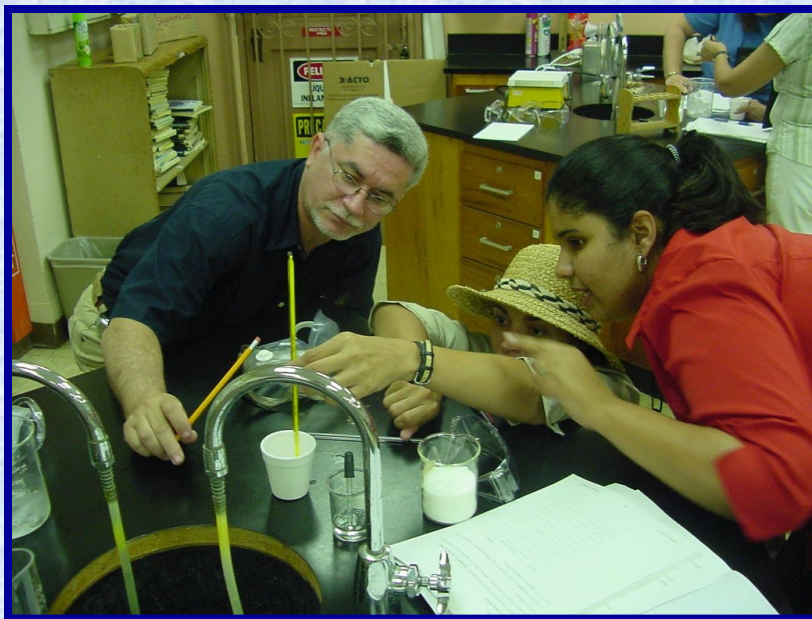


Math and Science Partnership (MSP) Program



A Research and Development Effort



Kathleen Bergin

and

James Hamos

**Division of Undergraduate
Education**

**Directorate for Education and
Human Resources**



Today's Agenda

- **What are we learning?**
- **Revisiting the STEM Summit**
- **Funding Opportunities**
- **Tools & Instruments**



Disclaimer

The instructional practices and assessments discussed or shown in these presentations are not intended as an endorsement by the U.S. Department of Education.



119 Funded MSP Projects

12 Comprehensive Partnerships
(FY 2002, FY 2003)

36 Targeted Partnerships (FY 2002, FY 2003,
FY 2004, FY 2008)

16 Institute Partnerships (Prototype Award
in FY 2003, FY 2004, FY 2006, FY 2008)

9 MSP-Start Partnerships (FY 2008)

2 Phase II Partnerships (FY 2008)

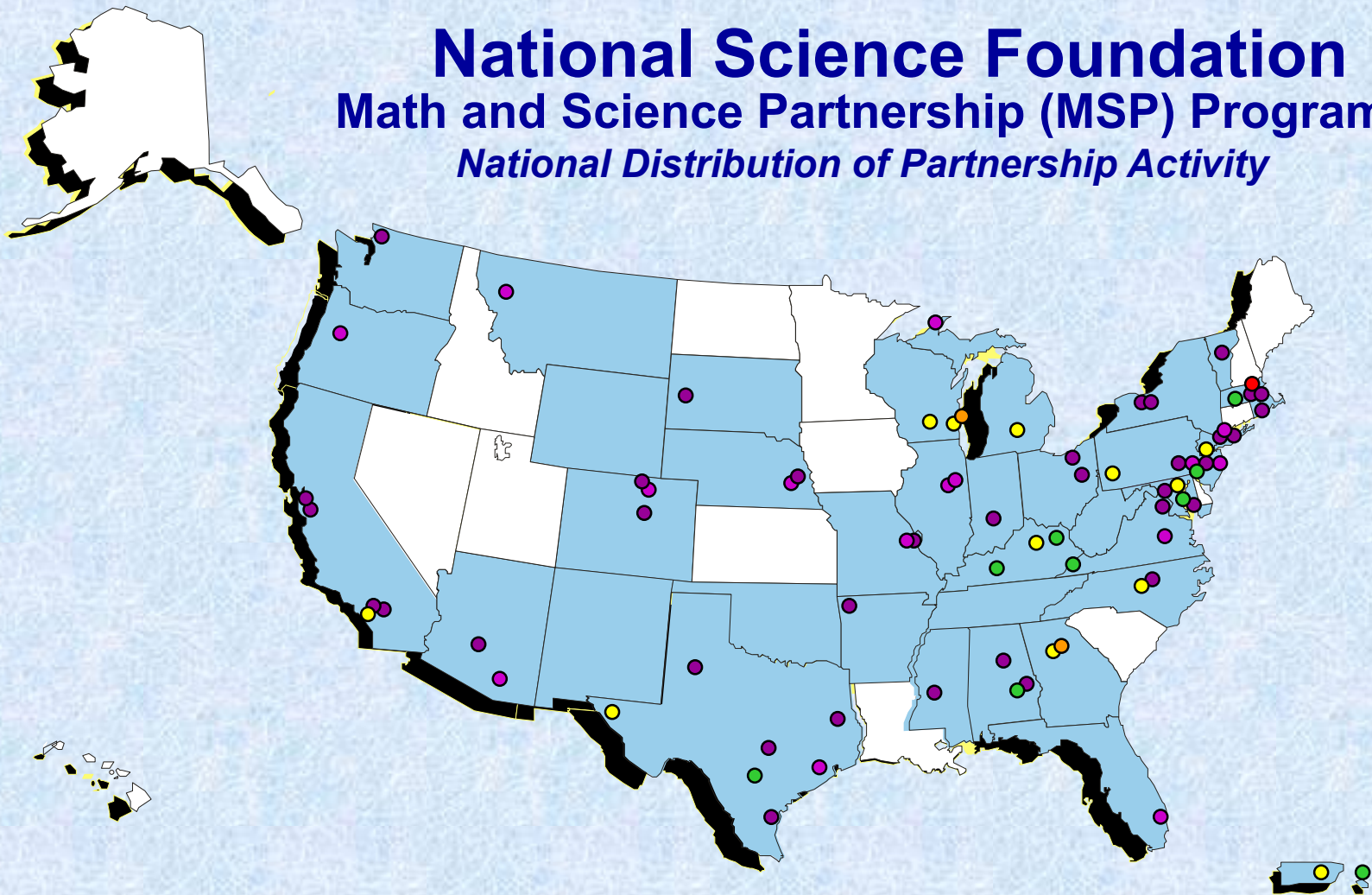
44 RETA projects (Design Awards in FY
2002, FY 2003, FY 2004, FY 2006, FY 2008)



National Science Foundation

Math and Science Partnership (MSP) Program

National Distribution of Partnership Activity



● - Lead institutions / **Comprehensive** partnership projects

● - Lead institutions / **Targeted** partnership projects ● - Lead institutions / **Institute** partnership projects

● - Lead institutions / **MSP-Start** partnership projects ● - Lead institutions / **Phase II** partnership projects

■ - States in which partnerships are active



Scope of Partnership Projects

- **Over 800 K-12 school districts**
- **~5 million students**
- **~147,000 teachers of K-12 math and science**
- **198 institutions of higher education**
- **Over 2600 faculty, administrators, graduate and undergraduate students**



Key Features

- **Partnership-driven, with significant engagement of faculty in mathematics, the sciences, and engineering**
- **Teacher quality, quantity, and diversity**
- **Challenging courses and curricula**
- **Evidence-based design and outcomes**
- **Institutional change and sustainability**



What are we learning?

