FEATURED PAPER SESSION:

Sustaining Momentum for Improvement

Comprehensive MSP:
Math and Science Partnership of Southwest Pennsylvania

Nancy R. Bunt

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2067 Massachusetts Avenue
Cambridge Massachusetts 02140
617-547-0430

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Principal Investigators
Joni_Falk@terc.edu
Brian_Drayton@terc.edu

Conference Documentation
Catherine McEver

About This Summary

This documentation of the 2010 Math and Science Partnership Learning Network Conference offers a brief summary of the presentation that took place during one conference breakout session and focuses on questions, answers and discussions during the session.

Readers interested in pursuing information about the project discussed in this breakout session are encouraged to visit MSPnet to access the full PowerPoint presentation.

The abstract for this presentation is posted on MSPnet at the following URL:

http://hub.mspnet.org/media/data/44_Bunt.pdf?media_000000006531.pdf

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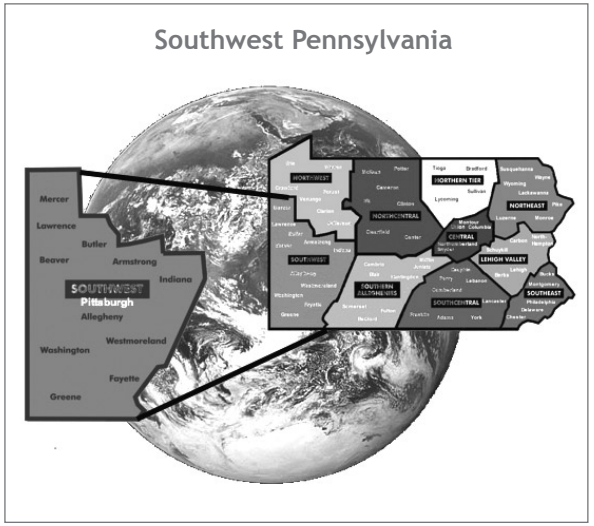
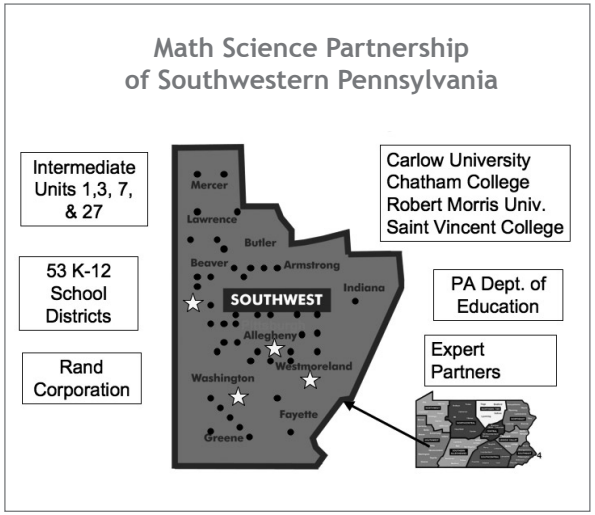
SUSTAINING MOMENTUM FOR IMPROVEMENT

Project Overview

Nancy Bunt begins by offering some background context regarding the MSP of Southwest Pennsylvania, pointing to the project's geographic location where eleven counties surround the city of Pittsburgh, and noting the project's partners. In Pennsylvania there are 500 school districts, one department of education, and twenty-nine Intermediate Units operating as regional service agencies. This is not a hierarchical structure and the Intermediate Units are not in charge of those school districts; the IUs provide professional development and shared

Nancy Bunt





Learning Network Conference Breakout
Session Number: 4 - 44

Author & Presenter:
Nancy R. Bunt

Comprehensive MSP Project:
Math and Science Partnership of Southwest Pennsylvania

SW PA MSP is a comprehensive, K-12 math and science MSP funded in 2003. It involves urban, suburban and rural settings across the 11 counties surrounding the city of Pittsburgh. IHE partners have been 4 smaller private colleges and universities more heavily focused on teaching than research. K-12 partners include 45 local control K-12 school districts ranging in size from 1,000 to 7,000 students. The lead agency is the Allegheny Intermediate Unit, a publicly funded regional service agency, which also works with three other Intermediate Units as partners. The Partnership is governed by a Cabinet comprised of representatives of the core partners, as well as the leader of the Evaluation Team and the financial manager, who convene monthly to plan and monitor progress.

