



United Nations
Educational, Scientific and
Cultural Organization

Santiago Office
Regional Bureau for Education in
Latin America and the Caribbean

Executive summary

ter**e**

The logo for the TER-E study, where the letter 'e' is replaced by a stylized graphic of a pencil tip and a ruler, with colorful segments in pink, blue, yellow, and orange.

THIRD REGIONAL COMPARATIVE AND EXPLANATORY STUDY

Learning achievements

LATIN AMERICAN LABORATORY FOR ASSESSMENT
OF THE QUALITY OF EDUCATION

————— **July, 2015** —————

Acknowledgments

This study has been a collective regional effort which has involved numerous teams, organizations, and regional and national authorities over the past five years. TERCE has been characterized by its consideration of the educational context of the region, and for having followed a model of participatory construction. The study has involved the participating countries in all decisions, stages of implementation, and activities conducted. Specifically, the countries played a key role in the design of the assessment instruments and in their application at the local level, with technical assistance from institutions and experts coordinated by OREALC/UNESCO Santiago. Using their respective realities as a basis, the countries have contributed to the development of the theoretical frame of reference, the curricular analyses, and the elaboration of items, only to name a few things.

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Executive summary

The Third Regional Comparative and Explanatory Study (TERCE) is an initiative of the Latin American Laboratory for Assessment of the Quality of Education (LLECE) in conjunction with its member countries. This study seeks to evaluate the learning achievements of third and sixth grade students, and identify the factors associated with those achievements. Thus, TERCE does not only intend to provide information with regard to the quality of education in the region. It is also focused on gathering information that enables the identification of factors that are associated with learning, and from this, generating inputs for decision-making, design, and the development of educational policies and practices.

Fifteen countries participated in TERCE: Argentina, Brazil, Chile, Colombia, Costa Rica, Ecuador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, the Dominican Republic, and Uruguay, as well as the Mexican state of Nuevo León. More than 67,000 students in third and sixth grade were evaluated in different academic disciplines: reading, writing, mathematics, and sciences (the first three in both grades, and natural sciences only in sixth grade). In addition to the exams, a series of context questionnaires was applied (to students, families, teachers, and principals) to gather information about the factors associated with learning, and in this way provide the explanatory dimension of the study.

The referential framework of the exams is constituted by the academic curricula of the participating countries. In order to develop this framework, an update of the curricular analysis of the second study (named SERCE) was conducted, establishing the teaching focuses of the four areas evaluated in the participating countries and the definition of the thematic axes and cognitive processes that would serve as a foundation to delineate the specifications of the exams.

The results regarding learning objectives provided by TERCE are presented based on two types of information. On the one hand, the results associated with the average scores from each country, as well as their respective standard error, are provided. On the reading, mathematics, and natural science exams, the mean of the scale was fixed at 700 points, and the standard deviation at 100 points, corresponding to the mean and standard deviation of the countries analyzed. On the writing exams, results are measured on a scale of 1 to 4 points, which correspond to the rubric levels used to correct the texts produced by the students.

The second type of information is related to performance levels. This background information allows for the characterization of what students know and are capable of doing at each level, and the results delivered correspond to the percentage of students that are located at each of these levels. Three cut-off points were established in each exam, thereby creating four performance levels, from the lowest level of knowledge to a more advanced one, from I to IV.

In relation to scores, on each of the exams countries are distributed into three groups: those whose average is statistically equal to the regional average, those that have significantly higher scores, and those with significantly lower scores.

Countries that are consistently above the regional average on all exams and grade levels evaluated are Chile, Costa Rica, and Mexico. Countries that are in the same group in the majority of cases are Argentina, Uruguay, and the Mexican state of Nuevo León.