New tools and instruments, with documented reliability and validity, help professional developers accurately assess the content that teachers need to know for the teaching of math and science

Research projects – at the *University of Michigan*, the *Harvard-Smithsonian Center for Astrophysics* and *Horizon Research* – have developed instruments to assess growth through teacher professional development. By using the new instruments, validated on a national scale with strong attention to psychometric properties, it is expected that professional developers and their evaluators will better learn how to improve teachers' mathematics and science knowledge for teaching. Several studies have found that higher scores on the teacher assessments are correlated with higher quality instruction and increases in student achievement.



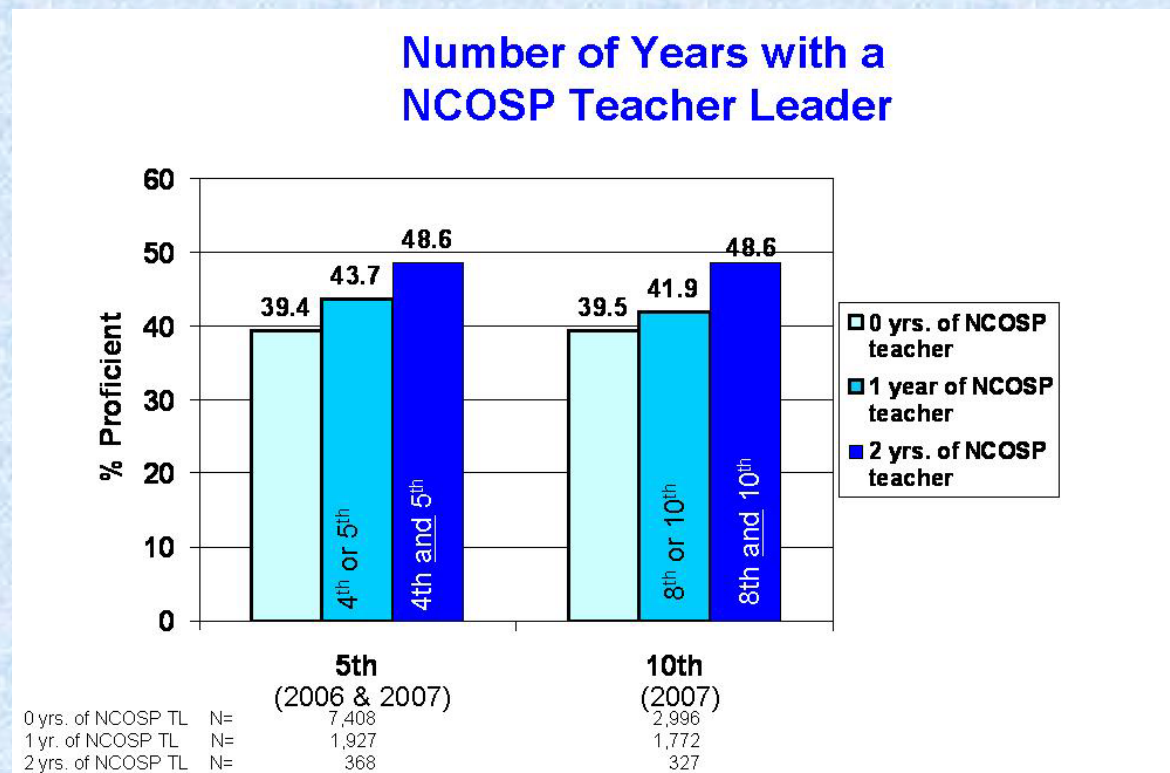
What are we learning?

Through new long-term and coherent courses and programs, the involvement of STEM faculty and their departments in pre- and in-service education enhances content knowledge of teachers

In Western Washington University's *North Cascades and Olympic Science Partnership*, which includes local community colleges and 28 predominately rural school districts, over 150 teachers have been engaged in a long-term experience of three 80-hour summer academies and at least 40 hours of professional development in each of the academic years. The sequence of learning experiences included immersions in science content with connections to instructional materials and classroom practice. Additional experiences focused on collaborative practices, facilitation strategies and leadership skills. This strategic, systematic approach to professional development has resulted in positive and measurable changes in teacher leaders' knowledge and skills.



North Cascades and Olympic Science Partnership



Students who have NCOSP teacher leaders for one and two years of instruction are more likely to score proficient on state assessments than students who do not have such a teacher.



What are we learning?

Teachers-in-residence on college campuses incorporate teacher expertise to broaden discussions of teaching and learning, and to support new efforts in teacher preparation

The Math & Science Partnership of Southwest Pennsylvania, led by the Allegheny Intermediate Unit, designed its Teacher Fellow experience to build intentional feedback loops between K-12 and IHEs, and also improve math and science learning experiences for undergraduates. K-12 Fellows and higher education mentors revise courses with the ultimate goal of improving undergraduate education and preparing pre-service students aspiring to become teachers. By the summer of 2007, 43 K-12 teachers, representing nearly 30 school districts, had participated in the Teacher Fellow program. Further, 74 college courses had been revised through this process, and this has resulted in greater success for IHE students: in at least 75% of revised courses, more than 80% of the students are attaining proficiency (a grade of C or above).



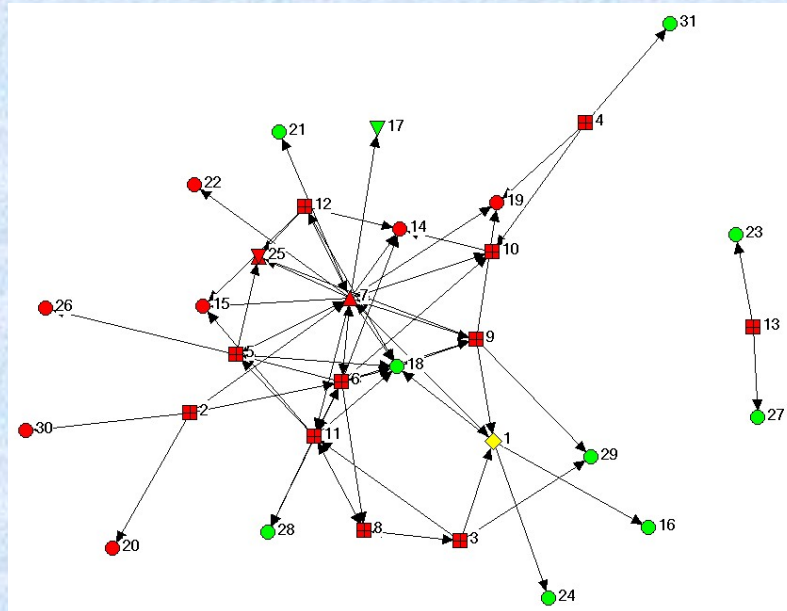
What are we learning?

