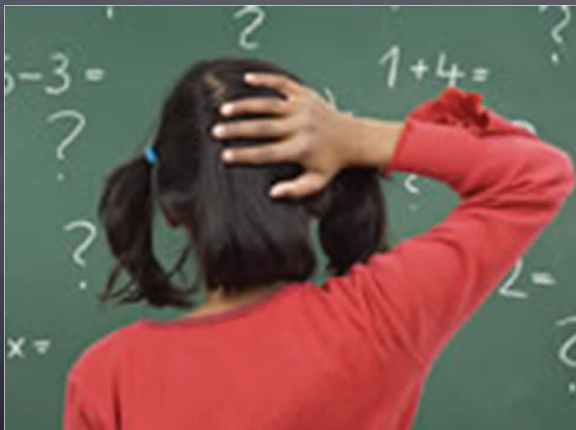


SUMMARY REPORT



An Even Start

Numeracy Education in Latin America and the Caribbean



On June 7, 2010, the Inter-American Development Bank (IDB) hosted an expert seminar in Washington DC entitled “An Even Start: Numeracy Education in Latin America and the Caribbean.” The seminar aimed to share some of the initiatives implemented under the IDB’s Numeracy initiative, which is focused on implementing policies to help children reach their full potential in mathematics and the natural science.

The seminar was attended by 60 education and evaluation specialists from 11 countries, representing government agencies in education, science and technology, the private sector, academia and non-governmental organizations. Eight experts gave presentations on the state of numeracy education, the challenges, and the results of efforts towards improving math and science education in Latin America and the Caribbean.

Accompanying the Equal Start seminar was an art exhibit with the same name, which included works chosen for their potential to raise awareness about numeracy education issues. The exhibit served as the visual launch of the IDB initiative.

The Event in
Numbers

over **60**
Individuals in attendance

2 Experimental evaluations
of innovative numeracy
programs

Evaluators and educators from **11** countries

24
Organizations
represented

250
Numeracy art pieces
in response to the call
for proposals

The Region is Facing a Profound Crisis in Numeracy Education

Marcelo Cabrol opened the seminar, explaining that “the Latin American and Caribbean region is facing a profound crisis in numeracy education.” The region is falling short of goals set by the national educational policies of countries in the region for proficiency in mathematics and science. Even after controlling for per capita GDP, students perform below students in OECD and East Asian countries on international standardized tests. The Latin American countries participating in the secondary education Programme for International Student Assessment (PISA) and in the Trends in International Mathematics and Science Study (TIMSS) are all among the weakest performers. These meager student outcomes are the result of both a lack of teachers with a background in mathematics and natural science, and of outdated curricula and pedagogical models.

“These problems cannot be resolved using simple short term fixes,” said Marcelo Cabrol. Therefore, the Bank has launched a Numeracy initiative involving long term investment in: pedagogical models that are engaging; mathematics and science teachers, developing their content knowledge and pedagogical practices; and assessment systems that adequately reflect the outcomes and objectives to which we aspire with regard to numeracy education.

The IDB has launched a Numeracy initiative that spans from preprimary and primary education through secondary and tertiary education, said Cabrol. At the pre-primary level, the focus is on the development of early numeracy skills, including counting, order, dates and shapes. At the primary level, our focus is on Quantitative Literacy to help primary aged children to reason quantitatively, and demonstrate some understanding of the scientific method and acquaintance with achievements in science. To achieve measurable improvements in student learning at the secondary level, we focus on the development of lifelong numeracy skills for transition to working life or further studies. At the tertiary level, the focus is on developing a future supply of scientists, mathematicians, and engineers that can help improve our societies and the competitive edge of the region’s economies.



Marcelo Cabrol

**Chief of the IDB
Education Division**

The Quality of Numeracy Education in Latin America and the Caribbean Merits Serious Questioning



Gilbert A. Valverde

Chair of the Department of Educational Policy and Leadership at the State University of New York at Albany

Professor Gilbert Valverde, of the Department of Education Policy and Leadership of the State University of New York at Albany, painted a stark picture of the state of numeracy education in the region. Based on data from national and international assessments Valverde showed that the region has made almost no progress in improving student learning in numeracy, including both mathematics and natural science.

