Fafo

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Literacy (EGRA) & numeracy (EGMA) results: 2022

Content

Introduction

ADRA Norway has been implementing the program Strengthening Equity, Access, and Quality in Education (SEAQE) Sahel in Mali and Niger with financial support from the Norwegian Agency for Development (Norad) since 2017. SEAQE Sahel is working to increase education opportunities for all children, including poor and marginalized children, with special focus on girls and children with disabilities. As part of these efforts, ADRA is implementing an educational intervention program in Niger through the provision of e-learning laboratories (E-labs) in which primary school learners have access to tablet devices and other learning material for practicing literacy and numeracy skills.[1]

ADRA has introduced E-labs in five schools within Niger's Balléyara school district, establishing one classroom in each school equipped with tablet devices with literacy and numeracy applications. Alongside tablets, each E-lab features a personal computer, a collection of books, games, puzzles, colored posters with letters and shapes, paper money, and similar learning materials. The E-labs are designed to accommodate up to 30 students simultaneously.

ADRA commissioned Fafo to conduct an evaluation on the impact of the E-labs on learning outcomes and how teachers conduct their teaching activities. The study sought to address the following research questions:

1. What are the effects of E-labs on literacy?
2. What are the effects of E-labs on numeracy?
3. To what extent does the addition of tablets change the learning process for learners (e.g., attendance) and results for learners?
4. Does working with E-labs influence the teaching style of the teachers outside of the laboratories?

This paper presents baseline data that laid the ground for a phase 2 — which gathered data in May/June 2023, and enabled us to respond to the four research questions. *This* paper, however, is restricted to data pertaining to achievement in French and mathematics.[2] More precisely, we present the results for Grade and Grade 4 children in the five E-lab schools and seven 'control schools' (Table 1) who took the Early Grade Reading

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[1] The E-labs were originally developed by Leap Leaning (https://leaplearning.no) and have been adapted to the Nigerien context.

[2] Inherited from the time of colonization, French remains the dominant language of instruction in Niger, which creates learning challenges for many children, especially those living in rural areas whose mother tongue is not French.

The use of national languages in schools began with the creation of the first Hausa/French bilingual school in Zinder in 1973. The early 2000s saw the revival of bilingual education in Niger mainly with the support of donors. However, it was not until the 2011 curriculum reform that bilingualism was officially introduced in primary education with five national languages: Fulfulde, Hausa, Kanuri, Tamajaq, and Zarma.

In general, children are expected to start school in their mother tongue in addition to oral French until grade 3. From the third grade onwards, French becomes the language of instruction, with the national languages used orally. Due to the continued dominance of French as medium of instruction, the E-labs are implemented in French.

Assessment (EGRA) and Early Grade Mathematics Assessment (EGMA) tests in 2022. Most children repeated the exact same tests in 2023, which allowed the examination of progress.

Table 1 List of primary schools selected for the evaluation.

Program schools with E-lab	Program schools, no E-lab	Schools without program (NGO) support
Agou Koira Tegui	Balléyara Centre	Borgo Gorou
Balléyara Château	Borgo	N'Dikitan
Jidikamatt I	Tabla Quartier	
Kabé	Jidakamatt II	
Sandiré	Winditane	

The EGRA and EGMA assessments were customized for Grade 2 and Grade 4 students by Fafo's partner École Normale Súperieure (ENS) at the University of Niamey. The tests were conducted 25-31 January 2022 with the assistance of 30 pedagogical advisors and 6 supervisors recruited from the Balléyara and Niamey regions.

A total of 833 children participated in the EGRA while 787 took the EGMA tests in the second grade. Amongst fourth-grade students, 770 students took the EGRA test and 791 took the EGMA test (Table 2). A higher number of students attending schools with E-lab than schools without E-lab took the Grade 2 test whilst the number of students taking the Grade 4 test was more even. There were somewhat more girls (55 percent) than boys (45 percent) taking the tests.

The paper presents the results as mean and median scores for schools with and without E-lab in a table, and for most tests, the distribution of the actual scores for all children are presented in a graph. The tables also present the results for two different sets of non-E-lab schools: those that have and those that have not received program support from ADRA (and other NGOs). Such support would typically be construction of class-rooms and toilets, teacher training, school equipment, and support to facilitate the learning of children living with disabilities. All five schools with E-lab have also received such assistance. This document concentrates on the difference between E-lab and non-E-lab schools without referring to variation between the two types of schools lacking E-lab.

Table 2 Number of students by type of test, type of school, and grade.

	EGRA		EGMA	
Type of school	Grade 2	Grade 4	Grade 2	Grade 4
With E-lab	504	366	475	384
Without E-lab	329	404	312	407
No E-lab, program support	264	338	261	340
No E-lab, no program support	65	66	51	67
Total	833	770	787	791

EGRA results, Grade 2

EGRA consisted of five sub-tasks: reading letters and syllables, reading words, reading a single sentence, reading five simple sentences, and text comprehension. The results of each of these tasks are presented below.

Reading letters and syllables

This sub-task assessed the students' skill in reading letters. As shown in Table 4, students in E-lab schools (mean score=11; median score=9) performed better than students in schools without E-lab (mean score=8; median score=8). The overall result is rather poor — more than one-half of the students scored 7 or fewer points out of a possible 40. Figure 1 provides a visual representation of the score distribution for all Grade 2 students who were tested on this sub-task. One hundred and twenty-five students (15 percent) did not recognize and succeed in reading out aloud a single letter or syllable.

Table 3 Mean and median number of correct responses in reading letters (max. score=40).

Type of school	Mean	Median	Number of students
With E-lab	11	9	502
Without E-lab	8	7	329
- No E-lab, program support	8	7	264
- No E-lab, no program support	8	7	65
Total	10	7	831

