



# IMPressions

FALL 2000

A NEWSLETTER ABOUT THE INTERACTIVE MATHEMATICS PROGRAM®

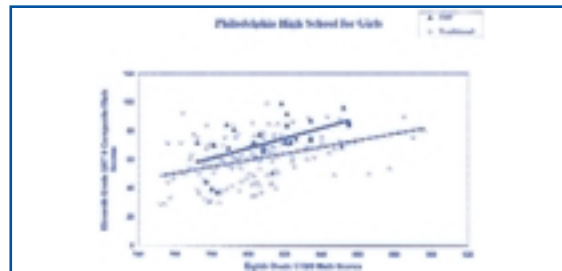
## IMP Students Score Higher than Traditional Peers

A recent analysis of SAT-9 math scores at Philadelphia's High School for Girls showed that *IMP* students outperformed their traditionally taught counterparts. The study was conducted by Dr. Ned Wolff of Beaver College with the support of Steven Kramer of the University of Maryland and Atenssa Cheek of La Salle University. Three different scores were examined: the composite mathematics score and its two major components, the open-ended and multiple choice scores. To account for differences

in student backgrounds before enrolling in high school, the study took into consideration the students eighth grade test score on the Comprehensive Test of Basic Skills (CTBS). Using the statistical technique, Analysis of Covariance, it computed and compared the two lines (called regression lines) that best predict *IMP* and traditional students' eleventh grade SAT-9 scores from their eighth grade CTBS scores.

All students were included in the study as long as they didn't switch math programs and the Philadelphia School District was able to supply both eleventh grade math SAT-9 scores and eighth grade CTBS scores. The only exception was that one of the traditional students was dropped from the study. A so-called "outlier," this student did very well on eighth grade CTBS but so poorly on the SAT-9 that, if included in the study, would have appreciably lowered the overall performance of the traditional group. Remaining in the study were 27 *IMP* and 138 traditional students.

The graph above shows the regression lines for both the *IMP* and traditional students where the composite math SAT-9 scores are predicted from the CTBS scores. The fact that the *IMP* line is higher means that if an *IMP* student and traditional student had the



IMP vs. Traditional: Growth from CTBS to SAT-9

same CTBS score, the *IMP* student generally got a higher SAT-9 score. The *IMP* gains demonstrated in this study were statistically significant ( $p < .01$ ).

The steeper slope of the *IMP* regression line suggests that *IMP* was especially beneficial for the best students, because the further to the right you go, the greater the

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## IMP Students Star at NCTM in Chicago

By Anne Horn

Chicago *IMP* students made an excellent *IMP*ression at the annual NCTM conference held in Chicago in April. Nine students from three Chicago public high schools presented the audience with some mathematics they found interesting, and they and their teachers answered questions about their experiences with *IMP* as their high school curriculum.

From Northside College Prep, a new high school that opened this year with *IMP* as its core curriculum, freshmen Chris Budsinski and Martin Klein presented their solution of the problem of the week, "Corey the Camel." *IMP* author



Chris Budsinski, an *IMP* star.

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# THE INTERACTIVE MATHEMATICS PROGRAM, IS IT DEBATABLE?

By Kimberly Race

Having taught mathematics at Eaglecrest High School in Aurora Colorado for only 5 years, I never realized the impact *IMP* could have on students and educators outside of my content area. My good friend Maryrose Kohan teaches social studies and coaches Forensics at Widefield High School in Colorado Springs, Colorado. In many conversations Maryrose would inquire about my training and experience with teaching the *Interactive Mathematics Program*. “*IMP* sounded like a wonderful way to learn math, a far superior way than the way I was taught. The *Interactive Mathematics Program* seemed to make sense because it was based in the real world and didn’t involve endless pencil and paper problems,” Maryrose commented. She further added, “I taught on an interdisciplinary team and we always struggled to figure out how to incorporate math.” In one conversation in particular I was sharing the unit problem from *Small World, Isn’t It?* with Maryrose. We thought how exciting it would be to teach an interdisciplinary unit combining *Small World, Isn’t It?* with her unit on population in World Geography. Several months later Maryrose called asking my opinion on *IMP* becoming a national curriculum. She was interested in using the idea for her debate team.



supported the case with evidence on how well *IMP* expanded critical thinking skills, increased student mathematical achievement, in addition to achievement in other content areas.