Research on opportunities available for students to learn numeracy in Latin American and Caribbean countries paints a daunting picture. “Students have inadequate opportunities to learn demanding content in numeracy, due in no small part to the limited proficiency of their teachers in mathematics and science. Classrooms are characterized by rote learning of routine computational operations or rote memorization and regurgitation of facts, often with little or even erroneous teacher feedback for students,” explained Valverde.

Although many governments recognize the importance of numeracy education, such recognition has rarely resulted in concrete, workable goals. “The most common area of activity in ministries of education is efforts at curriculum reform, but such efforts are justified almost exclusively on philosophical or ideological grounds and are typically done with no reference to research evidence.”

We Seek to Remove the Teacher from the Center of the Class, and Make Group Inquiry the Motor of Learning

The *Hagamos Ciencia* program was created by the Panamanian government in response to the disappointing math and science test scores of 500 teachers. “To our surprise we found that science teachers scored as low as teachers of humanities on math and science tests. Starting from the premise that you cannot teach what you do not know, we understood that the program we had to implement in the country could not be limited to students, but had to work with the teachers and seek their training.”

Together with the IDB, National Secretariat of Science Technology and Innovation (SENACYT) designed and launched *Hagamos Ciencia*, to provide educational materials to children and trains teachers in child-centered approaches. Today, the program benefits 79,485 students and 3,200 teachers in 9 of the 15 regions. Results of the evaluation indicate in learning improvements among third graders nationwide, and among students in other grades in some regions. A qualitative assessment to help explain the quantitative results is pending. “Long term, we seek to remove the teacher of the center of the class, and make inquiry the motor of learning,” said Talavera.



Marissa Talavera

Director of Innovation and Learning at SENACYT Panama

Experimental Education in Mathematics and Science in Argentina



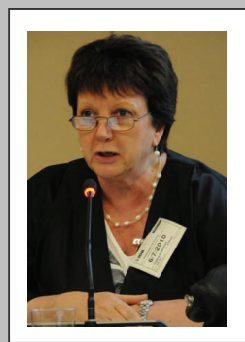
Nora Bahamonde
Coordinator of Science
of the Ministry of
Education in
Argentina

The National Ministry of Education in Argentina and the IDB are implementing a Program for Improving the Quality of Natural Science and Mathematics Education in 240 schools in the provinces of Tucumán and Buenos Aires. Project Coordinator Annie Mulcahy, explained that the beneficiaries include 670 teachers and 18,000 fourth grade students from socioeconomically disadvantaged backgrounds. Graciela Chemello and Nora Bahamonde of the National Ministry of Education, and Ines Dussel of Sangari Argentina presented three pedagogical models that are being tested in the pilot project: the Scientific Literacy Program (CAP), Science and Technology through Creativity (CTC), and Mathematics for All. All three models are inquiry based, with students developing the procedures to investigate teacher selected questions.



Annie Mulcahy
Project Coordinator
of the Ministry of
Education in
Argentina

The evaluation was experimental, with random assignment of schools to four different groups: CAP, CTC, Mathematics for All and a control group that received no special treatment. The Director of the International Institute for Educational Planning (IIEP) of UNESCO, Margarita Poggi, presented the qualitative results of the evaluation, indicating that all three models were well received overall and that they improved student outcomes. However, after one year of treatment, limited changes have been made in teacher discourse and changes in methodology need to be consolidated. “You can see improvement in all areas of evaluation of students,” said Poggi.



Margarita Poggi
Director of
IIEP-UNESCO

Pedro Ravela, Professor of the Catholic University of Uruguay presented the quantitative results, which show some encouraging progress in student learning after one year of treatment. Ravela cautioned that what may at first seem to be slow improvement in student performance is actually reasonable progress, in view of the international research on processes for changing education. “It is logical to expect a more substantial improvement, when the program is applied over a longer period,” concluded Ravela.

The Bank is very proud to be part of this initiative, and will do everything in its power to make this effort succeed and have a lasting impact on the lives of young Argentines.