Research methods in ethnography and social network analysis help document change in institutions and partnerships

The *Milwaukee Mathematics Partnership*, led by the *University of Wisconsin – Milwaukee*, has a major objective to distribute leadership across Milwaukee's schools based on the premise that schools (1) with stronger collaborative networks and (2) where key personnel such as the school-based math teacher leader and district-based math teaching specialist play important roles in that network will demonstrate stronger student achievement results in mathematics. The project has employed Social Network Analysis – the study of relationships within the context of social situations – as a method for assessing distributed leadership, and found that schools embracing the concept of distributed leadership demonstrated stronger school-level achievement outcomes.

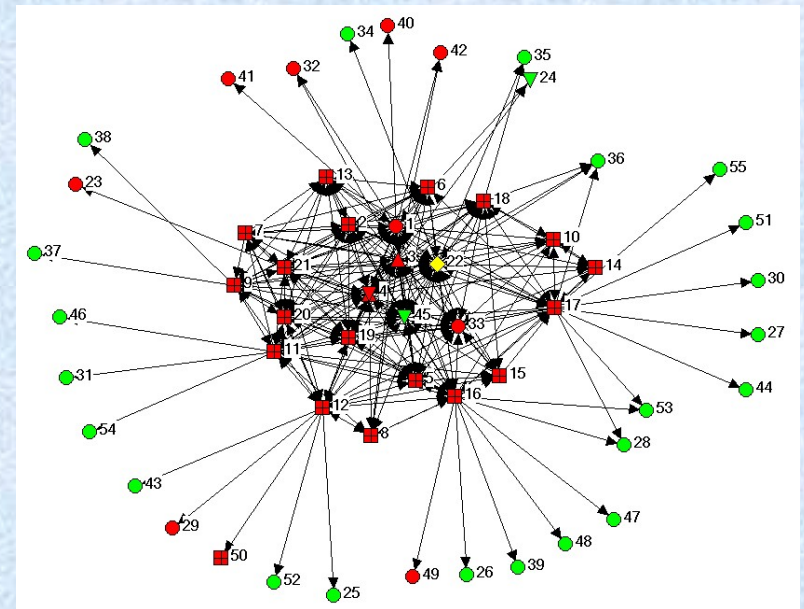


Milwaukee Mathematics Partnership

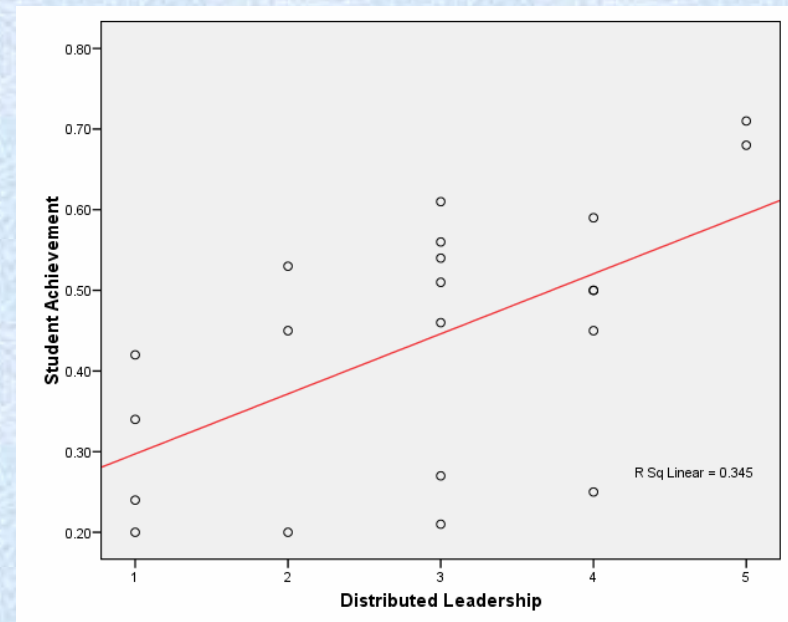


School with Emerging Distributed Leadership

- Distance is important. Closer nodes are more tightly connected than nodes that are further apart.
- Color is important. Individuals from the subject school are colored red and those who are not at the school are green. The MTL for each school is colored yellow.
- Shape denotes role as follows: Diamond = MTL; Overlapping Triangles = Principal; Up Triangle = Literacy Coach; Down Triangle = MTS; Square = Teacher; Circle = Other role



School with High Distributed Leadership





What are we learning?

New centers and institutes devoted to K-16 math and science education facilitate interactions between higher education and K-12, offer professional development for STEM faculty, and advance the scholarship of teaching and learning

Emerging out of the *Math Science Partnership of Greater Philadelphia*, led by *La Salle University* but also including 12 other institutions of higher education and 46 schools districts, is the *21st Century Partnership for STEM Education*, a Pennsylvania nonprofit corporation that will be operated exclusively for educational and research purposes, to promote public awareness, and to provide support for the improvement of student achievement in the sciences, technology, engineering, and mathematics. The Partnership aims to be a regional leader in data-based analysis, program planning, innovative curricula and professional development in K-12 and post-secondary institutions.



What are we learning?

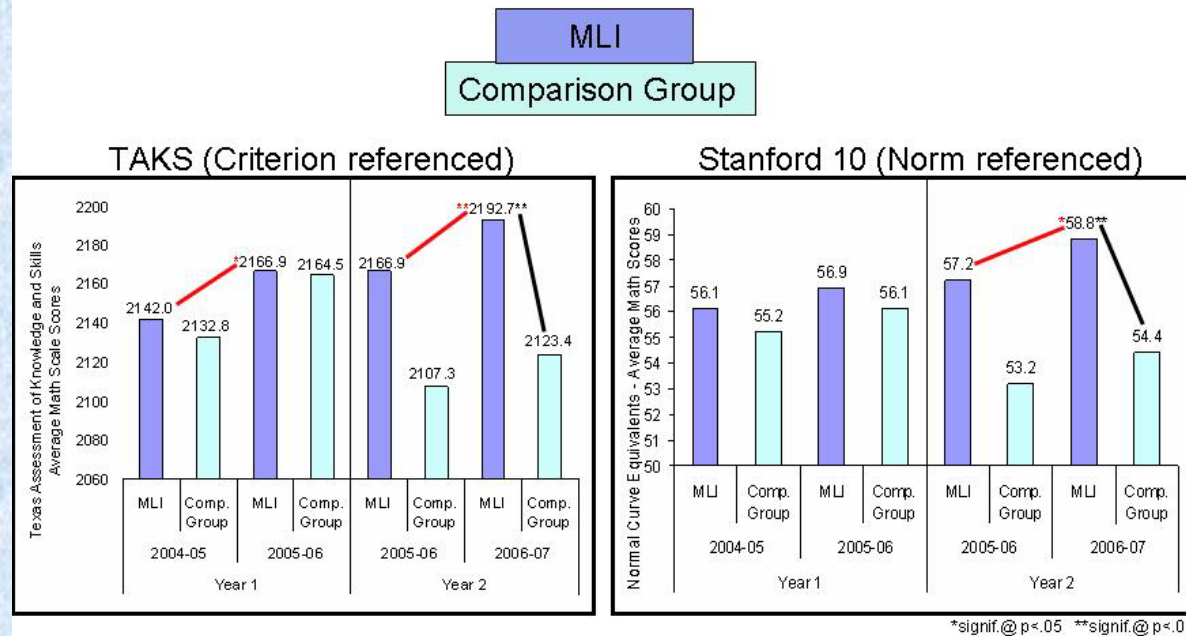
STEM professional learning communities are new exemplars in professional development

