 \%)$ | $3(27 \%)$ | $0(0 \%)$ | $7(64 \%)$ | $11(100 \%)$ |
| Subtraction | $2(18 \%)$ | $2(18 \%)$ | $3(27 \%)$ | $4(36 \%)$ | $11(100 \%)$ |
| Written Exercise | $3(27 \%)$ | $2(18 \%)$ | $1(9 \%)$ | $5(45 \%)$ | $11(100 \%)$ |
| Word Problem | $6(55 \%)$ | $0(0 \%)$ | $3(27 \%)$ | $2(18 \%)$ | $11(100 \%)$ |

Class 7 and class eight learners with physical disabilities were given the same numeracy test which had three sub-tasks. Sub-task 1 had ten questions (No. 1-10) comprising of basic arithmetic operations and simple geometry related questions. Sub-task 2 had five questions (No. 1-5) comprising basic algebra while sub-task three had four questions \{No. 1, No. 2, No. 3, No. 4\}. Sub-task 1 and Sub-task 2 were marked out of $100 \%$ while in sub-task three, each question was marked out of $100 \%$. Figure 3 shows the average score in each sub-task for learners with physical disabilities in class 7 and class 8 . The results suggest that learners experienced
significant difficulties solving question 1 and question 2 of sub-task 3 where the average score for each of the two classes was 0 percent. Further, the highest average mark was recorded at 26.7 percent in class 7 in sub-task 3 question 3 . The general observation based on the average score suggest to a possibility that class 8 learners have poorer numeracy skills compared to class 7 learners.


Figure 3: Average scores in numeracy for learners with PH in class 7 and 8
To further understand the distribution of numeracy score for learners with physical disabilities in class 7 and 8, achievement distribution matrix was conducted are results presented in Table 8. The results indicate that at least $50 \%$ of learners with physical disabilities could not score anything (scored $0 \%$ ) in all the sub-tasks, and none scored $80 \%$ in any of the numeracy subtasks. These results point to a potential deficiency in the acquisition of numeracy skills among learners with physical disabilities.

Table 8: Distribution of numeracy scores for learner with PH in class 7 and 8

| SUB-TASKS | SCORE RANGE |  |  |  |  |
| :--- | :---: | :---: | :---: | :---: | :---: |
|  | $\mathbf{0}$ | $\mathbf{1 - 4 0}$ | $\mathbf{4 1 - 8 0}$ | $\mathbf{8 1 - 1 0 0}$ | TOTAL |
| Subtask 1 (No 1-10) | $10(50 \%)$ | $8(40 \%)$ | $2(10 \%)$ | $0(0 \%)$ | $20(100 \%)$ |
| Subtask 2 (No 1-5) | $18(90 \%)$ | $2(10 \%)$ | $0(0 \%)$ | $0(0 \%)$ | $20(100 \%)$ |
| Subtask 3 (No. 1) | $20(100 \%)$ | $0(0 \%)$ | $0(0 \%)$ | $0(0 \%)$ | $20(100 \%)$ |
| Subtask 3 (No. 2) | $20(100 \%)$ | $0(0 \%)$ | $0(0 \%)$ | $0(0 \%)$ | $20(100 \%)$ |
| Subtask 3 (No. 3) | $13(65 \%)$ | $2(10 \%)$ | $5(25 \%)$ | $0(0 \%)$ | $20(100 \%)$ |
| Subtask 3 (No. 4) | $17(85 \%)$ | $3(15 \%)$ | $0(0 \%)$ | $0(0 \%)$ | $20(100 \%)$ |

### 4.2.2 Literacy scores for learners with physical disabilities

Learners with physical disabilities were given reading tasks. The tasks involved reading on 50 invented words, 50 familiar words, and a passage of 174 words, and the learner was expected to read all the words. The results presented in Figure 4 show that at most $27.3 \%$ of learners are able to read all invented words, and at most $18.2 \%$ of learners are can read all the familiar words. It was also observed that the percentage of learners who read all words diminishes as learner progress from class 6,7 to class 8 . Further, it was observed that across all the classes, learners read more of invented words and less of familiar words, none of the class was able to read at least half ( $50 \%$ and above) of the number of words given.


Figure 4: Average scores for learners with PH in reading invented and familiar words

Passage reading was conducted in two distinct sessions. The first session of passage reading was timed while the second session of passage reading was untimed. During timed passage reading session, a learner would be given a specified amount of time to read a passage and they would be stopped when the time elapses and the number of words read is recorded. During untimed passage reading session, a learner was to read freely and the session ended only when either the learner completed reading or could not read at all. There were a set of comprehension questions to be answered after every passage reading session. Figure 5 presents the results of the passage reading and response to comprehension questions in both sessions.

It was found that the percentage of learners who are able to read the whole passage with 174 words is only 18.2 percent in class 6 and none in class 7 and class 8 . Additionally, the results suggest that there is a significant improvement in the number of words learners with disabilities could read when there are no time restrictions. For instance, class 6 improves from reading an average of 37 percent of the words when timed to an average of 44 percent of the words when not timed. Similar trends are observed for class 7 with an increase from 30 percent to 43
percent, and a much more significant improvement for class 8 who improved from an average of 24 percent to 56 percent.

