

## *Chapter 5*

# **How Remediation Helps to Improve Children's Educational Learnings in Primary Education in Senegal**

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### **INTRODUCTION**

As one of the countries with a low Human Development Index (HDI), Senegal, a West African country, also faces the challenge of rapid population growth (UNDP, 2019; ANSD, 2018). According to the National Bureau of Statistics, the country's population in 2020 was estimated to be around 16.7 millions with an average annual growth rate of 2.7% (ANSD, 2020). Around 46% of the population lived in urban areas and the capital, Dakar, alone accounted for nearly a quarter (23%) of the people. At the same time, Senegal is one of the youngest countries in the world. In 2015, the median age of the Senegalese population was eighteen (ANSD, 2018). Similarly, the under-fifteens accounted for 42% of population, while children under four accounted for 16% (op. cit.). This high proportion of young children, which will remains at this level for decades, reflects a high gross demand for education.

The (Programme d'Amélioration de la Qualité, de l'Équité et de la Transparence) also called "PAQUET" (i.e., Program for the Improvement of Quality, Equity and Transparency) 2015–2030 is Senegal's current national education and training sector policy. Taking into consideration Goal 4 of the UN Sustainable Development Goals (SDGs), PAQUET aims to "strengthen the acceptability by the population of the orientation of education and training, the accessibility of education and training offers for all people, the adaptability of the system to the different needs and contexts of learners, the adequate allocation of resources in response to real needs" (Sénégal, 2013, p. 26).

The Senegalese education system faces several challenges in achieving the objectives for "Post-2015 Education" initiative and the "Plan Sénégal

Émergent (PSE).<sup>1</sup>” These include the challenge in geographical inequalities mainly between urban and rural areas and regions; and, above all, the challenge in the quality of learning (Moussa et al., 2019). On the latter aspect, even if the gross enrollment rate (GER) in Senegal is fairly high, at 87% (DPRE, 2017), the level of assimilation of learning by children is far from satisfactory. For example, the assessment of the skills of learners aged nine to sixteen carried out by LARTES-IFAN (2017) showed that only 17.8% of children had expected (good) skills in reading; and only 22% in mathematics. According to the data from the Educational Systems Analysis Program,<sup>2</sup> in 2014, 38.8% of students at the end of the primary cycle (after six years of schooling) do not reach the “satisfactory” level in reading and 41.2% in mathematics (PASEC, 2016). In this sense that UNICEF (2017, p. 2) points out that “the evaluation of the first phase of the PAQUET revealed downward trends in the quality of education at the different levels of the system.”

The established trend is a result of several factors both internal and external to schools, including the instability of the education system characterized by the recurrence of strike movements organized by teachers’ or students’ unions. The issue is accentuated by the low level of many teachers. In fact, several years ago, there were considerable gaps in the recruitment and training of teachers. The macro-economic situation of the country, classified as a “developing country” by UNDP (2019) and “lower-middle-income countries” by the World Bank (2019), limits the capacity of the government to fix some of the critical issues.

To alleviate the problem of quality, many initiatives have been taken by the Ministry of National Education (Sénégal, 2018, 2013). For example, the minimum requirement for the recruitment of teachers is now set at the baccalaureate level, with a very rigorous selection process. Continuous teacher training is better managed with many capacity-building sessions, especially regarding reading and mathematics, which are key disciplines. Textbooks in reading, mathematics and education for science and social life are provided to all students in public schools. In addition, to improve transparency and accountability in the management of the structures, performance contracts are signed as part of the Quality Improvement Plans (PAQ) and Quality Improvement Contracts (CAQ). Also, the Basic Education Curriculum (CEB) has been revised and pedagogical manuals provided to teachers. More relevant, officially, academic support has been increased with mandatory tutoring courses, led by teachers, every Tuesdays and Thursdays afternoon in public schools. However, monitoring and mentoring are insufficient because of the challenges related to the organization of work in schools, their availability and, above all, the motivation of the teachers combined with the multiple tasks of the inspectorate.

In addition to government interventions to improve rapidly and significantly the quality of the education system, the Research Laboratory on

Economic and Social Transformations (LARTES-IFAN<sup>3</sup>) of the Cheikh Anta Diop University of Dakar (Senegal) has developed and implemented the “Elementary Remediation Program (ERP)” as a citizen initiative. The program aims to systematize assessment and remediation based on a computer application and physical teaching resources to improve student performance in reading and mathematics in French and Arabic. Therefore, the focus of this chapter is aimed to analyze the impact of the remediation activities carried out by LARTES-IFAN on the level of primary school children with known difficulties in mathematics and reading in Senegal.

