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

How can IHE/school districts partner to provide effective, sustainable sabbatical programs for school district teachers?

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. IHE partners have been four 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 (IUs) 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. Its goals are to increase K-12 students’ knowledge of mathematics and science, increase the quality of the K-16 educator workforce, and create sustainable coordination of partnerships in the IUs. Initially funded for five years, the project end date has been extended by two years.

The SWPA MSP Teacher Fellow Program (TF) enables teachers from qualifying school districts to spend a summer, a semester, or a full academic year at a partner IHE. During each term on campus, it is expected that the TF will work with IHE faculty to help refine two IHE courses, take a math or science college course, and participate in SWPA MSP activities. The TF program is an important activity within the SWPA MSP as it addresses a number of goals. In addition to course revision and refinement, participating teachers receive professional development through their enrollment in college courses. Through course revision, it is intended that IHE faculty become more familiar with state and national content standards while TFs become more familiar with the depth and scope of specific content. Moreover, the TF also becomes a link between the IHE campus and its school or school district, helping to meet the goal of sustainable partnerships.

The strategy to establish a Teacher Fellow Program was developed for the proposal by Principal Investigator, Nancy Bunt: “As our model was that K-20 had much to learn and the source of that learning would be coming from expert partners rather than uni-directional from IHE to K-12, we were thinking about how to bridge the cultures of IHE and K-12—and make clear that the
learning could go both ways. The K-12 teachers knew the standards and pedagogy—and the IHE teachers knew the content. We knew that with our many districts and small IHEs, that the IHE faculty could not be spread across the many schools, but perhaps the K-12 teachers could come to IHE—and therefore, we planned the Summer Academies to be on the campus—and then looking for more in-depth involvement, the idea of K-12 teachers being fulltime on campus came up—and we began talking about how we could build it into the already existing K-12 sabbatical system. We originally planned for it to be only during the school year—and the feedback from the K-12 districts was immediate—that such an approach could be a deal breaker. They feared us taking their physics, chemistry, algebra teachers out of the schools… So we expanded our notion to the TF program being available to elementary, middle or high school teacher—and added the option of the summer semester.”

Such a strategy was consistent with the research which describes the characteristics of good professional development for teachers: sustained opportunities to study (Horizon Research identified 80 hours as a benchmark number of hours needed to effect classroom changes in the Local Systemic Change Initiatives evaluation; even the TF summer program consisted of 280 hours); teacher influence on the substance of their professional development and collaboration with professional peers as argued by Newmann and King (2000) (the TF was able to select the math or science course he or she took as well as being matched with a faculty member who shared common math or science interests).

This presentation will focus on the Teacher Fellow Program at one of the core IHE partners, Saint Vincent College. From 2004-2009, 16 Teacher Fellows (11 secondary, 5 elementary or middle school; 10 science, 6 mathematics) were hosted at Saint Vincent College; 4 for full academic years, and 12 for an 8-week summer term. They worked with 15 STEM faculty members (11 science, 4 math) and 3 education faculty members to assist in the revision or development of 34 distinct courses that continue to be offered at the College. In addition, they took one course per term in math or science and participated in appropriate SWPA MSP activities such as the Teacher Leadership Academies that were held at Saint Vincent or at IUs during the academic year, and Network Connections which were full day conferences for teachers from all of the school districts in southwest Pennsylvania.

3. Claim(s) or hypothesis(es) examined in the work (anticipating that veteran projects will have claims, newer projects will have hypotheses):

The claim is that the TF program was a successful professional development experience for school district teachers. The required course work provided an accessible opportunity for teachers to deepen their math and science learning. The partnership with the higher education faculty members in working together to do course revisions was particularly valuable because it created an environment where both the higher education faculty and the school district teacher were contributing mutually.

Perhaps the most consistent value of the TF Program was that of sabbaticals in general, an opportunity to explore new areas of math and science without the day-to-day work
responsibilities, thus resulting in a fresh and renewed spirit. In particular here are responses from 3 of the 16 Teacher Fellows:

- The most valuable thing I gained is not really information, but rather a new perspective that allows me to direct my high school students better, knowing what they will need to succeed at the college level.
- That as an educator, I can still continue to learn and be excited about the subject I love and the pedagogy required to be a great teacher.
- I realized the importance of collaboration and that inquiry is the basis for meaningful learning. I left feeling energized and eager to return to school.

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

The required coursework was done with an expectation that the TFs would take the course for a grade. While personal circumstances resulted in the withdrawal from courses by two TFs, all the other TFs earned grades of As or Bs in these courses.

Individual reports were filed at the conclusion of each sabbatical by the TF. But the most relevant evidence of the success of the program is found in a survey that was completed this past fall in which all 16 TFs participated. The overall rating of their experience with 5 as excellent to 1 as poor, was 4.9 (12 excellent, 4 very good, 1 good, 0 fair, 0 poor).