Figure 1 Results from reading letters (max. score=40). All students in Grade 2.
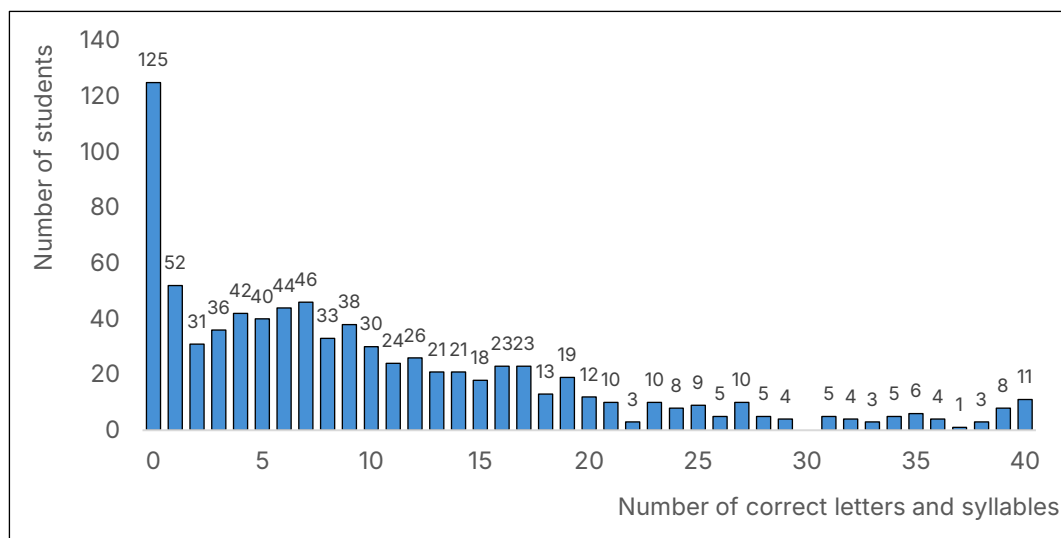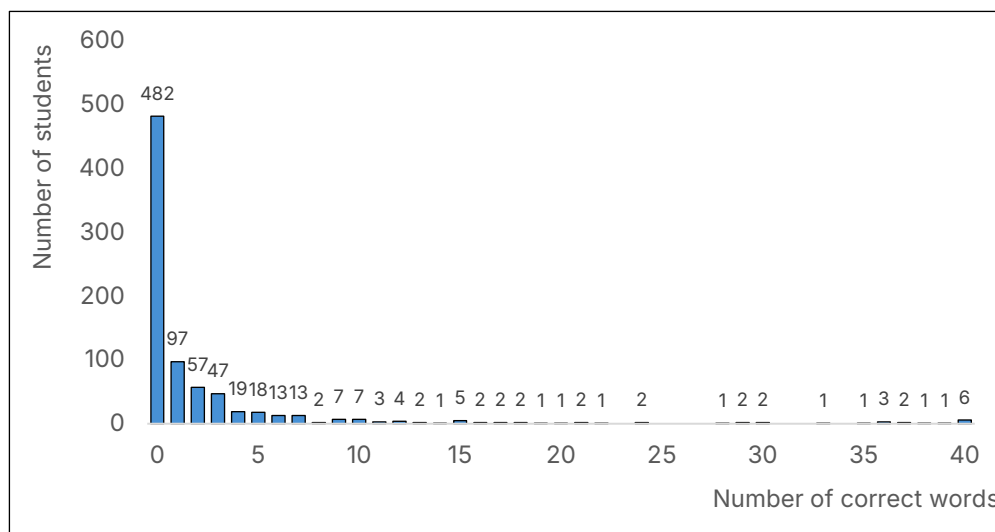
Reading of words

The second sub-task of the EGRA test was the reading of words in two minutes. Given the poor score on the previous task, it is no surprise that the result of this more difficult task was poor (Table 5). On average, the children succeeding in getting two out of 40 words right, with no variation between E-lab and non-E-lab schools. Sixty percent of them did not manage a single word (Figure 2). The strong left-skewed pattern of the graph underscores the weak reading performance of most students.

Table 4 Number of words read in two minutes (max. score=40).

Type of school	Mean	Median	Number of students
With E-lab	2	0	496
Without E-lab	2	0	314
- No E-lab, program support	2	0	252
- No E-lab, no program support	4	2	62
Total	2	0	810

Figure 2 Results from reading words (max. score=40). All students in Grade 2.

Reading of a single sentence

Table 6 presents the results of a one-minute simple sentence reading test, where reading a five-word sentence correctly would result in the maximum possible score of 5. The mean and median scores for both schools with and without an E-lab are 1 and 0, respectively. The uniformly low median score of 0 across all types of schools suggests that a significant number of students were unable to read the simple sentence within the one-minute timeframe. Figure 3 shows that only 28 students scored 4 or 5 out of 5, indicating the generally low reading skills amongst the Grade 2 students. Seven in ten (71 percent) did not get a single word right.

Table 5 Reading of five-word sentence (max. score=5).

Type of school	Mean	Median	Number of students
With E-lab	1	0	310
Without E-lab	1	0	287
- No E-lab, program support	1	0	241
- No E-lab, no program support	1	1	46
Total	1	0	597

Figure 3 Results of the sentence reading (max. score=5). All students in Grade 2.
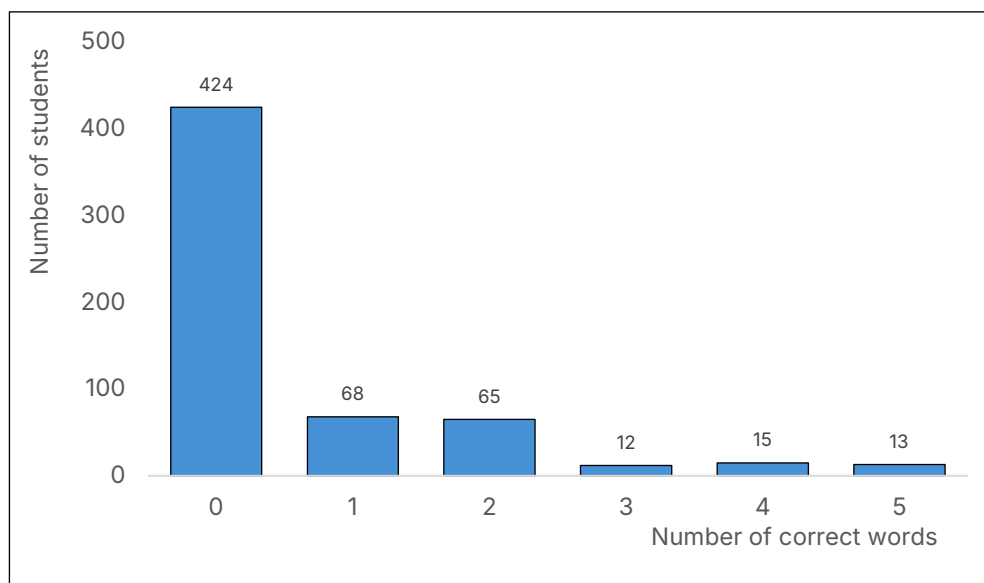
Reading simple sentences

The fourth test comprised reading five sentences containing altogether 19 words. The maximum score is 19, one point for each correct word. The mean and median scores are uniformly low at 1 and 0, respectively (Table 7). The distribution of the scores is shown in Figure 4. Eight in ten children did not get any word right.

Table 6 Total number of correct words (max. score=19).