The next section of this chapter presents the literature review and theoretical framework. Then the third section describes at some length the ERP. The fourth section presents the methodology and the data we used and is followed by the results section. Discussion and conclusion are the two last parts of the work.

## LITERATURE REVIEW

Several studies indicate that quality inevitably refers to the measurement and evaluation of learning (De Landsheere, 1979; Legendre, 1993; Sall, 1996; Guèye, 1997; Sall & De Ketele, 1997; Bouchard & Plante, 2002; UNESCO, 2004; Verspoor, 2005; Demeuse & Strauven, 2006; Dieng, 2007; Roser et al., 2013). The need for data to measure the performance of education systems in Africa will lead to an increase in the number of assessments of learner achievement using national or international tests (Bernard, 2004). When quality education is examined from this perspective, whether provided in school or through other forms of learning, then the process is expected to lead to the acquisition of knowledge, skills, and attitudes that will ultimately lead to the achievement of important human goals (Laderriere, 1997). Verspoor (2005) confirmed this view that the quality of education is measured primarily in terms of learning outcomes.

The question of quality of learning is acutely raised in Senegal, as the Senegalese education system is still facing major challenges. Despite major investments made by the State and its technical and financial partners, the performance of the education system remains below the proclaimed aspirations. Internal efficiency remains a challenge, with a GER in elementary school of 86.4%, a completion rate of 59.8%, a repetition rate of 3.68%, and a dropout rate of 10.61% (DPRE, 2018).

Quality is even more worrying as the Jàngandoo barometer in 2016<sup>4</sup> revealed that only 20% of the students reach the appropriate bar, particularly in the core subjects of reading and mathematics. It is therefore imperative to act on 80% of students to give them the chance to continue learning and

become autonomous and useful citizens, and to strengthen the quality of the country's human capital. The current context of the Senegalese education system is marked by the failure to maximize existing resources for the improvement of school performance. These resources include learning time, teaching methods, and teaching aids.

Faced with this situation, remedial action seems to be the major way to combat school failure and reverse the current trend. This is more so since repetition, long considered as the main solution for pupils with difficulties, is increasingly decried as being associated with a loss of resources (DPRE, 2018). Empirical studies on the effectiveness of repetition show that it is ineffective for many reasons (deterioration of self-image, loss of self-esteem, and stigmatization). In fact, it makes it possible to break with the "generalist" approach, which does not sufficiently consider the specificities of learners and their differentiated needs. However, remediation is well inscribed in the timetables (with 4 hours per week [2 hours on Tuesdays and 2 hours on Thursdays]) as well as in the contents of initial and in-service teacher training, but it is not systematic.

Nevertheless, there is a deficit in terms of studies that capitalize on remediation experiences and their impact on learners' performance. Generally, the literature on the impact of remediation in children's performance at school in Africa is relatively limited. Based on a case-control study, Khattala and Bouali (2019) showed the positive impact of a pedagogical remediation program focused on strengthening reading skills among fifth-grade pupils in two public schools in the city of El Aioun Sidi Mellouk in Morocco. The remediation program, conducted by the authors themselves, consisted of forty-five-minute sessions per week during school time. Students were organized in each school into two groups (one experimental and one control) of seventeen students each, for a total of sixty-eight students. The dimensions assessed at the beginning and at the end included "accuracy of reading the text," "time of reading the text in seconds," "accuracy of deciphering logatoms," and "accuracy of deciphering regular words." Following the implementation of the program, the authors show that the score for "Reading accuracy of text" increased from 72.7% to 79.9% (an increase of 6.7%) in the group of children with "French decoding deficits." Among other children, this rate rose only from 73.09% to 75.26% (+2.17). Similarly, in terms of "accuracy of deciphering regular words," the score for children who benefited from the initiative rose from 29.85% to 65.71% (+35.86%); compared to 32.32% to 41.18% (+8.86%) among the others. In the other two dimensions assessed, the rate of progress is much higher for children who have benefited from remediation than for others.