In the *Rice University Mathematics Leadership Institute*, a professional learning community emerged among participating lead teachers from the Aldine and Houston ISDs and continues to sustain itself today. This community came to be through formal participation and collaboration in intensive summer leadership institutes over multiple years and through informal means, and embodies the characteristics of a sustaining and coherent *knowledge community* among participants within and across schools, resulting in:

- knowledge and resource sharing, uncharacteristic of typical high school teacher culture;
- a significant increase in the number of Master Mathematics Teacher (MMT) certifications at the 8 – 12 grade level within the state;
- increased student achievement for these teachers; and
- participant teachers' abilities to take counter-culture stands when they perceive personal professionalism to be at risk.

Rice University Mathematics Leadership Institute

HISD Student Achievement Data



Students of MLI teachers consistently outperformed the students of comparison teachers who were matched on course(s) taught, years of experience, and HISD region.





What are we learning?

Revised tenure & promotion policies recognize faculty for scholarly contributions to the advancement of math and science education

A hallmark of the MSP program is its requirement that science, engineering and mathematics faculty from higher education partner organizations commit to working on issues of K-12 mathematics and science education. Some MSP projects have developed strategies to reduce barriers and motivate faculty to increase their time and effort on activities potentially critical to increasing K-12 student achievement. PRISM's Strategy 10 – involving all levels of the *University System of Georgia*, from individual faculty members to departments to Schools and Colleges to the Board of Regents – resulted in a new advocacy policy that encourages and values joint higher education / K-12 work. Faculty in Georgia can now be promoted based on Scholarship in Discovery, in Teaching & Learning and/or in Engagement.



Using the *Inventory of Teaching and Learning (ITAL)*, PRISM has studied whether or not participation in learning communities (LCs) increases K-12 teachers' uses of varied teaching practices in science and/or mathematics classes, and if having an IHE faculty member engaged in LCs increases teachers' uses of varied teaching practices. In a 2006 study, based on ITAL data from over 4000 STEM teachers, those who participated in PRISM LCs reported greater emphasis on standards-based teaching and learning practices than those who did not. Moreover, **teachers who participated in PRISM LCs that had IHE faculty members** reported greater emphasis on both **inquiry-based and standards-based teaching and learning practices** than participants in PRISM LCs that did not have higher education involvement.

Improved Science Scores – GA High School Graduation Test

100% of PRISM districts increased pass rates from 2004-2005. In 2004, only 1 PRISM district had a pass rate greater than 75%; in 2006 – 8 had pass rates greater than 75%.

2003-04

7 PRISM Districts pass rate \geq the state average pass rate (68%)

2004-05

9 PRISM Districts pass rate \geq the state average pass rate (68%)

2005-06

10 PRISM Districts pass rate \geq the state average pass rate (73%)



STEM Summit – December 2007

Why Do STEM Faculty Get Involved in the K-12 Work?

- **People/Personal**
- **Responsibility**
- **Teaching for Learning**
- **Professionalism**



STEM Summit – December 2007

Impact of MSP Involvement on STEM Faculty

- **Increased sophistication in pedagogy and praxis of STEM faculty**
- **IHE STEM course redesign**
- **Awareness of the importance of the STEM faculty role in pre-service preparation—including encouraging strong STEM students to consider teaching as an appropriate career path**
- **Paradigm shift of Respect—Professionalism—Mutual Benefit**
 - **Teachers learn from STEM faculty who have deep subject knowledge and can make vertical and horizontal connections across the discipline**
 - **STEM faculty learn from teachers relative to pedagogy and praxis, including the importance of differentiation (e.g., second language learners)**



STEM Summit – December 2007

Charting a Course for the Future—the need to

- **engage IHE leadership in dialogue around the importance of involvement in improving P-20 STEM education and to give greater value and prestige to STEM faculty contributions**
- **bridge the divide between Education and STEM faculty through interdisciplinary work**
- **involve STEM disciplinary societies in developing standards and measures for evaluating the intellectual merit of the scholarship associated with MSP-type work**
- **expose future teachers of K-12 science to university and industry labs**
- **increasingly engage social scientists in the work and examination of MSPs**

STEM Summit – December 2007

*Ultimately, there are no quick fixes...
the substantive improvement of K-20
STEM education requires long-term
attention from people who are
committed to long-term solutions.*





New FY'09 Solicitation:

NSF 09-507



FY'09 MSP Solicitation

NSF 09-507

In this solicitation, NSF seeks to support six types of awards:

Partnerships

Targeted **

Institute

MSP-Start

Phase II

***Research, Evaluation and Technical
Assistance (RETA)***

***Innovation through Institutional
Integration (I³)***



Targeted Partnerships

- **Focus on improving student achievement**
- **Choose a grade range, critical juncture, or a specific discipline where analysis indicates effort would result in great improvement**
- **Involve teachers in multi-year, content and pedagogical content learning experiences**
- **Contribute evidenced-based findings to the knowledge base about teacher and student learning**
- **Articulate institutional changes for all core partners**



Institute Partnerships

- **Develop master/lead teachers through multi-year programs of coherent study within a particular discipline, plus a strong leadership component**
- **Contribute evidenced-based findings to the knowledge base about teacher leadership and its impact on student learning**
- **K-12 core partners are:**
 - **Districts from which participants are selected, and**
 - **Required to grant sufficient non-classroom time for participants to carry out responsibilities**



MSP-Start Partnerships

- **Not a prerequisite for a full partnership proposal**
- **NSF seeks to diversify the types of institutions engaged in the NSF MSP effort--institutions of higher education of varying scope, size, experience and perspectives emphasizing minority-serving institutions (e.g., Tribal Colleges, Historically Black Colleges and Universities, Hispanic Serving Institutions), community colleges and primarily undergraduate institutions**
- **Will conduct the data collection, analysis, team building and evaluation necessary for developing a proposal for a full MSP Targeted or Institute Partnership**
- **Successful MSP-Start awardees build strong partnerships, with or without further NSF Funding**