Type of school	Mean	Median	Number of students
With E-lab	1	0	486
Without E-lab	1	0	306
- No E-lab, program support	1	0	247
- No E-lab, no program support	2	0	59
Total	1	0	792

Figure 4 Distribution of scores from reading words in sentences (max. score=19). All students in Grade 2.
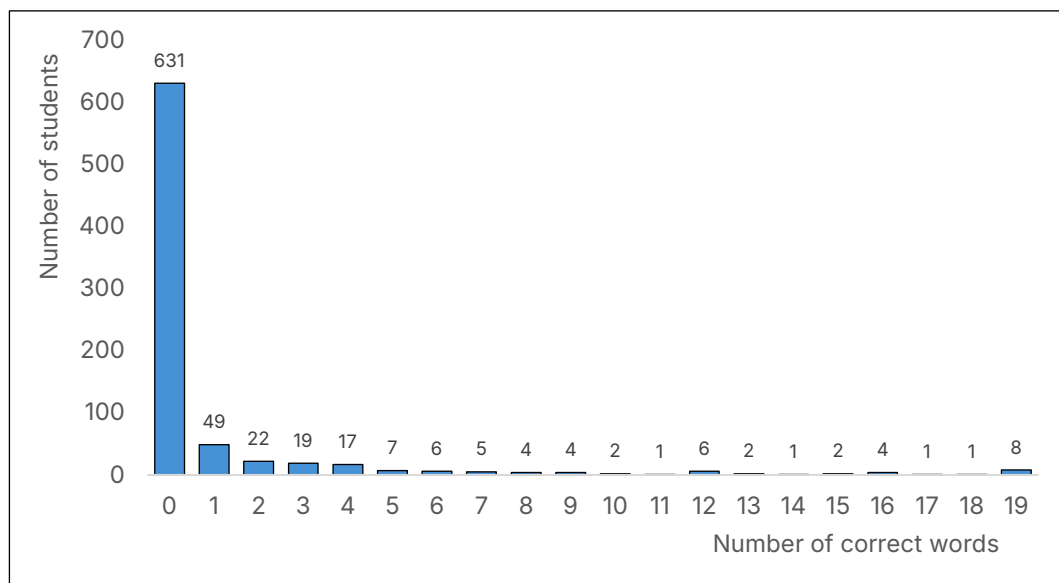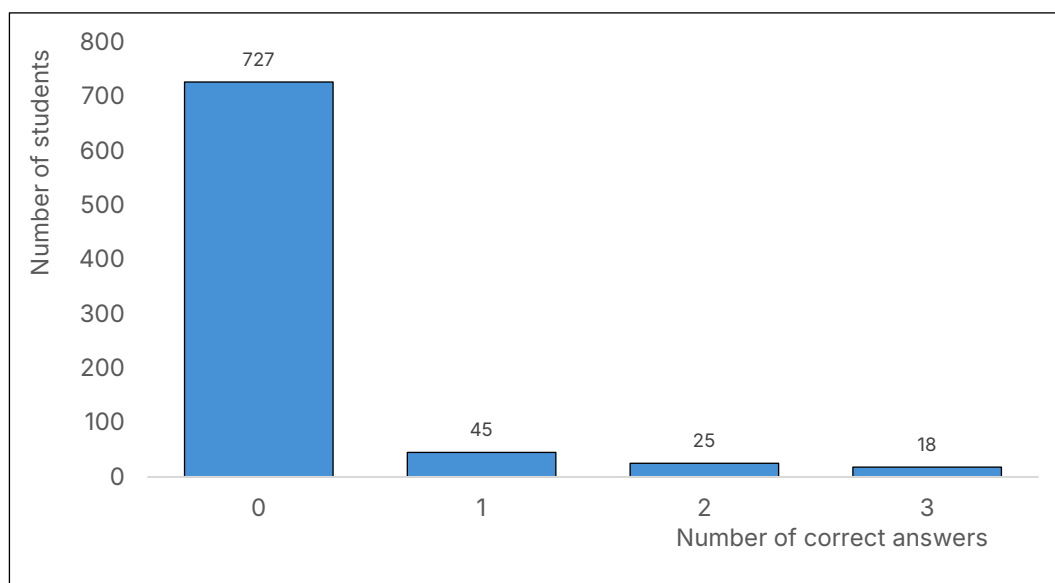
Text comprehension

In the following test, the Grade 2 students were given three questions designed to test their comprehension of the five sentences presented to them in the previous task. The mean and median equals zero for both types of school (Table 8). Compliant with the former AGRA scores for Grade 2, this uniformly poor performance suggests that there are widespread issues with French reading comprehension skills among these young students, regardless of whether they attend E-lab schools or not. A detailed representation of the score distribution is shown in Figure 5. Nine in ten students scored 0 whilst only 18 students (2 percent) achieved the maximum score.

Table 7 Total score on comprehension (max. score=3).

Type of school	Mean	Median	Number of students
With E-lab	0	0	498
Without E-lab	0	0	317
- No E-lab, program support	0	0	256
- No E-lab, no program support	0	0	61
Total	0	0	815

Figure 5 Distribution of scores on comprehension (max. score=3). All students in Grade 2.

EGRA results, Grade 4

The EGRA test administered to fourth-grade students covered four sub-tasks: word reading, simple sentence reading, paragraph reading, and comprehension. The results are presented below.

Word reading

The first sub-task is like the second sub-task of second graders, namely the reading of words in two minutes. Table 10 presents the data on the number of correct responses in word reading tasks for fourth-grade students, with a maximum possible score of 40. For E-lab schools, the mean score is 12 and the median is 6. Schools without E-lab have a lower mean score of 10 and a lower median of 3. This suggests that schools with E-lab perform slightly better that other schools. However, it's worth noting that the scores are still low relative to the maximum possible score, indicating considerable room for improvement. This is demonstrated by Figure 6, which shows that only one-half of the students read out more than four words correctly. Beyond that, the performance level of the students was rather diverse.

Table 8 Number of correct responses in word reading (max. score=40)

Type of school	Mean	Median	Number of students
With E-lab	12	6	344
Without E-lab	10	3	369
- No E-lab, program support	10	3	311
- No E-lab, no program support	7	3	58
Total	11	4	713

Figure 6 Scores in word reading (max. score=40). All students in Grade 4.
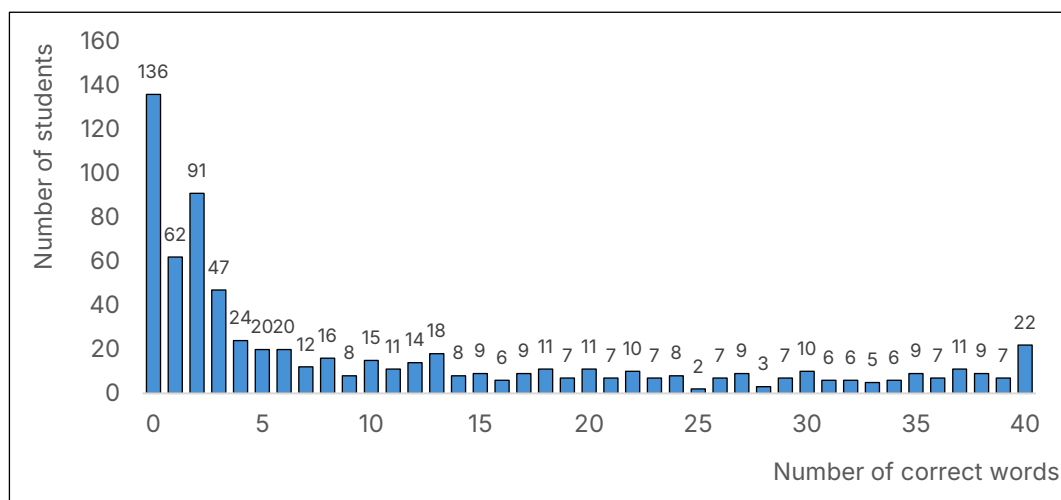
Reading of simple sentences