Similarly, learners with physical disabilities were able to answer more questions when after reading a passage without timing compared to when they are timed in reading. For instance, class 7 improved from an average of 18 percent to an average of 30 percent, the trend that was observed in class 8 with an improvement from 18 percent to 40 percent.


Figure 5: Summary scores for passage reading task for learners with PH in class 6,7 and 8

To assess the trend in each of the literacy skill area for learners with physical disabilities, scatter plots were fit on each skill area and simple linear regression models included. The linearity assumption was based on the expectations that given the same test, learners in higher grades or classes would perform better than those in lower classes or forms (See scatter plots in annex 1). The results suggest that the improvement in literacy skills (reading and comprehension) among learners with physical disabilities improve by a margin of at most $8 \%$ as these learners move from one class to the next class.

The results presented in Table 9 show more than one-third (30\%) of learners with physical disabilities are unable to read any written text. Additionally, learners with physical disability struggle more with comprehension compared to reading.

Table 9: Distribution of literacy scores for learners with PH

| TASK | SCORE RANGE |  |  |  |  |
| :--- | :---: | :---: | :---: | :---: | :---: |
|  | 0 | $\mathbf{1 - 4 0}$ | $\mathbf{4 1 - 8 0}$ | $\mathbf{8 1 - 1 0 0}$ | Total |
| Number of Invented Words | $12(39 \%)$ | $4(13 \%)$ | $5(0.16)$ | $10(32 \%)$ | $31(100 \%)$ |
| Number of Familiar Words <br> Questions Answered in Oral Passage <br> Timed | $12(29 \%)$ | $7(23 \%)$ | $4(13 \%)$ | $8(26 \%)$ | $31(100 \%)$ |
| Words Read in Oral Passage Timed | $11(35 \%)$ | $9(29 \%)$ | $7(0.23)$ | $4(13 \%)$ | $31(100 \%)$ |
| Questions Answered in Oral Passage <br> Untimed | $15(48 \%)$ | $6(19 \%)$ | $4(13 \%)$ | $6(19 \%)$ | $31(100 \%)$ |
| Words Read in Oral Passage <br> Untimed | $12(39 \%)$ | $4(13 \%)$ | $4(13 \%)$ | $11(35 \%)$ | $31(100 \%)$ |

### 4.3 Learners with Visual Impairments

As presented in Table 6, there were 9 learners with visual impairments in class 6, 11 in class 7, 11 in class 8,10 in form 1,17 in form 2 and 12 in form 3. Thus, this section presents results for 70 learners with visual impairments in class 6 , class 7 and class 8 .

### 4.3.1 Numeracy scores for learners with visual impairments

Figure 6 presents average scores in the seven skill areas; the results suggest that on average, leaners with visual impairments performed better in quantity discrimination, number identification, subtraction and addition where the average score above 90 percent. It was also noted that learners with visual impairments had relatively poorer achievement outcomes in word problem with an average of 39 percent. The results suggest that learners with visual impairments in class 6 experience significant difficulties in word problem.


Figure 6: Average scores in numeracy for learners with VI in class 6

The distribution of scores among across the seven skill areas is presented in Table 10. The results suggest that class 6 learners with visual impairments experience profound difficulties in word problem where 44 percent of learners could not score anything (scored $0 \%$ ). On a positive note, it was found that none of learners with visual impairments scored below 40 percent in number identification, quantity discrimination, missing numbers, addition, subtraction and written exercise.

Table 10: Distribution of numeracy scores for learners with VI in class 6

| SKILL AREA | SCORE RANGE |  |  |  |  |
| :--- | :---: | :---: | :---: | :---: | :---: |
|  | $\mathbf{0}$ | $\mathbf{1 - 4 0}$ | $\mathbf{4 1 - 8 0}$ | $\mathbf{8 1 - 1 0 0}$ | Total |
| Number Identification | $0(0 \%)$ | $0(0 \%)$ | $0(0 \%)$ | $9(100 \%)$ | $9(100 \%)$ |
| Quantity Discrimination | $0(0 \%)$ | $0(0 \%)$ | $0(0 \%)$ | $9(100 \%)$ | $9(100 \%)$ |
| Missing Number | $0(0 \%)$ | $0(0 \%)$ | $3(33 \%)$ | $6(0.67)$ | $9(100 \%)$ |
| Addition | $0(0 \%)$ | $0(0 \%)$ | $2(22 \%)$ | $7(0.78)$ | $9(100 \%)$ |
| Subtraction | $0(0 \%)$ | $0(0 \%)$ | $1(11 \%)$ | $8(0.89)$ | $9(100 \%)$ |
| Written Exercise | $0(0 \%)$ | $0(0 \%)$ | $4(44 \%)$ | $5(0.56)$ | $9(100 \%)$ |
| Word Problem | $4(44 \%)$ | $0(0 \%)$ | $3(33 \%)$ | $2(0.22)$ | $9(100 \%)$ |

Class 7, class 8, form 1, form 2 and form 3 learners with visual impairments were given the same numeracy test which had three sub-tasks. Sub-task 1 had ten questions (No. 1-10) comprising of basic arithmetic operations and simple geometry related questions. Sub-task 2 had five questions (No. 1-5) comprising basic algebra while sub-task three had four questions $\{$ No. 1, No. 2, No. 3, No. 4\}. Sub-task 1 and Sub-task 2 were marked out of $100 \%$ while in subtask three, each question was marked out of $100 \%$. Figure 7 shows the average score in each
sub-task for learners with visual impairments in class 7 , class 8 , form 1 , form 2 and form 3 . The results suggest that the highest score was recorded at 59 percent in form 2 in question 3 of subtask 3. There was low achievement in sub-task 3 question 1 where none of the learners in class 7 , class 8 , form 1 and form 3 could score and an average score of 6 percent in form 2.