DISTRIBUTION OF COUNTRIES ACCORDING TO THEIR RESULTS AND THEIR COMPARISON WITH THE REGIONAL AVERAGE

Results		Distribution of countries in comparison with the regional average		
Subject Areas	Grades	Below the regional average	Equal to the regional average	Equal to the regional average
Reading	3rd	Guatemala, Honduras, Nicaragua, Panama, Paraguay, and the Dominican Republic.	Argentina, Brazil, Colombia, and Ecuador.	Chile, Costa Rica, Mexico, Peru, Uruguay, and the Mexican state of Nuevo León.
Reading	6th	Ecuador, Guatemala Honduras, Nicaragua, Panama, Paraguay, and the Dominican Republic.	Argentina and Peru.	Brazil, Chile, Colombia, Costa Rica, Mexico, Uruguay, and the Mexican state of Nuevo León.
Mathematics	3rd	Guatemala, Honduras, Nicaragua, Panama, Paraguay, and the Dominican Republic.	Colombia and Ecuador.	Argentina, Brazil, Chile, Costa Rica, Mexico, Peru, Uruguay, and the Mexican state of Nuevo León.
Mathematics	6th	Guatemala, Honduras, Nicaragua, Panama, Paraguay, and the Dominican Republic.	Brazil, Colombia, and Ecuador.	Argentina, Chile, Costa Rica, Mexico, Peru, Uruguay, and the Mexican state of Nuevo León.
Natural sciences	6th	Guatemala, Honduras, Nicaragua, Panama, Paraguay, and the Dominican Republic.	Argentina, Brazil, Ecuador, and Peru.	Chile, Colombia, Costa Rica, Mexico, Uruguay, and the Mexican state of Nuevo León.
Writing	3rd	Guatemala, Honduras, Nicaragua, Paraguay, and the Dominican Republic.	Brazil, Colombia, Ecuador, Panama, and the Mexican state of Nuevo León.	Argentina, Chile, Costa Rica, Mexico, Peru, and Uruguay.
Writing	6th	Colombia, Ecuador, Honduras, Paraguay, and the Dominican Republic.	Brazil, Nicaragua, Panama, Peru, and Uruguay.	Argentina, Chile, Costa Rica, Guatemala, Mexico, and the Mexican state of Nuevo León.

Another relevant aspect is the variability of the scores, which demonstrates the difference in student performance in each country and at the regional level. These results illustrate the grade in which performance is more heterogeneous or homogeneous among students. The results of TERCE reveal that there are countries with learning achievement results that, on average, can be very similar. To cite an example, Paraguay and Nicaragua on third grade reading. However, the results are different when the information is analyzed from the perspective of variability. On the same exam, Paraguay is one of the countries with the highest dispersion of results (most unequal), whereas Nicaragua shows results with lower variability (less unequal). This implies a challenge for the educational systems of the region, in that it requires an improvement in average learning and at the same time, an advance towards a more equitable distribution in those learning areas.

There are countries that on average obtain the best results, such as Chile, Uruguay, Mexico, and the Mexican state of Nuevo León, but that present a high variability of scores within the country. Or, in another scenario, countries such as the Dominican Republic, Costa Rica, Nicaragua, and Honduras, obtain lower scores on average, but their distribution of scores has a lower variability, meaning they have systems in which learning is distributed similarly among all students.

Results	3rd Grade Reading	6th Grade Reading	3rd Grade Mathematics	6th Grade Mathematics	6th Grade Natural Sciences
Scores associated with the 10th and 90th percentiles	573 and 830 points	574 and 832 points	573 and 832 points	581 and 834 points	575 and 831 points
Greatest variability observed	Paraguay, the Mexican state of Nuevo León, Mexico, and Peru.	Uruguay and Chile.	Brazil and Uruguay.	The Mexican state of Nuevo León, Chile, and Uruguay.	Chile and Uruguay.
Lowest variability observed	The Dominican Republic, Costa Rica, Nicaragua, and Honduras.	The Dominican Republic, Nicaragua, and Honduras.	Costa Rica, Nicaragua, and the Dominican Republic.	The Dominican Republic and Nicaragua.	The Dominican Republic and Nicaragua.

Nota: El puntaje asociado a los percentiles 10 y 90, indica el puntaje de los estudiantes que se ubican en el extremo derecho y el extremo izquierdo de la distribución de puntajes en cada materia. A mayor distancia entre estos dos puntos, mayor variabilidad en los desempeños de los estudiantes.

As indicated, the report includes the presentation of performance levels. These are an important contribution to an increased understanding of learning, given that they put the focus on those achievements that students demonstrate at each level, thereby establishing the learning outcomes of students at higher levels as desirable, that way providing information to teachers and schools in order to mobilize them all towards the attainment of these learning goals.

