

## Management and Assessment of a Science Improvement Education Program in Colombia

Programa pequeños Científicos  
Cristina Carulla  
Mauricio Duque

Pequeños Científicos -Rio de Janeiro, Brasil, April – May 2006, reunión IANAS

## Alliance between

- Colombian Academy of science
- Los Andes University
- French embassy
- French school Louis Pasteur
- Alianza Educativa
- Maloka – interactive science museum
- Ministry of education
- Entrepreneurs Foundation - EXE

Pequeños Científicos -Rio de Janeiro, Brasil, April – May 2006, reunión IANAS

# Contents

## ° FIRST PART °

Mauricio DUQUE

### **C o n t e x t**

### **G e n e r a l   s t a t e m e n t s**

### **P r o g r a m   m a n a g e m e n t**

### **N a t i o n a l   O r g a n i z a t i o n**

### **Q u a l i t y   S y s t e m**

### **E v a l u a t i o n   S y s t e m**

Pequeños Científicos -Rio de Janeiro, Brasil, April – May 2006, reunión IANAS

## ° SECOND PART °

Cristina CARULLA

### **E v a l u a t i o n   S y s t e m**

#### **Q u a l i t y**

- Scientific Competences and results of national tests
- Citizenship Competences
- Teachers competences
- International Evaluation test