SW PA MSP Vision

Successful Efforts to Increase Student Achievement

service. Funded in 2003 as a Comprehensive Partnership, the SW PA MSP is now in its seventh year with a no-cost extension.

The vision of the SW PA MSP is to involve faculty with learning teachers in order to have achieving students. The project has zeroed in on three aspects deemed important in terms of intervention, Bunt explains. Those interventions include: strong and distributed leadership, using professional learning communities, and research-based structures and protocols to help build PLCs and develop and expand leadership. Two aspects crucial to this effort were coherence and collaboration. The model developed by the project placed math and science expertise in the Intermediate Units, which then coordinate the higher education partnership with K-12 institutions.

Project initiatives are outlined below. They include establishing a Leadership Action Academy at the district level comprised of a team of elementary, middle and high school level math and science teachers, central office administration and guidance counselors. The project brought these LAAs together for four days every year over the course of the program to review data analysis and for major conferences, pulling teams together to network and gain expertise from national and international speakers.

SW PA MSP Initiatives

- Leadership Action Academies (LAA)
- Lenses on Learning / Eyes on Science for Administrators
- Teacher Fellows
- Materials and Coaches Networks
- Content Short Courses
- Teacher Leader Academies
- Curriculum Frameworks
- Parent Handbooks

Within this project model, it was not assumed that those in higher education would have all of the solutions. Instead, expert partners and tools were identified that would benefit both K-12 and higher education. Lenses on Learning is one of those, Bunt notes, an adult learning curricula for administrators that helps them understand the nature of effective mathematics instruction and how to support teachers in that process.

Teacher Fellows involve K-12 teachers-in-residence on higher education campuses, working with IHE faculty to revise IHE courses in math and science. They bring to the table their understanding of standards and of pedagogy.

There are also a number of regional professional learning communities, Bunt relates. Shortly after the project began the state made money available for math coaches in districts. The project established a network for math coaches and served as their main source of professional development.

Content short courses were published on particular topics based on conducting a needs assessment. The need in the physical sciences was particularly acute, Bunt notes.

Teacher Leader Academies represent the main intervention employed by the project. The

Leadership Action Teams identified two teachers from each building at each level to attend these academies. So, for example, every elementary building would appoint two teachers to attend an Elementary Math Teacher Leader Academy, Bunt explains. Those teachers would come to the project for extended training in the summer and follow-up during the school year. The expectation was that they were to lead Professional Learning Communities back in their buildings, and the project provided them with the materials to do that.

Curriculum frameworks relate back to the concept of coherence. Prior to the MSP, Bunt explains, they had developed a curriculum framework around the big ideas at various grade levels for mathematics and had brought together a regional team to accomplish that and build knowledge networks. That was offered as a tool for coherence. One of the first projects as an MSP was developing a science curriculum framework in the same way. The state has now used both of those frameworks in their effort to develop a curriculum framework at the state level, suggesting the big ideas at each grade level. Pennsylvania is a local-control state, Bunt notes, and each of the 500 school districts gets to pick their own textbooks and decide what is taught when. They are all now being measured by a state test, but it is up to the district to decide what will be used.

The demographic figures below offer some idea of project scope and the numbers the project has been working with over the past seven years.

SW PA MSP Scope (Math & Science)

- 4500 math and science teachers
- 127,000 students
- 710 teacher leaders
- 267 administrators
- 53 district leadership teams
- 262 school buildings
- 3 institutions of higher education
- 43 university faculty members
- 3 intermediate unit partners
- 8 IU-based coordinators
- ~ 9,500 square miles (11 counties)

Sustaining Momentum

Bunt then turns to the question of what sustainability should look like for a Comprehensive MSP that is working in grades K-12 in math and science. The project used a logic model to guide its activities from the outset, and the model was included in the original proposal to NSF.