James and Folorunso (2012) analyzed the "effects of feedback and remediation as instructional strategies on junior secondary school students'

achievement in mathematics” Akure South Local Government Area of Ondo State in Nigeria. Based on a sample of 240 students selected in three schools, they compared three models for monitoring children in mathematics (one model by school): “formative Test with Feedback and Remediation, Formative Test with Feedback only and Formative Test without feedback and remediation which served as control” (James & Folorunso, 2012, p. 1). From a rather macro or structuring perspective, Oduro-ofori et al. (2014) showed that remedial schools make a significant contribution to the Ghanaian education system. The authors worked on data from 120 remediation facilities, even less recognized and supported by the government, in a quantitative and qualitative approach. To this, they added data on teachers, school principals, and local inspectorates. The authors conclude that remedial schools contribute significantly to development in a variety of ways in addition to adequately preparing their students. It emphasizes that these schools provide a remarkable opportunity for low-performing secondary school students as well as those who have dropped out or are working to continue their education.

Thus, the literature is unanimous: remediation strengthens the capacities of students who encounter difficulties and, beyond that, strengthens the education system of countries. Only the abovementioned studies have dealt with small enrollments and only concern one discipline, namely reading or mathematics. Our study is characterized by the large number of children on the one hand, and on the other hand, by the large number of children in the two disciplines.

## **THE ELEMENTARY REMEDIATION PROGRAM**

### **ERP's Overview**

Supported by the Dubai Cares Foundation, the “Mainstreaming Continuous Assessment and Remediation in the Education System of Senegal (ERP)” was implemented by LARTES-IFAN in partnership with the Ministry of National Education of Senegal. The ERP is a formative evaluation aimed at accurately identifying the difficulties encountered by learners in reading and mathematics in all levels of elementary (primary) education. A strategy based on a participatory approach has been implemented with a strong involvement of academic authorities at central and local level, the Ministry of National Education, Inspectorate of Academy (IA) at regional level, and Inspectorate of Education and Training (IEF) at district level. It involved also the local authorities and communities.

The ERP started on January 2018 and concerns three academies (regions) within fourteen of the country: Academies of Kaffrine (in 2018–2019), Kolda

(in 2019), and Matam (in 2019). The three regions were selected based on their low results compared with the other regions of the country according to the results of the barometer on the quality of learning in Senegal “Jàngandoo” (LARTES-IFAN, 2017). According to the barometer, all the three regions performed well below the national average in both reading and mathematics. The success rates of Kaffrine, Kolda, and Matam in reading are 6%, 10%, and 6%, respectively, while the national average is 16.4%. Similarly in mathematics, the success rate is 7% for Kaffrine, 9% for Kolda, and Matam against 20.3% for the national average. The program targeted all the districts in each region.

The ERP is based on a digital strategy combining a teaching platform on tablets and computers and a real-time monitoring system. The digital platform allowed to centralize all teaching resources and to monitor in real time the level and time spent using these resources per school. It also permitted real-time data collection on the performance of the children.

The program also developed a body of physical pedagogical resources to address the unavailability of electricity in some schools.

The PRE’s stakeholders at the national level are:

- The Department of Elementary Education (DEE) which ensures supervision to comply with institutional guidelines and ensure alignment with the activities of the Ministry of National Education.
- The “Institut National d’Etudes et d’Actions pour le Développement de l’Education—INEADE” (i.e., National Institute for Studies and Actions for the Development of Education) is responsible for supporting all aspects of evaluation, research, and the production of teaching materials.
- The Training and Communication Department (DFC) at the Ministry of Education is jointly responsible for training and institutional communication.
- The Division of Arab Education (DEA) at the Ministry of Education is responsible for supporting the activities for improving Arabic language education.

The local partners were:

- In the implementation of the PRE, the Academy Inspectorates (IA) designate a focal point who acted as a contact point between the IA, the Education and Training Inspectorates (IEF), the mayor of the Commune and the Program Coordinator at LARTES-IFAN’s level. Then, the IA participated in the selection of community remediation officers. In addition, the IA assisted LARTES-IFAN’s team in the execution of all field activities (training, evaluation, monitoring, and capitalization). In addition, IAs

were committed to developing mobilization and advocacy actions using the results shared with families.

- The mayor of each commune appointed a focal point who will act as an interface between the IEF, the mayor, and the program coordinator at LARTES-IFAN. Not only did the coordinator participate in the identification and selection of community remediation officers but also committed to provide support to them at the end of the PRE for the continuity of the project. Also, ERP mobilized Parent Associations (1 by school); School Management Committees (1 by school) and “Neighborhood Councils” (1 by school).