Science Fairs Help to Incorporate Scientific Inquiry into the School Curriculum, Promoting Public and Private Collaboration



Javier Firpo
Manager of
Education Programs
at Intel

“My son Tomás is one year old. That means that in twenty years he will enter the working world,” said Education Programs Manager Intel, Javier Firpo. “According to recent studies, we know that the best paid jobs in the future labor market will be jobs that do not exist today, and jobs that most likely involve a large amount of technology. What can we do to make sure Tomás is competitive in the world of tomorrow?” Firpo said. “Low enrollment in academic programmes in the natural sciences in Latin America is a direct result of the poor quality of education during primary school years. In my case, the decision to study law had much to do with the fact that my teachers were never able to awaken in me an interest in the natural sciences,” Firpo said.

While it takes a combination of tools and strategies to improve the teachings of mathematics and the natural sciences, “it is clear that the Science Fairs are a powerful tool” Firpo said. Fairs are an opportunity to set student free from the monotony of the classroom and give them a chance to apply their knowledge, but this is only the most obvious effect. Other are equally positive: science fairs help assimilate scientific research into school curriculum, promote partnerships of public and private sectors, provide showcases for outstanding students and bring science to the front pages of newspapers.

Supporting only the Best and the Brightest in a Few Elite Schools is “Missing the Boat”

From the perspective of Kei Kawabata, Manager of the IDB Social Sector Department, Numeracy Education is an “under-discussed issue in Latin America and the Caribbean.” In today’s knowledge-based societies, understanding basic mathematical and scientific concepts and theories and the capacity to structure and solve scientific questions is more critical than ever. Mathematics and science skills that in the past were only required by a few are now necessary to seek any kind of employment in today’s global economy. Poor mathematics and science skills are not only a challenge for the individual in functioning effectively in the modern society, but also constitute a major economic cost in terms of lost productivity and international competitiveness.

Against this background, it is clear that supporting only the best and the brightest in a few elite schools is “missing the boat” said Kawabata. Students of all backgrounds must have the opportunity to improve their numeracy skills to spur on more development in the area. The goal must be to bring numeracy education to all young people in the region, to give each student a chance to develop an understanding of the major explanatory themes of mathematics and science; and to enhance every student’s ability to engage with issues confronting contemporary society.



Kei Kawabata
IDB Manager of
Social Sectors

“When a child is born, you don’t know if they will be the next Einstein”

Art by Numbers

Through the Hands and Eyes of the Region's Artists, We Hope to Bring Attention to Mathematics and Natural Science as Foundational Skills our Children Need

Accompanying the Equal Start seminar was an art exhibit with the same name, displaying works embodying the hope and the aspiration for all students to attain a level of numeracy essential to successful participation in school, work, and everyday life. The exhibit served as the visual launch of the IDB initiative focused on implementing policies to help children reach their full potential in mathematics and the natural sciences.



Silvia Elena Monge Puig

Winning Artist with her piece
"Flying High"

Works in the exhibition were chosen from 250 pieces of art submitted by artists representing 19 Latin American and Caribbean countries. The work of five artists was represented at the exhibit: Alonso Durán Alfaro, Susana Sulic, Alejandro Valencia Tobón, Jorge Alonso Zapata Sánchez, and Silvia Elena Monge Puig.

The goal of this exhibit was to bring together artwork that specifically raised awareness in our societies about the need for education in Latin America and the Caribbean to bridge the gap that exists there in the areas of mathematics and natural sciences. The artwork selected included digital prints of geometrical functions, photographs of experiments in the natural sciences, and images of DNA.

For her exemplary piece entitled "Flying High", Ms. Monge Puig (featured left) was awarded the first prize by Ernesto Stein, Regional Economic Advisor of the IDB Country Department of Central America, Mexico, Panama and the Dominican Republic (CID). Moreover, words of recognition were spoken on her behalf by Minister Counselor Ana María Oduber of the Costa Rican Embassy.

In addition to the contributions of these distinguished artists, a separate category was created for young Honduran art students who were invited to conduct a numeracy art school project. The work of two students was selected for the exhibit: José Manuel Matheu Sánchez and Andrea Kafati. The students' artworks highlighted the importance of learning to think critically, and to make informed decisions based on scientific information.

This exhibit was organized by the IDB Cultural Center, and made possible by the efforts of Félix Ángel and Elba Augusti. The exhibit was also supported through the sponsorship of the Government of Finland and the IDB Knowledge Economy Fund.