Within that logic model, there is a major goal throughout of increasing capacity for change within K-16, with sub-components of that goal specified in a range of categories from outputs, short-term outcomes and mid-term outcomes to long term outcomes such as increased K-12 student knowledge of mathematics and science.

"The only way you are going to sustain something," Bunt observes, "is if you have developed

What Should Sustainability Look Like for SW PA MSP?

- Project Logic Model
  - Between sessions 3 and 4 in Tab 1
  - "Increased capacity for positive change"
- Key Questions:
  - How do participants describe their positive growth?
  - To what do they attribute it?
  - What will it take to continue it?

Logic Model:

http://www.aiu3.net/uploadedFiles/Curriculum_Instruction_and_Professional_Development/Math-Science_Collaborative/Journal%2007%20Use%20of%20the%20Logic%20Model.pdf

habits of mind in people and they see this as part of their work and their desire for ongoing work."

The goal was increased positive change, and the question became, what has changed? "We went to our participants to ask them how they would describe their positive growth, what they would attribute that growth to, and what would enable them to continue strengthening the teaching and learning of math and science," Bunt relates. The project's definition of sustainability, she explains, is the desire to sustain the effort and the work, not necessarily particular individuals or jobs.

Bunt outlines her goals for this presentation, which include exploring the project's approach to building consensus around sustainable strategies and asking participants to consider the findings of that work.

Goals for this Presentation

- Explore SW PA MSP's approach to building consensus around sustainable strategies.
- Consider findings: Valuing of collaboration via professional learning communities

The SW PA MSP conducted a survey with all of those engaged in project professional learning activities, asking them to answer four questions and to give their name and their district. This was done in the context of the professional learning activities because the project wanted to make it clear that these questions were not being asked in the abstract, but in terms of those who were actually engaged in the work. There were more responses than respondents because in some cases there were people who were engaged in more than one professional learning activity, Bunt explains. Question four on the survey varied depending on the context of the professional learning activity (e.g., Math Coach Network, Leadership Action Academy) in terms of what facets should be sustained.

Quick-Write Survey

1. What has been strengthened in your teaching and/or your students learning of mathematics or science?
2. What enabled those positive changes to happen?
3. How might the on-going work of strengthening professional practice continue?
4. What facets need to be sustained? Why?

Process of Data Collections

- Conducted in the context of on-going meetings of various MSP professional learning communities (K-20)
- 300 responses from 222 respondents over a 3 month period in Year 5 (Intended final year of the MSP grant)

The process of data analysis was a qualitative one, Bunt notes, and all questions were open-ended. She outlines the process used.

Process of Data Analysis

- Assessment and Evaluation Team identified themes
- MSP Staff identified emerging themes
- Combined for use in 12 page Evaluators' Report
- Inductive process using qualitative data to construct categorical examples of two types:
- Typical (most common response)
- Composite (illustrate a common response
- Examples detailed in the abstract

Four types of responses emerged.

4 Types of Responses Emerged

- Focus on *curriculum/content*
- Focus on *math and science thinking and learning*
- Focus on reflection and action on *pedagogy*
- Focus on *organizational learning*

Bunt proceeds to briefly review details within each of these four categories.

Focus on Curriculum Content

- This category focuses on responses related to participant identification of and concerns about curriculum and content issues.
- Sub-categories include:
  - alignment with state standards and testing
  - teacher content knowledge
  - coherence (across grade levels)
  - academic rigor
  - cohesiveness (cross-disciplinary)
  - "Big Ideas"

Focus on Math and Science Thinking and Learning

- This category includes comments that focus on thinking and learning; perhaps more specifically the use and analysis of cognitive processes in an educational context.
- Some respondents clearly distinguish between student thinking and teacher thinking in their comments. However, the majority of responses connect changes in teacher and student thinking in support of learning.

Focus on Reflection and Action on Pedagogy

- This category includes responses that address the practice of teaching, with techniques, methods, applications, and strategies as included key terms.
- Sub-categories include reflective practice and teacher strategies, and are loosely related to a pedagogical spectrum from modal methods to Schon's reflective practitioner.

Focus on Organizational Learning

- This category includes comments focused on social and structural aspects of schools systems.
- Sub-categories include collaboration, system change, teacher leadership, professional development, and supportive administration.