### *Teaching Material*

The teaching materials are composed of guides in reading and mathematics, picture boxes, letter labels, words, and so on. Computers have been made available to centers with electricity. Also, tablets (with Internet access) for the school principals' follow-up. In addition, after the pilot phase, LARTES-IFAN made a revision during the first year 2018 of assessment tools and pedagogical resources considering the lessons learned from the beginning. Hence, assessment tools and pedagogical resources have been revised and a new format of the platform has been developed. The digital strategy has been then readjusted.

### *Schools' and Classrooms Selection*

ERP targeted only public (government) schools at elementary (primary) level. Overall, seventy-six schools were involved, including thirty-four in Kaffrine, twenty-six in Kolda, and sixteen in Matam<sup>5</sup> (table 5.1). Around sixty-two schools were using French as the language of instruction and seven were Franco-Arabic schools. The selected schools are in ten “Education and Training Inspectorate—IEF” (i.e., Districts); four in Kaffrine (Kaffrine, Malem Hodar, Koungheul, Mbirkelane); three in Kolda (Kolda, Velingara, Médina Yoro Foula); and three in Matam (Matam, Ranerou, Kanel).

The selection of schools is done by the local education administration (Education and Training Inspectorates) based on three main criteria: (1) having at least 600 students and 12 classrooms; (2) a balance between urban and rural areas; and (3) power availability. In a school, ERP concerns all classrooms from CP (second year of primary) to CM2 (sixth year of primary). However, in Kolda, some teachers integrated the first year (CI) as they should do remediation even at that level. Before starting the activities, in each academy, training sessions were organized by LARTES-IFAN experts. As a result, 912 teachers (20% were women), 76 schools directors (8% were women), and 152 community-based remediation officers (20% are women)

**Table 5.1** Distribution of Schools, Classes, and Teachers by Region

	IEF*/ District	Schools			Human Resources Trained and Involved		
		French Only	Franco- Arabic	Total	Teachers	Directors	Remediation Officers
Kaffrine	Kaffrine	9	1	10	105	10	20
	Malem	7	2	9	73	9	18
	Hodar						
	Koungheul	5	1	6	43	6	12
	Birkelane	7	2	9	79	9	18
Kolda	Kolda	13	0	13	214	13	26
	Velingara	11	0	11	139	11	22
	M.Y. F.**	2	0	2	30	2	4
Matam	Matam	5	1	6	38	6	12
	Ranerou	1	0	1	7	1	2
	Kanel	9	0	9	60	9	18
<b>Total</b>	<b>10 IEF</b>	<b>69</b>	<b>7</b>	<b>76</b>	<b>788***</b>	<b>76</b>	<b>152</b>

\*Education and Training Inspectorate

\*\*Médina Yoro Foula

\*\*\* 294 (37.3%) are women

had been trained. This data is captured in table 5.1. Inspectors are trained to be familiar with evaluation and remediation tools and practice them in monitoring tasks. The training of the other stakeholders (teachers, principals, and remediation facilitators) aimed to take ownership of the content of remediation tools and apply them in remediation activities. The contents of the training were (1) assessment and remediation strategies (analysis of mistakes made and implementation of effective remediation strategies); (2) mastery of computer applications; and (3) monitoring and support systems.

#### *Children's Selection and Classification*

For the selection and classification of children who need remediation, a positioning test (baseline) was done at the beginning to identify the students who faced difficulties and identify accurately their gaps to subsequently classify them into homogenous need groups for the implementation of dedicated remediation activities. According to their results in the baseline, children in need of remediation were classified into three groups (levels) in reading and mathematics. In reading (French or Arabic), children are divided into the three groups:

- Reading/Beginner level: Child who does not master the alphabetical principle (letters, sounds, syllables, words).
- Reading/Intermediate level: Child with problems with fluency.



