



**Promoting
Rigorous
Outcomes**

in Mathematics and Science Education

**Frequently Asked
Questions &
Answers**

Summer 2004

PROM/SE Questions and Answers Newsletter Summer 2004

Big, ambitious projects such as the PROM/SE partnership generate many questions as people learn about the project and become involved. Below is a set of questions that have been already asked and that might mirror some of your own. Some of the exciting work ahead of us involves questions for which we will need to figure out the answers together. Still, we already have working answers to many basic questions, which we have organized below into three categories: What is the Big Picture? What are we doing now? And what's coming up next? Running through each of these is probably the most immediate question you might have – How do I fit in?

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What is the Big Picture?

So, what IS the big picture?

Wow – that’s a big question! At its heart, the PROM/SE partnership is about empowering educators to use good data about their students, themselves and their curriculum materials to make sound decisions about what to do to improve learning for all students in mathematics and science.

So, the first part of PROM/SE is about collecting much richer data from all our partners than is typically collected by schools, districts or states. Depending on your situation, most of you have helped collect data on student learning and have filled out a detailed survey on your

own math and science background. You may also have helped make sure that others in your building have completed the survey. Your district is providing information about your math and science curriculum materials, the math and science standards in effect in your district, and the professional development activities that your district provides. We will be gathering data in different ways throughout the five years of PROM/SE.

Based on these data, the next steps will be to identify specific challenges in your district and school, and to design and provide the best possible professional development to meet your specific needs and those of your colleagues. Remember that among our main goals is to move toward having high expectations for all students, and to structure teaching to enable students to reach those expectations.

As a PROM/SE Math Associate, you will have the first chance to see and use the data that are collected, and to be involved in professional development activities based on those data. Our hope is that, to the degree you feel comfortable, you will become a valuable resource to the other educators in your building on matters pertaining to PROM/SE specifically and on effective mathematics instruction generally. We see PROM/SE Associates helping colleagues understand what the data tell them about their curriculum and teaching, working with administrators and project staff to identify key areas for improvement, helping to design professional development activities that respond to these key areas, and working with colleagues on strategies to improve their practices.

In other words, PROM/SE Associates – with support from the partnership – will have the opportunity to work with their colleagues in a host of different ways to use school and district data as a basis for targeting key areas for improvement.

How will PROM/SE impact our current reform efforts in mathematics? Could the outcome of the PROM/SE goals cause changes in the math and science curriculum?

Depending upon the nature of your current efforts, your participation in PROM/SE could actually accelerate the effectiveness of those efforts. PROM/SE is based upon the best research about improving student achievement in mathematics, but it is not about any single approach or set of curricular materials. As your knowledge about what your students actually know and need to know about math increases, as you expand your own knowledge about mathematical concepts and strategies for helping students understand them, and as your ability to share these ideas with your colleagues grows, your current efforts should become even more effective. PROM/SE was conceived to work within existing curriculum frameworks, but you may find your school and district sharpening and focusing the curriculum you have.

How will student mobility affect the student data collected?

Student mobility is an important consideration both in trying to understand the student population who will be served by the PROM/SE partners, and in assessing its effectiveness at the end of the project. The data that we will be collecting for this project will help us understand more fully the extent of student mobility in our partners, and improve our ability to find strategies for dealing with the problem. The grade level standards and expectations that are now in place in both Michigan and Ohio may help create more uniformity in the topics addressed in different grade levels, and this can help students who are moving from school to school and the teachers who work with them. As for the effect of student mobility on data collection, there are statistical techniques we can use to account for population shifts; this will be factored into the information districts will receive.

How was parental consent managed for all the students included in this study?

Federal guidelines governing research involving students are quite rigorous, and as researchers, we support these safeguards fully. They do allow data to be collected without individual parental consent as long as the data about students are gathered as part of a school district's overall assessment-based efforts to improve their programs. Note that there is minimal risk to students or teachers, because the federal guidelines require us to treat both student and teacher responses as confidential, which means that the results are not identifiable to individuals. None of the data will be reported at the student level – we're looking for larger trends about how students are doing overall, and what we can do to help them. Data will only be reported in ways that protect the identities of those who respond.