The second EGRA component for children in Grade 4 also resembles one of the sub-tasks used for children in Grade 2: the reading of five simple sentences in two minutes. However, the sentences were not the same, and with one exception had a more complex structure than then sentences used for Grade 2. The maximum score is 5, one point for each correct sentence.

Table 11 shows that students in schools with E-lab performed somewhat better on average (mean=2 correct responses) than those attending schools without E-lab (mean=1). The median for all three school types is 0, which implies that at least one-half of the students in each group struggled with this sub-task and did not read any sentence correctly. In fact, as many as 427 out of the 710 Grade 4 students (60 percent) scored zero (Figure 7). On the other hand, 15 per cent of the students achieved the maximum score of 5.

Table 9 Number of correct responses in sentence reading (max. score=5).

Type of school	Mean	Median	Number of students
With E-lab	2	0	344
Without E-lab	1	0	366
- No E-lab, program support	1	0	313
- No E-lab, no program support	1	0	53
Total	1	0	710

Figure 7 Distribution of scores reading correct sentences (max. score=5). All students in Grade 4.
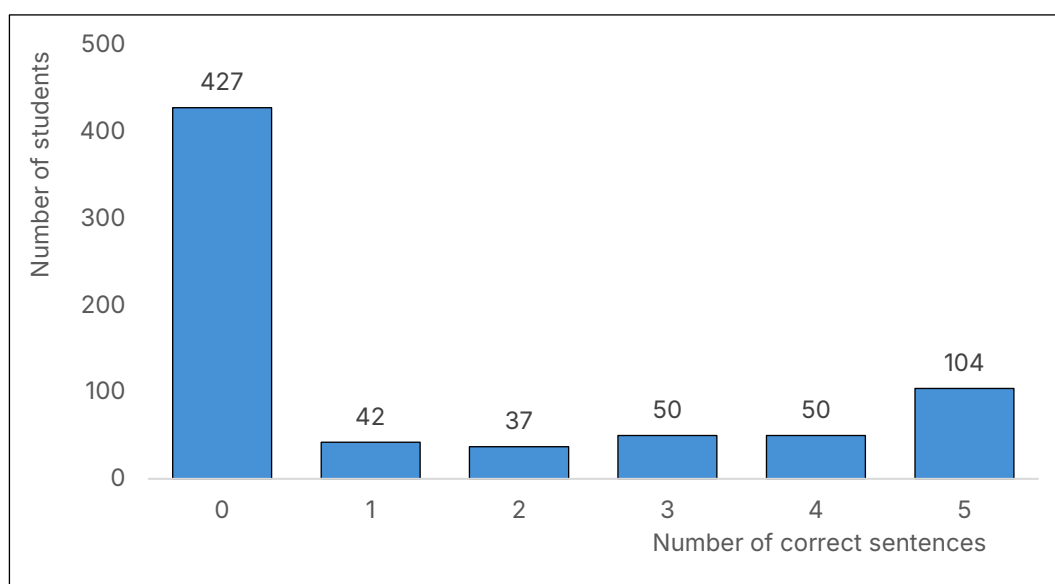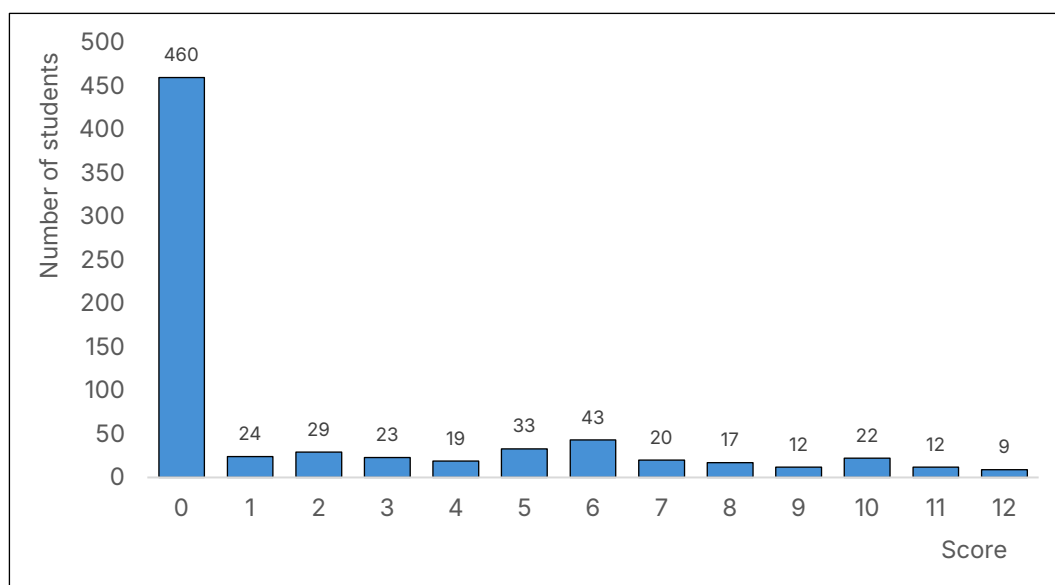
Paragraph reading

The third sub-task of the EGRA for Grade 4 students is an assessment of the ability to read a full paragraph. Again, the time at the disposal of the children was two minutes. The maximum score is 12. For both schools with and without E-lab, the mean score is 2 and the median score is 0 (Table 12). This means that the performance in paragraph reading is uniformly low. The median score of 0 implies that a significant number of students were unable to read any part of the paragraph correctly. Figure 8 shows that nearly two-thirds of the students (64 percent) scored 0, and that the remaining students were distributed across the scores 1 to 12. Only 1 percent accomplished the maximum score.

Table 10 The paragraph reading score (max. score=12).

Type of school	Mean	Median	Number of students
With E-lab	2	0	351
Without E-lab	2	0	372
- No E-lab, program support	2	0	316
- No E-lab, no program support	2	0	56
Total	2	0	723

Figure 8 Distribution of paragraph reading scores (max. score=12). All students in Grade 4.