MSP Phase II Partnerships

- **From any institution of higher education partner in a previously funded Comprehensive or Targeted Partnership whose work began in 2002 through 2004**
- **Concentrate on analysis, adaptation, dissemination and use of existing innovative practices developed through prior MSP support.**
- **Phase II Partnerships must include:**
 - **Some, but not necessarily all, of the original partners and the rationale for the new Partnership,**
 - **One or more research questions, in conjunction with appropriate research methodologies,**
 - **Detailed Evaluation Plan with benchmarks and measures that will demonstrate results, and**
 - **Plans to continue longitudinal analyses on aspects of the prior work and must continue to contribute data to the MSP Management Information System**

Research, Evaluation and Technical Assistance (RETA)

- **RETA directly supports the work of the Partnerships**
- **In Solicitation 09-507, RETA seeks methodologically rigorous studies on the impacts of MSP activities on student or teacher learning. Longitudinal and cross-site studies are particularly encouraged as are those that test innovative methodologies**



Innovation Through Institutional Integration (I³)



Innovation through Institutional Integration (I³)

- I³ challenges institutions to think strategically about the creative integration of NSF-funded awards, with particular emphasis on awards managed through programs in the Directorate for Education and Human Resources (EHR), but not limited to those awards
- In FY 2009, proposals are solicited in multiple EHR programs that advance I³ goals: CREST, GSE, HBCU-UP, ITEST, LSAMP, MSP, Noyce, RDE, and TCUP
- All I³ proposals are reviewed in competition with one another
- An institution may submit only one I³ proposal in only one program; Does not affect submission to other programs





Other Opportunities for Funding

Advanced Technological Education (ATE)

Focuses on the education of technicians for the high-technology fields that drive our nation's economy in part through programs that are designed to improve existing as well as prospective K-12 teachers' technological understanding; to provide them with experiences to use in engaging students in real world technological problems; and to strengthen their preparation in science and mathematics overall

Course, Curriculum and Laboratory Improvement (CCLI)

Supports efforts to create, adapt, and disseminate new learning materials and teaching strategies, develop faculty expertise, implement educational innovations, assess learning and evaluate innovations, and conduct research on STEM teaching and learning



Other Opportunities for Funding

Robert Noyce Teacher Scholarship Program

Encourages talented STEM majors and professionals to become K-12 mathematics and science teachers through scholarships, stipends, and academic programs if they commit to teaching in high-need K-12 school districts. The program also provides professional development and salary supplements for exemplary math and science teachers to become Master Teachers in high-need school districts.

NSF Scholarships in Science, Technology, Engineering, and Mathematics (S-STEM)

Makes grants to institutions of higher education to support scholarships for academically talented, financially needy students, enabling them to enter the workforce following completion of an associate, baccalaureate, or graduate level degree in science and engineering disciplines.



Tools & Instruments



Evidence: An Essential Tool

***Planning for and Gathering
Evidence Using the Design-
Implementation-Outcomes
(DIO) Cycle of Evidence***

NSF 05-31



RETA Developed Tools

Design, Validation, and Dissemination of Measure of Content Knowledge for Teaching Mathematics [University of Michigan; PI - Heather Hill] – <http://sitemaker.umich.edu/lmt/home>

- Assessment items for mathematics teachers in the upper elementary and middle school grade levels
- Approximately 300 items in number, operations, pre-algebra and algebra, and geometry
- Disseminated to approximately eighty projects, including ten NSF MSPs and numerous U.S. Department of Education MSPs

RETA Developed Tools

Assessing Teacher Learning About Science Teaching (ATLAST) [Horizon Research, Inc. and AAAS; PI - Patrick Smith] – <http://www.horizon-research.com/atlast/>

- Instruments that measure change in knowledge needed by middle school teachers in three topics of science
- Provides assessment materials, scoring and reporting as part of its technical assistance
- Eight of the U.S. Department of Education's MSP sites, and a number of NSF MSPs, are using the assessments to gauge the impact of their professional development activities



RETA Developed Tools

Misconception Oriented Standards-based Assessment Resource for Teachers (MOSART)
[Harvard University; PI - Philip Sadler] –
<http://www.cfa.harvard.edu/smgphp/mosart/index.html>

- Content instruments for K-12 physical science and earth science, based on the research literature on students' science misconceptions
- A free, open web site that provides versions of its tests to any interested party, including an online tutorial that explains how the tests were developed and their intended uses
- Expertise shared with U.S. Department of Education MSPs

MSPnet Toolbox

MSPnet

Log Out | My Space | Help

Welcome, Jim

Search | Contact MSPnet

MSPnet Hub **NSF Officers**

Home
MSPnet Essentials
Membership
Project Showcase
Search & Mail Center
Working Groups
Online Event Center
Library
Resources
Useful Websites
MSP Toolbox / Materials
MSP Program Info
NSF News
ED News
Related NSF Programs
Conferences
Calendar
What We're Learning

Resources / MSP Toolbox / Materials

MSP Toolbox / Materials

NEW! **POST** **SEARCH**

The MSPnet Toolbox contains materials that projects have found particularly useful in their work and that may be adapted for use by other MSP projects. Tools may include assessment instruments, evaluation protocols, form letters, etc. We look forward to your suggestions for tools that would be most useful to share in this area of the site.

There are 31 documents in this category.

1 2 next »

| Posted | Title |
|----------|--|
| 03/20/08 | MSP-KMD Knowledge Reviews |
| 01/16/08 | STEM Academy Measurement: An Evaluation Tool |
| 11/26/07 | Core Elements Involved in Designing, Implementing, and Studying an Improvement Program |
| 08/09/07 | SEC CD: Surveys of the Enacted Curriculum Interactive CD, 2006 |
| 08/07/07 | SEC On-Line |
| 08/07/07 | Surveys of Enacted Curriculum (SEC) |
| 05/23/07 | Partnership Rubric |
| 05/15/07 | Summary of the Development and Use of the Inventory for Teaching and Learning (ITAL) in the External Evaluation of the Georgia Partnership for Reform in Science and Mathematics (PRISM) |
| 05/03/07 | Teacher Qualifications Literature Data Base |
| 05/03/07 | A Science Lesson Plan Analysis Instrument for Formative and Summative Program Evaluation of a Teacher Education Program |

start | NSF WinStation III | Inbox - Microsoft Out... | US NSF - National Sci... | MSP Toolbox / Materi... | Microsoft PowerPoint ... | Internet | 4:44 PM

http://hub.mspnet.org/index.cfm/msp_tools



OERL Toolbox

Online Evaluation Resource Library - Microsoft Internet Explorer provided by National Science Foundation

File Edit View Favorites Tools Help

Address <http://oerl.sri.com/>

Google OERL

OERL : Online Evaluation Resource Library

contact contributors

search

overview

Programs

CCLI

CLT

ITEST

Topic

curriculum development

teacher education

faculty development

laboratory improvement

under-rep. populations

technology

Supports

criteria

Welcome to OERL, the Online Evaluation Resource Library. This library was developed for professionals seeking to design, conduct, document, or review project evaluations. The purpose of this system is to collect and make available evaluation plans, instruments, and reports for NSF projects that can be used as examples by Principal Investigators, project evaluators, and others outside the NSF community as they design proposals and projects. OERL also includes professional development modules that can be used to better understand and utilize the materials made available.

