

# **THE P IN PME: PROGRESS AND PROBLEMS**

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## **A problem of math education in the real world**

‘Between a hundred and two hundred million students does not get any kind of math education’

‘The statistice show that the number of illiterate citizens is rising and that in the countries of the MENA region 50% of the women will be illiterate in 2000’.

## **Obstacles in solving this problem**

The philosophical gap:

‘ The question is not how we can improve the quality of education, but how we can improve the quality of formal education’.

The parrot effect:

Developing countries should look at and copy the curricula and tests from western countries.

The political vs. content gap:

Prerequisites for improving education according to World Bank: Lower the decifits; Let the GNP grow; Look for changes in the structure.

The gap between research and practice:

‘Bent Christiansen would not have been comfortable in an english or american math education department. Reading, thinking, reflecting and discussing new ideas was more appriciated than the production of scientific articles and starting a production line for Ph.D’s.’

## **The problem of mathematics in relation to math education**

What is mathematics and what does this mean for math education?

Mathematics has evolved from the science of number, into the science of number and shape, into the science of number, shape and change into, at this moment, the science of patterns.

Mathematics education does not seem to reflect this development: another gap.

Mathematics and math education are under heavy pressure from society: why is mathematics important as it does not seem very relevant to the needs of society.

Modern mathematics was the mathematicians mathematics. What we want: the students mathematics. The content of students mathematics depend on the perception of the discipline, the role mathematics plays in society, the broadness of definition,

the relation with other subjects, the goals for math education. The way we teach mathematics depend on many things-one of them the results from research.

### **The Problem: The science of math education**

In 1978 Freudenthal wrote the book: 'Preface to a Science of Mathematics Education'. The function was: To accelerate the birth of a science of mathematical education, which is seriously impeded by the unfounded view that such already exists.

That was almost 25 years ago. Where are we now?

'There is no agreement among leaders in the field about goals of research, important questions, objects of study, methods of investigation, criteria for evaluation, significant results, major theories, or usefulness of results... a field in disarray.'

'Results obtained by different research schools are very difficult to compare and researchers prefer to stay within a strictly homogeneous reference system'.

Math education as a science is under pressure: University students close schools of education; colleagues find most research papers uninteresting (they deal with marginal details) and teachers cannot synthesize results into useful forms'.

### **The problem: gap between research and practice**

In 1980 Freudenthal stated as one of the main problems of mathematics education: 'How to design educational development as a strategy for change?'

'Failure is the only possible outcome for any approach in which researchers hand their results to curriculum developers who are then expected to apply them in their practices'

'Wouldn't it be helpful to let outstanding teachers co-determine the selection and granting of research projects?'

### **The problem: the results of the practice of math education**

TIMSS shows clearly that the actual outcome of at least part of the results of math education in a large number of countries leaves much to desire.

TIMSS also identifies some of the causes of the relatively disappointing results.

PISA tries to identify the functionality of math education for 15 year olds-seen from the perspective of mathematical literacy. And although most western countries do have excellent facilities: books, paper, pencils, computers etc. the mathematical literacy leaves a lot to be desired.

We should take more responsibility. We should adjust our agenda's.

We have made progress: if it were just by identifying clearly the problems as just mentioned. But we have not used the combined talents of all of us interested in math education. We have tried too much to build a research discipline. We should try to develop better math education. A research discipline will be the result.