Comprehension

The fourth and final component of the EGRA administered to the fourth graders assessed comprehension as a follow-up to the paragraph reading. The students were asked three questions to detect if they understood the text they had just read — or attempted to read. (The evaluator re-read the paragraph before asking the questions.) The maximum possible core is 3.

For both school types, the mean score is 1 and the median 0 (Table 13), i.e., a significant number of students — 442 out of 755 (59 percent) to be exact — were unable to answer any comprehension question correctly (Figure 9). This uniformly poor performance suggests that there are widespread issues with reading comprehension skills among fourth-grade students. Fourteen percent reached the maximum score.

Table 11 Total correct responses from comprehension (max. score=3)

Type of school	Mean	Median	Number of students
With E-lab	1	0	359
Without E-lab	1	0	396
- No E-lab, program support	1	0	331
- No E-lab, no program support	0	0	65
Total	1	0	755

Figure 9 Distribution of comprehension scores (max. score=3). All students in Grade 4.
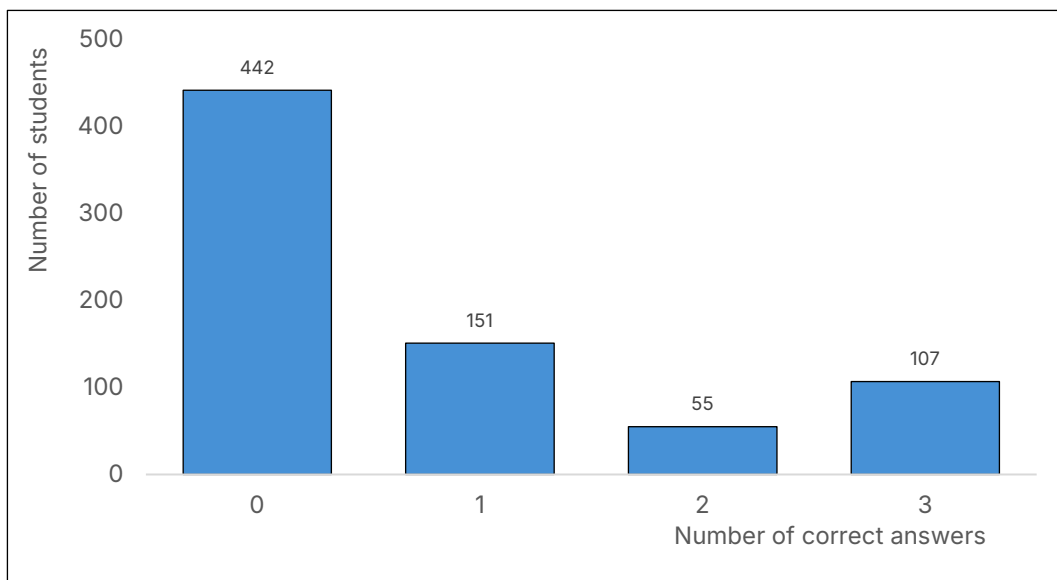
EGMA results, Grade 2

The EGMA test for second-grade students includes four sub-tasks: number counting, number identification, number ordering, and addition and subtraction.

Number counting

The first EGMA sub-task assessed children's skills in number counting from 0 to 20. The time limit was two minutes. The average score is 19 and median score is 20 for both schools with and without E-lab (Table 15). Only 4 percent of the children were unable to count to 10.

Table 12 Scores on number counting (max. score=20).

| Type of school	Mean	Median	Number of students
With E-lab	19	20	493
Without E-lab	19	20	348
- No E-lab, program support	19	20	282
- No E-lab, no program support	19	20	66
Total	19	240	841

Number identification

Table 16 provides results on the number identification sub-task of the EGMA test for second graders with a maximum possible score of 24, which corresponds to the 24 numbers between 0 and 20 that was distributed in a table, and which the students were asked to read out loud. The mean and median scores for E-lab schools is slightly better than for schools lacking E-lab (at 16 versus 14 and 18 versus 14, respectively). Nearly nine in ten students reached the maximum score (Figure 10).

Table 13 Scores in identification of numbers (max. score=24).

Type of school	Mean	Median	Number of students
With E-lab	16	18	487
Without E-lab	14	14	346
- No E-lab, program support	13	14	283
- No E-lab, no program support	16	21	63
Total	15	16	833

Figure 10 Distribution of scores on identification of numbers (max. score=24). All students in Grade 2.
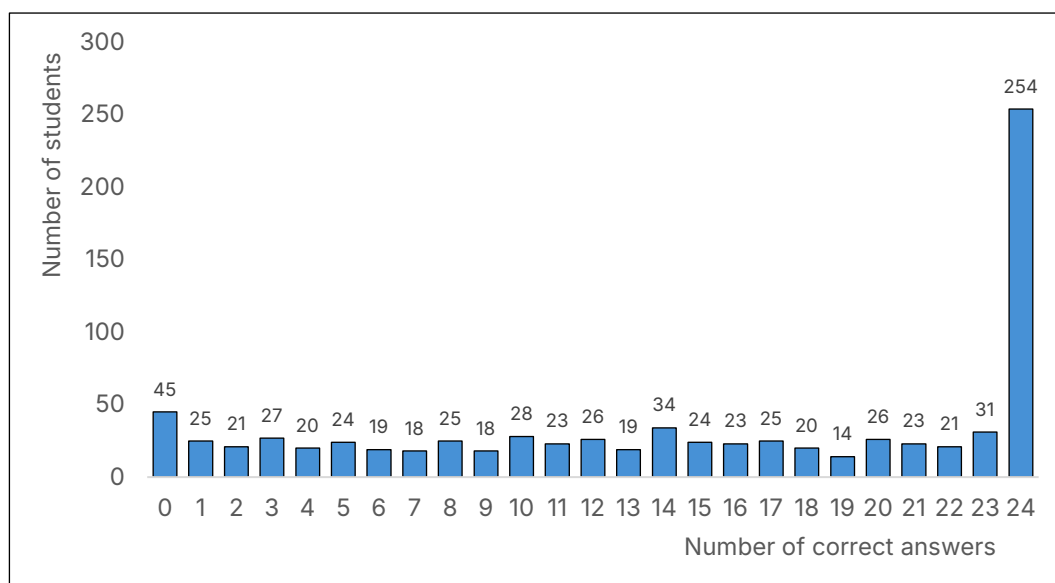
Number ordering

The third sub-task asked the students to order seven numbers from the lowest to the highest value. Table 17 shows the percentage that managed to organize all seven numbers in ascending order. Overall, second graders in E-lab schools did better than second graders in non-E-lab schools.

