GENERAL CONCERNS IN EDUCATION

• National Education Budget:
  – Constitution: 30% of the General State Budget.
  – Real: 13%.
  – Economics decisions on Education done by Economics Ministry.
• Political Instability: 19 Education Ministers in the last 24 years.
  – Education is controlled by a political party (MPD).
• Very low salaries:
  – average in 2002 was $250/month (with all the law benefits)
  – 20 different categories: starting at $50 and up to $245.
  – 10% increase between categories
  – Teacher’s Low Motivation and Self-Esteem.
  – Multiple jobs, schools abandonment and immigration.
Teacher Education in Ecuador:
A presentation for PCMI 2003

Luis Hernández
Colegio Menor San Francisco de Quito
Rolando Saenz
Universidad Central
• No follow-up, control or evaluations of teacher’s performances.
• Since 1996 there is a National Education Project
• No Link between Education and Social and Economics Policies.
• No Integration between University Research and other Education levels
• Very little information and research in Education Field.
CURRICULUM CONCERNS

• Very rigid Education System
  – Resistant to change
  – Differences are not allowed

• ES, MS and HS are not linked together
  – No continuity criteria
  – Many topics are repeated
  – Isolated theme blocks in each grade level (privilege some and discard others)

• Wide Range of Topics and too detailed
  – Little relation with students development
  – Mechanical repetition

• No relation between the curriculum content and the natural and social environment

• No standard evaluation system.
• Very weak Professional Development Programs
• Old bibliography, not up to date
• Books are used like text books not as resources
• No access to Concrete Material
• No access to Technology
• Very little communication between teachers, students, authorities and social environment
• No evaluation processes of the curriculum implementation and its results.
What Is The Mathematics Teachers Must Know To Teach Well?

- ES & MS (1st to 9th gr.): 6 blocks (40-50min) of mathematics per week
- In HS (10th to 12th gr.): 6 blocks (40-50min) of mathematics per week.
  (every school year is 36 weeks)
- Teachers need to know more than the math they teach.
- Teachers need to have a deep conceptual understanding of the math they teach.
- Teachers need to know all the meanings of operations.
- Teachers must be able to interpret mathematically the student’s thinking
- Teachers must be open-minded: every strategy is valid
How do they come to learn that mathematics?

- From the school (university)
- By teaching
- By professional development
- Having a math specialist available
- By real life experiences
- By class observations
- By experimenting themselves challenging problems
- By analyzing misconceptions
- By tutoring with other teacher’s program
What are the mathematics teachers must know to teach well?

- Need to have a deep conceptual understanding of the topics they will teach.
- Need to know all the meanings of operations.
- Need to be able to interpret mathematically the student’s thinking:
  - open-mindedness
  - start from the principle that everything is valid
- Need to understand the math, not just know how to do the math.
Particular problem or challenge in the preparation and development of teachers in Ecuador

- Math teachers usually do not have a teaching background. They are engineers, architects, economists, administrators, etc. This is in most of the cases an advantage.
  - Don’t have any knowledge about pedagogy or about methodology.
  - Class management is one of the biggest issues.

- No number sense beside the value of a number. For example if you ask them to explain what 10,000 is, all they know is the value but not 100 x 100 or 1000 x 10. They do not think on other approximations than the value.

- Afraid to learn new ways of doing things.

- All the concepts they know, are by heart. They are very mechanic.
• No national certification to teach. There is no standardization of the requirements to teach math

• Big difference between private and public schools: knowledge level of teachers is very different, even among private schools and it becomes worst when it is in the rural area.
SCHOOL TEACHER’S EDUCATION

- ECH – ES – MS Teacher’s requirements:
  - High School Degree
  - + 6 semesters courses:
    - 800 hours per semester
    - 120 hours of Mathematics Didactics (3.75%)
    - First two semesters: Basic Professional Education
    - Semesters 3, 4, 5: Specific Professional Education
    - Semester 6: Practice
HIGH SCH00L TEACHER’S EDUCATION

• High School Teachers requirements (Bachelor Degree):
  – High School Degree
  – + 4 University years (900 h/year)
    • Psycho-Pedagogy Area: 875 hours
    • Socio-Education Area: 152 hours
    • Mathematics Education: 892 hours
      – Trigonometry: 52 hours (5.8%)
      – Geometry: 52 hours (5.8%)
      – Basic Mathematics: 104 hours (11.7%)
      – Algebra: 257 hours (28.8%)
      – Calculus: 331 hours (37.1%)
      – Analytical Geometry: 96 hours (10.8%)
    24.8% dedicated to math learning
  • Physics and Chemistry: 634 hours
  • Computers Area: 141 hours
  • Teaching Practice: 50 hours
HOW DO THEY LEARN THE MATH?

- 4 weeks of professional development to move up one teaching category, every 4 years.
- Masters Degree in Teaching Mathematics.
- CIEM: Professional Development through Problem Solving Method.
- Math Seminars: specific subjects (fractions, operations, manipulatives..)
- Internal Professional Development
  - Math specialist or Math Coordinator
  - TTT: Teachers Teaching Teachers (community Service)
TEACHER’S EDUCATION

- Very emphasized in Pedagogy and Didactics
- Not enough scientific content
- Teachers are not specialists (the same faculty students become teachers)
- Math curriculum is limited to what they have to teach
- Math is taught by heart, very little time for reasoning and for research