

MATH SCIENCE Partnership



NEWSLETTER

Number 1



Collaboration and Innovation: Central to This Partnership's Action Plan

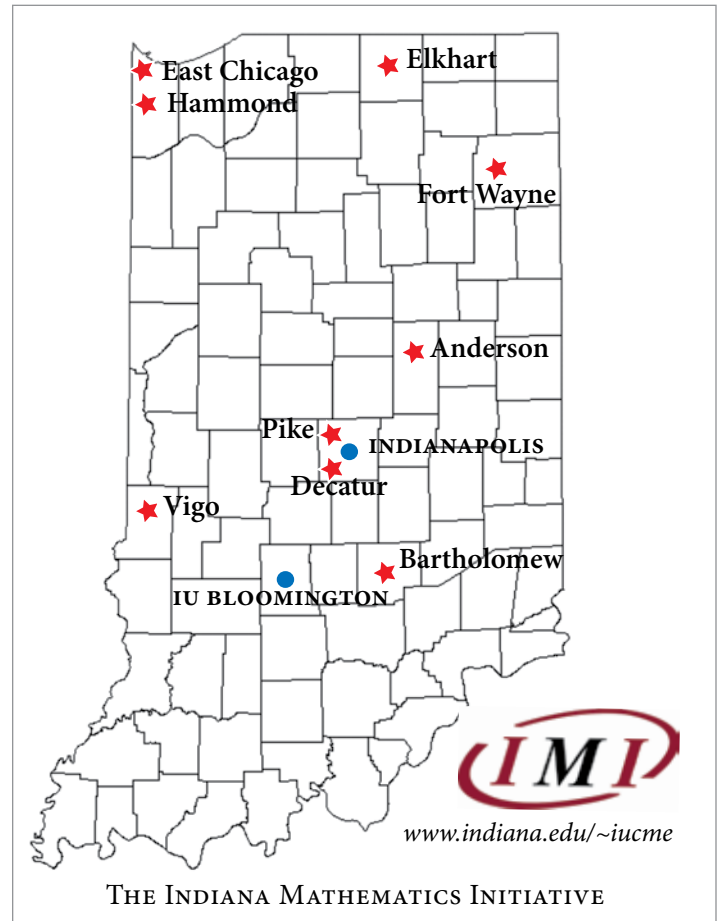
The Indiana University/National Science Foundation Math Science Partnership strives to increase the capacity of nine urban districts in the Indiana Mathematics Initiative (IMI) Consortium to deliver effective standards-based mathematics teaching to all students within the nine school districts.

A decade-long history of trust-building and comprehensive collaboration between the IMI Consortium and IU is responsible for the effectiveness and success of the partnership, which has been funded since 1997 (\$10M) in two separate grants from the National Science Foundation.

The nine partner districts are scattered throughout the state, as shown on the map at the right. There are a total of 126 elementary schools (57 Title I), 36 middle schools, and 24 high schools in the nine districts, serving over 120,000 students.

Achieving project goals requires that the partnership's action plan involve a broad range of coordinated objectives centering on the following areas: (i) the promotion of a comprehensive understanding of Indiana academic standards and the adoption of high quality curricular materials closely aligned with these benchmarks; (ii) the professional development of teachers in the mathematical content and associated pedagogy essential to the effective implementation of these curricula; (iii) the incorporation of a broad and rich concept of assessment, including both its critical role in effective classroom pedagogy as well as a framework driving the intelligent alignment of curricula and professional development objectives with the state's high stakes examinations; and (iv) the development of a robust mentor teacher leadership corps to provide each IMI district with an infrastructure to assist it to achieve and sustain these objectives well beyond the project's funding period.

A unique strength of this project is its ability to collectively address and overcome formidable political and institutional challenges that invariably accompany attempts to improve teaching and learning in US public education. This strength is directly connected to the fact that the participating districts within the IMI Consortium have been in active collaboration, for over ten years, with each other and Indiana University. Most importantly, this long history of collaboration has produced a significant level of mutual knowledge and trust among IMI districts and Indiana University that continue to provide the partnership with the resources needed to overcome the human and institutional problems that often undermine similar efforts. The importance of this tra-



dition of collaboration—and the reservoir of trust it has accumulated—cannot be overstated.