#### **C o n s o l i d a t i o n**

- Curriculum
- Improvement Plans

#### **C o v e r a g e**

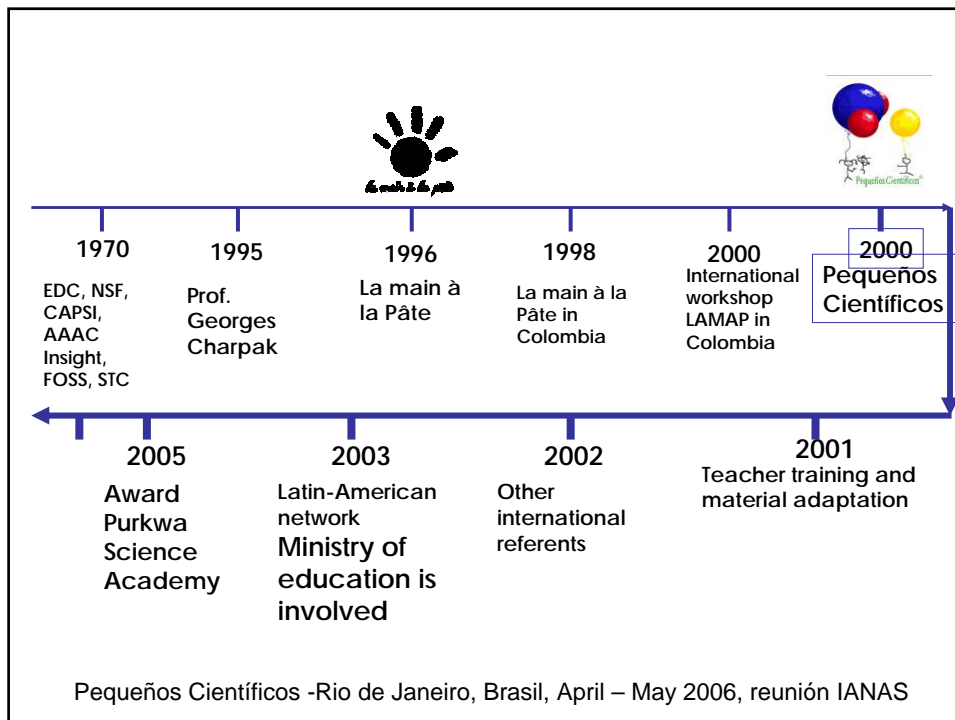
- Goals

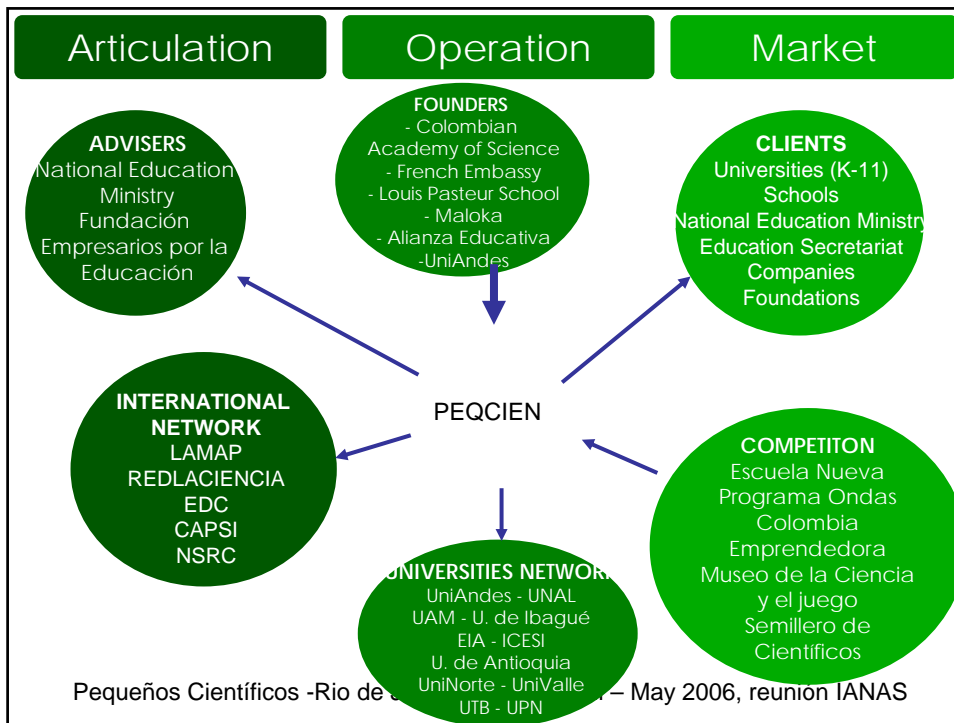
### **F u t u r e**

Pequeños Científicos -Rio de Janeiro, Brasil, April – May 2006, reunión IANAS

# Context

Pequeños Científicos -Rio de Janeiro, Brasil, April – May 2006, reunión IANAS





# General Statements

Pequeños Científicos -Rio de Janeiro, Brasil, April – May 2006, reunión IANAS

## Mission

- The goal of this K-11 Science and Technology educational initiative is to promote and contribute to the improvement of the teaching and learning in science and technology for Colombian children and youngsters.
- Through guided inquiry and cooperative learning in class, quality management and coverage amplification strategies in the institutional level, the program develops scientific and technological competences, communication skills and citizenship values.

Pequeños Científicos -Rio de Janeiro, Brasil, April – May 2006, reunión IANAS

## Vision

- Be a high quality alternative in teaching-learning of natural science and technology for the Colombian Children and youngsters, with national coverage up to **10%** of the students population, sustainable, with visible achievements concerning scientific and technological competences and teachers' and institutions' professional development.

Pequeños Científicos -Rio de Janeiro, Brasil, April – May 2006, reunión IANAS

## Our Strength

- ***Pequeños Científicos*** is a Scientific and technological literacy program founded on a structured teacher professional development approach, based on the state of the art in science and technology education, framed in a systemic approach to the educative institution and in an **integral evaluation system.**

Pequeños Científicos -Rio de Janeiro, Brasil, April – May 2006, reunión IANAS

## Program Management

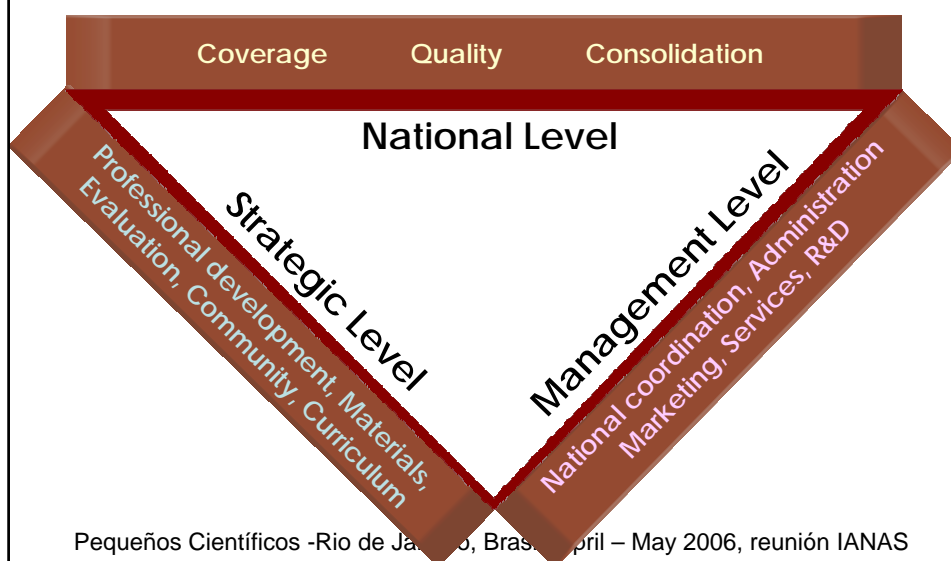
Pequeños Científicos -Rio de Janeiro, Brasil, April – May 2006, reunión IANAS