Bunt also reviews the frequency of types of responses to each of the four questions on the survey. Looking at responses to question one, she notes that pedagogy falls last on the list of what has been strengthened. Bunt cites Iris White's study, *Inside the Classroom* (http://www.horizon-research.com/insidetheclassroom/reports/looking/), which looked at a random sample of math and science classrooms across the nation. When asked why they were teaching what they were teaching, a uniform answer was, "Because it's the next page in the textbook." Focusing on understanding how you are positioning what you are teaching within a discipline and within a coherent plan for the student to move through is a huge part of the solution, Bunt states.

In looking at what has enabled these changes, organizational learning tops the list of types of responses. The importance of providing and building opportunities for people to come together and strengthen their practice, and learn from that, document it and stand on the shoulders of others was recognized by more than half of the respondents. The importance of the cognitive sciences and students' under-

Frequency of Types of Responses to #1 *What has been strengthened?*

- Math and science thinking and learning (58%)
- Curriculum (15%)
- Organizational learning (13%)
- Pedagogy (12%)

Frequency of Types of Responses to #2 *What has enabled these changes?*

- Organizational learning (50%)
- Awareness of math and science thinking and learning (30%)
- Awareness of how curriculum matters (10%)
- Reflection and action on pedagogy (5%)

Frequency of Types of Responses to #3
How might ongoing work of strengthening professional practice continue?

- Organizational learning (68%)
- Focus on math and science thinking and learning (13%)
- Focus on curriculum (8%)
- Reflection and action on pedagogy (5%)

Frequency of Types of Responses to #4
What needs to be sustained?

- Opportunities for organizational learning (48%)
- Awareness of math and science thinking and learning (25%)
- Awareness that curriculum matters (10%)
- Reflection and action on pedagogy (5%)

Examples of Opportunities for Organizational Learning

- Focus on administrative support
- Opportunities for collaboration
- Opportunities to grow teacher leadership
- Opportunities for professional development
- The explanation and demonstration of Lesson Study and its effect on collaboration between professionals

standing of mathematical and scientific thinking and what teachers can do to advance that was also recognized.

When it comes to the heart of the project's concern about sustainability, organizational learning again came out very high, Bunt observes—"that need to have that intentional opportunity to come together and focus on strengthening of practice." The need to continue discussions on revealing math and science thinking was also identified. This is where your understanding of misconceptions comes in and what anticipated student responses might be, Bunt notes, and what you might do if that is occurring.

In terms of what needs to be sustained, opportunities for coming together, collaborating, and establishing protocols and structures to work together and strengthen professional practice is again emphasized. Bunt notes that while there is some awareness that curriculum matters, it may be the case that once you get that it becomes a habit of mind and something you do as a matter of routine.

Bunt reviews examples that survey respondents gave of opportunities for organizational learning. Lesson Study, which was something introduced by the project, was repeatedly cited as an example of something that accomplishes all of the things described in the other bullets.

Bunt also reviews examples from survey respondents regarding the focus on math and science learning and thinking.

Focus on Math and Science Thinking and Learning

- "Opportunities to continue to discuss teacher thinking and learning in connection with student learning"
- "Lesson study (cross-curricular)"
- "Continuing focus on data to drive instruction"

In the last question on the survey, in addition to asking what should be sustained there was also the question of why. The following responses offer insights into some of the reasons participants felt it was important to come together.

Response to #4B
Why sustain facets?

- "Authentic cases provide insight into students' conceptualizations. - It all comes down to understanding children's conceptualization of math concepts."
- "The more we know about how they [students] think, the more we can gear our teaching toward them [students]."
- "Collaboration with other teachers has been key to me being a better teacher - seeing what works/doesn't work."
- "Lesson Study is research proven as an effective teaching and learning tool. Our schools need to be aware of this approach."
- "There would be no point in giving the assessments if we didn't use them to impact instruction."
- "You need to be a learner to be a teacher."