In Indiana, the enactment of NCLB legislation and Indiana Public Law 221 has put enormous pressure on state school districts. This development greatly transformed the job of the school principal and has made a principal's support essential to the success of any systemic reform effort to improve classroom teaching. Principals, after decades of viewing their jobs as primarily administrative, are now required to be innovative change agents in areas of curriculum, assessment, and professional development. Not only principals, but classroom teachers, central administrators, students, and their parents realize the importance of this NCLB/PL221 context of accountability, and the serious consequences of not meeting its benchmarks. The effectiveness of this partnership's action plan is directly connected to the belief of these stakeholders that implementation of high-quality research-based best practices in mathematics and mathematics education is essential for achieving these federal and state mandates. *(continued on page 3)*

The IU/IMI Math Science Partnership Offers Administrators the Tools to Improve Teaching

The success of the IU/IMI project relies upon the understanding and involvement of many segments of the school community. Building administrators are of paramount importance in the vision, process, and implementation of the project, especially for curriculum reform and professional development.

IMI offers administrators the tools to deal with challenging compliance requirements. For example, the “No Child Left Behind” federal legislation requires that teacher qualifications be assessed regularly. In the nine Indiana IMI school districts, teachers take the “Learning Mathematics for Teaching” assessment, which measures individual teacher content knowledge. In addition to indicating where teachers need improvement in their classroom instruction, the LMT assessment provides composite information for improving instruction throughout school districts.

Another IMI tool offers administrators a workable on-the-ground system of intensive content training. Combined with LMT assessment, this provides a framework whereby teachers can align their instruction with state standards and state-wide assessments.

School administrators are supporting teachers in such constructivist programs as the *Everyday Mathematics* curriculum and involving the school community in after-school programs.

(See www.indiana.edu/~iucme/elementary/EMcomments.htm for comments by IMI teachers about the *Everyday Mathematics* curriculum.)

The use of the internet in encouraging communication among IMI teachers has greatly increased the possibility for their professional development. Throughout the project, administrators have been supportive of this community-building effort.

IMI Districts Show Increasing Success on Indiana ISTEP+ Tests

One of the primary goals of the IU/IMI Partnership is to increase the mathematics achievement of all students in the project and at the same time narrow the achievement gaps that exist between groups of students. The success of the project in this area is determined by analyzing the 3rd, 6th, 8th and 10th grade ISTEP+ test math scores regarding overall differences in achievement, as well as the extent to which gaps narrow over the life of the project. The primary emphasis has been with pre-K–8, and we are pleased with the progress at these grades.

The following data reflect the ISTEP+ mathematics test results of students from the nine urban school districts who



have participated in the IU/IMI Partnership throughout the 2002–2005 school years:

- In grade 3, seven of our nine districts showed gains in the percent passing the mathematics exam, with a maximum gain of 14%. But in Language Arts, the same students in grade 3 throughout the districts in the project showed no significant gains.
- In grade 6, all nine districts showed gains in the percentage passing the mathematics exam, with maximum gains in achievement of 17 and 18% by three districts.
- In grade 8, seven of nine districts showed gains in the percentage who passed the mathematics exam, with a maximum gain of 18%.
- In grade 10, in contrast to the elementary grades, seven of the nine districts showed a decrease in the percent passing the mathematics exam. The changes ranged from a decrease of 9% to a gain of 7%.

The most significant gains are being made with underrepresented groups. These are the students who traditionally do not do well on mathematics testing or do not pursue classes, degrees, or professions in mathematics beyond elementary school. These groups include ethnic minorities, females, and students who receive free or reduced lunches while in school. Every district in our project scored overall passing gains in mathematics in each of these categories at grade 3, significant double-digit gains at grade 6, and nearly as high in grade 8. In grade 10, however, very little or no gains were reported. These data reflect that the achievement gaps are also being narrowed as reflected by the improvement in ISTEP+ mathematics test scores among the traditionally underrepresented groups.

The data reported above would tend to substantiate that the teacher training, rigid adherence to a standards-based reform mathematics curriculum, and a sincere commitment of teachers and administrators to academic success have resulted in improved student achievement.