Will socioeconomic status (SES) be considered in analyzing the data? How will we address the likely disparity in scores between small rural and big urban districts, on the one hand, and more affluent, suburban districts on the other?

The greatest educational challenge facing our nation is to diminish the link between SES and student achievement; in fact, this is a major goal of the PROM/SE partnership. SES is a crucial factor in analyzing the Year One "baseline" student data and the Year Five "follow up" student data to see if our efforts have begun to diminish the role of SES in student achievement. For this reason, we will help Associates understand in detail why this link seems to matter so much in mathematics and science.

How "public" will all these data be? Can we expect to see yet another newspaper story reporting how our school compares?

Because it is collected with public money, school-level and higher data are in the public domain. Some form of these data will (and needs to) be made public as part of our collective effort to educate the community on the true nature of the challenges we face, and to marshal support for our efforts to overcome these challenges. That said, we need to be very thoughtful about how data ARE presented to prevent the kind of adverse publicity schools and teachers too often receive. The Executive Management Committee, which includes school district representatives, is paying careful attention to how such data will become public.

The idea that student achievement is limited by a lack of opportunity is fundamental to this project. When you say, for example, that the sequence of Algebra II/Bio/Chem/Physics is taken by very few students, does this mean that: a) certain courses are not offered in some schools (possibly because of a lack of teachers or a lack of student interest), or b) students achievement (or lack thereof!) excludes them from these courses? What exactly does "taken by very few students" mean?

There are two important ideas here about opportunity to learn. One is that student success in later years (high school and college) is often limited by a lack of foundational coursework. For example, the TIMSS research shows that the number of 8th grade students taking algebra or pre-algebra content (regardless of the course title) is disappointingly low – and even lower in schools serving higher percentages of poor and minority students. These students often wind up in lower track math courses in high school that do not prepare them for success in high school or college level science courses.

The second important idea about opportunity to learn is that some schools and districts simply do not offer or expect students to complete the kind of rigorous coursework typically offered students in high-achieving countries. For instance, in our international comparison of student achievement we wanted to compare the performance of U.S. students who were taking Physics with those of other countries, but had a difficult time identifying a sample of U.S. students because so few of our students ever take physics.

In each case, we know that other countries do a much better job of providing the majority of their students with these types of rigorous courses; we believe that our students are capable of doing as well as their counterparts in other countries if given the opportunity to do so.

Another fundamental idea is that students in other countries perform much better on international assessments such as the Third International Mathematics and Science Study (TIMSS). If other countries do a better job preparing students, why don't we adopt their teaching methods? Why are we trying to reinvent the wheel?

This might seem like the logical solution, but it's not that easy. Educational contexts (such as what society expects, what children are prepared for, the way schools are structured, norms for learning, etc.) vary widely across countries. What works in one context doesn't necessarily work in another. Additionally, we are just beginning to have reliable data about what teachers actually do in classrooms internationally. Part of the PROM/SE strategy is to learn what we can about educational expectations and curriculum in these countries, as well as teaching methods and approaches, and then combine that knowledge with our own traditions, practices, and approaches in ways that will work for students in the U.S.

Part of our problem is the need for teachers to see the overall vision of math development and not be limited to their own grade levels. With only a grade level emphasis, teachers might not realize why something needs to be taught, and therefore feel free not to teach it. Will PROM/SE address this problem?

Absolutely – it is critical to move from having and understanding the data to figuring out what can happen in the classroom that will address what the data tell us. Day 2 of the Summer 2004 Math Institute will include opportunities to discuss how to help colleagues see the “bigger picture” of mathematics across grade levels. We look forward to hearing from you about how well the Summer Institute and other PROM/SE activities address these important issues in improving student learning in mathematics.

If this grant was for \$35 million, why is MSU paying only \$10.00 per hour for the involvement of Associates? I don't feel so valuable, just necessary to do the grunt work.