The survey focused on three questions: 1) to what extent was this experience shared with their colleagues when they returned to their school district, 2) did their participation as a TF change or affect the way they taught or worked, and 3) was contact with their higher education colleagues maintained.

In the first case, the answer in general was yes with responses such as the following:

- We ran a series of SWPA MSP workshops at my school as part of our district participation in the program. At one of those sessions Dr. Gravelle (SVC) and Dr. Woolcock, Indiana University of Pennsylvania (IUP), presented information about college expectations. We also did some activities in those workshops similar to the POGIL (Process Oriented Guided Inquiry Learning) (www.pogil.org) style activities that Dr. Fish and I worked on.
- Absolutely! We often use the PowerPoint presentations that I developed. I train new teachers of science for Greensburg Salem. I refer to the insight that I received and the many resources that I had access to. I’ve used much of the information from Angela’s Environmental Science course in a summer enrichment academy that I developed.
- Yes, I shared with them the fact that every teacher should take advantage of this opportunity, especially if you are teaching a course that is college preparatory.

The second question was whether there was any change in their teaching. Approximately half said yes to this question with answers such as:

- As part of the TF experience, I attended a regional chemistry conference with Dr. Fish. That experience and the related work I did that summer probably was one of the most influential experiences of my teaching career in terms of influencing how I currently approach teaching. Dr. Fish and I worked on POGIL style classroom activities, something of which I had no
My participation as a TF has definitely improved my high school classroom. The experience has allowed me to refine many areas of my curriculum to better meet both the current and future needs of my students. The chance to revisit higher level math topics that I have not addressed in years made me more aware of the difficulties students face when learning a new topic that is difficult for them. I have introduced additional methods that may help students. I not only added to my physics knowledge base by solving many physics problems throughout the year, but I also saw which difficulties many students do not overcome throughout their high school courses and continued to struggle with at college. I have and will continue to make more of an effort to address these areas at the high school level. In addition, I had the opportunity to observe different ways to teach topics that I teach to my students in high school. After one becomes a high school teacher, there is usually little if any opportunity to observe other teachers and gain new techniques in this manner. This afforded me the chance to do so on a daily basis.

I am lucky to have a high school science department of 7 teachers that are truly a professional learning community. SV provided me with the knowledge and experience to share with them.

After examining how children learn math, I realize that there are changes that need to be made in how we instruct our students. I will continue to assist my fellow teachers in understanding how students construct mathematical knowledge.

The third question was whether continued contact with higher education has occurred. This objective has been more difficult to achieve. Roughly a third of the responses were positive with answers such as:

- I have been in contact several times with several of the faculty I had the pleasure of working with at SV, including a couple of trips back to your campus. The best was the chance to meet Bill Nye. I happened to have a student teacher at the time so I was able to include him. I also have enjoyed seeing some of the faculty at the SWPA MSP meetings.
- Yes, but unfortunately not often enough. We have emailed back and forth a few times, but not recently. They are, as I am, very busy people, so it is understandable why communication is not easy to accomplish for any of us. However, the experience left me with the feeling that I could contact any of the professors I worked with regarding educational issues at any time if I needed guidance or clarification on a topic in science.
- Since I was a TF, I have been in contact with Dr. Maize. This fall (2009) I spoke with his Physics Freshman Seminar students about my physics experience, the SWPA MSP, and what it is like to be a math and physics teacher.

One particularly noteworthy story is that of a school district which, in the initial planning of the proposal, was skeptical of the TF program since it had never granted any sabbaticals. In fact over the course of the project, four TFs came from this school district (3 secondary, 1 elementary; and 2 science, 2 math). Further, this school district was selected to receive the 2009 Carnegie Science Award for their commitment to science education. The awards program, sponsored by the Carnegie Science Center in Pittsburgh, was established to recognize and
promote innovation in science and technology across western Pennsylvania. Over 200 committed individuals and organizations have been honored in the various award categories including the Advanced Manufacturing Award; Advanced Materials Award; Educator Award; School District Award; Emerging Female Scientist Award; and Entrepreneur Awards. The School District Award recognizes excellence in system-wide commitment to strengthening science education throughout grades K–12, with a particular emphasis on promoting professional development to support teachers, teacher leadership in improvement of science education, and a conceptual approach to teaching science with hands-on science materials.

5. Key insights (retrospective for veteran projects, prospective for newer projects) that have value for the Learning Network:

Sabbatical programs are perhaps the best form of professional development. In this instance the partnering of school district teachers with higher education faculty to make course revisions based on student focused teaching and attentiveness to national standards for math and science allowed for a genuine partnership where both the school district teacher and the higher education faculty member had something to contribute.