"I think the last one is probably the one that I have the greatest concern about—building an

understanding that this is going to be a life-long effort," Bunt states. "If you are a teacher and you are not learning, then you probably shouldn't be teaching." The project feels strongly enough about this, she adds, that they feel they need to move into a public awareness campaign. "In part that is because when it comes to sustainability, the biggest challenge is building the habits of mind and the understanding that this is a lifelong effort," she explains. "It isn't an initiative that is ending. How are we building the capacity for the institutions to sustain that?"

In the case of the SW PA MSP, the Intermediate Units agreed that they are going to sustain the coordinator positions that were initiated. This was built into the grant up front: in year four they were to pick up a third of the costs, in year five two-thirds, and by year six and on they should be paying it all. In the current economic climate resources are restricted, and Bunt notes that one of the things she has been looking at is where that other funding comes in so that there is the capacity to go forward and support those teacher leaders.

The project never paid for freeing up the teacher leaders, Bunt explains, and part of that was intentional. If the project did not provide the money, there was no reason they couldn't go on doing what they were doing when the grant went away. Very little money from the grant went to pay for the in-district, onsite Professional Learning Communities. The project provide materials in the first two years and the training, and the district had to find the time. The project helped them in that effort through a brainstorming process to identify ways to accomplish that. The goal was to eliminate, as far as possible, providing anything that could in the long run give the districts a reason to not sustain something.

While initially everything was provided for free, in this past year the project started charging for those things that non-partner districts had been charged for all along. The expectation now is that districts will have to pay for their materials. There are 138 school districts in the service area, and 53 of them are Leadership Districts. The project made its professional learning opportunities open to all, but if a district wasn't part of the MSP, the project did not pay for substitute teachers or for summer honoraria. In turn, the non-MSP districts weren't required to supply data.

Bunt explains that in the project's view, there are a number of on-ramps to becoming a teacher leader and once you are a teacher leader, for the rest of your life you should be coming together at least four times a year during the school year in these quarterly academies. In those sessions, teachers learn about the latest research and new tools that have become available, and in turn go back and share that with their colleagues, building a network based on a common mission.

Bunt concludes by observing that the SW PA MSP's approach to sustainability was to engage constituents and ask them what matters about

For More Information:

Math & Science Collaborative at the Allegheny Intermediate Unit

http://www.aiu3.net/msc

nancy.bunt@aiu3.net

How About You?

- How are you defining sustainability?
- What would your participants say has changed their practice?
- What would they say was needed to continue the on-going work of strengthening their practice?
- How will you know?

what they have been doing, and what they need to keep doing that. This survey was conducted in the fifth year of the SW PA MSP, when the assumption was that it was a five-year grant before the no-cost extension option became available. The project is now in its seventh year and has acted on the results of this survey as it has moved forward.

She encourages participants in this LNC session to think about how their projects are defining sustainability, and what their participants would say has changed their practice.

Group Discussion

Teacher Attrition Post-Project; Teacher Learning as a Deep, Ongoing Effort

- We are also in year seven, but don't have an ongoing full grant. We also have a no-cost extension. We're in the process of reshaping our work from large numbers of teachers to a very small group, which might be just the teacher leader portion of a grant. We also focus on collaboration as a key tool for learning in our project. Instead of using Lesson Study, which requires people being out of the classroom and substitute time, we used the Critical Friends model, which we found very powerful. There were about thirty ongoing groups and we tried to make them as site-based as possible to avoid travel time. We paid a little for people to engage and come together, intentionally a very small amount, and a little for the person serving as organizer.

  Even though we worked hard to integrate this into their regular meeting times, our biggest concern, once the main part of the project is over, is that we see this dropping off dramatically. Other concerns come to the fore and even with the best of intentions they find it hard to maintain this group. **• Participant, Partnership for Student Success in Science (PS3), San Francisco, CA**

- You're not alone. When I was showing you the scope of the project, that covered the whole project. When we finished the first two years, we had defined the Teacher Leader Academy as a two-year experience and realized we needed more. We extended to a third year, starting new on-ramps for new cohorts. The teacher leaders themselves recognized that they weren't done and wanted to come together and continue to work. Our quarterly academies don't have the 700 teacher leaders in them. That was the challenge I was talking about, of recognizing that this is an ongoing learning process and you're never going to be done. I think the culture in our profession is the in-and-out: "That was last year and this is this year, and we have a huge proliferation of initiatives. The MSP? We did that, now we're doing X."