OERL's mission is to support the continuous improvement of project evaluations. Sound evaluations are critical to determining project effectiveness. To this end, OERL provides:

- A large collection of sound plans, reports, and instruments from past and current project evaluations in several content areas
- Guidelines for how to improve evaluation practice using the Web site resources

OERL's resources include instruments, plans, and reports (the tabs across the top of this page) from evaluations that have proven to be sound and representative of current evaluation practices. These resources are organized into project categories, represented by the tabs at left. Also included are [alignment tables](#) that contain criteria and a glossary to help you develop your own plans, reports, and instruments.

Take the site tour!

Navigating OERL

This site has a set of tabs across the top and another running down the left side. Each combination of the two takes you to a different page. For example...

[CCLI Evaluation Plan Webinar](#)

[Pointer to Evaluation Articles](#)

[OERL Presentations and Papers](#)

[Evaluation Event Calendar](#)

[Professional Development Modules](#)

Not sure where to start?
Try reading some [user scenarios](#) for these resources.

<http://oerl.sri.com/>



Surveys of Enacted Curriculum

The screenshot shows the SEC Online website in a Microsoft Internet Explorer browser window. The title bar reads "SEC Online - Welcome - Microsoft Internet Explorer provided by National Science Foundation". The address bar shows the URL "http://seconline.wceruw.org/secWebHome.htm". The website has a green header with the title "Surveys of Enacted Curriculum" and the subtitle "State Collaborative on Assessment and Student Standards". Below the header is a navigation bar with buttons for "Resources", "SEC Quiz", "SEC Reports", "Content Analysis", "Registrar", and "Contacts". A "Help" link is also present. The main content area is titled "Welcome to SEC On-Line" and includes a paragraph about the site's purpose: "The purpose of this site is to encourage teacher reflection and conversation about classroom practice and instructional content." It also has a section titled "About the Survey" which explains the data collection and reporting model. A "Registration Guide" link is provided. On the right side, there is a "Login" section with fields for "Username:" and "Password:", and buttons for "Register" and "Login". Below the login section is a "Survey Administrators" section with a numbered list of steps: 1. Contact Us to coordinate survey dates and participation; 2. Check with your Computer Lab Director to make sure facilities meet minimum requirements; 3. Test the survey on computers to be used by participants; 4. Print the Reference Guide (PDF) and make copies for participants. The bottom of the browser window shows the Windows taskbar with various open applications and the system clock displaying 9:23 AM.

SEC Online - Welcome - Microsoft Internet Explorer provided by National Science Foundation

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites AutoFill Send to Leadership Content Knowledge Settings

Address <http://seconline.wceruw.org/secWebHome.htm> Go Links

Google Leadership Content Knowl Go Bookmarks 22 blocked Check AutoLink AutoFill Send to Leadership Content Knowledge Settings

Surveys of Enacted Curriculum

State Collaborative on Assessment and Student Standards

Resources SEC Quiz SEC Reports Content Analysis Registrar Contacts

Help

Welcome to SEC On-Line

The Surveys of Enacted Curriculum web site.

The purpose of this site is to encourage teacher reflection and conversation about classroom practice and instructional content.

About the Survey

Using a survey data collection and reporting model, teachers can compare their own practice and instructional content to responses by other teachers around the country and within their school or district.

Participating states, schools and districts are able to make use of aggregated teacher reports (individual teacher responses are disclosed only to the teacher) to develop a base-line of information about teacher practice in mathematics, science and English language arts, or to inform professional development or school improvement planning efforts.

[Registration Guide](#)

Login

Username:

Password:

[Forgot your Username or Password?](#)

Survey Administrators

- 1 [Contact Us](#) to coordinate survey dates and participation
- 2 Check with your Computer Lab Director to make sure facilities meet [minimum requirements](#)
- 3 Test the survey on computers to be used by participants
- 4 Print the [Reference Guide](#) (PDF) and make copies for participants

<http://seconline.wceruw.org/secWebHome.htm>



Teacher Content Knowledge & Teacher Leadership

MSP - Knowledge Management and Dissemination - Microsoft Internet Explorer provided by National Science Foundation

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Address http://www.mspkmd.net/ Go Links

Google Bookmarks 22 blocked Check AutoLink AutoFill Send to Settings

Math and Science Partnership Knowledge Management and Dissemination

KMD Home

Under Construction

This dissemination site will provide syntheses of findings in the K-12 arena in the areas of deepening teacher content knowledge, teacher leadership preparation and practice, and teacher induction. These syntheses will articulate the contribution of the Math and Science Partnership program to the knowledge base and identify "gaps" and promising practices/strategies for further investigation.

First to appear on this site is a series of Knowledge Reviews that provide a summary of what we know from experienced practitioners and research in the areas of deepening teacher content knowledge and teacher leadership.

| Deepening Teacher Content Knowledge | Teacher Leadership | Teacher Induction |
|---|--|-------------------|
| Teacher Knowledge of Challenging Mathematics/Science Content Posted 12/17/07 | Teacher leaders providing classroom support to teachers through demonstration lessons/modeling Posted 1/25/08 | Coming soon |
| Teacher Knowledge of Student Thinking Posted 1/14/08 | Teacher leaders providing classroom support to teachers through lesson planning Posted 2/29/08 | |
| Defining Teacher Content Knowledge Posted 2/18/08 | Teacher leaders designing and facilitating professional development for teachers Posted 4/3/08 | |
| Engaging Teachers in Content-based Investigations Posted 03/20/08 | Teacher leaders supporting the implementation of instructional materials Posted 05/07/08 | |
| Teacher Knowledge: Use of Student Instructional Materials Posted 04/16/08 | Teacher leaders providing leadership to teams of teachers and administrators Coming 06/12/08 | |
| Teacher Knowledge: Developing Conceptual Maps of Content Coming soon | Preparing teacher leaders Coming soon | |
| Teacher Knowledge: Analyzing Classroom Instruction Coming soon | Use/impact of release time on teacher leaders providing instructional support to teachers Coming soon | |

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<http://www.mspkmd.net/>



Distributed Leadership



Distributed Leadership Study :: Projects - Microsoft Internet Explorer provided by National Science Foundation

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Back Forward Stop Home Search Favorites Reload Mail Print Address Book

Address <http://www.sesp.northwestern.edu/dls/projects/> Go Links

Google Go Bookmarks 22 blocked Check Look for Map AutoFill Send Settings

The Distributed Leadership Study

The School of Education & Social Policy, Northwestern University

- DLS Home
- About Distributed Leadership
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- Instruments
- Publications
 - Papers
 - Dissertations
 - Presentations
- Site Map

Projects

Distributed Leadership for Middle School Mathematics Education: Content Area Leadership Expertise in Practice

The goal of this project is to design and validate a series of research instruments to identify leadership for mathematics instruction in middle schools and for documenting instructional leadership practice. Adopting a distributed perspective on leadership, this work focuses on both formally designated and informal leaders and their leadership routines.