We appreciate your time and effort in completing the survey, and wish we could offer you more in the stipend and honorarium department. Some of our constraints come directly from the National Science Foundation, which sets limits for teacher stipends; other constraints have to do with the large number of teachers involved, the quantity and quality of the professional development opportunities that you will be offered, and the other essential activities that the grant must fund.

For example, you should know that more than one third of the PROM/SE budget is set aside for professional development activities for teachers. We want to be sure that the majority of those funds are directed toward the various institutes, workshops, and school- and district-

based activities that will occur over the course of the five years of PROM/SE. Thus, we can only afford to pay modest amounts for your time in completing the surveys – but we hope that you will see the benefits of having good data as the Associates program develops, and we very much appreciate all of the time and effort that Associates and teachers have put in to this data-gathering phase.

What are we doing now?

I understand that the teacher data was to be collected through a Web-based survey; has this already been done? Our district never received information about this.... I have tried numerous times to take the Web-based survey and can't. My log-on/password keeps being denied. I have tried all suggestions from the data guru. Can another password/log-on be issued?.... We have yet to receive any information on the Web-based survey. No teachers in my building have completed it. Where do we go from here?

In the spring of 2004, at the suggestion of the PROM/SE Executive Management Committee, we attempted to survey teachers about course content goals via the Internet. Let's just say we were overly ambitious in thinking that we could design, mount and effectively communicate about this survey in the brief time that we gave ourselves. The amount of data we were able to collect varied greatly across partners. This was an important early lesson for us in communication and data collection.

So, what next? Stay tuned; we will be in touch with districts individually in the next few weeks with requests and instructions for follow-up data gathering, including paper versions of the web-based survey.

These data are crucial to our baseline information. Math Associates who attend the Summer Math Institute in August will see firsthand how important and powerful such data – e.g., knowing what others are teaching in your building, district and elsewhere – can be in making good decisions about professional development and curriculum to know what other teachers are teaching in your buildings and districts. The teachers in our St. Clair ISD partner site have already had the chance to see this type of data, and their response has been enthusiastic. For this reason, we'll need your help in making sure that the “make up” data collection is a success.

At the Summer Institute, will associates be able to have data to compare and analyze? How will attending the Summer Institute help me prepare for the upcoming school year?

Associates will definitely spend time examining the initial data summaries for their buildings and districts and will have the chance to work at identifying key issues and possible challenges. The idea is that, armed with this information, Associates will take some next steps in their buildings to help their colleagues also look at and interpret the data.

Will we look at data for each school building or only by school district?

Both – though remember our commitment never to provide data reports that would allow identification of an individual teacher or student.

There appeared to be several errors in the Student tests. Do you have a sense of

- a) How many errors there were?*
- b) How you will deal with their impact on the data?*

The student tests were developed on a very short timeline, and included about 1500 different items across all the different forms of the tests. We've done a careful review and analysis of the forms, and have found that the error rate is about 1% -- well below the normal bounds for a test of this type. So, we have corrected the errors and in any future assessments, we hope to have our error rate down to 0%. Analyses will exclude any problematic items, but this will not affect either the breadth or depth of what we can learn about the aggregate groups of students who took the test.

What's coming up next?

Is there a way of keeping everyone informed on PROM/SE events and developments? A calendar of event dates/assessments, etc. would be helpful.

Great idea. This newsletter is part of a comprehensive strategy we are developing, one of multiple ways of communicating with all of the teachers, Associates, and administrators who are involved with PROM/SE. Another important piece of that communications strategy is our website (www.promise.msu.edu), which will continue to grow as our project unfolds.

How many days do you foresee Associates being out of the classroom for PROM/SE in the next year?

PROM/SE activities and projected schedules are being developed even as you read this, including a make-up session for those who could not attend the summer institute, fall and winter workshops, and the first science and second math summer workshops. Activity dates will vary by partner site and district, but you might spend as many as five or six days out of your classroom for PROM/SE professional development and other activities during the 2004-05 school year.

Who will be working on professional development for us? What experience do they bring and what can we expect from them?