IN THE CASE OF **READING**, THE EXAM ASSESSES TWO THEMATIC AXES:

- 1 Text comprehension:** reading of continuous and discontinuous texts, from which an intratextual or intertextual work is done.
- 2 Metalinguistic and theoretical:** command of language and literature concepts, which implies focusing on language through the knowledge of its terms in order to recognize and designate properties or characteristics of texts and its parts.

AT THE LEVEL OF COGNITIVE PROCESSES, THE READING EXAMS WERE CONSTRUCTED IN ORDER TO ACCOUNT FOR THREE LEVELS OF TEXTUAL INTERPRETATION.

- 1 Literary comprehension:** abilities linked to recognition, that is, to the identification of explicit elements of the text and localization of information in specific segments of the text.
- 2 Inferential comprehension:** abilities linked, on the one hand, to comprehension, that is, to relating information present in distinct sequences of the text; and on the other hand, abilities linked to analysis, that is, to dividing information into its constitutive parts and establishing how they are related to one another and with the purpose and structure of the text.
- 3 Critical comprehension:** abilities linked to evaluation, that is, to assessing or judging the point of view of the narrator in the text, and distinguishing or contrasting it with other points of view as well as one's own point of view.

The results from **third grade reading** show that **61%** of students at the regional level are within performance levels I and II. Learning achievements in this area are related to the comprehension of familiar texts, where the fundamental task is to recognize explicit and evident information; as such, the main challenge is widening comprehension towards less familiar texts and where the student can establish relationships, and interpret and infer meaning.

The results of **sixth grade reading** show that **70%** of students at the regional level are within performance levels I and II. Learning achievements in this area are related with the comprehension of text based on explicit and implicit key elements, which enable making inferences regarding the meaning of the texts and their communicative purposes. The need to stimulate in children the ability to interpret figurative language expressions and strengthen knowledge of the components of language and their functions appears as a challenge.

IN THE CASE OF **MATHEMATICS**, THE TERCE EXAM EVALUATES FIVE THEMATIC AXES OR PROFICIENCIES:

- 1 Numerical proficiency:** meaning of the number and structure of the numbering system; interpretation of situations concerning representation and construction of numerical relations in diverse contexts; utilization of operations appropriate for the situation (addition, subtraction, multiplication, division, exponentiation, roots).
- 2 Geometric proficiency:** attributes and properties of bidimensional and tridimensional objects; translations and rotations of a figure, translations and rotations of the same figure

on a plane; notions of congruency and similarity between figures; designs and constructions of geometric bodies and figures.

- 3 Proficiency in measurement:** magnitudes, estimates, and range of these estimates; the uses of units of measurement, patterns, and coins.
- 4 Statistical proficiency:** use and interpretation of data and information; measures of central tendency; representations of data.
- 5 Proficiency in variation:** numerical and geometric regularities and patterns; identification of variables; notion of function; direct and inverse proportionality.

AT THE LEVEL OF COGNITIVE PROCESSES,
THE MATHEMATICS EXAMS CONSIDER THREE SKILL LEVELS:

- 1 Recognition of objects and elements:** identification of mathematical facts, relations, properties, and concepts expressed in a direct and explicit manner in the wording.
- 2 Solution of simple problems:** use of mathematical information that is explicit in the wording, referring to a single variable, and the establishment of direct, necessary relationships in order to reach the solution.
- 3 Solution of complex problems:** reorganization of mathematical information presented in the wording and the structuring of a proposed solution from non-explicit relationships, in which more than one variable is involved.

The results of **third grade mathematics** show that **71%** of students in the region are within performance levels I and II. Learning achievements at these levels are related with the identification of numbers and their ordinal properties, such as the recognition of basic geometric figures and the reading of explicit data in tables and graphs. Challenges in this area are related to solving problems that require the application of arithmetic operations, measurements, and geometric figures, as well as learning to interpret information that is presented in tables and graphs.

In the case of the **sixth grade mathematics** exam, **83%** of students at the regional level are within performance levels I and II. Learning achievements at these levels in this area are related with the ability to work with natural numbers and decimals in simple contexts and with the reading of explicit data in tables and graphs. The main challenges lie in the solving of complex problems (those that contain more than one variable), that involve operations with natural numbers, decimals and fractions, the calculation of perimeters and areas, and other aspects, such as units of measurement and data presented in tables and graphs.