## The “4 rules” General Strategy

- Learning
  - A true learning organization
- Articulation
  - Alliances with complementary programs
- Opening
  - New organizations and practices are welcome
- Appropriation
  - Good practices appropriation and adaptation

Pequeños Científicos -Rio de Janeiro, Brasil, April – May 2006, reunión IANAS

## Program dimensions



Pequeños Científicos -Rio de Janeiro, Brasil, April – May 2006, reunión IANAS

## National Level

- **Quality**
  - How close are the practices and process implemented to national and international quality standards.
  - Which is the performances.
- **Coverage**
  - How many students and Institutions learn science and technology by an inquiry based approach?
- **Consolidation**
  - Which is the capacity of autonomous sustainability with reduced follow up?

Pequeños Científicos -Rio de Janeiro, Brasil, April – May 2006, reunión IANAS

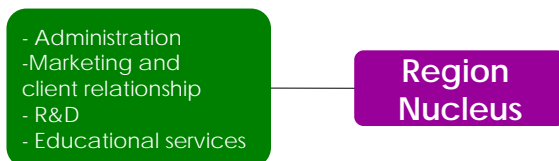
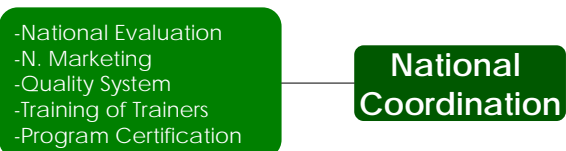
## Strategic Level (NSRC)

- **Professional development**
  - Teacher's training and follow up
- **Materials**
  - Science kits and inquiry guides supply
- **Evaluation**
  - Children learning evaluation
  - Program evaluation
- **Community**
  - Teachers, Parents, Students, local business and governmental
- **Curriculum**
  - National standards and Inquiry material

Pequeños Científicos -Rio de Janeiro, Brasil, April – May 2006, reunión IANAS

# National Organization

Pequeños Científicos -Rio de Janeiro, Brasil, April – May 2006, reunión IANAS



University

Enterprises

Government

Reference School

## SCHOOLS

Pequeños Científicos -Rio de Janeiro, Brasil, April – May 2006, reunión IANAS

# Quality Management System

Pequeños Científicos -Rio de Janeiro, Brasil, April – May 2006, reunión IANAS

## CMM and ISO 9001:2000

**Optimizing**

The organization optimize processes taking in to account costs and benefits. Incremental improving and innovation is present regularly.

**Managed**

Quality indicators, information system, early warnings that are used to control situations and make on time adjustments.

**Defined**

Documented processes: people in charge are formed and the professional profile well defined.

**Repeatable**

Well defined processes: good practices are learn by the organization.

**Initial**

Ad-hoc work, successful depends on individual effort, non repeatable, reaction in crisis, variable quality.

Pequeños Científicos -Rio de Janeiro, Brasil, April – May 2006, reunión IANAS

## Quality management system

- Our quality system includes:
  - Process definition
  - Procedures definitions and follow up
  - Indicators definitions and follow up
  - Evaluation and information systems
  - Teacher training protocols
  - Material specification
  - General documentation
  - ...