Sheena and Brandon used statistical data to support *IMP* maintaining high standardized test scores, high G.P.A.s, and its positive influence on students taking more math classes. Sheena and Brandon were successful in their tournaments throughout the debate season. They even debated teams from schools that use the *IMP* curriculum and none of them had any concrete evidence against the idea of implementing *IMP* nationally. They qualified for the Colorado Forensic State tournament, which is commendable for a novice team.

Prior to the state tournament Sheena and Brandon visited Eaglecrest High School to get a first hand glimpse of *IMP* in action. They observed all levels of *IMP* and interviewed the students and teachers involved in the program. This furthered their commitment to their debate case and to *IMP* in general. Both debaters made comments that they wished *IMP* were an option for them at their high school. Maryrose observed, “Brandon and Sheena are extremely smart and talented debaters, but I also think much of their success was due to their effective use of *Interactive Mathematics* as their affirmative case. No one had any negative statements or evidence against *IMP*, and I am definitely committed to getting *IMP* implemented at Widefield High School.” Maryrose has since given information about *IMP* to her administrative team.

The *Interactive Mathematics Program* is more than just a math curriculum. It has become a statement on educational reform and an avenue for interdisciplinary teaching strategies. It appeals to students and teachers in all areas of education. Maryrose and I are proud of Sheena’s and Brandon’s success. Their success further translates into a strong endorsement for continued expansion of the *Interactive Mathematics Program*.

## IMP Students Star . . .

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Sherry Fraser later told them she had never encountered the solution presented quite like they had done it.

Sophomores Deyci Markowski and Delia Ramirez from ACORN Charter School, a dual language school, revealed that they had learned the first half of *Do Bees Build it Best?* in English and the second half in Spanish. They talked about their school as a nurturing environment providing them a family away from home, their teachers being friends as well as mentors. They explained the unit problem from *Do Bees Build it Best?* and why they had finally decided that the hexagonal prism was the ideal basic shape for a honeycomb, so that the bees did not “waste wax.”

Northside freshmen Ana Markowski and Hassan Khan explained



Ana explains the problem.

the unit problem from *Cookies* and how they were beginning to work on it. Although *Cookies* is from *IMP 2*, their school has decided to cover an extra unit each year in their standard curriculum.

Carl Green, Crystal Williams, and Tiffany Jones are juniors at Corliss High

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## IMP Students Star . . .

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School, on Chicago's far south side. They presented a problem from *Meadows or Malls?*, which adds a third dimension to the *Cookies* problem. They showed a solution to a problem where multiplication of matrices made practical sense to them in the context of an expanded *Cookies* problem.

Remarks by students and teachers Paula Murphy, Corliss High School, and Dawn Guest, Northside College Prep, were prompted by questions from the audience. Examples:

- Paula asserted that she knows more from the *IMP* way of assessing what her students understand than she did in the old quiz and test days.
- Dawn said she does not supplement the *IMP* curriculum

because all the math concepts and skills are developed in their own time.

- Ana Markowski confided that although her dad may not know how to do the math she brings home, he contributes a lot by working with her through the reading, organization, and reasoning of a difficult problem.
- Chris said that whereas he was really bored with math before, now he finds it really interesting and tied to applications that he can see are important.
- Tiffany said that she understands math better than when she was in traditional math because communications skills are emphasized, and she learns best by communicating.
- Delia said that she used to forget most of her math over school breaks, with *IMP* she remembers almost everything.

## ACTIVITY

### What's On Back?

Probability is a subject in which our intuition often leads us astray. Fortunately, we can sometimes do experiments called simulations that will test whether our intuition is correct or not. The Problem of the Week discussed here, *POW 5: What's on Back?* from *The Game of Pig (Year 1)* is a good example.

#### The Original Problem

Here is the situation in that problem:

Three otherwise identical cards are marked in the following way:

- One card has an X on both sides.
- One card has an O on both sides.
- One card has an X on one side and an O on the other side.

The three cards are placed in a bag, and the bag is shaken. You draw out one card and look at one side only. You cannot look at the other side of the card you drew out or look at the other cards. The goal is to predict whether there is an X or an O on the other side of the card you drew out.

No prediction strategy will be successful all of the time. In the *POW*, students are asked to examine various strategies. For each strategy they consider, they must find both an experimental probability of success, through a simulation, and also find the theoretical probability of success. Ultimately, they are looking for the strategy with the highest probability of success for correctly predicting "what's on back."