Figure 7: Average scores in numeracy for learners with VI from class 7- form 3
To further understand the distribution of numeracy score for learners with visual impairments from class 7 to form 3, achievement distribution matrix was conducted are results presented in Table 11. The results suggest that majority of learners with visual impairments struggle with numeracy skills such as basic arithmetic, geometry, and algebra. For instance, 98 percent of learners did not score anything in question 1 of sub-task 3, 92 percent failed in question 2 of sub-task 3 and 23 percent could not score anything in sub-task 1 which was on basic arithmetic operations.

Table 11: Distribution of numeracy scores for learner with VI from Class 7 - form 3

| SUB-TASK | $\mathbf{0}$ | $\mathbf{1 - 4 0}$ | $\mathbf{4 1 - 8 0}$ | $\mathbf{8 1 - 1 0 0}$ | Total |
| :--- | ---: | ---: | ---: | ---: | :--- |
|  |  | SCORE RANGE |  |  |  |
| Subtask 1 (No 1-10) | $14(23 \%)$ | $27(0.44)$ | $19(31 \%)$ | $1(0.02)$ | $61(100 \%)$ |
| Subtask 2 (No 1-5) | $49(80 \%)$ | $9(15 \%)$ | $3(5 \%)$ | $0(0 \%)$ | $61(100 \%)$ |
| Subtask 3 (No. 1) | $60(98 \%)$ | $0(0 \%)$ | $0(0 \%)$ | $1(2 \%)$ | $61(100 \%)$ |
| Subtask 3 (No. 2) | $56(92 \%)$ | $0(0 \%)$ | $1(2 \%)$ | $4(7 \%)$ | $61(100 \%)$ |
| Subtask 3 (No. 3) | $24(39 \%)$ | $8(13 \%)$ | $21(34 \%)$ | $8(13 \%)$ | $61(100 \%)$ |
| Subtask 3 (No. 4) | $36(59 \%)$ | $16(26 \%)$ | $4(7 \%)$ | $5(8 \%)$ | $61(100 \%)$ |

### 4.3.2 Literacy scores for learners with visual impairments

Learners with visual impairments from class 6 to form 3 were given reading tasks. The tasks involved reading on 50 invented words, 50 familiar words, and a passage of 174 words, and the learner was expected to read all the words. The results presented in Figure 8 show that learners with visual impairments in secondary schools read more invented words compared for those in primary schools. For instance, the form 2 read the highest number of invented words at an average of 90 percent while form 3 read an average of 78 percent of all the invented words. This is on average higher than primary school classes whose achievement outcome ranged between $66 \%$ of the words by class 6 and 62 percent of the words by class 8 . Further, the percentage of learners who were able to read all the invented words was less than $30 \%$ of the class. The results show a non-linear relationship between grade level and reading abilities among learners with visual impairments. For instance, while it was expected that learners in class 8 would read more words than classes 6 and 7 , the results show that only 9.1 percent of class read learners could read all words compared to 15.4 percent of class 6 who read all invented words correctly. Additionally, only 8.3 percent of form 3 class could read all invented words compared to 30 percent of form 1 class who read all words.


Figure 8: Average scores of reading invented words by learners with VI

Achievement outcome on reading of familiar words for learners with VI is presented in Figure 9. The results show that there was an improvement among class 6 learners regarding the number of familiar words they read compared to the number of invented words previously presented in Figure 8 from 66 percent to 71 percent. Except for class 6, the results show that learners in all classes read fewer familiar words compared to invented words. Additionally, the percentage of learners who could read all familiar words was found to be equal of less that the percentage of learners who could read invented words. The most notable trend was in form where 30 percent of the class could read all invented words as shown in Figure 8 but only 10 percent were able to read all words as shown in Figure 9.


Figure 9: Average scores of reading familiar words by learners with VI

Passage reading was conducted in two distinct sessions. The first session of passage reading was timed while the second session of passage reading was untimed. During timed passage reading session, a learner would be given a specified amount of time to read a passage and they would be stopped when the time elapses and the number of words read is recorded. During untimed passage reading session, a learner was to read freely and the session ended only when either the learner completed reading or could not read at all. Figure 10 presents a summary of average scores of percentages of words read by learners with visual impairments during timed passage reading session. The results show that at most 11.1 percent of learners were able to read all the words in the passage in class 6 , none in class $7,9.1$ percent in class 8,10 percent in form 1. 5.9 percent in form 2 and 8.3 percent in form 3 . On average, it was found that learners in secondary schools are able to read more words compared to those I primary school
as the average score from secondary school ranged between 51 and 76 percent while average scores for primary schools ranges between 40 and 52 percent.


