



Mathematik  
Anders Machen

Ein Projekt der Deutsche Telekom Stiftung

# Mathematics Done Differently

## a German Initiative for Teachers' Professional Development

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# Preliminary Remarks

## Underlying Hypothesis

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*In particular I would like to let the individuality of a teacher's confer freedom (in teaching). I believe more in the effectiveness of personalities than that of the sophisticated methods and curricula. (Felix Klein, 1900)*

## Preliminary Remarks

### Making an application for our projects

As part of its commitment, Deutsche Telekom set up Deutsche Telekom Stiftung in Bonn in December 2003. With an endowment of Euro 150 million, it is one of Germany's largest corporate foundations. Main focuses are **mathematics** and **STEM** (= MINT).

One of the first projects (2005) of Deutsche Telekom Stiftung addresses **mathematics teacher education** (*Think new on mathematics* (Mathematics Neu denken)) at two cooperating universities.

Thus, when making an application for our **in-service training project**, the applicants were driven by at least two ideas resp. beliefs:

- In-service training activities in Germany are (with some exceptions) deficient.
- In-service training initiatives may pay off on the next day!

# Professional Development

## Conflicting Contexts

Professional development takes place in a field of tension

Teachers' needs

"Administration should..."



Educational demands

"Teachers should..."

How to balance these two demands...?

# Professional Development

## Different Approaches

### ● Traditional Approaches:

- Focus on content
- Well arranged frame
- Narrow goals
- Based on bringing outside knowledge to the teachers (Krainer, 1996)
- Grounded in a knowledge-for-praxis conception (Cochran-Smith & Lytle, 1999)

Compensation of deficits. . .

### ● Innovative Approaches:

- Sensitive to teachers' needs
- Consider community aspects
- Are not of the type "either/or", but "both/and" (Lieberman, 2007)
- Grounded in a knowledge-of-practice conception (Cochran-Smith & Lytle, 1999)

Empowering of teachers. . .

# Mathematics Done Differently

## In-Service Training Initiative

Driven by the sobering results of TIMSS and PISA the mathematics teaching in Germany is changing profoundly since 2000, so we would like to stand aside the teachers.

School education is under the authority of 16 provinces (Bundesländer), however the math education problems are not of 'provincial type'. Thus:

- The project has to be arranged countrywide, ignoring the 'borders' of provinces!
- The project has to address all school types, including preschool Kindergarten.
- Project duration (in the meantime): 01/2007 - 08/2011
- In charge of the project:  
Jürg Kramer, Humboldt-University Berlin; Bettina Rösken, Ruhr-University Bochum; Günter Törner, University of Duisburg-Essen; Heinz-Elmar Tenorth, Berlin (scientific mentor)



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## Identifying Teachers' Needs

Our leading metaphor when starting the project in 2006: We want to set up a store on a main boulevard in Berlin selling in-service training of mathematics teachers; which units should be put on the shelves?

### Quantitative Data

- Data collection by a questionnaire
- Participants were teachers from all over Germany
- Information about interesting topics and conditions
- Factors structuring teachers' needs and expectations were identified



# Mathematics Done Differently

## Constitutive Characteristics (I)

- Finding the **best** course when it is requested by a group of teachers
- **Ignore provincial borders** and distances when bringing “trainers” to teachers
- Reflect **sustainability** of any course initiative
- Showing **appreciation** for the teachers; being dedicated to some kind of ‘wellness aspect’; create **good memories** on courses. . .
- Connecting **research and practice**: “trainers” operate as tandems of researchers and teachers

The recommendations and the expertise of our colleagues lead to the first courses “à la carte”. Some of them meanwhile turned out as shelf-warmers.

- Mathematical content oriented models
- Pedagogical methods oriented models
- International models

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## Constitutive Characteristics (II)

- Schools, not individuals, can order a course if there 15 to 25 teachers show interest
- Addressing the groups of mathematics teachers from one school (provided the person is interested), eventually invite neighboring ones
- Create and initiate **networks**
- Considering teachers needs: **courses “on demand”**
- Offering **elaborated course material** on the project's homepage
- **Evaluating** the single course and all courses:
  - On the “trainers level”
  - On the participants level

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## Course Statistic

<b>Courses</b>	
Performed courses	345
Scheduled courses	12
In preparation	50
Waiting list	2
<b>Courses “on demand”</b>	
Performed courses	20
Scheduled courses	-
In preparation	1

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## Courses on Demand (I)

Example for a course “on demand”, taken from a teacher’s email:

- I work in an integrated Haupt-/Realschule in Berlin; we mostly teach without internal differentiation. As educational priorities for the next year we have decided on the internal differentiation (customization) and the promotion of the students to work independently. My question is now if you could offer a training program entitled “promoting independent and autonomous work of the students” in the first half of the school year 2007/08.

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## Courses on Demand (II)

Initiated procedure:

- Supporting and encouraging teachers to concretize their needs
- Classifying the request with regard to research
- Literature review
- Searching for experts that may serve as “trainers”
- Designing the course
- Offering the course on the project homepage
- ...
  
- Long term goal: Generating a net of experts

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## Conclusions (I)

### Observations

- Great demand for courses
- Courses well-accepted
- Courses “on demand” are challenging to design and implement
- More courses for Elementary schools and at the interfaces are needed
- Unfamiliar roles for
  - ... teachers when formulating their needs
  - ... “trainers” when formulating their goals for the course

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## Conclusions (II)

Main conclusion: **WE ARE A LEARNING SYSTEM**

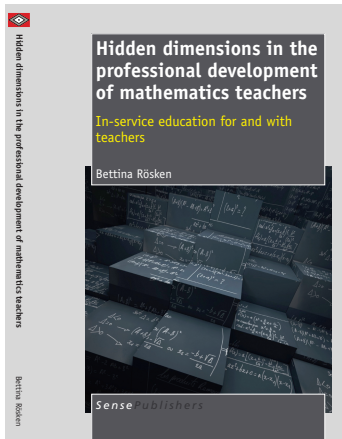
- Success of in-service training depends on many factors that play together but always in different strength
- Challenge to understand teachers' needs from a research perspective
- Flexibility is a very important factor in order to be able to respond to teachers' needs
- Interesting dynamic in specific courses like group effects
- ...

... and there will be a large major step of Deutsche Telekom Stiftung in the forthcoming months, see the talk of E. Winter on Wednesday



# Conclusions

We need a system of variety, diversity and flexibility while supporting teachers to get articulated about their practical requirements.





Deutsche Telekom Stiftung



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**Thank You!**

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