Abstract Name: Preparing Teacher Leaders to Facilitate Professional Learning Communities
MSP Project: Math and Science Partnership of Southwest Pennsylvania
Author(s): Nancy R. Bunt
Presenter(s): Nancy R. Bunt and Samuel Shaneyfelt

1. Questions(s) or issue(s) for dialogue at Learning Network Conference session:

What are the essential elements to be addressed in the preparation of teacher leaders?

2. Context of the work within the STEM education literature and within your MSP project:

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. Institutions of Higher Education (IHE) partners include 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. With 500 school districts in Pennsylvania, being served by one Department of Education, 1970 state law established 29 Intermediate Units, as intermediary, publicly funded regional educational service agencies. The lead agency for SW PA MSP is the Allegheny Intermediate Unit (IU). Three other Intermediate Units have also partnered.

SW PA MSP supports a faculty member to be a .5 FTE MSP coordinator at each partner IHE. The SW PA MSP model added mathematics and science expertise to existing IU professional development staff via math and science “coordinators.” These coordinators provide professional development leadership at elementary and secondary levels in both math and science for the 100 districts served by the partner IUs. To serve the multi-county region, there are a total of 6.0 FTEs. Focused by grade level and discipline, there are 1.5 elementary math coordinators; 1.5 secondary math coordinators; and 3.0 science coordinators. IU-based coordinators collaborate with partner IHE faculty recruited by the IHE coordinators to facilitate MSP professional development to build professional learning communities.

With its multi-county, multi-IU focus, addressing K-12 mathematics and science, and staffing intentionally limited to promote sustainability, the MSP uses a teacher leader model designed to work effectively at scale. Math or science coordinators, alongside IHE faculty, engaged in extensive discipline-focused training by “expert partners” in field-tested adult learning curricula. However, rather than directly providing the professional development to the thousands of math and science educators in the many MSP districts, the MSP Coordinators and IHE faculty develop district-appointed teacher leaders who guide their colleagues in well-defined professional learning experiences.
There is no assumption that the teacher leaders are experts. While suggested characteristics of teacher leaders are outlined to guide district selection, the teacher leaders present the full spectrum of background and experience, with varying levels of mathematics and/or science expertise. Most teacher leaders have neither the credentials to portray themselves as experts, nor the “positional authority” that could be perceived to mandate their colleagues to defer to their wisdom.

At the request of their districts, the teacher leaders take on this responsibility without a reduced workload or official changes in their job titles. Just as the MSP does not provide funding support for educator participation in the in-district experiences, this informal distribution of leadership is intentional in order to build capacity to sustain the refinement of practice through self-led professional learning communities that are not dependent upon costly added positions, external experts or external funding.

3. Claim(s) or hypothesis(es) examined in the work

Preparing teacher leaders to facilitate the learning of colleagues offers a different lens to examine typical professional development practices. SW PA MSP claims there are several essential elements that emerged from their experience that could inform professional development practices.

4. Evaluation and/or research design, data collection and analysis:

The essential elements were distilled from the experiences of the SW PA MSP as it developed 600 teacher leaders who facilitated the in-district learning of 4600 of their colleagues. Participants completed evaluations and reflections. The evaluators conducted K-12 Case Studies, observed professional development sessions and lesson study, conducted focus group interviews. Their findings include: “Teacher leaders have grown in their ability to make use of professional learning communities in their schools…” Additional findings like “Teacher leaders embrace the importance of a focus on the “big ideas” of math and science to guide instruction,” offer support for the value of these elements.

5. Key insights that have value for the Learning Network:

The essential elements for developing teacher leaders to facilitate the learning of their colleagues are captured by the acronym LEADS.

L is for Learning, rather than teaching, which must be at the core.
As has been well documented, you cannot teach what you do not know. The Teacher must first be a learner; s/he actually experiences the adult learning activity that s/he will later lead. The learning experience also serves to model best practices for that adult learning. How People Learn describes in detail the ways that adults learn best.
The learning activities must be designed so that s/he is able to envision herself leading the experience. Elaborate presenter-based “performances” may deter teacher leaders from believing that they have the capacity to facilitate such an experience for their colleagues.

Having a framework emphasizing relationships enables memory by providing structure for what may otherwise appear as isolated items. Various visual organizers serve that purpose. Liping Ma used knowledge networks to organize mathematical concepts.\textsuperscript{1} The AAAS Atlas organizes the Science Benchmarks to show the relationships among those key concepts.\textsuperscript{2} The Math and Science Curriculum Frameworks feature knowledge networks that help educators understand the relationships among the many state standards.

In planning for the second year of the teacher leadership academies in each discipline, the MSP made explicit the learning expectations for teacher Leaders through the following visual organizers which were shared with the teacher leaders throughout the academy experience.

- **Concept map** indicates the big ideas of the learning experience and their relationship to each other. Science and Math Coordinators developed one-page concept maps for the overall learning experience involved in each teacher leadership academy.

