The Middle School Math Problem: Professional Development Challenges

An examination of the effect of teacher education on student learning.

Abstract

The session reports on findings about the influence of professional development of teachers on math achievement of middle school students. Findings from an IES-sponsored experimental research project that analyzed effects of a three-component intervention to increase teachers’ competence to teach math will be reported. The session will present data and introduce a framework for content analysis of teacher development. Participants will discuss findings in terms of the balance between context and process for teacher education about mathematics; issues of fidelity of implementation in studies based in urban schools; and implications for pre-service and in-service teacher education. The findings are relevant to teacher educators, researchers, and school districts.

Teacher Analysis Framework

Findings: After the treatment, teachers increasingly wrote of their beliefs that the following were important in their teaching of mathematics:

- Active, social learning
- Individualized instruction
- Planning

Achievement Data Analysis

2005 ITBS Analysis

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<th>Grade</th>
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<th>2005 Grade 1</th>
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2006 ISAT (Illinois Standards Achievement Test) Analysis

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Content Analysis of Student Surveys

Based on an analysis of student responses to open-ended questions before and after treatment about their feelings about math and how they best learn it.

Year One (172 Student Responses):

- Post-treatment, students expressed more positive feelings and fewer negative feelings about math in general.

Year Two (172 Student Responses):

- Post-treatment, students expressed more positive feelings about math in general, both positive and negative.

Conclusion:

- Increased feelings: students had more to say in their post-treatment survey responses.

- Students appeared to have an increased awareness of their motivations (both intrinsic and extrinsic) for learning math.

Student Schema Change

Findings:

- Analysis of student problem solving explanations indicates that student writing practices led to improvements in their problem-solving skills, particularly in the following areas:
  - Restatement
  - Variety of strategies used
  - Explicit math techniques, such as charting, underlining, and math paths

CONCLUSIONS

- The zone of proximal development for teachers should be considered in planning professional development.

- Consistent implementation of teacher professional development can significantly influence student learning.