Our objective is to develop valid and reliable instruments that make the day-to-day practice of school leadership for mathematics instruction more transparent, as well as measure changes in this practice over time. This project utilizes Social Network Surveys, Experience Sampling Methods (ESM) and Daily Practice Logs. To validate these instruments we are using a combination of shadowing, end of day cognitive interviews, and semi-structured interviews. These instruments are used to describe and analyze when and how teachers and other educators solicit or provide instructional advice and the degree to which these resources influence their work.

The following are resources and findings from the Distributed Leadership for Middle School Mathematics Education Project.

Principal Experience Sampling Method (ESM)

The ESM log is designed to determine the activity of the participants at a specific moment in time with a series of signals. Using handheld computers (PDA), participants are beeped at randomly selected times throughout the workday alerting them to fill out a brief questionnaire programmed on the PDA. The questionnaire asks participants to document the type of administrative or curricular activity in which they are currently engaged.

Implementation

The ESM log for school principals was piloted in 52 elementary, middle, and high schools in Spring 2005. Forty-two of the fifty-two school principals completed the log on a regular basis over a 6-day period. At 15 randomly selected times throughout the workday the PDA would beep and vibrate, alerting them that it was time to fill out a brief questionnaire programmed on the PDA. In order to validate the instrument, we shadowed a sub-sample of the school principals and had all 52 school principals complete an end of day (EOD) practice log. We also conducted an email-based survey of the school principals at the end of the logging period that focused on their experience completing the log.

Results/Findings

The majority of the analysis performed on these data has pertained to the validity and reliability of the methodology of ESM. Our findings suggest that there is a high level of agreement between these data and the data that were captured via an end of day web log, specifically in regards to how principals spend their time. The ESM data was also found to be highly correlated with the data logged by a shadower who observed five different principals for one day each. Our findings suggest that ESM is a valid and reliable method for collecting data. This is a significant finding in that ESM drastically reduces recall bias while maintaining reasonably high response rates.

In an attempt to determine instrument reliability and validity, we compared the results of the ESM log with an end of day (EOD) practice log that also captures how principals spend their time. A significant correlation was identified when comparing the percentage of time spent each day on Administration, Instruction and Curriculum, Professional Growth, and Fostering Relationships that was captured via the EOD and ESM logs. In both instruments, the percentage of time spent on administration and instruction or curriculum exceeded 80% of the total time reported. Using regression techniques, we confirmed a high-level of agreement in these percentages. To account for inflated agreement due to other factors, the regression models that were used to calculate the correlation coefficients controlled for day, time, non-response, and principal effects.

As an additional means of validation we shadowed 5 principals and observed them each for 1 day. This data was then compared to the ESM data and correlation coefficients were calculated between the ESM and the shadower data on the same measure. Results indicated that the relationship between

start NSF WinStation III Inbox - Micro... ED State Super... MUSR math - G... Page Not Found... Distributed Lead... Distributed Lead... Microsoft Word 10:02 AM

Instructional Leadership Daily Practice Log
Principal Experience Sampling Method (ESM) Log
School Staff Network Survey

<http://www.sesp.northwestern.edu/dls/projects/>

Leadership Content Knowledge

The screenshot shows a web browser window titled "Thinking About Mathematics Instruction - Microsoft Internet Explorer provided by National Science Foundation". The address bar shows the URL <http://www2.edc.org/tmi/index.html>. The website has a red and yellow color scheme. On the left is a red sidebar with white text links: Home, Collaborators, Project Description, Advisory Board, Papers & Publications, Survey, Project Staff, and Center for the Development of Teaching Homepage. Below the last link is a small box with the EDC logo and text: "TMI is a project in EDC's Center for the Development of Teaching". The main content area has a yellow background. At the top, it says "TMI" and "Thinking About Mathematics Instruction". Below that, the title "Thinking About Mathematics Instruction: A Study of Leadership Content Knowledge of Elementary and Middle School Principals" is displayed. A "Welcome!" message follows, stating: "The Thinking About Mathematics Instruction (TMI) Study explores the nature of instructional leadership for mathematics that elementary and middle school administrators provide for instructional faculty as well as parents at their school. The study design for data collection about principals includes both survey and case study approaches." It then mentions: "Barbara Scott Nelson of Education Development Center is the Principal Investigator for this project. This RETA study is funded by The National Science Foundation and will be completed in September 2009." Below this, it says: "Please explore the links on the left to learn more about the study and our research colleagues." and "You may also contact: Kim Foster". The Windows taskbar at the bottom shows several open applications including "NSF WinStat...", "Microsoft...", "ED State Su...", "ED MSP Coor...", "MUSR math...", "Leadership C...", "Thinking Abo...", "Bethel Colleg...", and "Microsoft Excel". The system clock shows 9:35 AM.