#### Some Variations

One way to generalize this problem is to vary the number of cards of each type. For instance, suppose instead of one card of each type, there are two cards of the type that have an X on one side and an O on the other side, as well as the other two original cards: one with an X on both sides and one with an O on both sides.

Does this change what the best strategy is? If so, what is the new best strategy? What would happen if you created other combinations of the original three cards?

Another variation is to switch from ordinary, two-sided cards to some other kind of object. For instance, you might create 'three-sided cards' out of triangular prisms. (You would only mark the three vertical sides, and not the bases on the top and bottom.)

In this case, you might have four 'cards' altogether:

- One card with an X on all three sides.
- One card with an O on all three sides.
- One card with an X on one side and an O on the other two sides.
- One card with an O on one side and an X on the other two sides.

You would draw out one 'card' and look at one of its sides, and try to predict what was on the other two sides. As with the original version, you could vary the number of cards of each type. You could also create 'four-sided cards' using a tetrahedron.

# Regional IMPressions

## ARIZONA

In its final year our National Science Foundation (NSF) Local Systemic Change project continues to support the implementation of *IMP* and the teaching and learning of standards-based mathematics for all students. Our newest school, Alcheyay High School on the White River Indian Reservation, completed both *Years 1* and *2* through their block schedule system. An additional two teachers joined the three teachers from this past year to offer all four years of *IMP* to the 660 primarily American Indian students. Jon Hoyt, mathematics department chair, reported that not only are the students successful in their mathematics classroom due to the student centered approach, but the required writing is having a positive effect on their work in English classes.

The *IMP* high school teachers in the Sunnyside Unified School District have been involved in another NSF-funded project, Math and Parent Partnerships in the Southwest (MAPPS). Throughout the past year, they worked to develop leadership teams consisting of parents, teachers and administrators while attending Math Awareness Sessions. These sessions were designed for parents to improve the communication between parents and students about mathematics, to understand the changes in mathematics today and the need of mathematics in their students' futures. An integral part of each session is to either experience or become aware of the mathematics of the adopted curriculum programs. In the Fall of 2000, parents and teachers will be responsible for teaching these modules to other parents. These sessions, aimed at the mathematics from grades K-12, are a means of not only gaining parental support for existing programs but also improving the mathematics content knowledge of parents.

## CALIFORNIA

California *IMP* has used the inservice model of five days of summer workshops and three days of winter workshops for a number of years. Many *IMP* teachers who have completed all four years of inservice are now requesting a refresher course. These experienced *IMP* teachers still desire to improve their teaching, want to discuss issues, and enjoy sharing their ideas and success stories. One California region recently addressed this need by sponsoring a Saturday workshop for veteran *IMP* teachers. *IMP* leaders Janice Bussey from Tracy Unified School District and Susan Ford from Delhi High School organized and facilitated this "refresher course." Janice and Susan shared their outline in case other regions would like to sponsor a similar event.

9:00–9:30

Refreshments

Opening Prompt: Focused Free-Writing:

What benefits does an *IMP* class offer students over a traditional classroom?

Make and share a poster

9:30–10:15

Groups of 4 work on an activity from *IMP 1*, *IMP 2*, or *IMP 3*.

The groups must decide on the following:

- How will you introduce the activity?
- How will you facilitate it?

- What are some good questions to ask students in order to stimulate thinking and understanding?
- How will you process and debrief the activity?
- What is the essential mathematics in this activity?
- How does this activity connect with prior learnings and how does this activity relate to the unit problem or a future assignment?

10:15–10:30

Break

10:30–11:30

Group Reports

11:30–12:15

Lunch with Table Topics:

- Making the best use of portfolios
- Getting quality *POWs*
- How to get kids to do homework
- How to make presentations a learning experience for the whole class
- Intervention—What do you do with the kids who aren't getting it?

12:15–12:45

Table Reports

12:45–1:00

Next steps for our region? Where do we go from here?

Raffle (TI-89 calculator)

Comment Cards:

- Was this day helpful?
- What is one thing you got out of today that you will apply in your classroom?
- What kinds of staff development would you like in the future?

"When I collected responses from the opening focused free-writing prompt, we ended up filling three pieces of chart paper. Susan and I wanted this time to be for teachers to revisit their passion for *IMP*. They did! And the neat thing was that we kept revisiting those posters throughout the day and tied the rest of their work to what they knew was powerful about *IMP* from those posters," comments Janice.