THE NATURAL SCIENCES EXAM ALSO EVALUATES FIVE
THEMATIC AXES OR PROFICIENCIES.

- 1 Health:** knowledge of the structure and functioning of the human body.
- 2 Living beings:** recognition of the diversity of living beings, the characteristics of organisms, the identification of common patterns, and the classification of living beings based on certain criteria.

- 3 Environment:** interaction between organisms and the environment.
- 4 The Earth and the Solar System:** physical characteristics of planet Earth, the movements of the Earth and the moon, and their relation with observable natural phenomena; it also considers the importance of the atmosphere and the comprehension of some climatic phenomena.
- 5 Matter and energy:** elemental notions related to the general properties of matter: weight, volume, temperature, types of energy.

AT THE LEVEL OF COGNITIVE PROCESSES, THE SCIENCE EXAM CONSIDERS THE RECOGNITION OF INFORMATION AND CONCEPTS, AND THEIR COMPREHENSION AND APPLICATION. IT ALSO CONSIDERS SCIENTIFIC THINKING AND PROBLEM SOLVING.

The results of this exam, just like in the preceding cases, show that the majority of students (**80%**) at the regional level are at performance levels I and II. In terms of learning achievements, this implies the ability to interpret simple and familiar information in order to establish relationships and recognize conclusions. It also assesses achievements associated with knowledge of the classification of living beings and personal health care in everyday contexts. Challenges in this area must be focused on the development of scientific thinking, that is, the ability to formulate questions, distinguish variables, select pertinent information, and utilize scientific knowledge to understand one's surroundings.

IN THE FOLLOWING TABLE A SYNTHESIS OF THE RESULTS ACCORDING TO PERFORMANCE LEVELS IN EACH EXAM AND GRADE IS PRESENTED.

Exam		Percentage of students according to performance level			
Exam	Grades	I	II	III	IV
Reading	3rd	39.5	21.7	26.2	12.7
Reading	6th	18.4	51.5	16.5	13.7
Mathematics	3rd	47.2	23.3	22.1	7.4
Mathematics	6th	46.9	35.9	12.1	5.1
Natural sciences	6th	40.0	39.1	15.2	5.7

In summary, based on the results of performance levels in these exams, greater performance is observed in the area of reading in comparison to mathematics and sciences. In all disciplines it has been assessed that there are important challenges in promoting more profound and advanced learning achievements that help students in interpreting texts, solving complex mathematical problems, and developing scientific thinking to understand the world around them.

The **writing** exam has characteristics different than the other five exams. First, because it consists of a task in which the student must produce a text (a letter to a friend in third grade and a letter to a school principal in sixth grade); and also because to grade this text, an

analytical rubric was used that allowed for the assignation of performance levels to each of the aspects evaluated. This evaluation rubric is structured in three dimensions, and each one considers two or three specific indicators:

- 1 Discursive proficiency:** includes genre and purpose, sequence and adaptation to the instructions. In the case of sixth grade, adaptation is added to the examination.
- 2 Textual proficiency:** overall coherence, agreement, and cohesion.
- 3 Conventions of legibility:** initial literal spelling, segmentation of words, and punctuation.

The highest development in this area, both in third grade as well as in sixth grade, is linked to textual proficiency, that is, with elements of the internal structure of the text. In general, the texts produced by students are coherent (thematic continuity is assessed), with intra-sentence agreement and cohesion (appropriate grammatical order is assessed). However, the main challenge that arises from the results is strengthening the education of aspects that compose the discursive dimension of the text, or in other words, the capacity to produce texts that are appropriate for the communicative purpose and genre.

The TERCE study does not seek to place comparison between countries as a focus, but rather on the description of what students know and are capable of doing (according to curricular analysis that establishes learning goals), and on how individual students are distributed through the performance levels according to the learning goals. It is this view that can mobilize educational systems towards an internal improvement and not towards competition.

All of the above, complemented with the information gathered through questionnaires directed at different actors of the educational system provides decision-makers and the general public with an important input for encouraging the development of education and well-being in the countries within the region.

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