TIM – A TWO-YEAR MODEL TEST ON THE CALCULATOR USE FROM CLASS 7 AND 9

Prof. Dr. Regina Bruder
Technische Universität Darmstadt, Germany

TECHNISCHE UNIVERSITÄT DARMSTADT

The project TIM (2005-2007)

TIM was a two-year model test in Rhineland-Palatinate with 13 teachers in six 7th classes and seven 9th classes at different grammar schools (Gymnasium) - supported by the Ministry of Education and Texas Instruments.
(Graphic Calculator from year 7 and CAS-Calculator from year 9)

Concept

• Quarterly meetings of the 13 teachers to become more familiar with the calculator and to work together on the didactic concept:
- provide regular mental arithmetics without calculator
- discuss different ways to find a solution
- use open tasks.

• The learning platform www.proLehre.de as a support system (developed tasks, teaching plans, proposed solutions and technical advice)

The use of the calculator should become an increasingly self-evident tool in the competency development of the learners.

Goals for the evaluation of the project TIM

• to analyze to what extent calculator-supported lessons are accepted by students and teachers

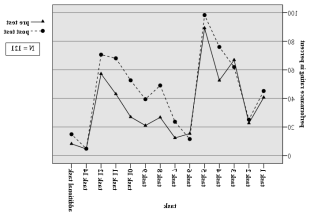
• to study the conditions for successful learning with the calculator and various potential effects of the calculator use on the students' concept of mathematics, their perception of the lessons and development of competencies

Instruments for evaluation combined with monitoring:

• student performance tests at the beginning and the end of each school year,
• mental arithmetic test without calculator (pre-post)
• 3 student and 2 teacher surveys
• Standardized lesson reports to be kept by teachers in the first project year
• partly standardized lesson reports to be kept by students in the second project year

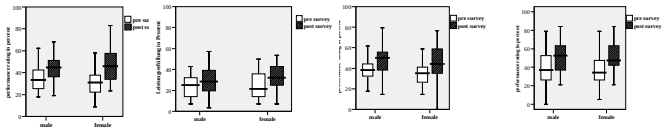
Testdesign and some results

Two parallel tests were conceived as open end test (45 min)
Easy items were followed by difficult items and again by easy ones (wave-like)

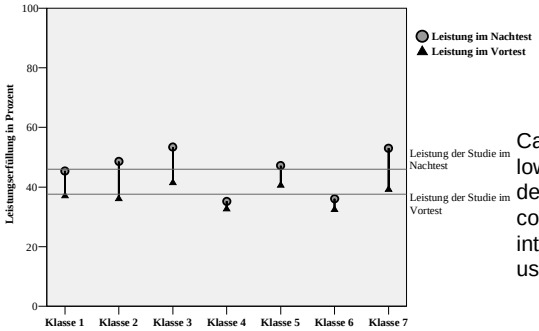


Results:
- Performance increase by almost 18% within the group of low attainers
- girls reached the biggest performance increase the age group 7 and 8

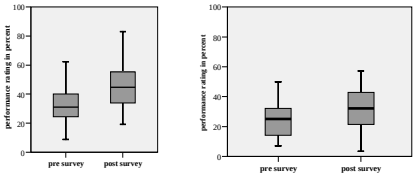
Performance development of boys and girls in classes 7 , 8 , 9 and 10 (from left to right) :



Result in year 10: Calculator use enhances a diversity of individual approaches



Case studies show, that a lower performance development in the test is corresponding with a low interest and engagement to use calculators by teachers



Performance development in the mental arithmetic tests in class 7 (left) N=121
and 8 (right) N=81

Results of the lesson reports (students, N=173)

- Mental exercises are practiced in 9% of the lessons

- Calculators had been used in half the lessons

-The introduction of new themes is steadily increasing with every school year, while the repetition of previous themes is less practiced

- individual working decreases in favour of teamworking between the classes 8 and 10 (there is a shifting of methods in the classes 8 to 10)

Result: If important topics are not regularly repeated and maintained, they are not kept available and a performance decrease must be expected – regardless of any calculator use.