Figure 10: Average scores of reading a timed oral passage by learners with VI

The results on reading of a passage in untimed setting are presented in Figure 11. The results suggest significant improvement in the average number of words learners read when untimed. For instance, in primary schools the average scores improved from between 40-52 percent presented in Figure 10 to between 70-85 percent as shown in Figure 11 . Similar improvements were observed in form 1, form 2 and form 3 learners. Further, there were notable improvement in the average number of learners who are able to complete reading all the words when not timed. For instance, in class 6, there was a significant improvement from 11.1 percent to almost also of the class at 44.4 percent of the class who completed reading the passage given, form 1 improved from 10 to 20 percent. However, it was noted that in class 8 , there was a drop in the percentage of learners who read all words when not timed from 9 to 0 percent.


Figure 11: Average scores of reading an untimed oral passage by learners with VI

There were a set of comprehension questions to be answered after every passage reading session. As presented in Figure 12, there is a general improvement in the number of questions answered when a passage is read in a freer environment for learners with visual impairment across all classes. For instance, the average scores on the passage read when timed range between 22 and 43 percent while the average scores on the passage when not timed range between 48 and 63 percent. Additionally, it was found that on overall, comprehension level increase with increases marginally yet progressively among learners with visual impairments.


Figure 12: Average scores on comprehension questions by learners with VI
To assess the trend in each of the literacy skill area for learners with visual impairments, scatter plots were fit on each skill area and simple linear regression models included. The linearity assumption was based on the expectations that given the same test, learners in higher grades
or classes would perform better than those in lower classes or forms (See scatter plots in annex 2). The results suggest that the improvement in literacy skills (reading and comprehension) among learners with visual impairments improve by a margin of at most $3 \%$ as these learners move from one class to the next class.

The results presented in Table 12 show that learners with visual impairment are able to read more of words and may have challenges when reading continuous passage. For instance, 63 percent of learners with VI were to read between $81-100$ percent of invented words, 49 percent of learners with VI were able to read between $81-100$ percent of familiar words. In contrast, only 30 percent of the same learners were able to read between $81-100$ percent of the words in a continuous passage when timed. However, it was observed that when the same learners are given more time to read without time restrictions, 84 percent of the class could read between 81 - 100 percent of the words in the passage. Further, it was found that when timed, only 4 percent of learners with VI could score between 81 - 10 percent of the questions asked, when not timed, 24 percent of learners with VI could score between $81-100$ percent.

Table 12: Distribution of literacy scores for learners with VI

| TASK | $\mathbf{y}$ | $\mathbf{1 - 4 0}$ | $\mathbf{4 1 - 8 0}$ | $\mathbf{8 1 - 1 0 0}$ | Total |
| :--- | :---: | :---: | :---: | :---: | :---: |
| Number of Invented Words | $3(4 \%)$ | $8(11 \%)$ | $15(21 \%)$ | $44(63 \%)$ | $70(100 \%)$ |
| Number of Familiar Words | $5(7 \%)$ | $13(19 \%)$ | $18(26 \%)$ | $34(49 \%)$ | $70(100 \%)$ |
| Questions answered in <br> after a timed oral passage | $9(13 \%)$ | $35(50 \%)$ | $23(33 \%)$ | $3(4 \%)$ | $70(100 \%)$ |
| Words Read in Oral | $4(6 \%)$ | $20(29 \%)$ | $25(26 \%)$ | $21(30 \%)$ | $70(100 \%)$ |
| Passage Timed |  |  |  |  |  |
| Questions answered after <br> an untimed oral passage | $7(10 \%)$ | $19(27 \%)$ | $27(39 \%)$ | $17(24 \%)$ | $70(100 \%)$ |
| Words Read in Oral <br> Passage Untimed | $4(6 \%)$ | $3(4 \%)$ | $4(6 \%)$ | $59(84 \%)$ | $70(100 \%)$ |

### 4.4 Learners with Hearing Impairments

As presented in Table 6, there were 13 learners with hearing impairments in class 6, 6 in class, 14 in class 8,15 in form 1,26 in form 2 and 16 in form 3 . Thus, this section presents results for 90 learners with hearing impairments in class 6 , class 7 , class 8 , form 1 , form 2 and form 3.

### 4.4.1 Numeracy scores for learners with hearing impairments

Figure 13 presents average scores in the seven skill areas; the results suggest that on average, leaners with hearing impairments perform better in quantity discrimination (79\%), subtraction tasks ( $73 \%$ ) and number identification ( $63 \%$ ). On the other hand, written exercises ( $41 \%$ ) and word problem (8\%) seem to pose significant difficulties to learners with hearing impairments.


Figure 13: Average scores in numeracy for learners with HI in class 6
To further understand the distribution of achievement outcomes for learners with hearing impairments in class 6, distribution matrix was computed and results presented in Table 13. The results confirm that 69 percent of learners with HI scored between 81-100 percent in quantity discrimination and 54 percent scored between 81-100 percent in subtraction. Additionally, 92 percent of learners with HI could not score anything in word problem.