**Table 5.2 Number of Students (Direct Beneficiaries) Par Region Et Gender**

	<i>Girls</i>	<i>Boys</i>	<i>Total</i>	<i>% Girls</i>	<i>% Region</i>
<b>Kaffrine</b>	4,838	3,362	8,200	59.0	19.3
<b>Kolda</b>	11,745	9,600	21,345	55.0	50.3
<b>Matam</b>	7,601	5,277	12,878	59.0	30.4
<b>Total</b>	<b>24,184</b>	<b>18,239</b>	<b>42,423</b>	<b>57.0</b>	<b>100.0</b>

- Reading/Fairly good level: Child who has problems with problem solving.
- Mathematics/Beginner level: Child who has problems with number knowledge and simple operations.
- Mathematics/Intermediate level: Child who does not master practice operations.
- Mathematics/Fairly good level: Child who has difficulty solving problems.

ERP targeted 42,423 pupils (i.e., 98.2% of 43,200 targeted) including 57% of girls (table 5.2). Half (50.3%) of students are from Kolda Academy; 30.4% from Matam, and the remaining from Kaffrine (data are detailed in Appendix 1). Furthermore, Kaffrine and Matam Academies were among the target regions of the “Reading for All” Program initiated by the Government of Senegal in partnership with United States Agency for International Development (USAID). This program focused on reading by using local languages as a teaching medium. The activities of the “Reading for All” started in some CI (first year of primary) and CP (second year of primary) of some schools. Given that, to avoid duplication effort, ERP avoided the CIs and CPs in schools Matam targeted by that initiative (see Appendix 1).

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*Community-Based Remediation Officers Selection*

Community-based remediation officers (called also Remediators), two by school, were first identified by the communities. After the LARTES team had explained the purpose of the program to them, the communities determined the literate people available and able to carry out the remediation activities properly. Candidates were expected to be highly motivated and can listen, especially to children. The inspector then analyzed the proposed list and submitted the final list of successful remediators. Finally, the latter underwent training on all the program’s teaching, evaluation, and monitoring-evaluation tools.

*Flow of Remediation Activities*

The remediation activities are done during the class period: from March to June the first year (2018), and from December 2018 to start of June 2019

in the second year (2019). In sum, it ran from March 2018 to start of June 2019. The rest of June and July are avoided because they correspond to rainfall in Senegal and children are no longer available. In addition, this is a period set aside for school exams and the teachers unavailable (mobilized to supervise and correct the tests). Furthermore, students who have already passed their exams no longer feel the need to come to school.

In each school, a classroom was dedicated to remediation activities where the children, gathered by need groups, led by a pair of remedial teachers in reading and mathematics. Remediation courses were conducted at school or in the household. At the school, it was done by regular teachers every Tuesday and Thursday afternoon (on days and moments scheduled in the official timetable by the minister of education) for at least 2 hours by session. On the other hand, community remediators conducted their activities in households, with mutual agreement with parents, outside school hours, three times a week for 2 hours and two months per cohort. However, if they were not using the same moment, teachers and remediators used the same tools. It should also be noted that the remediators had longer training than the teachers since the former were not regular teachers.

Students of level 1 were grouped in a cohort of twenty students and were looked after by a pair of remediators for two months. Pupils with difficulties at levels 2 and 3 were taken care of by the teachers. In reading, the pupils learned, according to their level, letters/sounds, words, a simple text. In mathematics, they were helped in knowledge of numbers and order, operations, and simple problem solving. Then, after two months, following an evaluation made by the teacher and on the basis of his track record, if a student no longer had any shortcomings, he/she left the program and a new student replaced him/her in the program. Student's performance was monitored continuously and evaluated monthly. Performance monitoring sheets for each student were developed and provided to remediators and teachers. Each sheet contained a list of students by level, their performance in the placement test, the class they attend, their performance at the end of the month, the number of sessions attended, and so on. The summary of these sheets was made by the director and communicated to the parents and the focal point inspector. This sheet facilitated decision-making for changing from one level to another. Also, monitoring and control by the inspection bodies and LARTES-IFAN's team was done in real time (successively from May to June 2018 and from December 2018 to July 2019). Student performance was systematically collected and analyzed to monitor progress. At the end, another assessment is done to see the progress of the children. The students' performances were also shared with all the stakeholders in the three academies.

### *Monitoring the Effectiveness of Remediation*

Monitoring the effectiveness of remediation was ensured by the director of school, as focal point was responsible for monitoring the effectiveness of remediation. The director planned for the remediation days and reported on the progress of the activities. The monitoring inspector prepared the monthly report and sent it to LARTES-IFAN. Also, ERP designed a Monitoring of Remediation by the Management Committee (MRMC) which served as an interface between the school and parents. Its main role was to inform parents of the progress of remediation activities and monthly meetings to share results. The MRM follows up on the remediation and certification of the quality of the services provided.