## HAWAII

*IMP* teachers have been actively participating in mathematics reform in the state of Hawaii. The state has identified 14 Content Standards grouped in five content strands.

Diana Agor (Mililani HS), Elaine Denny (Kapaa HS), Michael Long (formerly Moanalua HS), Jeanette Tanaka (formerly Kalani HS), and Wendy Tokumine (Farrington HS) are members of a cadre of high school teachers working on Hawaii's Performance Standards. They are identifying performance tasks that may be used to show where students are with respect to the grade 9–12 math benchmarks. Throughout the year, the high school cadre have met to "design" performance tasks and have been collecting sample student work for these tasks. The exemplar (typical student work) with teacher commentary (teacher notes that discuss the evidence found in the work that show that the standard is met) will soon be posted on a Web site.

Elaine, Michael, Jeanette and Wendy also participated in a three-day item review for the Hawaii Assessment Program (HAP). They were among 80 education personnel whose task was to review test items for mathematics and language arts according to

four criteria (standards congruence, instructional sensitivity, out-of-school factors, and absence of bias). The items were field tested last May as part of the HAP criterion-referenced exam.

Diana and Michael will be transferring their talents to Kapolei High School (a new high school in Leeward, Oahu) when it opens its doors in August 2000. The philosophy of the school is based on integrated curriculum that involves intensive reading and writing. It will be a performance-based school that will require students to present a final project that integrates all disciplines, to a committee as a graduation requirement. To keep with the vision of the school, *IMP* will be the mathematics curriculum.

## ILLINOIS

A new school has opened in Chicago with the *Interactive Mathematics Program* as the only mathematics curriculum. Northside College Preparatory High School was built on Chicago's northwest side as part of Mayor Daley's initiative to keep middle class parents from fleeing to the suburbs in search of better schools. The school is headed by principal Dr. James Lalley who envisions a school of active learners engaged in problem solving and meaningful projects. Dr. Lalley regularly directs visitors to the mathematics classes to see what active learning looks like.

The school is on an ABC block with Wednesdays devoted to three-hour colloquia chosen by students in their interest areas. Classes meet twice a week for 95 minutes each. These blocks were sufficient this last year to complete six units in each of *IMP 1, 2,* and *3*. About 40% of the freshman class enter at the level of *IMP 2*. Future plans include providing many sections of AP Statistics and AP Calculus. The entire teaching staff will prepare to teach all levels of *IMP* as well as an advanced placement course.

The public relations involved in making the single mathematics curriculum acceptable to the diverse parental and student communities was carefully planned. Parents and students were educated at information sessions, open house, family mathematics nights, and an eighth grade "*IMP*" style mathematics contest.

Chicago has a policy of creating schools that draw high-scoring students away from the neighborhood schools. As a result, the city provides a unique opportunity to see how *IMP* works in many different kinds of schools. *IMP* in Chicago has been successful at all the schools where administration and faculty supported the change necessary to implement standards-based curriculum. Northside College Prep provides another unique opportunity to show how well *IMP* prepares students for advanced placement courses.

## MIDWEST

Minneapolis Public Schools is in the final stages of being awarded a five year Urban Systemic Project from the National Science Foundation. This will focus on K–5 elementary mathematics and 9–12 science, along with continuing support of the *Interactive Mathematics Program (IMP)* and *Connected Math Project (CMP)* in the middle and high schools. Lynne Garrett, who started her *IMP* career in Bakersfield, California, will be the project director of the Minneapolis program.

## MIDDLE COLLEGE HIGH SCHOOL CONSORTIUM

For the past three years, the Middle College High School (MCHS) Consortium has had a special grant to upgrade the teaching of mathematics in their consortium schools. The grant allowed schools to implement either *IMP* or CPM (College Preparatory Math). This special project is soon to come to an end. Nearly all teachers from the MCHSs participating in the grant have been fully trained in the first three years of *IMP* or the first three years of CPM. However, with the little bit of money left over from the grant, Bobbi Beinacker, Coordinator for the grant, decided to do something a little different at the annual MCHS Consortium Summer Conference. This July, at the Harrison Conference Center on Long Island, New York, math teachers came together for advanced workshops focusing on continued professional growth in the teaching of mathematics. Nearly 30 teachers, both *IMP* and CPM, attended workshops on such topics as Alternative Assessments, Creating the Ideal Student-Centered Classroom, Improving Questioning Strategies, Using Rubrics to Convert Resistant Students into Self-Directed Learners, Using the Graphing Calculator, Math on the Internet, and Supporting Colleagues in Mathematics. Many of the workshops were led by Janice Bussey, *IMP* Consultant, and Chris Mikles, CPM Consultant, who have worked with the Consortium for the past three years. But new teacher leaders emerged to do some of the training. Myra Boime and Roger Butcher, *IMP* teachers from L.A. Southwest, ran the workshop on using rubrics to improve the quality of student work.