Table 13: Average scores in numeracy for learners with HI in class 6

| SKIIL AREA | SCORE RANGE |  |  |  |  |
| :--- | :---: | :---: | :---: | :---: | :---: |
|  | $\mathbf{0}$ | $\mathbf{1 - 4 0}$ | $\mathbf{4 1 - 8 0}$ | $\mathbf{8 1 - 1 0 0}$ | Total |
| Number Identification | $1(8 \%)$ | $3(23 \%)$ | $4(31 \%)$ | $5(38 \%)$ | $13(100 \%)$ |
| Quantity Discrimination | $1(8 \%)$ | $0(0 \%)$ | $3(23 \%)$ | $9(69 \%)$ | $13(100 \%)$ |
| Missing Number | $1(8 \%)$ | $1(8 \%)$ | $7(54 \%)$ | $4(31 \%)$ | $13(100 \%)$ |
| Addition | $0(0 \%)$ | $5(38 \%)$ | $2(15 \%)$ | $6(46 \%)$ | $13(100 \%)$ |
| Subtraction | $0(0 \%)$ | $3(23 \%)$ | $3(23 \%)$ | $7(54 \%)$ | $13(100 \%)$ |
| Written Exercise | $2(15 \%)$ | $4(31 \%)$ | $6(46 \%)$ | $1(8 \%)$ | $13(100 \%)$ |
| Word Problem | $12(92 \%)$ | $0(0 \%)$ | $0(0 \%)$ | $1(8 \%)$ | $13(100 \%)$ |

Class 7, class 8, form 1, form 2 and form 3 learners with hearing impairments were given the same numeracy test which had three sub-tasks. Sub-task 1 had ten questions (No. 1-10) comprising of basic arithmetic operations and simple geometry related questions. Sub-task 2 had five questions (No. 1-5) comprising basic algebra while sub-task three had four questions $\{$ No. 1, No. 2, No. 3, No. 4\}. Sub-task 1 and Sub-task 2 were marked out of $100 \%$ while in subtask three, each question was marked out of $100 \%$. Figure 14 shows that learners with hearing impairments across all the classes scored an average of less than 30 percent in all the sub-tasks. It was found that all learners with hearing impairments did score anything in question 1 of subtask 3 and all except form 2 could not score anything in question 2 of subtask 3 . The highest scores ranging from 17.3 to 23.8 percent were recorded in subtask 1 .


Figure 14: Average scores in numeracy for learners with HI from class 7 - form 3

Table 14 shows the distribution of scores for learners with hearing impairments in class 7, class 8 , form 1 , form 2 and form 3 . The results show that most (more than $70 \%$ ) learners with hearing impairments were unable to score anything (scored 0) and over 85 percent of learners scored below $40 \%$ in different numeracy skills.

Table 14: Distribution of numeracy scores for learner with HI from Class 7 - form 3

| SUBTASK | SCORE RANGE |  |  |  |  |
| :--- | :---: | :---: | :---: | :---: | :---: |
|  | $\mathbf{0}$ | $\mathbf{1 - 4 0}$ | $\mathbf{4 1 - 8 0}$ | $\mathbf{8 1 - 1 0 0}$ | Total |
| Subtask 1 (No 1-10) | $20(26 \%)$ | $47(61 \%)$ | $9(12 \%)$ | $1(1 \%)$ | $77(100 \%)$ |
| Subtask 2 (No 1-5) | $66(86 \%)$ | $10(13 \%$ | $1(1 \%)$ | $0(0 \%)$ | $77(100 \%)$ |
| Subtask 3 (No. 1) | $77(100 \%)$ | $0(0 \%)$ | $0(0 \%)$ | $0(0 \%)$ | $77(100 \%)$ |
| Subtask 3 (No. 2) | $75(97 \%)$ | $0(0 \%)$ | $1(1 \%)$ | $1(1 \%)$ | $77(100 \%)$ |
| Subtask 3 (No. 3) | $61(79 \%)$ | $8(10 \%)$ | $6(8 \%)$ | $2(3 \%)$ | $77(100 \%)$ |
| Subtask 3 (No. 4) | $57(74 \%)$ | $16(21 \%)$ | $3(4 \%)$ | $1(1 \%)$ | $77(100 \%)$ |

### 4.4.2 Literacy scores for learners with hearing impairments

Learners with hearing impairments from class 6 to form 3 were given reading tasks. The tasks involved reading on 50 invented words, 50 familiar words, and a passage of 174 words, and the learner was expected to read all the words. The results presented Figure 15 shows that on average, secondary school learners with HI are able to read more invented words compared to those in primary schools. This is because the achievement outcomes in secondary range between 74 and 88 percent, and between 47 and 77 percent in primary. However, it is curious to note that the highest scored of 88 percent in secondary school was recorded in form 1 while form 2 and form 3 scored the same mark on average. Similarly, form 1 class had the highest number of learners who read all invented words at 40 percent followed by those in class 8 at 35.7 percent


Figure 15: Average scores of reading invented words by learners with HI

The average score on the reading of familiar words by learners with hearing impairments is present in Figure 16. The results suggest that there is a significant drop on the average number of familiar words read compared to invented words. For instance, in primary schools, the average score dropped from between 47 and 77 percent as presented in Figure 15 to between 3 and 23 percent. Similarly, in secondary school, there was a drop from between 74 and 88 percent to between 37 and 55 percent. However, the percentage of numbers who were able to read all words remained relatively the same except for class 8 which recorded the highest drop from 35 to 14 percent. These results suggests that most learners with hearing impairments have significant difficulties reading familiar words.