### *Challenges Encountered*

Teachers, it was noted, had difficulties in some schools, which justify the organization of additional capacity-building sessions for those who needed them. The instability of the Internet connection was deplored in some localities. However, it did not prevent the implementation of remediation activities as physical resources were available in all schools. However, an offline accessible version of the tools should be considered in the future, which would not only ensure that the attractiveness of the IT tool for children is always maintained but also that the remediation course is carried out. Finally, the low number of children in schools in some localities (Matam in particular) had led to the reorganization of the target schools. Also, the disruptions caused by teachers' strikes and end-of-year examinations and the arrival of rainy season, which had impacted on the time and deadline allocated to the implementation of remediation activities.

## **METHODOLOGY AND DATA**

The data used in this study comes from ERP and collected and analyzed by the authors and other researches of LARTES-IFAN. They relate to the results achieved by all of the following children by the program. In order to evaluate the evolution of the children's performance, and thus the main impact of the remediation activities, a placement test (baseline) was carried out at the beginning of the program; and a final test (endline) at the end of the program. Both baseline and endline tests are in in reading and mathematics.

The duration of remediation classes was not the same for all children. On the one hand, those who showed significant improvement after two months left the program. On the other hand, the duration of the program was not the

same in the three regions and schools. Specifically, the remediation lasted 6 months in 28 schools in Kaffrine, called “1st generation—2018”; and 4 months for the other 48 schools called “2nd generation—2019” (with 6 in Kaffrine, 26 in Kolda, and 16 in Matam).

The development of the pedagogical tests was based on a scientific process in accordance with international standards for the evaluation of school performance. The pedagogical tests were standardized and made it possible to situate the levels of pupils’ academic performance according to the class they attend in primary school. To ensure comparability between the placement test and post-test assessment, the same tests were administered individually to all students in the target schools. The evaluation of the tests was carried out on numeric tablets within the schools by a team dedicated to this task.

The pedagogical tests include a reading test and a math test. Overall, the reading tests indicate whether students can identify words and understand what they read, whereas the math tests indicate whether they have mastered number knowledge, the meaning and practice of the four operations, and simple problem solving. Table 5.3 shows the skills measured in the two assessment areas.

Tests were administered in French and Arabic depending on the type of school the student attended. Pupils attending French-language schools, which were the majority, were tested in French, whereas those attending French-Arabic schools were tested in Arabic. Tests in both languages have the same level of difficulty and linguistic equivalences were respected.

The results obtained from the placement test made it possible to classify the children into three groups of need for each discipline. To sum up, the first group is composed by pupils with very inadequate, the second by pupils with moderate difficulties, and the third group by fair performing pupils and those with some difficulties. Subsequently, depending on the difficulties encountered, the cohort of students assessed in the placement test participated in targeted and personalized remediation activities, which are operationally implemented by teachers and community remediators over a period of four

**Table 5.3 Evaluated Components in Reading and Mathematics**

Reading	<ul style="list-style-type: none"> <li>• Recognition and reading of letters of the alphabet, sounds, syllables, and words</li> <li>• Reading fluency</li> <li>• Reading and understanding</li> </ul>
Mathematics	<ul style="list-style-type: none"> <li>• Sorting</li> <li>• Elementary operative practice</li> <li>• Problem solving</li> </ul>

to six months. At the end, a post-test was organized to measure the effect of the remediation activities carried out.

Out of the 42,423 pupils who benefited from the program, our analysis covers 20,869 children<sup>6</sup> (49.2% of the beneficiaries and 57.2% of whom were girls) who were tested at the time of the final evaluation. Their profile is presented in table 5.4. In the next section, we analyze the evolution of the proportion of children who passed the test in reading and mathematics at the beginning of ERP and at its end. If accurate, we present the results by gender, regions, and languages used during remediation.