The most "gutsy" workshop by far was Creating the Ideal Student-Centered Classroom. Teachers had to bring a video tape of one of their math lessons. During the workshop, the group developed criteria for evaluating an ideal *IMP* classroom. They then designed descriptors of practice for each criteria in terms of what it would look like if a teacher met the standard, was below the standard, or exceeded the standard. The group finally used these descriptors to rate and analyze their own videotaped lessons. Gail Snider from Mott Middle College in Flint, Michigan commented, "I think one of the most helpful things was generating the criteria for our ideal class. In just doing that, I had mental pictures of myself and my classes—good and bad." Cherrita Allen from Boyce Middle College in Pittsburgh, Pennsylvania came away from the workshop very excited. "This workshop was fabulous! I feel that it helped me to not only take a critical look at my classroom but also see other classrooms. I would like other teachers to know that it was an almost painless exercise that helped me tremendously. I was a little nervous about coming but I couldn't imagine a better outcome. Try it and they will like it!" Janice Bussey, who conducted three workshops during the four days, was very pleased with the outcome. "Just because you've been through the initial *IMP* training doesn't mean you have all of those ideal teaching strategies down," she commented. "This conference has been exciting! *IMP* teachers and CPM teachers are working together towards common goals. We are all perfecting our craft in teaching mathematics and getting our students to be the best they can be!"

# Regional IMPressions

## NEW ENGLAND

Janie Malloy of U-32 High School, Montpelier, Vermont, Cathy Capalbo of Narragansett High School in Rhode Island and Bill Blatner of South Hadley High School in western Massachusetts represented the New England region at the *IMP* National TOPS (teacher-leaders) conference in Sausalito, CA in February. Working with Tara Haller of Durango High School in Colorado, Blatner planned an “*IMP* Math Expo” and, on returning to Massachusetts, implemented the plan.

*IMP 1, 2* and *3* students prepared and then presented their solutions to a series of problems before a packed house of parents, teachers and administrators from South Hadley and surrounding schools as well as educators from nearby Smith College and Mount Holyoke College. The problems came from *The Overland Trail*, *Cookies* and *Meadows or Malls?* units and highlighted *IMP*s development of algebraic and graphical reasoning, as well as the complexity of the problems tackled by *IMP* students through the first three years of the program. Fifteen students participated in the presentations using posters, overhead transparencies and a TI-83 overhead calculator. A panel of teachers and *IMP* students then fielded questions about the program from the audience.

In a letter to Blatner, education professor Sam Intrator of Smith College wrote, “Your students embodied all those adjectives we like to throw around: intellectually vital, confident, engrossed, and most impressively, deeply appreciative of the opportunity to be involved in the program . . . It’s rare to see a program so rooted in constructivist principles be so thoughtful and rigorous in content as well.” Congratulations to all who helped make this night a success!

The New England regional family of schools and teachers using *IMP* continues to grow. We now have 39 schools supported by the New England Regional Center with over 275 teachers attending *IMP* workshops this year. More schools attended the summer 2000 workshops. Many teachers who represent the first generation of trainees are beginning to lead workshops as training moves out across the region.

## NEW YORK

The Bronx has taken a leadership role in implementing mathematics reform in New York City. Our superintendency has mandated that every high school in the district pilot a nationally validated standards-based program in September 2000. As a result, 12 schools, (five of which are new to *IMP*), will be teaching *IMP* in the Fall. We are in the process of training approximately 60 Bronx teachers who will be teaching *IMP Year 1* for the first time. Schools that have been on board for the last four years are increasing student enrollment in the program.