Figure 16: Average scores of reading familiar words by learners with HI
Passage reading was conducted in two distinct sessions. The first session of passage reading was timed while the second session of passage reading was untimed. During timed passage reading session, a learner would be given a specified amount of time to read a passage and they would be stopped when the time elapses and the number of words read is recorded. During untimed passage reading session, a learner was to read freely and the session ended only when either the learner completed reading or could not read at all. As presented in Figure 17, the results suggest a wide achievement gaps in reading abilities between learners with hearing impairments in primary and secondary schools. For instance, the average scores of the number of words read in passage when timed for learners with hearing impairments in primary school range between 10 and 21 percent, while in secondary school the range is between 46 and 53 percent. Further, it was noted that there was no learner between class 6 and form 3 who was able to read all the words in the given passage correctly.


Figure 17: Average scores of reading a timed oral passage by learners with HI
Figure 18 presents average reading scores for learners with hearing impairments from class 6 to form 3. The results suggest a significant improvement in the average number of words read in the passage for all learners with hearing impairments when reading an untimed text. For instance, in primary schools, the average scores improved from between 10 and 21 percent and presented in Figure 17 to between 15 and 49 percent. In secondary school, there was an improvement from between 46 to 53 percent as presented in Figure 17 to between 74 and 78 percent as presented in Figure 18.


Figure 18: Average scores of reading an untimed oral passage by learners with HI

There were a set of comprehension questions to be answered after every passage reading session. Figure 19 presents the average scores of questions answered by learners with hearing impairments when they answered after reading a timed passage and after reading an untimed
passage. As presented in Figure 19 there is a general improvement in the scores when learners read when untimed over when learners read timed. For instance, when learners with HI are timed, the score on comprehension questions range between 3 and 23 percent. When learners with HI are not timed the average score on the comprehension questions range between 19 and 54 percent.


Figure 19: Average scores on comprehension questions by learners with HI

To assess the trend in each of the literacy skill area for learners with hearing impairments, scatter plots were fit on each skill area and simple linear regression models included. The linearity assumption was based on the expectations that given the same test, learners in higher grades or classes would perform better than those in lower classes or forms (See scatter plots in annex 3). The results suggest that the improvement in literacy skills (reading and comprehension) among learners with hearing impairments improve by a margin of at most $5 \%$ as these learners move from one class to the next class.

The results presented in Table 15 show that learners with hearing impairment are able to read more of words and may have challenges when reading continuous passage. For instance, 46 percent of learners with hearing impairments scored between 81 and 100 percent of the invented words while only 4 percent of the learners scored between 81 and 100 percent of the familiar words. When timed, only 6 percent of learners with hearing impairment were able to read over 80 percent of the words in the passage. When learners are not timed, 16 percent where able to read over 80 of the words in the passage.

Table 15: Distribution of literacy scores for learners with HI

| TASK | SCORE RANGE |  |  |  |  |
| :--- | :---: | :---: | :---: | :---: | :---: |
|  | 0 | $\mathbf{1 - 4 0}$ | $\mathbf{4 1 - 8 0}$ | $\mathbf{8 1 - 1 0 0}$ | Total |
| Number of Invented Words | $1(1 \%)$ | $8(9 \%)$ | $40(44 \%)$ | $41(46 \%)$ | $90(100 \%)$ |
| Number of Familiar Words | $2(2 \%)$ | $46(51 \%)$ | $38(42 \%)$ | $4(4 \%)$ | $90(100 \%)$ |
| Questions answered in <br> after a timed oral passage | $38(42 \%)$ | $32(36 \%)$ | $14(16 \%)$ | $6(7 \%)$ | $90(100 \%)$ |
| Words Read in Oral |  |  |  |  |  |
| Passage Timed |  |  |  |  |  |
| Questions answered after <br> an untimed oral passage | $2(2 \%)$ | $51(57 \%)$ | $32(36 \%)$ | $5(6 \%)$ | $90(100 \%)$ |
| Words Read in Oral <br> Passage Untimed | $1(1 \%)$ | $24(27 \%)$ | $31(34 \%)$ | $34(38 \%)$ | $90(100 \%)$ |