Table 14 Students who correctly organized seven numbers in ascending order. By type of school. Percentage.

| Type of school	Percent	Number of students
With E-lab	24	487
Without E-lab	19	322
- No E-lab, program support	15	267
- No E-lab, no program support	40	55
Total	22	809

Addition and subtraction

The last component of the Grade 2-level EGMA assessed skills in addition and subtraction. The students were requested to solve three math problems (10+3; 5+11; and 17-7), which gives a maximum possible score of 3. The mean is the same for both type of schools (1), but the median score is higher for E-lab schools (2 versus 1) (Table 18).

The overall mean and median scores for all students are both 1. These low scores indicate that a significant number of students struggle with basic addition and subtraction. However, as shown by Figure 10, the students are distributed on the various scores, and 17 percent of them got all three calculations right.

Table 15 Scores in three math problems (10+3; 5+11; 17-7) (max. score=3).

Type of school	Mean	Median	Number of students
With E-lab	1	2	487
Without E-lab	1	1	344
- No E-lab, program support	1	1	278
- No E-lab, no program support	2	2	66
Total	1	1	831

Figure 11 Distribution of scores on the three math problems (max. score=3). All students in Grade 2.
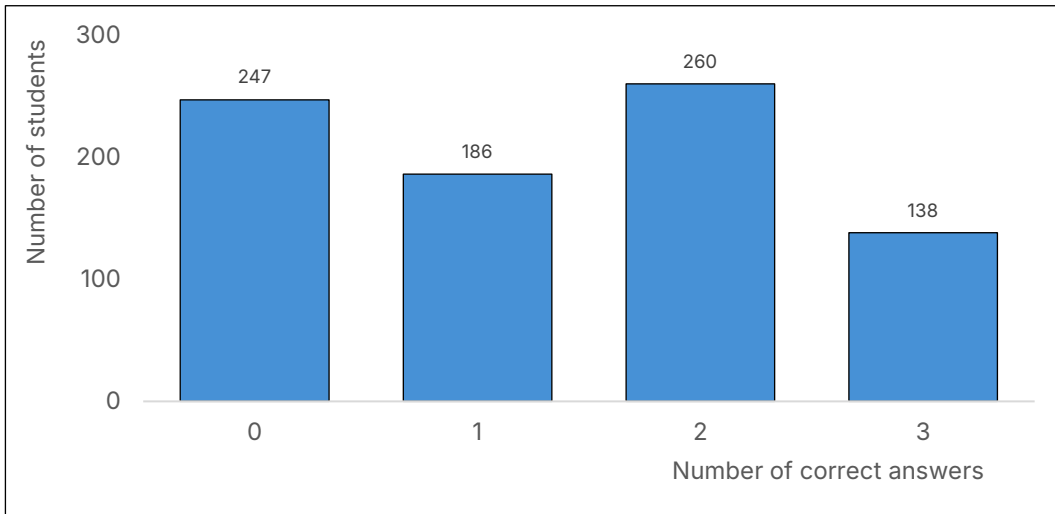
EGMA results, Grade 4

In fourth grade, the EGMA test was used to assess students' skills in seven sub-tasks: number identification, comparison of two numbers, comparison of multiple numbers, identifying missing numbers, addition, subtraction, and word problems.

Number identification

The first sub-task was number identification. The maximum possible score is 24 — which corresponds to the 24 numbers between 2 and 286 that were distributed in a table, and which the students were asked to read out loud within a time frame of one minute.

Whilst the performance of student in schools with E-lab is somewhat better than that of students in non-E-lab schools, the overall picture is generally good with mean and median scores of 21 and 23 out of 24 (Table 20). Nearly one-half of the students (48 percent) achieved the maximum score (Figure 11).

Table 16 Scores on number identification (max. score=24)

Type of school	Mean	Median	Number of students
With E-lab	21	24	382
Without E-lab	20	23	398
- No E-lab, program support	20	23	333
- No E-lab, no program support	18	20	65
Total	20	23	780

Figure 12 Distribution of scores on number identifications (max. score=24). All students in Grade 4.
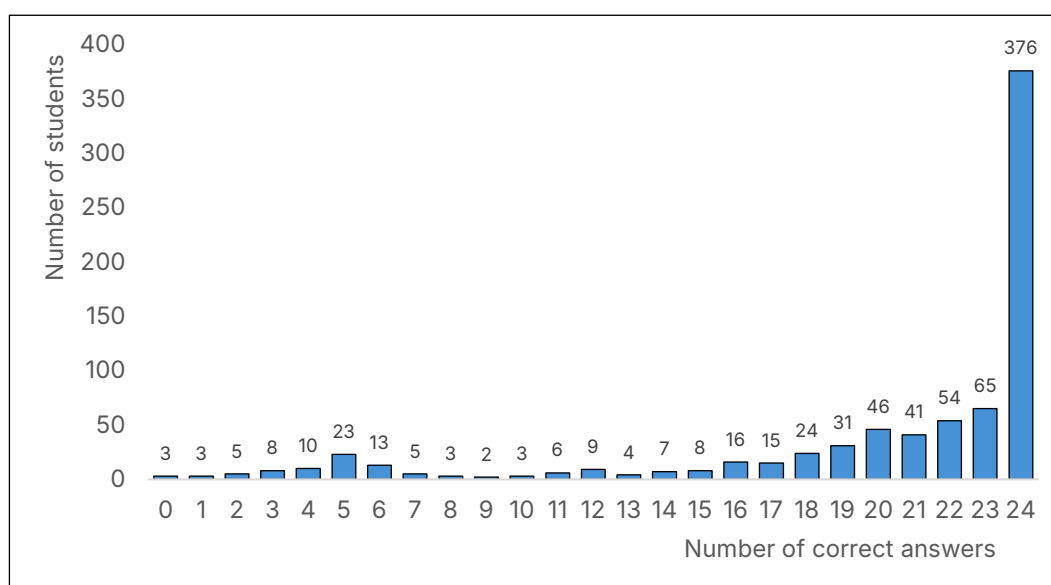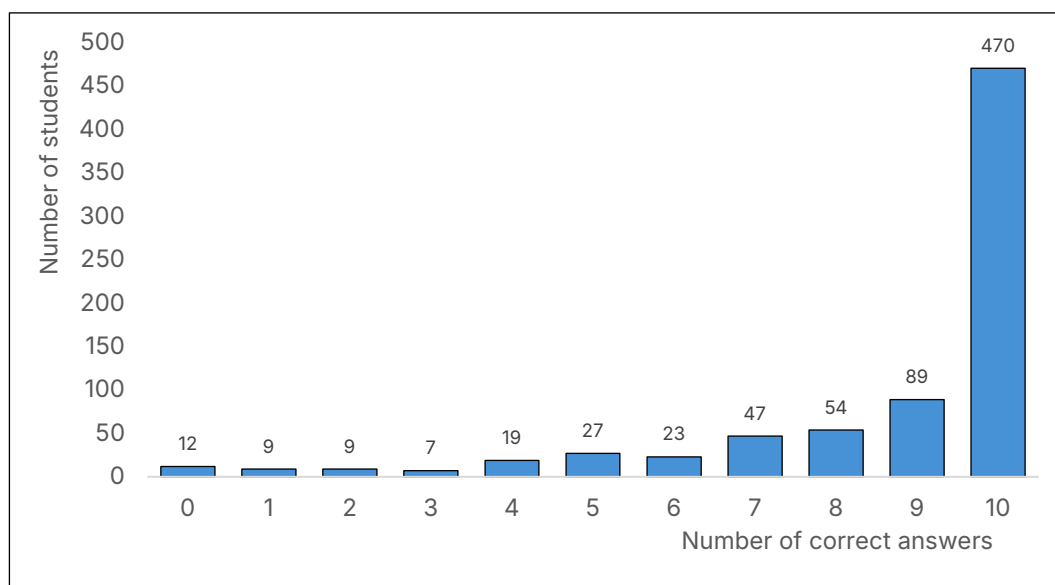
Comparison of two numbers