- **Conceptual flow graphic** for the 5 day experience indicates the sequencing of learning goals over the week. Each activity is represented in terms of what it contributes to the larger learning goals.

- **Lesson graphs** or **Facilitator PowerPoint presentations** with notes describe the learning experience day-by-day detailing the learning activities related to the learning goals with expected actions by the teachers and anticipated responses by students. These tools are saved electronically on a shared drive for future analysis. They have already served as references for various site visits and conference presentations.

**E is for Explicit.**

Once the activities have been experienced as a learner, the learning goals of the activities and the instructional strategies must be made transparent. The learning in each experience must be made explicit. To transition to become an effective leader, the learner needs to see the purpose of each activity, and how the various concepts work together to build the essential learnings.

Rarely are learning activities implemented exactly as originally experienced or as designed. Once back in their districts, teacher leaders are constrained by a variety of contextual factors, most often with pressures to compress activities into less than the optimal time. The MSP experienced this compression with its first on-site academies. Teacher Leaders had been prepared with eight three-hour modules to be facilitated for a 24 hour in-district experience. Only one third of MSP districts were able to accomplish all three modules with access to 20 to 24 hours. Another third of the districts accomplished between 10 and 20 hours. The remaining third were able to only facilitate 10 or fewer hours.

How did the MSP teacher leaders use the time available to them? According to the in-district documentation, the teacher leaders were quite varied in the selection: both of the modules and of


\textsuperscript{2} Project 2061 American Association for the Advancement of Science, (2007 *Atlas of Scientific Literacy Volume 2.*)
the activities within the modules to enact. Many started at the beginning and worked their way through, meaning they did not accomplish the learning agenda in the one year timeframe. Some selected activities that they had found to be “fun.” At least one listed the various activities and let their colleagues decide which ones would be facilitated in which order. Seago described this reality as inevitable adaptations that can go in two directions: fatal or productive, depending on whether they enhance learning (productive) or prevent learning (fatal).³

A is for Assessment
Also needing to be made explicit are the means of assessing learning. For each learning activity how will the learning be assessed? What evidence will be sought? The lesson graphs included pre-thinking to answer the following: What questions will be asked to assess the learner’s understanding? What will the leader ask to help the learner move forward?

Assessment involves utilizing tools to more fully understand the learning. The Concerns Based Adoption Model (CBAM) was shared with first year teacher leaders. In Year 4, the MSP developed a tool for districts to utilize in the Leadership Action Academy to gauge the challenges they faced in engaging their faculty in strengthening their teaching practice. This rubric, “Readiness for the Journey” was also shared with the teacher leaders, to have them assess their own status and estimate the percentage of their professional learning community that were at each stage of the rubric. Formative assessment utilizing the work of Dylan Wiliam has been a major focus of each academy.

D is for De-briefing
The training must model for the teacher leaders the use of de-briefing to refine practice. Learners who are becoming leaders must be helped to collaboratively reflect to make sense of their own learning, and to see how assessing the learning of the learners helps to refine facilitation. It involves developing a sense of teaching as “shared practice.”

- Each session was consistently evaluated via a formal evaluation tool or informal “gots and needs.”
- These feedback tools were compiled and analyzed to be shared with participants and facilitators to inform the next session’s instruction and future planning.
- Plans were made to address identified needs. Within the SW PA MSP, these summarized compilations were emailed to all colleagues and the assessment and evaluation team as soon as possible after the completion of each session. Saved electronically on a shared drive, they have served as references for the evaluators’ report and several conference presentations, and will be available for future analysis.

S is for Support
Supporting the teacher leader involves several essential aspects. The featured professional development materials merit specific considerations.

- The featured materials should provide a solid foundation for collegial discussion/learning that is not dependent on the individual expertise of the teacher leader.

• Carefully developed, field tested, adult learning professional development materials presented a comprehensive tool that enhanced the likelihood of productive adaptation by making major omission of learning activity more apparent.

• While potentially expensive, having the core material in a commercially available published form helped to avoid potential copyright issues.

• All materials must be easily managed by the learner. If the activity requires materials, they must be provided. Preparation of participant materials must be minimal. In addition to the published materials described above, the MSP routinely provided facilitator binders for each teacher leader which included hard copies and disks with Power Points with discussion prompts. If warranted, the MSP provided up to 20 sets of participant materials. When the science TLAs required experiments, providing those materials became logistical challenges that were met by heroic efforts.

• Also incorporated are the integration of supportive tools and additional resource materials:
  o Curriculum frameworks and curriculum topic study guides
  o Email contact and occasional visits for support by coordinators and IHE partners
  o Website: MSP Net and the MSC website.

References

The MSP utilized several published adult learning curricula in mathematics, including the Developing Mathematical Ideas series, Lenses on Learning, and VideoCases for Mathematics Professional Development. While the science teacher leadership academies came from BSCS’s work related to the National Academy for Curriculum Leadership, they had no written published curricula. The conceptual flow graphic originated as the science coordinators made explicit the learning expectations to finalize facilitation materials for the Teacher Leaders. It was then adapted to elementary and middle levels.