### 5.0 CONCLUSIONS AND RECOMMENDATIONS

### 5.1 Recommendations for Action by the Government of Kenya

- The ministry of Education needs to enforce policy on teacher-learner ratio for various disabilities in order to address the current challenge of learners with severe to profound disabilities and multiple disabilities in most schools. This would make it possible to address specific learning needs of individual learners within the classroom.
- Post specially trained teachers with diverse subject combination to address current challenge in most special secondary and primary schools without specialist in SNE.
- The ministry of education and teachers service commission to staff EARCs with adequate staff to assist in early identification, assessment and intervention in reading and arithmetic as well as other special needs.
- Ensure there is adequate supply of reading materials and resources to facilitate teaching and learning in schools.
- Provide infrastructure with adapted ICT resources to support teaching and learning of numeracy and literacy skills
- Enforce policy on development and implementation of IEP to cater for individual learning needs of SNE learners
- KNEC to review policy on adaptations of National Examinations in order to facilitate individualised timing, for better test items adaptation and adaptations of instructions and candidates' responses.
- Facilitate School based teacher development in specialised areas like braille and sign language for improved performance in literacy and numeracy.
- Build capacity of teachers in classroom practices that support development of learners' foundational reading and numeracy skills.


### 5.2 Recommendations for Action by the Teachers

- Teachers to form subject panels at school level to discuss and address numeracy and literacy gaps
- Teachers to use innovation and creativity to adapt learning resources and methodologies to suit specific needs of learners with special needs and disabilities while teaching numeracy and literacy.
- Teachers to introduce healthy competitions with a reward system to motivate learners' interests in numeracy and literacy
- Teachers to cover foundation concepts before introducing advanced concepts in numeracy and literacy
- Teachers to develop IEPs for all learners with focus on task analysis and other approaches suitable for learners with special needs. This will allow learner to move at their own pace
- Ensure adequate time is allocated to daily practice and mastery of decoding familiar words as well as basic mathematical facts and operations.
- To address poor performance in word problems, teachers should train learners in word problem solving through guided practice.


### 5.3 Recommendations for Action by the Civil Society Organizations

- It is recommended that interested stakeholders and NGOs be engaged further to support early identification, assessment and school placement.
- NGOs support in provision of teaching and learning resources especially for learners with severe to profound disabilities.
- Non-state education stakeholders to complement government efforts by participating in infrastructure development, family support and provision of resources for capacity building.


### 5.4 Recommendations for WWW (EDT)

- Develop teacher capacity on support of learners with severe and multiple disabilities.
- Provide adapted assistive devices to support learning.
- Avail learner support for learners with severe and multiple disabilities.
- Support extended learning activities at home for all the learners.
- Provide adequate learning resource tailored to meet specific learning needs for learners.
- Develop specialized remediation programs for learners with reading difficulties guided by individualized education program (IEP).
- Support correct school placement for learner with disabilities through educational assessment and re assessment in schools.
- Support training of teachers through Inservice programme.
- Support early identification and intervention services for learner with disabilities.
- Lobby for implementation of the recommendation of the project by concerned agencies.


## ANNEXURE

## Annex 1: Scatter Plots and Linear Model Fits for Literacy Skills among Learners with PH







## Questions Answered in Oral Passage Untimed

| $\begin{aligned} & 0 \\ & \hline 0 \\ & 0 \\ & 0 \\ & 0 \\ & 0 \\ & \frac{0}{0} \\ & \frac{1}{2} \end{aligned}$ |  | $\begin{gathered} y=0.0864 x+0.1364 \\ R^{2}=0.9918 \end{gathered}$ |
| :---: | :---: | :---: |
|  |  |  |
| $\begin{array}{clc}\text { Class } 6 & \begin{array}{cl}\text { Class } 7 & \text { Class } 8 \\ \text { Grade Level }\end{array} & \end{array}$ |  |  |
|  |  |  |  |

Annex 2: Scatter Plots and Linear Model Fits for Literacy Skills among Learners with VI




SUBTASK 3 (No. 4)

$$
\begin{gathered}
y=0.0145 x+0.1695 \\
R^{2}=0.1682
\end{gathered}
$$

Average Score

Class 7
Class8
Form 1
Form 2
Form 3

Annex 3: Scatter Plots and Linear Model Fits for Literacy Skills among Learners with HI




SUBTASK 3 (No. 4)




## Annex 5: Inception Report

## 1. Background

Education Development Trust (EDT) and KISE are involved in midterm review of Wasichana Wote Wafaulu (WWW) program as consultants in the area of special needs. The Program is mainly geared towards improving efficiency, effectiveness and relevance of national education systems and school programmes to increase access, retention and quality of learning.

The project aims at assessing the literacy and numeracy levels of learners with Visual Impairments, hearing impairments and physical impairments categories of disabilities both in primary and secondary.

## 2. Rationale for EGRA/EGMA TESTS in WWW Project

Improving learning has become a priority in the education sector worldwide. Despite the expansion of education in the recent past, many countries including Kenya have not realised desired learning outcomes. The progress of learning is typically slow and is marked with inequalities across different regions. Learners who make it out of primary school do not master adequate competency levels that ultimately equip students with skills that are needed to lead healthy, productive and meaningful lives. About 60 percent of learners in Grade 2 in Kenya, for example, cannot perform two-digit subtraction according to Uwezo Assessment Reports (2015) (http://www.uwezo.net/). The KCPE results indicate a marginal realization of both literacy and numeracy skills. Given the learning challenges of children with disabilities and the general lack of special needs learning equipment and resources, it is expected that disabled children are likely to perform even more poorly than their counterparts at the same level.

