



The 2004-2005 Pershing/Rice University Math Partnership: PUMPing Up Math Achievement

Caren Grant
 cgrant@houstonisd.org
 Pershing MS, Houston ISD
<http://www.pershingms.org/>

Richard Parr
 rparr@rice.edu
 Rice University School Mathematics Project
<http://rusmp.rice.edu>

Bryce Amos, Principal
 bamos@houstonisd.org
 Pershing MS, Houston ISD
<http://www.pershingms.org/>

Project Collaborators:

- Pershing Middle School, a comprehensive multi-cultural middle school in the Houston Independent School District
- Rice University School Mathematics Project (RUSMP), a nationally recognized center in mathematics education

Project Description:

- The Pershing/Rice University Math Partnership (PUMP) is a mathematics problem-solving enrichment program targeting students at-risk of failure in mathematics.
- The program is funded by the Houston A+ Challenge.
- Students practice and refine problem-solving strategies that they are taught in their mathematics classes.
- Students work in cooperative groups to develop higher-level strategies necessary to solve engaging problems.
- Specific problem-solving strategies are the focus for each week of instruction.
- The program is a departmental effort with all twelve Pershing Middle School mathematics teachers teaching approximately 240 students at the sixth-, seventh-, and eighth-grade levels.
- RUSMP Directors assisted with the development and continue to assist with the implementation of the program.

Results:

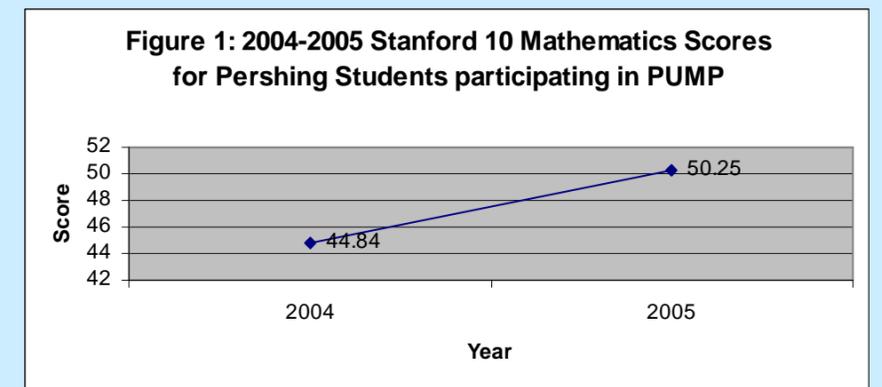
Student Performance:

- For students enrolled in the enrichment program, the 2004 Stanford 10 mean mathematics score was 44.84 ($SD = 16.9, N = 209$), and the 2005 Stanford 10 mean mathematics score was 50.25 ($SD = 18.4, N = 212$).
- Of the 198 students for whom both 2004 and 2005 scores were available, the 2004 mean score was 44.90 ($SD = 16.8$), and the 2005 mean score was 50.12 ($SD = 18.2$). A paired sample t-test was conducted. Results indicated a statistically significant increase in mathematics scores $t(197) = 3.88, p < .001$. (Figure 1).

- Problem-solving scores for the entire student population (including English Language Learners and special education students) indicated an increase in problem-solving achievement at all grade levels.
- Preliminary results from the 2005-2006 program indicate an increase in the Stanford 10 mathematics scores of students who participated in PUMP.

Student Attitudes

- Over 70% of the students in the 2004-2005 program felt the enrichment course was useful and helped them with their mathematics.
- Students in the program believed that their teachers were positively concerned about their understanding of mathematical concepts.
- Over 80% of the students believed that their teachers encouraged them to find different ways to solve problems, accepted mistakes as long as they were learning, and wanted them to understand mathematics rather than simply memorize procedures.



Discussion:

- Students in the program develop problem-solving skills that help them in their regular mathematics classrooms.
- Teachers develop more facility in teaching problem solving.
- Improvements to the program have been continual and include:
 - increased collaboration among teachers,
 - more careful selection of problems used, and
 - better integration of developing computational skills within the context of problem solving.