<http://www2.edc.org/tmi/index.html>





Website for MSP at NSF

<http://www.nsf.gov>

Click on Program Area – Education

**Click on Division of Undergraduate
Education (DUE)**

**Click on Math and Science Partnership
Program**

Website for MSPnet

<http://mspnet.org>

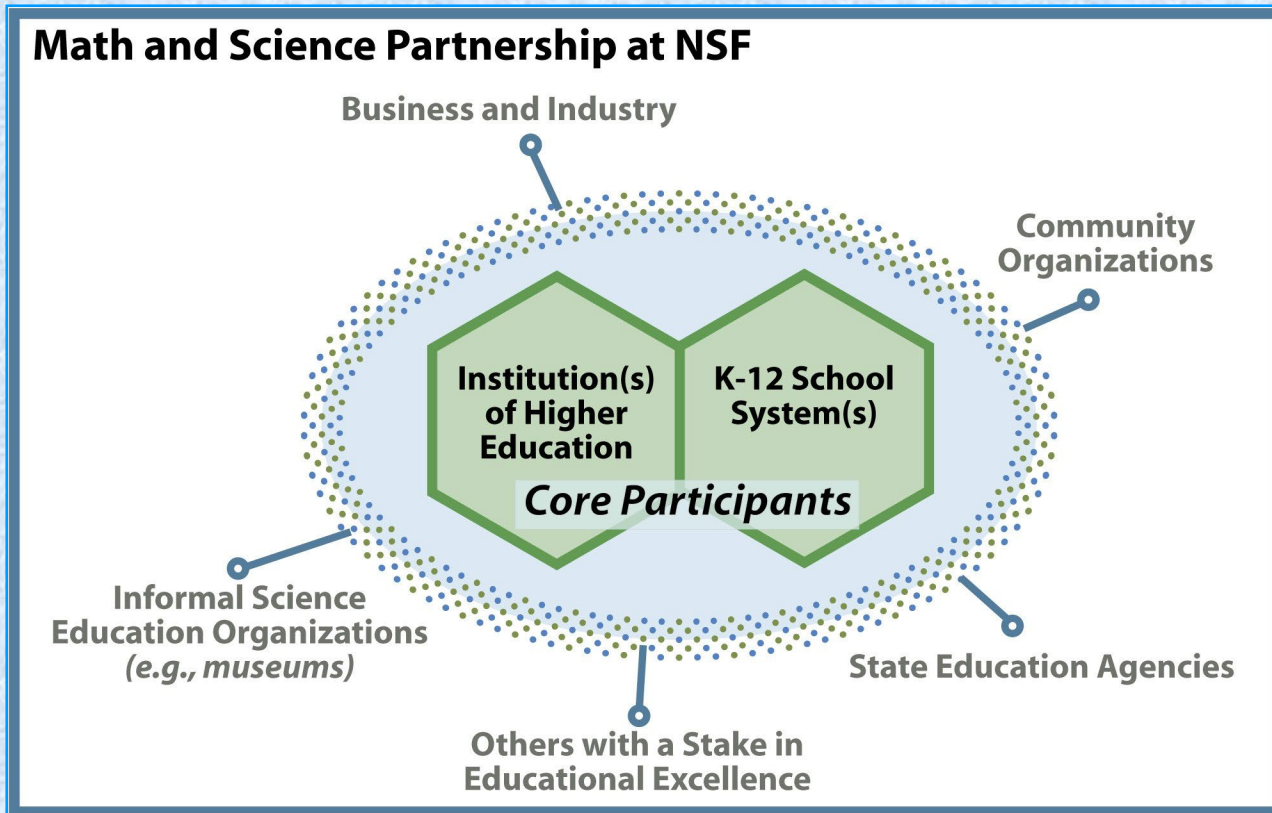


General Information on NSF's Math and Science Partnership Program

NSF's Math and Science Partnership

- **A research & development effort at NSF for building capacity and integrating the work of higher education with that of K-12 to strengthen and reform mathematics and science education**
- **Launched in FY 2002 as a key facet of the President's NCLB vision for K-12 education**
- **Strongly reauthorized as part of the America COMPETES Act of 2007**





Through the Math and Science Partnership program, NSF awards competitive, merit-based grants to teams composed of institutions of higher education, local K-12 school systems and supporting partners. At their core, Partnerships contain at least one institution of higher education and one K-12 school system.



NSF's Math and Science Partnership

- **Seeks to improve student outcomes in mathematics and science for all students, at all K-12 levels**
- **Is a coordinated effort between NSF and ED, who together have defined the program linkages necessary to manage investment for greatest effectiveness**



What distinguishes NSF's MSP Program?

- **Substantial intellectual engagement of mathematicians, scientists and engineers from higher education in improving K-12 student outcomes in mathematics and the sciences**
- **Depth and quality of creative, strategic actions that extend beyond commonplace approaches**



What distinguishes NSF's MSP Program?

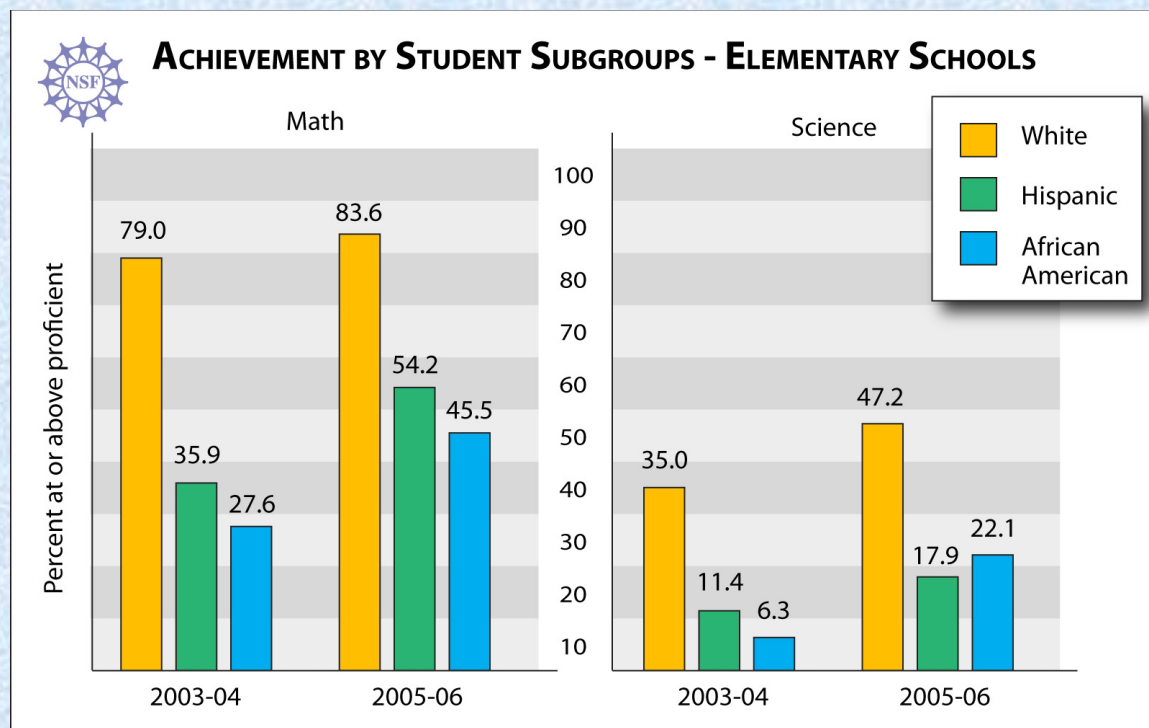
- **Breadth and depth of Partnerships – Partnerships between organizations, rather than among individuals only**
- **Organizational/institutional change driven by Partnerships**
- **Degree to which MSP work is integrated with evidence; degree to which the work of the Partnerships is itself the work of scholars who seek evidence for what they do**



Examining Student Achievement

- Year-by-Year Trend Analysis
- Matched comparisons
- Meta-analysis pre/post assessments

***Closing the
Achievement
Gap***





**What tools and instruments
are you aware of in current use
in your state funded MSP
projects?**

**What tools and instruments
are needed?**



**What else should we be
learning about?**