## NORTHWEST

Activities can sometimes be enhanced by sharing from teachers’ inservice to directors’ retreat and back to teachers’ inservice. This was accomplished last year when the teachers at the *IMP-NW* Winter Retreat focused on the mathematics studied within the four years of *IMP*. Their results were shared with the *IMP* regional directors at the national retreat where the mathematical content was

expanded upon. The next step was for the Northwest *IMP* directors to share these results back with the original teachers. The entire process gave teachers, teacher-leaders, and directors a broader insight into the mathematics involved in the entire *IMP* curriculum.

In other news, two high schools in the Portland area—Century High School and Tigard High School are on 4x4 schedules. For the past few years their Algebra 1 have been offered as 2-credit classes and have met for 90 minutes, every day, all year long. In order to provide equity between their programs, both schools will also place *IMP 1* on this schedule. This will allow the *IMP 1* classes at these schools to complete most (if not all) of the supplemental problems from each unit as well as allow them to add *Solve It!* to *Year 1* (Tigard High School will also add *It’s All Write* to *Year 1*), and place more emphasis on writing, reflecting, etc. Since *Solve It!* will be in *Year 1*, it is hoped that *Fireworks* will be studied in *Year 2*.

## PENNSYLVANIA

The 1999-2000 academic year was busy and productive for our regional center. Our biggest development has been the growth of *IMP* in nearby suburban districts. Whereas one year ago we had two suburban districts in our *IMP* family, we now have nine! Several of these districts have undergone whole-school change and now offer *IMP* as the only mathematics curriculum for all their students.

We are able to support our new *IMP* teachers through our National Science Foundation grant, the Greater Philadelphia Secondary Mathematics Project. This grant emphasizes professional development including teacher inservices and classroom mentoring for participating teachers. Our mentors are recently retired veteran *IMP* teachers, eager to support others who are new to the curriculum.

Our center’s teachers and directors continue to enjoy working with our colleagues in other regions. For example, our lead teachers and directors are helping New York City’s efforts to support and expand *IMP*. We also continue to share results of our statistical analyses of *IMP* student outcomes and are happy to offer technical advice to others who are conducting their own studies.

## ROCKY MOUNTAIN

Late on a summer Friday afternoon, over 100 teachers are huddled in 10 groups around a school cafeteria complex. In each group, the teachers have been looking at student work, reading about a teacher’s efforts to grade this work, and are now engaged in lively discussion about the issues raised by this situation. In each group, one teacher is clearly the facilitator, asking questions, posting responses, and posing tasks. “Broadening Our Horizons” (BOH) is the *IMP-RMR* teacher leadership workshop. These week-long courses are designed for teachers who are at least two years into the *IMP-RMR* professional development program and who want to take more of a leadership role in their departments, schools and communities.

The 10 participants in this year’s BOH workshop engaged in three types of activities designed to help them meet the following goals:

- to become more focused observers of classroom practice;
- to provide colleagues with support through “cognitive coaching;”

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# IMP National and Regional Centers Contact List

## ROCKY MOUNTAIN . . .

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–to use case discussions as a professional development activity with colleagues.

The classes for teachers in their first and second year in *IMP-RMR*–going on concurrently in rooms down the hall–provided the venue for BOH participants the observe class and interact with the instructors. Using the framework provided by the Cognitive Coaching program, participants learned about and conducted planning conversations with the class instructors, themselves experienced *IMP-RMR* teachers. BOH participants also provided focused feedback to the instructors via reflective post-observation conferences.

Teachers in each *IMP-RMR* course read and discuss a supplementary book chosen by the instructors. For this year's BOH workshop, this book was *On Becoming a School Leader: A Person-Centered Challenge* (Combs, Miser, & Whitaker, ASCD, 1999). Participants read chapters for homework and discussed them after lunch each day.

Woven throughout the week were three “case discussions,” structured group activities built around written or videotape situations that raise complex sets of issues for mathematics teachers. Alongside these discussions, participants engaged in meta-conversations about ways to incorporate and design case discussions with colleagues in their schools.

By Thursday afternoon participants were using their developing coaching skills to prepare–in pairs–to conduct their own case discussion activity, the project-wide activity portrayed at the start of this article.

## NOVA SCOTIA, CANADA

Nova Scotia French schools and the French immersion schools complete the implementation of *Year 4 IMP*, in September 2000. Parents, students, teachers and school administrators have found *IMPacts Mathématiques* very useful to develop a mathematics global culture and to provide an ideal preparation for the International Baccalaureate (IB) examination and certification program.