  I'm not saying we've solved this, but one of the strategies we employed was trying to identify what the school and the district wanted to do. We did this in the Leadership Action Academy, where we had that vertical team together. We asked them what their

goals were for their building and what they were hoping to accomplish. We then tried to be really explicit about their teacher leaders. For example, if you're talking about differentiated instruction, we know how to do differentiated instruction. We tried to tie it into the language of whatever they were doing. A major finding of the MSP research in the last ten years is that you have to be content-specific in professional development if you're going to make a difference. At the same time, you've got school buildings that have lots of other teachers besides math and science teachers, and they want to have the generic stuff because any time they free up everybody, how are they going to do that if the math and science teachers need to be doing X?

We're thinking that part of what we have to do is relate the specific things that are content-related back to the general reform agenda. They have to be able to understand that differentiated instruction is happening in math and science when you're using a 5E lesson, or when you're using math and offering all of these different access points. I think it's translation in part, and trying to build that culture.

I have real concerns that as a nation we don't understand what it means to learn something deeply. Think of the fast food movement and think of the slow food movement. Do you just want to eat it quickly and get on with your life, or do you want to spend the time engaging in developing locally grown stuff? In education, I'm not sure there's a lot of confidence that if you take time to go deeply and learn something, it will benefit you because you will still have it. Look at the cramming before the standardized test, or thinking that they have to teach everything in the year the test is being given because otherwise they might not have it. I think about the teachers getting up in the morning. If I really believe everybody's going to forget everything I'm doing that day, why get up? This core standards movement is excellent because for the first time we're saying it enters and it leaves a topic.

We have so little experience of how to engage deeply in learning something. We would get push-back from teachers on this. For example, in the secondary math Teacher Leader Academy, we were using some of WestEd's video cases on linear relations. Their reaction was, okay we get it, let's move on. We said, "Let's talk about what it means to learn this deeply so that you don't have to review it again next fall, so you've got it and you're building on that." There isn't an understanding of that. It's the pressure to move on and every time you move on, people haven't engaged in a deep enough learning to realize it's theirs. Our teacher leaders, those who are still coming to the quarterly academies, which is a much smaller group, get that.

How do we get others to get it? Higher education is getting that more. They report that

Shared Experience and Structures for Conversation

- There are two factors that I think are really important in the work that we are doing that are transferable. One is that all of the people in our Master Teacher Initiative have a shared, common experience. They were not all together in the same group, but they all went through a very rigorous, long, content-focused masters degree program either in chemistry education or integrated science. We mixed high school and middle school teachers. Even though they weren't in the same cohorts, the fact that they survived that meant they were instantaneously a group that could work together.

  The second was having structures in place by which conversations can happen that are productive. We are using the Tuning Protocol. There was a session on Saturday that was amazingly powerful. Each one of them is doing an individual leadership project that is not supported by the school district, is not systemic, is none of those things, but each one of those projects is taking those teachers to a place where they are really making changes. It has made me realize that I don't have to control everything, but within the group we are controlling our own destiny. So I think the tools are out there, but somebody has got to put it together and keep it going. • **Participant, University of Pennsylvania, Philadelphia**

Professionalization and Accountability

• It's interesting, being a K-12 lead in all of this. I think the changes that need to happen at the K-12 level in order to enable this aren't being addressed as much. We have collaborative teachers that we have been working with. You can always get individuals. The question is, how do we turn this into a profession, where there's a professional body of knowledge that you expect everybody to know and we are all holding everybody accountable for that? That's got to be a partnership both ways, higher ed and K-12. • Participant

they are changing the way they are teaching as an unintended consequence of their participation in our Expert Partner Training. They had an opportunity to reexamine and understand their own coverage versus learning (to cover something means to conceal from sight).

So I think we are all facing what you are facing. How do you begin to build an understanding overall in education about this instead of the current flavor-of-the-day approach? I believe a big part of that is focusing on what kids are learning and if they engage deeply in something, they do learn it. Then they'll have it and you can go on to something else, but that's a confidence builder. • Nancy Bunt