Pequeños Científicos -Rio de Janeiro, Brasil, April – May 2006, reunión IANAS

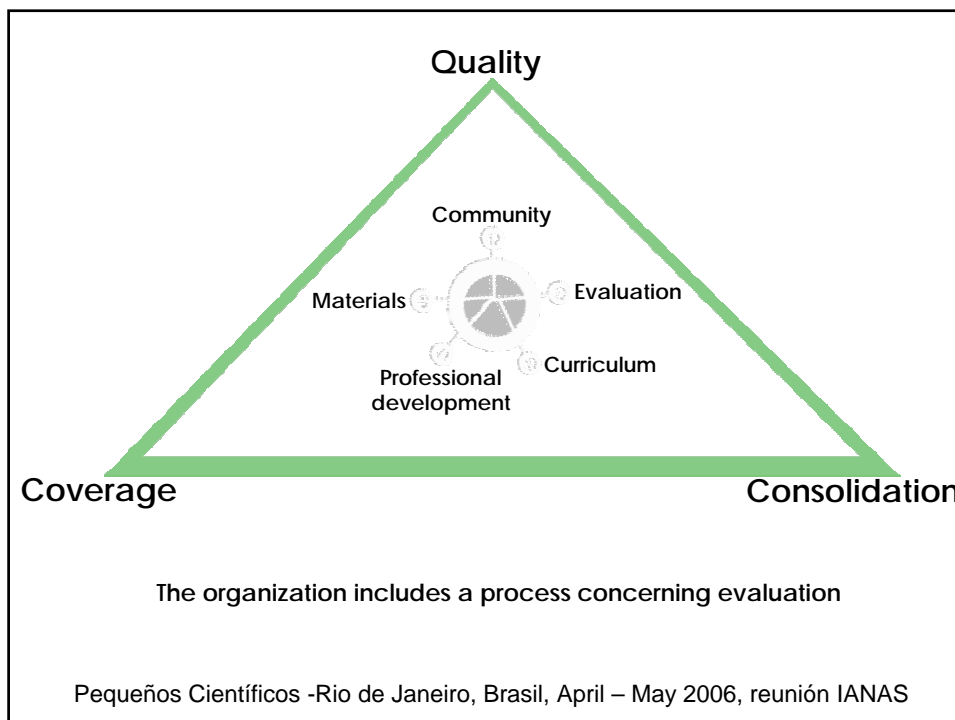
## Quality statement

- The research group (LIDIE), promoter of the program **Pequeños Científicos** is committed to the development and maintenance of a management system according to the **ISO9001:2000 standards**.
- This is done in order to guaranty quality products and services according to the needs and requirements of the country, teachers and children, as well as to fulfill the expectations of our stakeholders with whom we conform strategic alliances.
- **Processes must guarantee a continuous learning, improvement and innovation** in each of the products and services that we offer, **demonstrating a permanent incorporation of the state of the art, based on evaluation, research and development.**

Pequeños Científicos -Rio de Janeiro, Brasil, April – May 2006, reunión IANAS

# Evaluation system

Pequeños Científicos -Rio de Janeiro, Brasil, April – May 2006, reunión IANAS



Pequeños Científicos -Rio de Janeiro, Brasil, April – May 2006, reunión IANAS

## Final remarks

- We have to evaluate different aspects for different purposes:
  - Learning process feedback
  - General results and benchmarking
  - To improve the program (I.e. Benefit/cost optimization)
  - To obtain and maintain funding and support
  - ...
- The evaluation system have to be integrated in the general quality management system – **results have to be used systematically**
- Each purpose needs different evaluation strategies and tools

Pequeños Científicos -Rio de Janeiro, Brasil, April – May 2006, reunión IANAS

## Final conclusions

- Quality assurance, integrating evaluation, is very expensive but the cost of a poor evaluation is bigger: the program itself.
- IBSE successful depends on many factors including the approach itself and the way that the program is implemented and managed. It is impossible to separate those factors in order to evaluate just one aspect.

Pequeños Científicos -Rio de Janeiro, Brasil, April – May 2006, reunión IANAS

## A concern

- Each country has one or several teams that develop IBSE programs (Ministry, Universities, Institutions, Schools) with probably many years of work.
- Those groups have crucial information and experience to contribute to the development of evaluation goals, strategies, tools and procedures.
- How to involve those groups in a very productive way?

Pequeños Científicos -Rio de Janeiro, Brasil, April – May 2006, reunión IANAS

## Pequeños Científicos UniAndes – TEAM

From left to right

<b>Catalina SANDOVAL</b>	<b>Research and Development group</b> , Media Arts. WEB, design, video and multimedia.
<b>Andrés MOLANO</b>	<b>Evaluation group coordinator</b> . Psychology, M.Ed.
<b>Mariana TAFUR</b>	<b>Training Group , study plan coordinator</b> . Electronic I. M.Ed.
<b>James RAMÍREZ</b>	<b>Evaluation Group, visit coordinator</b> . Anthropology
<b>Rocío CARDONA</b>	<b>Promotion, Administration and Finance Coordinator</b> . Environment I.
<b>Cristina CARULLA</b>	<b>Research and Development Coordinator</b> . Mathematics, M.Ed.
<b>Tiberio HERNÁNDEZ</b>	<b>General Coordination of the National Program</b> . Systems I. MSC, DR.
<b>María FIGUEROA</b>	<b>Training Workshop coordination</b> . Biology, M. in Science education.
<b>Juliana HOYOS</b>	<b>Promotion, Administration and Finance group</b> . Lawyer, M. in Public and Social Politics
<b>Mauricio DUQUE</b>	<b>General Coordination of the National Program</b> . Electric I., MSC, DR,

Pequeños Científicos -Rio de Janeiro, Brasil, April – May 2006, reunión IANAS