## RESULTS

The results of the two tests show that a large proportion of students who had difficulties in reading and mathematics during the placement test improved significantly their proficiency in both disciplines attributable to remediation activities. The evaluations show that only 16.9% of students mastered basic reading skills during the placement test, compared to 42.8% after remediation corresponding to an increase of 25.9% points. In mathematics, the results were more satisfactory, going from 48.1% to 88.3%, which represents an increase of 40.2% points. In other words, most students (88.3%) now have the basic skills in mathematics. When disaggregated by gender, the results for boys and girls do not show significant differences in the two tests. In the starter test, the results of boys and girls represent about 17.0% in reading compared to 50.6% for boys and 46.3% for girls in mathematics at the endline. While about 43% of both sexes have mastered basic reading skills after remediation activities, almost 88% have now mastered the fundamental knowledge in mathematics.

The proportion of students who obtained the maximum score (those who passed all the test exercises in both disciplines) increased significantly after the completion of the remediation activities. In reading, the proportion of students with the highest score increased from 3.4% to 17.6%. In mathematics, this figure ranged from 6.8% to 27.2%. Also, the proportion of students with zero scores significantly reduced from the baseline to the endline. At the baseline, 15% and 20.8% of students had a score of zero in reading and mathematics, respectively. These rates dropped to almost 3% in both subjects after remediation. These observed numbers show that only a small proportion of students still had serious difficulties in both areas of evaluation after ERP.

The results show that there is a marked improvement in performance at each of the three academy inspections, whether in reading or mathematics. The Kolda region registered the highest performance, followed by Matam and Kaffrine. Kolda's score increased by 28 points in reading and 49 points in

mathematics; the Matam achieved a performance gain of 27 points in reading and 44 points in mathematics; and 20 and 19 points, respectively, in the two disciplines for Kaffrine.

At the IEF level, Kolda's IEF registered the best performance with a leap of 50.2% points in reading and 32 points in mathematics, followed by IEF of Medina Yoro Foullah with a leap of 43 points in reading and 35.4 points in mathematics. The least performance was recorded in IEF Birkilane with an increase of 8.1 points in reading and 14.4 points in mathematics and IEF Kougheul with an improvement of 14.3 points in reading and 25.1 points in mathematics. However, it should be noted that very significant progress was observed in all IEFs in both disciplines.

Regarding learning languages, the results show that students in Franco-Arabic schools demonstrated better performance than their peers in French schools in reading, given that these schools do not study mathematics in the school's evaluation language. In fact, the results indicate that 53.9% of Franco-Arab students no longer had difficulties in reading at the endline, whereas this percentage was 29.9% before the start of remediation activities, an increase of 34 percentage points.

Another finding is that the program has been particularly effective for students in junior and senior grades of elementary school (5th and 6th levels respectively named "CM1" and "CM2") in both disciplines. For example, the results show that 67.9% of CM2 students no longer have reading difficulties compared to 34.6% before the start of remediation activities (an increase of 21.3 percentage points). This result is even more satisfactory in mathematics as 96.2% of students now master the basic skills in mathematics, while this percentage represented 58.4% before the implementation of remediation activities (an increase of 38.8 points).

## DISCUSSION

The results indicate that improvements have been observed in all the schools in the program and in all levels of learning in both subjects, with a predominance of mathematics performance. These results clearly show the positive effects of ERP on student performance. Indeed, significant progress has been made in both disciplines and at all levels of learning after the implementation of remediation courses. These are very encouraging results despite the relatively short duration of implementation of remediation activities that was 6 months in 28 Kaffrine schools and 4 months in 48 schools of other academies (Kolda and Matam).

These results were possible due to a relevant pedagogical strategy and the involvement of all stakeholders. The pedagogical content was developed by

experienced education inspectors and then shared and discussed with teachers for improvement. The use of computers, making learning more fun for children, was a key factor. The respect of the remediation timeline and their format (at home or at school depending on whether the activities are conducted by the teacher or the remediator) was also important. Children with learning difficulties are motivated and involved in remediation activities. On the other hand, data on students' performance were available in advance and used for the conduct of remediation activities. So, monitoring and control by the inspection bodies and LARTES-IFAN's team was done in real time. Student performance was systematically collected and analyzed to monitor progress and to identify weaknesses that needed to be addressed.

On the other hand, ERP developed a huge capacity-building program for all stakeholders especially regular schoolteachers, school principals, and pre-meditators; and this contributed positively to the observed results. The sustainability of the business is a major challenge, so the large investments made must pay for themselves. The partnership protocols signed with the local authorities must be revitalized in order to maximize their contributions for an extension of the network of enrolled schools. If it is not extended to the whole country, ERP should urgently concern three other regions among those most affected by learning difficulties (Kaolack, Tambacounda, and Kedougou). It remains that a strong advocacy at the Ministry of National Education level for the mainstreaming of elementary remediation is needed.