On the right: Parent Math Night at Eastbrook Elementary School in Pike Township, November 9, 2005. The event was hosted for K–2 students and their parents, who watched the parent portion of the *Everyday Math* video, saw video taken in classrooms at Eastbrook, and then participated in games at their child's grade level.

On the left: A kindergarden student from Pike Township graphs sums by throwing dice.



Parent Math Nights Help Students Achieve

All nine of the IU/IMI school districts in Indiana conduct Parent Math Nights several times throughout the school year. Teachers and administrators have been thrilled with this year's turnouts, with many schools reporting increased at-

Collaboration and Innovation (continued from page 1)

Another major resource developed by this project, and a tool that offers great potential benefits to all these stakeholders, is its use of technology and the internet in developing an electronic community that can link all project stakeholders. The most sophisticated and developed use of this electronic network has been for teachers' professional development. This partnership is committed, in its final years, to assist its districts to utilize distance technology and the project's electronic community infrastructure it has developed to continue to achieve the innovative learning and teaching improvement goals beyond the NSF funding period. Again, as with the other goals, the project's success in this innovative area is due to its districts seeing and believing that their commitment and support of this project's objectives is closely aligned with their own high priority compliance goals related to state and federal accountability mandates. It has been a major achievement of this partnership to work with districts to develop high quality best practices in the areas of curriculum, professional development, and assessment that are practical and can be implemented within each of their unique district cultures and done in a way that is closely aligned with NCLB and PL 221.

tendance at each subsequent Math Night. In the elementary schools of one district, attendance ranged from 130 to 200 parents and students for Parent Math Nights.

One important avenue for gaining the support of parents is to show them how the *Everyday Math* program helps their children make the transition from intuition to concrete operations and later to abstractions and skills with symbols. When parents are informed about the goals and methodologies, they naturally take a strong interest in helping develop their children's mathematical and thinking skills.



Families enjoyed playing games, including Coin Exchange, at Math Night at Eastbrook Elementary.

The Select Cadre Teacher Leadership Team: Teaching, Learning, and Leading

One of the accomplishments of the IU/IMI Partnership has been the development of a Select Cadre Leadership Team as the major resource for the professional development of all elementary mathematics teachers in the district. Select Cadre Leadership Teams design and facilitate workshops and Parent Math Nights, and coach and mentor district colleagues.

Teachers who serve on the Select Cadre Team are known for their organizational, leadership, and interpersonal skills, as well as their strong educational backgrounds. They are self-directed and committed to improving their knowledge and leadership skills, enabling them to assist other teachers in implementing the IMI standards-based mathematics curriculum. Since Select Cadre teachers are known and respected within their districts, they are able to “lead from within.” They gladly mentor other teachers and model effective teaching strategies.

Each year Select Cadre teachers attend professional training sessions that cover such topics as content knowledge, teaching methods and strategies. They also develop program packets for implementing classroom assessment. Since its beginning,

the IU/IMI project has focused on the role of assessment in teaching *EM* and on state and national assessments, such as the Indiana Statewide Testing for Educational Progress (ISTEP+). Understanding the role of assessment has been a major focus of the Select Cadre Teacher Leadership Team.

Learning Logs, Log Readers, and IMI Forum

The IU/IMI Web site at www.indiana.edu/~iucme offers a Learning Log Professional Development System to assist nearly 600 elementary teachers in grades pre-K to 5 in their implementation of a new standards-based curriculum. The log system has been used for several purposes:

- To support the design of the program;
- As a tool for teacher reflection;
- For communication with the project, and
- To document the implementation and outcomes of the program.

Since the beginning of the project, teachers have submitted over 20,000 learning logs, reflecting on their teaching and the progress of their students. All logs are read by log readers, experienced resource individuals, who offer e-mail feedback on implementation of the curriculum, answering any questions, providing encouragement, and brainstorming with teachers on their plans to assist students who are not at levels of expected progress.

Teachers also participate in a public bulletin board on our Web site, the IMI Forum, to encourage the exchange of ideas among teachers throughout the project. Last year one group of 88 pre-K–5 mentor teachers submitted over 800 posts on the forum. The forum’s regular daily activity helps the project maintain momentum toward achieving its goal of curriculum implementation and institutional change.

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