In accordance with the National Education Sector Strategic Plan (NESSP) 2018-2022 priority 2, Wasichana Wetu Wafaulu project is contributing to Policy Priority 2 which is to improve the quality and relevance of primary and secondary education. Specifically, the project is contributing in the improvement of the learning outcomes, in the delivery of competence- based education and in the integration of ICT in teaching and learning in primary and secondary schools. The project has a specific bias on improving learning among the cohort of girls in the project through in and out of classroom learning activities in regular and special needs settings. WWW has been implementing the project from 2017. Baseline results for the project indicate that majority of the learners in the schools are yet to attain proficiency in the Mathematics and English competences for their levels. To establish changes in learning outcomes as a result of
the project interventions to date, Education Development Trust, through an external evaluator administered standardized EGRA/EGMA, SEGMA/SEGRA tests at mid-line June-September 2019. Results of the evaluation were mixed with intervention performance at $50 \%$ (literacy) and $72 \%$ (numeracy) of 0.25 Standard Deviation from comparison group, using Randomized Control Trial design. However, learners with disabilities were not targeted in the assessment and therefore the project is blind on the learning competences of learners of special needs.

## Purpose, Objectives and Scope of the Consultancy

The project aims at assessing the literacy and numeracy levels of learners with disabilities in the project and against this, remedial strategies developed. Specifically, the consultancy is to:
i. Adapt existing literacy and numeracy test instruments to the various disabilities represented in the program.
ii. Facilitate assessment of girls with various special learning needs in grades 6,7 and 8 in six WWW project-supported stand-alone special schools, special units and clusters of special needs children in Mombasa and Kilifi counties.
iii. Establish learning competency gaps and needs for girls with special needs in the two subjects and recommend remedial actions.

The project will be carried out in Malindi and Mombasa counties within a period of 21 days.

## Methodology and Approach

The project shall draw respondent from the selected special needs education primary and secondary schools. Learners from these schools will be the target respondents.

Teachers to conduct the tests will be identified and trained to ensure that they have thorough knowledge of the test administration procedures.

Tests will be administered to learners and results recorded using mark-lists and scoring sheets.
The scores will be digitized and analysed using descriptive statistics.

Preliminary results will be disseminated to teachers and stakeholders and thereafter a focus group to address the identified learning gaps. Finally, the final report will be compiled and sent to EDT.

## Sampling and Sampling Procedure

Sampling will consider population of the stream, sex and degree of severity. Stratified random and purposive sampling shall be used to ensure that all disabilities are catered for. Purposive sampling will be used in selection of the respondent. Thirty percent of the learners from Pwani and Likoni will be sampled. In the rest of the schools all learners shall be tested. Sampling frame will be provided by EDT.

## Test Adaptation

The EGRA/EGMA tests shall be adapted to suit individual needs of learners with visual impairment, hearing impairment and physical impairment.

All tests shall be produced in braille and large print depending on the needs of learners sampled.
The adaptation will require two teachers of Maths and English who are specialists in Visual and Hearing impairments.

## Workplan

$\left.\begin{array}{|l|l|l|l|}\hline \text { Task } & \text { Duration } & \text { Dates } & \text { Deliverables } \\ \hline \begin{array}{l}\text { i) Project briefing } \\ \text { Work plan preparation }\end{array} & \text { 2days } & 4^{\text {th }}-5^{\text {th }} \text { January } & \text { Work plan } \\ \hline \begin{array}{l}\text { ii)Develop the special needs learners } \\ \text { assignment framework }\end{array} & \text { 5days } & 24^{\text {th }}-28^{\text {th }} \text { January } & \begin{array}{l}\text { Adapted literacy and } \\ \text { numeracy tests } \\ \text { iii)Adapt literacy and numeracy tests } \\ \text { iv) Development of observation and } \\ \text { interview tools }\end{array} \\ \hline \begin{array}{l}\text { v) Tests , Observation and interview } \\ \text { tools presented to Trust }\end{array} & \text { 1days } & 29^{\text {th }} \text { Feb } & \begin{array}{l}\text {-Observation and } \\ \text { interview tools }\end{array} \\ \hline \begin{array}{l}\text { vi) Train teachers on special needs } \\ \text { assessment- test } \\ \text { development/adaptation and } \\ \text { administration }\end{array} & 3 \text { days } & 1^{\text {st }-3 \text { rd } \text { March }} & \begin{array}{l}\text { Tests and tools for } \\ \text { data collection }\end{array} \\ \hline \text { vii) Test administered and marked } & \text { 5days } & 4^{\text {th }}-10^{\text {th }} \\ \text { teachers on test } \\ \text { administration }\end{array}\right]$

| viii) Test result dissemination with <br> schools | 3 days | $11^{\text {th }}, 12^{\text {th }}, 13^{\text {th }}$ | Data from FGD |
| :--- | :--- | :--- | :--- |
| ix) Report writing including key <br> observations and actionable <br> recommendations shared with Trust | 3 days | $15^{\text {th }}-17^{\text {th }}$ March | Report with <br> recommendations |
| Total | 22days |  |  |