The next sub-task involves comparison of 10 pairs of one and two-digit numbers and identifying the larger one. The children had one minute to complete the task. The maximum score is 10.

Most students (61 percent) managed to identify the largest number in all pairs (Table 21, Figure 12). The variation in performance between E-lab and non-E-lab schools was minimal.

Table 17 Scores on comparison of two numbers (max. score=10).

Type of school	Mean	Median	Number of students
With E-lab	9	10	368
Without E-lab	8	10	398
- No E-lab, program support	9	10	333
- No E-lab, no program support	8	9	65
Total	9	10	766

Figure 13 Distribution of scores on comparison of two numbers (max. score=10). All students in Grade 4.

Comparison of multiple numbers

The third sub-task of the EGMA assessed comparison of multiple numbers. The students were presented five sets of four numbers lower than 100 and were asked to pick the highest number in each of the sets. The maximum score is 5.

The emerging picture resembles the result of the previous sub-task. The difference between the two types of schools is negligible, and the overall result is decent with more than one-half of the students (54 percent) reaching the maximum score (Table 22, Figure 13).

Table 18 Scores on comparison of multiple numbers (max. score=5).

Type of school	Mean	Median	Number of students
With E-lab	4	5	355
Without E-lab	4	4	382
- No E-lab, program support	4	4	319
- No E-lab, no program support	3	4	63
Total	4	5	737

Figure 14 Distribution of scores on comparison of multiple numbers (max. score=5). All students in Grade 4.
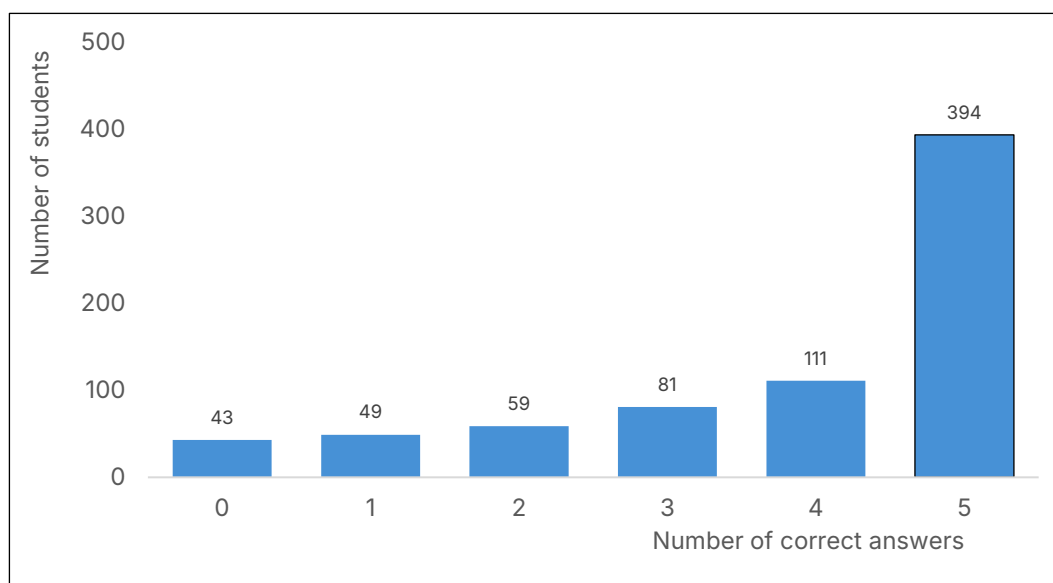
Identifying missing numbers

The fourth sub-task turned out to be a little more difficult for the Grade 4 children. The students were presented with a table with 10 rows. In each row, one 1 or 2-digit number was missing, and they were asked to identify the missing number.

Table 23 presents the results. With a maximum score of 10, the mean and median scores for all students were both 5. The E-lab schools achieved better results than schools without E-lab with both a mean and median score of 6, contrasted with a mean score of 5 and a median score of 4 for schools without E-lab. One-fifth of the students (21 percent) achieved the maximum score (Figure 14).

Table 19 Number of correctly identified missing numbers (max. score=10).

Type of school	Mean	Median	Number of students
With E-lab	6	6	368
Without E-lab	5	4	397
- No E-lab, program support	5	4	333
- No E-lab, no program support	6	6	64
Total	5	5	765