One of the many reasons why PROM/SE was awarded this highly competitive grant is the strength of the professional development team we have assembled. Biographic sketches of many of the primary PROM/SE personnel are available on the PROM/SE website. Briefly, the PROM/SE Math Associates professional development is being designed under the direction of co-PIs Joan Ferrini-Mundy and Bill Schmidt, and former National Council of Teachers of Mathematics (NCTM) president Gail Burrill. Gail has been working with a Professional Development Subcommittee of the Executive Management Committee that includes several members of the MSU departments of mathematics and science and mathematics education. A "pilot committee" of Associates has also been deeply involved in the planning (including Betty Bonney, Kathy Cilluffo and Jamie Tenney from our Michigan partner sites, and Vicki Nedelman, Amy Wettingill, Stephaie Myer, Sandy Dension and Karen Rego from our Ohio partner sites).

It's crucial to us that the professional development both carries forward the PROM/SE goals and meets your needs. What you can expect is nothing less than innovative, rich and rewarding "world-class" professional development specifically tailored to you and your students. But be prepared to be challenged – great professional development is not a spectator sport!

Will the associates' professional development involve separation into divisions such as Elementary math, Middle School Math, and High School Math teachers?

The sessions at the August Institute will be designed to look at the development of mathematical concepts and how to teach them from elementary through high school, as well as to consider what this means at each of the grade level clusters. The associates will be working in their district teams, in mixed groups across districts and grade levels, and in grade level clusters.

What if I am not teaching math next year; should I still be a Math Associate?

Yes – you can still be a resource in your building, even if your assignment has changed. It may be that you can recruit another person who is teaching math to join you as a Math Associate. PROM/SE is about building capacity in buildings and districts; your participation should make you a better teacher of mathematics if and when you resume teaching it.

I understand that some of the professional development will be web-based. What will this Virtual Resource be like?

Right now at the “envisioning” stage, the Virtual Professional Development Network is an effort to build an online environment of professional development to support the education professionals in mathematics and science. The Network will be developed based on our current understandings of social networks and online communities, so as to ensure an active and vibrant professional community for teachers. The Network is expected to provide individualized access to PD content based on each teacher’s current content knowledge and teaching context, and to provide immediate response to individual question(s), either from an interactive database of questions and answers or from peer experts in the network, including university faculty and graduate students.

As we envision it, the Network will provide standards-based subject matter content in math and science, and pedagogical content (e.g., exemplary teaching cases) at different levels so that teachers can have access to these materials based on their own needs. We see the Network becoming a community of experts and professionals with varying levels of knowledge in different areas who can provide support for each other through both individual and collective communication channels. For example, a teacher in the system can ask a question. The system will first search the archives for similar questions. If a similar question has been asked and answered, the teacher will be provided the answer(s). If this answer does not meet the needs of the teacher, it will be forwarded to an individual (peer or expert) who has been identified as having expertise in that field. That person will respond within a pre-set limited time frame (say, 24 hours), and the answer will be archived and evaluated. Sounds cool, doesn’t it?

If part of my role as an Associate is to be a resource to others in my building, how do I handle a colleague who refuses to participate?

This is a challenge that lots of us face or may face as the partnership moves forward. We hope that as an Associate you will feel comfortable being an advocate for the data-driven approach to professional development and curriculum that is the foundation of the PROM/SE partnership. But we think of Associates as being examples or exemplars, not enforcers. We believe that most teachers will see what you’re doing and the results you’re getting and gravitate towards you. While we do need all the teachers in your building to play a part in the data collection, we expect your district and partner site to help with participation issues on that.

This was helpful, but I have some questions of my own. How do I get them answered?

We know that there are many more questions out there, and that others will come up throughout the life of the project. That's why this Q&A newsletter will be a regular part of the partnership communications strategy. But this isn't the only way to get answers – your partner site (High AIMS or SMART in Ohio, or your ISD in Michigan) – is a great source of information, and you can always send a question, comment, observation or suggestion to PROM/SE Executive Director Bruce Umpstead (umpstead@msu.edu), who will get back to you or direct it to someone who can.