With the support of the Department of Education, la Direction des Services Acadiens et de Langue Francaise, French mathematics teachers have had very successful training workshops and summer institutes that began in August 1996 and lasted into April 2000. Participant reaction was enthusiastic and resulted in new bonding among teachers from varied schools across the province of Nova Scotia and the province of Prince-Edward-Island with a common interest in improving mathematics education. The *IMPacts Mathématiques* teachers would like to thank Dennis Cavaillé, *IMP* teacher-leader from San Lorenzo Valley High School, in Felton, California, for the effort that he gave by being their instructor during these four years of implementation of the *IMP* curriculum. At the end of March 2000, Antoine Jarjoura, mathematics consultant at the Department of Education and regional director of *IMP*, went to Boston for a training session conducted by Carla Oblas, from New England *IMP*, on the *Pollster's Dilemma* unit and went back to Halifax to provide workshop trainings on this interesting statistics unit.

For next year and for a long-term success of *IMPacts Mathématiques*, our project is involved in the collection and analysis of student achievement data.

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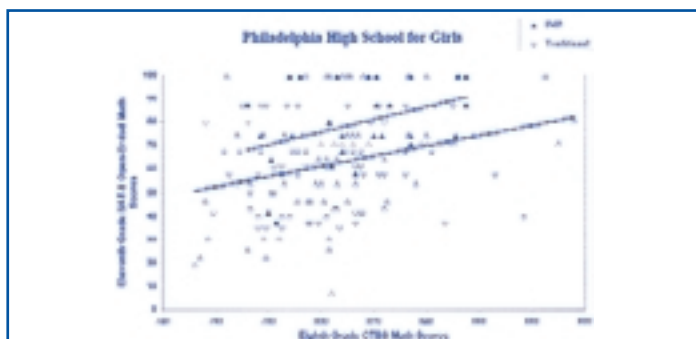
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## IMP students Score Higher . . .

*continued from page 1*

gap between the predicted scores of *IMP* and traditional students. However, the difference in slopes of the two regression lines turned out not to be significant (perhaps due to the small number of *IMP* students). Therefore, the study next proceeded on the assumption that the lines were parallel. When the equations of the best-fit *parallel* lines were computed, the distance between these lines was found to be 9.73. That is, if an *IMP* and a traditional student both have the same eighth-grade CTBS math scores, the *IMP* student's predicted eleventh grade SAT-9 math composite score would be 9.73 points higher.



Best-fit Lines for Open-Ended Component of SAT-9.

To better understand the gains demonstrated by *IMP* students, the open-ended and multiple-choice components of the SAT-9 were examined separately. The graph above shows the best-fit lines for the open-ended component of the test. As suggested by the figure, *IMP* students significantly outscored ( $p < .01$ ) the traditional students on this portion of the test by a comparatively large margin.

Indeed, given the same CTBS scores in eighth grade, an *IMP* student would be predicted to outscore the traditional student by 15.2 points. An examination of the multiple choice scores showed a small gain of 4.27 points for *IMP* students, but this gain was not statistically significant.

The SAT-9 scores analyzed above were reported on a scale of 1 through 99. Based on these scores, the School District of Philadelphia characterizes student performance as being either below basic, basic, proficient, or advanced, with the last three categories considered as passing. An analysis of the scores of all the juniors at Girls' High School (including those excluded from the above study because they did not take the CTBS in eighth grade) found that 80% of the *IMP* students versus 43.5% of the traditional students received passing scores. Also, although *IMP* students comprised only 13.6% of all juniors at Girls' High, they accounted for 35.1% of the scores in the two highest (proficient and advanced) categories.

## Key Comments

### NEW! Three IMP Units Available as Stand-alone Student Textbooks

- *Shadows* (from *Year 1*)
- *Solve It!* (from *Year 2*)
- *Fireworks* (from *Year 3*)

Many schools that use the *Interactive Mathematics Program* have asked that these three units be made available as stand-alone texts to allow for more flexibility in planning their programs. Some schools prefer to use *Shadows*, the last unit of *Year 1*, as the first unit before they begin *Year 2*. And some schools find that they can finish *Solve It!* and *Fireworks*, the first units of *Years 2* and *3*, in the last month of the previous year. To give all schools more flexibility, and to allow schools that have not adopted *IMP* as their core curriculum the opportunity to use these units to supplement their traditional curriculum, Key Curriculum Press has released these three units as stand-alone softcover books.



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