Figure 15 Distribution of scores on identifying missing numbers (max. score=10). All students in Grade 4.
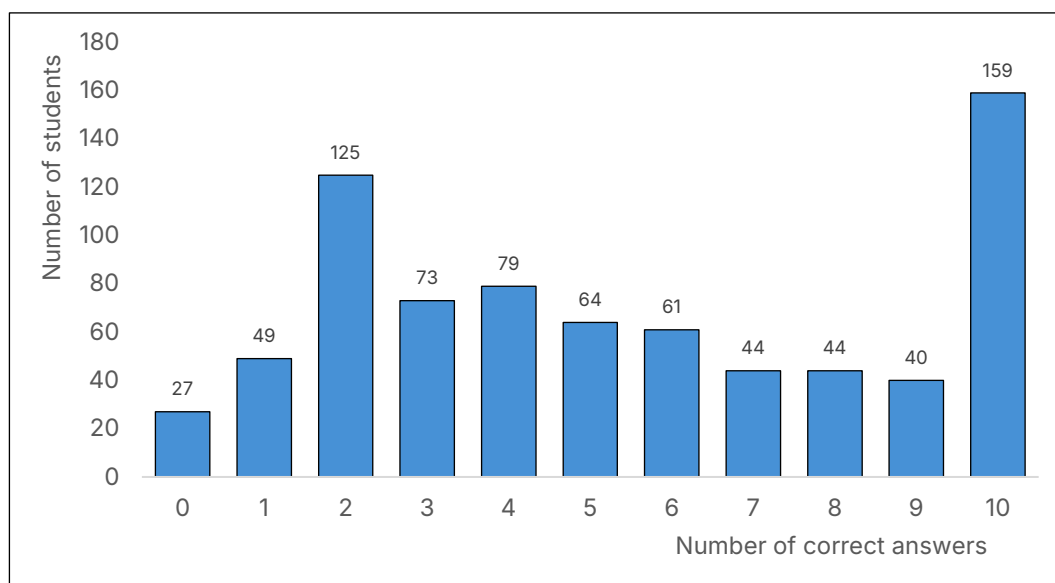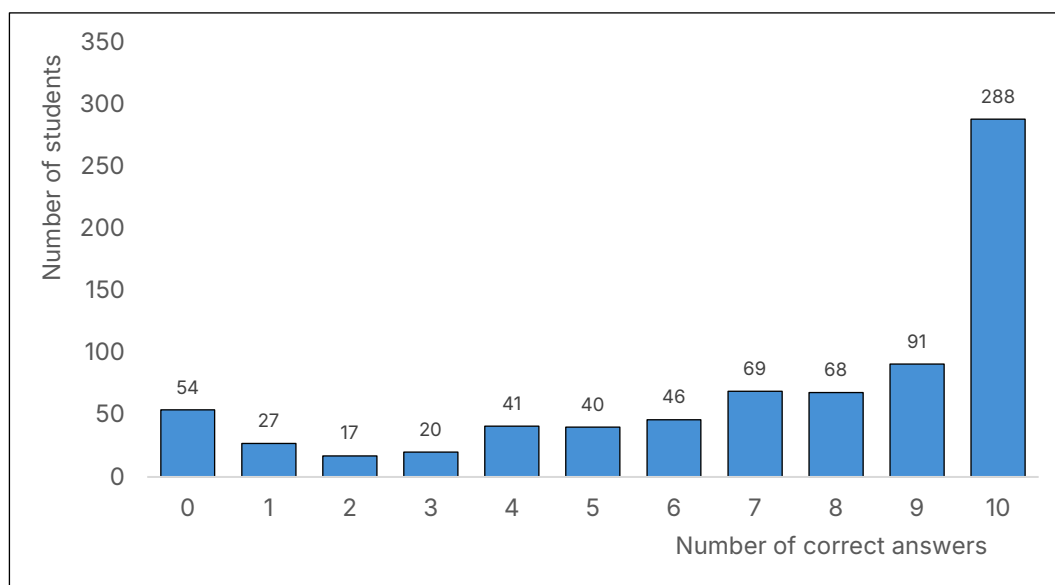
Addition

The fifth component of the EGMA assessment for children in Grade 4 comprised 10 addition exercises, where the sum was 20 or lower. The Maximum score was 10.

The performance was decent overall, with students in schools with E-lab doing slightly better than students in schools without E-lab (Table 24). Thirty-eight percent of the students achieved the maximum score; 5 percent got half of the exercises correct whilst 7 percent failed all ten exercises (Figure 15).

Table 20 Number of correctly added numbers (max. score=10).

Type of school	Mean	Median	Number of students
With E-lab	8	9	371
Without E-lab	7	8	390
- No E-lab, program support	7	8	328
- No E-lab, no program support	6	8	62
Total	7	8	761

Figure 16 Distribution of scores on additions (max. score=10). All students in Grade 4.
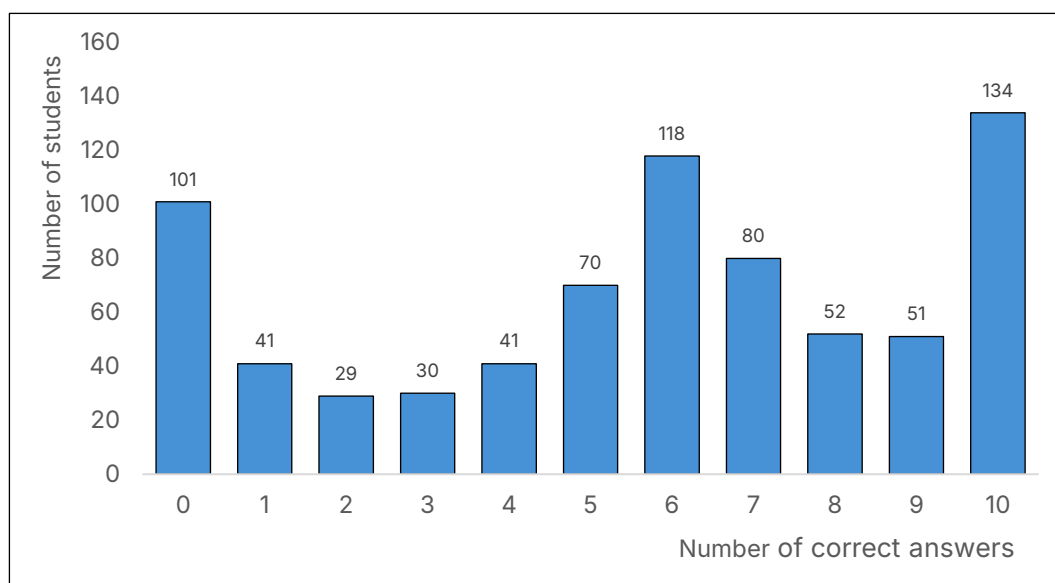
Subtraction

This exercise was about subtraction instead of addition. Ten exercises mean a maximum score of 10.

The performance was weaker than for addition with mean and median scores of 6 for all students taken together (Table 25). Students in schools without E-lab were slightly weaker than students attending E-lab schools, on average. Only 18 percent achieved the maximum score, which is about half as many as those who got all ten addition exercises right. Twice as many (14 percent) failed on all exercises (Figure 16).

Table 21 Number of correctly subtracted numbers (max. score=10).

Type of school	Mean	Median	Number of students
With E-lab	6	6	358
Without E-lab	5	6	389
- No E-lab, program support	5	6	327
- No E-lab, no program support	4	5	62
Total	6	6	747

Figure 17 Distribution of scores on subtractions (max. score=10). All students in Grade 4.

Text problems

The final component of the EGRA test for Grade 4 students assessed skills using text-based mathematical problems involving addition and subtraction, with numbers up to 30. There were four exercises, and the students could use up to 1 minute to complete each of them. The maximum possible score was 4.

Both the mean and median result for all students were 2, with students from E-lab schools scoring slightly higher, with a median score of 3 (Table 26). Figure 18 shows the distribution of the scores. Fifteen percent of all students (118 children) did not solve a single problem whilst 25 per cent (193 children) solved all four.

Table 22 Number of correct responses on text problems (max. score=4).

Type of school	Mean	Median	Number of students
With E-lab	2	3	374
Without E-lab	2	2	401
- No E-lab, program support	2	2	337
- No E-lab, no program support	2	2	64
Total	2	2	775

Figure 18 Scores on text problems (max. score=4) All students in Grade 4.