Comparability between the placement test and the post-remediation test could be refined if a control group was available at the outset. This would make it possible to isolate the real effect induced by remediation activities. Furthermore, it would have been very useful to understand why some children did not see significant improvement in their results despite remediation. These failures indicate that there are factors that need to be considered for remediation to be a more powerful factor. Its extension therefore calls for adjustments, readjustments, and deepening. Additional information, for example on children, their households and learning conditions, should have been collected and cross-referenced with the results to better understand the failures.

## CONCLUSION

The search for quality education is currently a major challenge for Senegalese education system. The LARTES-IFAN implemented the "Elementary Remediation Program (ERP)." The ERP was a formative evaluation aimed at accurately identifying the difficulties encountered by learners in reading and mathematics in all levels of elementary (primary)

education. A strategy based on a participatory approach was implemented with a strong involvement of academic authorities at central and local level (Ministry of National Education, IA at regional level, and Inspectorate of Education and Training at district level). It involves also local authorities and communities.

The main goal of the ERP was to develop a systematized assessment and remediation program based on a digital application to improve student performance in reading and mathematics in French and Arabic. The ERP started in January 2018 and involved three Academies (Kaffrine, Kolda, and Matam) which were purposively selected because they recorded the lowest scores in mathematics in the country according to the results of the Barometer on the quality of learnings in Senegal done by the LARTES-IFAN (2017).

ERP organized assessments before and after remediation. The first was used as baseline for selection of students and classify them, based on their performance and their precise gaps, into homogenous groups which needed specific remediation activities. At the end of the program, a second evaluation was carried out with the aim of measuring the effect of the remediation activities carried out. Thus, elementary cycle students (CP to CM) in the 76 schools where the intervention took place were tested again in reading and mathematics. ERP reached 42,423 pupils, of whom 57% are girls, in 69 French schools and 7 Franco-Arabic schools, 788 teachers, 76 school principals, 21 education inspectors, and 152 community remedial teachers.

The results of the two tests show that a large proportion of students who had difficulties in reading and mathematics during the placement test significantly improved their proficiency in both disciplines thanks to remediation activities. While only 16.9% of students mastered basic reading skills during the placement test, 42.8% had good skills after remediation corresponding to an increase of 25.9 percentage points. Improvement in abilities was observed in both boys and girls in similar proportions. While at the beginning of the program almost all (95%) of the students were at level 1 (i.e., has major difficulties in basics of reading and mathematics), by the end only 3% of these students still had difficulties in mastering the alphabetic principle and the mathematical operation mechanism. All obtained good impacts result from a package of relevant main strategies in the pedagogical approach and activities workflow. The different stakeholders were also very motivated.

The appeal of digital technology for the pupils during remediation sessions has been instrumental in improving student performance. In addition to its attractiveness and the interactivity that digital technology introduces, it has also greatly facilitated the daily monitoring of the effectiveness of the ERP by the platform. The program's strong components on capacity-building activities for stakeholders especially regular schoolteachers, school principals, and remediators was one main key for its success.



## NOTES

1. The PSE is the general reference for the Senegalese government's economic and social policies up to 2035.
2. PASEC is carried out by the Conference of Ministers of Education of the States and Governments of the Francophony (CONFEMEN).
3. Called in French " Laboratoire de Recherche sur les Transformations Économiques et Sociales. "
4. The Jàngandoo assessment, initiated since 2012 by the LARTES-IFAN in collaboration with nongovernmental organizations in the fourteen regions of the country, consists of tests in reading, mathematics, and general culture to measure the performance of children aged nine to sixteen in households according to their choice of language: French or Arabic. Jàngandoo thus combines several types of data on the children and the households from which they come, as well as on their learning conditions.
5. At the beginning, the seventy-six schools are divided into forty in Kaffrine; eighteen in Kolda and eighteen in Matam. But during the program, some changes have been done to take account of field realities in order to reach as many children as possible (for example, in Kaffrine, there were fewer qualified schools than expected, and in Matam schools have smaller number of pupils).
6. Due to the fact that some students have completed primary school, as is the case for many CM (5th and 6th years of primary) students, and for other reasons (absences, dropouts, etc.), some students have not been tested in the post-test.

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