Transfer of Math Pathways & Pitfalls Practices to Non-Math Pathways & Pitfalls Math Lessons

Heller Research Associates

Summary Statement

The following poster presentation was prepared for the Third Annual IES Research Conference held June 2008 in Washington, DC. It provides findings from an explanatory study conducted in conjunction with a randomized efficacy trial of Math Pathways & Pitfalls (MPP). The purpose of the study was to examine the transfer of effective Math Pathways & Pitfalls practices to the regular mathematics curriculum (non-Math Pathways & Pitfalls lessons).

Abstract

In order to assess the effects of MPP on non-MPP math teaching and the extent to which teachers generalized and integrated the structure, procedures, and individual components of the MPP approach, each participating teacher was observed and audio-taped twice during the year, first in October 2006, and then in March/April 2007. Observers took qualitative notes and evaluated the lesson using a three-point rubric that describes *Beginning*, *Developing*, and *Advanced* instructional environments in each of three areas: *Mathematics, Language and Discourse,* and *Equity*.

Summary of Results

Observations. Over the six-month period between observations, rubric scores increased, indicating that teachers' instruction generally developed in all three areas (mathematics, language, and equity) after implementation. Average scores show classrooms in the beginning-developing range during the fall observation, and in the developing-advanced range during the spring observation. All teachers improved in at least one area, and no teacher scored lower during the second observation than he/she did on the first. These results indicate that teaching practices during regular, non-MPP math lessons developed in the direction of general and specific aspects of the MPP approach.

Interviews. Teachers were better able to articulate the causes and effects of increased participation during the second interview, and were generally more specific about effective strategies and the strengths and weaknesses of their students. During the second interview, the interviewer also asked specifically how the MPP course was affecting their non-MPP lessons, and teachers cited a wide range of MPP teaching strategies and practices, and were generally very positive about their MPP experience.

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Transfer of *MPP* Practices to Non-*MPP* Math Lessons

The purpose of the Transfer Study is to describe ways in which the research-based teaching and learning practices introduced through *MPP* may transfer to regular, non-*MPP* lessons in math.

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Data based on 6/19/08 report, Math Pathways & Pitfalls Transfer Study Summary, by Joan I. Heller of Heller Research Associates

Sample

8 classrooms implementing *MPP* lessons

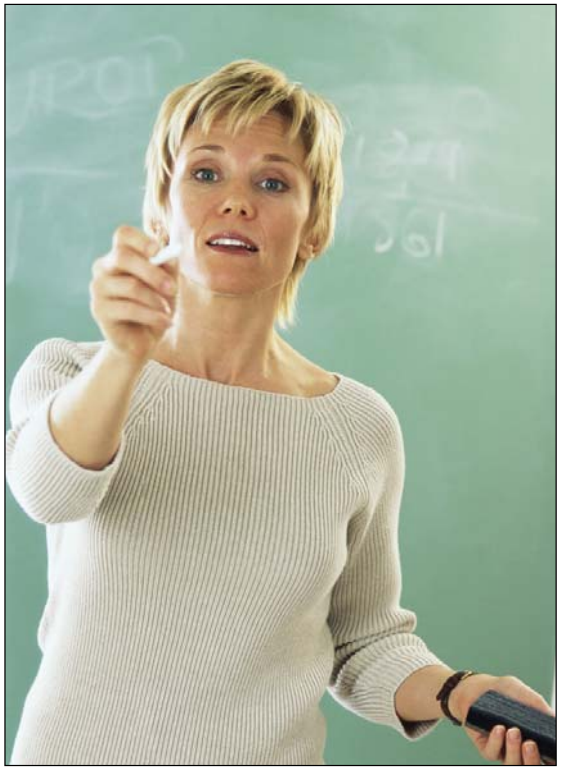
Data Collected

- 2 observations per classroom (pre/post)
- Teacher interviews
- Qualitative field notes
- Evaluation using three-point rubric

*Additional survey data has been obtained from all teachers participating in the main research study, but has not yet been analyzed.

Method

- Observations conducted in *MPP* implementation classrooms
- Only non-*MPP* mathematics lessons were observed
- Instructional environments evaluated using a three-point rubric *(Beginning*, *Developing*, and *Advanced)* in each of three areas: *Mathematics, Language and Discourse,* and *Equity* (9 points possible)



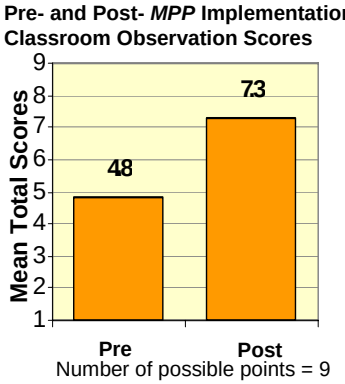
Transfer Study Analysis and Findings

A non-parametric statistical analysis compared the pre-*MPP* implementation data to post-*MPP* implementation data.

Statistical Findings

Mean total scores for the post-*MPP* implementation data were ***significantly*** greater than mean total scores before *MPP* was implemented (Wilcoxon $T^{+} = 36$, $p < .005$, $n = 8$).

MPP practices appear to *transfer* from *MPP* lessons to non-*MPP* lessons, but without a comparison group we cannot tell for sure. Survey data from all teachers (treatment and comparison) is being collected to further examine this hypothesis. If our hypothesis is true, a relatively small "dose" of *MPP* lessons (about 15 hours during the school year) has the potential to amplify mathematical learning during all lessons.



Pre- and Post-*MPP* Implementation Classroom Observation Scores

	Math		Math Language		Equity		Total score	
ID#	Pre	Post	Pre	Post	Pre	Post	Pre	Post
01	1	2	1	2	1	2	3	6
02	2	2	2	2	2	3	6	7
03	2	3	2	3	2	3	6	9
05	1	1	2	2	1	2	4	5
07	2	3	2	3	2	3	6	9
08	1	2	1	2	2	2	4	6
09	2	3	2	3	2	3	6	9
10	1	2	1	3	1	2	3	7
Mean	1.4	2.3	1.5	2.5	1.5	2.5	4.8	7.3
SD	*0.5*	*0.7*	*0.5*	*0.5*	*0.5*	*0.5*	*1.4*	*1.6*

Rubric scores on a scale of Beginning (1), Developing (2), and Advanced (3)

Descriptive Findings

Classrooms implementing *MPP* were more likely to exhibit the following kinds of patterns and practices in post observations than pre observations during their regular (non-*MPP*) math lessons.

Math

More challenging and difficult problems

Students expected to make sense of the math by sharing, showing, or explaining ideas

Pitfalls noticed and viewed as an opportunity to learn.

Deeper understanding of the mathematical topics

Language/Discourse

Greater variety of speaker roles and participant structures for students

More opportunities for students to explain and justify reasoning.

Extended discussions with fellow students about mathematical ideas

Mathematical vocabulary used with greater confidence

Greater level of engagement in the lesson over all

Equity

Greater variety and percentage of students participating,

Ideas put forth by students with diverse ethnic and language backgrounds

Positive comments and cooperation