**Lenses on Learning-Cumberland County Schools—March 1, 2007**

For the principals at Session 7 of Lenses on Learning, the “big ideas” included (1) attending to mathematical content when doing their classroom observations, (2) the teacher as a constructor of knowledge about mathematical thinking of their students, and (3) collaborative inquiry between administrators and teachers as a support for teachers’ generative learning.

Dan Krumanocker led his colleague-principals through an analysis of their Modes of Communication for which they were assigned to report the proportion of time they spent in consultation with a teacher after a pre-conference and a classroom observation of a mathematics lesson. Principals agreed that it is important for a principal to work with teachers as individuals rather than to approach their collaborations with them as if “one style fits all.” Principals agreed that, as a group, their time spent in direct criticism had been minimized (or was absent) while their time spent in discussion with teachers about their intentions of using specific strategies and activities in the lesson had become elevated. Notably, sharing—about what students were thinking—was a dominant mode of their communication with the teacher. Several principals analyzed their mode of communication with their teachers by using pie charts—3/1/07

"The essence of the generative learning model is that the mind, or the brain, is not a passive consumer of information. Instead, it actively constructs its own interpretations of information and draws inferences from them" (Wittrock, M. (1989). Generative processes of comprehension. *Educational Psychologist*, 24, p348)

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Principals noted that “giving advice” and “criticizing” are best tempered according to the individual characteristics of a teacher. In particular, to be an effective instructional leader, a principal needs to take into account obvious differences, as for example, being sensitive about whether they are working with a seasoned teacher or a first-year teacher. It was also emphasized that a principal’s pre-conference, combined with the actual classroom observation, is still only a snapshot of the teacher’s repertoire of instructional practices. Listening well to the teacher’s explanations and asking good follow-up questions during the post-observation interview are essential to a successful collaboration between the principal and the teacher for improving instruction.

While there were anticipated variations in the proportion of time spent in the several modes of communication with their teachers, a “typical” (average) profile extracted from the twenty principals’ pie charts looked something like:

- Giving advice----------------------------------------10%
- Criticizing------------------------------------------3%
- Asking questions about what was intended---------33%
- Sharing-curiosity about student thinking--------20%
- Collaboration---------------------------------------12%
- Praising & affirming--------------------------------18%
- Other (e.g., class data)-----------------------------4%

Some principals acknowledge that they are not mathematical experts, and consequently, that they have used the pre-conference with a teacher to identify the mathematical content of the lesson they will observe. Then, prior to the classroom observation, they would have reviewed the mathematical topics that will be covered to better prepare them for what the teacher does in the lesson. Principals also seemed to agree that each teacher should be knowledgeable about the vertical alignment of mathematical content; that is, their mathematical knowledge must not be limited to the grade level to which a teacher is assigned. One principal noted that the NC-PIMS professional development has brought the grade span of mathematics together for teachers in her school and “they get a good look at how the same mathematical topic is dealt with across the grades through the NC-PIMS workshops.”

Using their mathematical assignment with “pattern blocks” and a review of a videotaped 2nd grade class, principals in the Lenses class observed ways in which many mathematical learning objectives can be supported within one activity and often simultaneously. For example, with the activity in which children were asked to find all the ways to cover a hexagon with other given shapes (e.g., trapezoids, triangles, rhombi), they noted how students were learning about the names of shapes, congruent figures, tessellations, fractions, equivalence, trial-and-error strategies—all within the same problem solving experience.

NC-PIMS Director at MSEN Center Directors’ Meeting—March 1, 2007

The Project Director participated in a segment of the March 1st meeting held in the UNC-GA Board Room in Chapel Hill. Among other things we discussed some of the lessons learned from the NC-PIMS project and issues stemming from measuring student progress by the use of the NC assessment.
instruments. We also discussed the roles of the three university Hubs (mathematics and science education centers) in the project and the practicality of sustaining key features of the cascade model of teacher professional development. While there was some focus on the frustrating dilemma of providing tenable evidence of achieving the most important objectives of teacher professional development—that is, to improve student learning of quality science and mathematics—optimism was also expressed for the possibilities of using some existing tests for future projects that are accessible from recently conducted research studies on student learning. Meanwhile the day-to-day activities provided to teachers and partner districts and their communities continue to receive positive evaluations and encouragement for finding ways to support the project’s major strategies.

Student Encouragement/Parental Involvement Action

The following highlights describe some of NC-PIMS’ SEPI Facilitator, Lori Stancill’s recent activities with the Parent’s Utilizing Standards at Home (PUSH) and Adventures with Science and Mathematics (SAM):

Wilson County Hispanic PUSH I: Mr. Brent Maupin, principal of Vick Elementary in Wilson County, hosted an Hispanic parent workshop at his school on March 7, 2007. After a delicious meal, the parents participated in the NC PIMS workshop Parents Utilizing Standards at Home I (PUSH), which assisted them with tools to help their students excel in the area of mathematics. The parents readily joined in the games Raging Rectangles and Centimeter/Inch Crawl that helped to reinforce basic mathematics skills. Most of the participants brought along their children for a wonderful chance to learn mathematics together. All participants expressed gratitude for the opportunity to learn mathematics as their children do in the classroom and also for the Spanish version of the materials they received to take home!

Williamston Primary SAM: On two recent Saturdays, Lori had the pleasure to visit with NC-PIMS partner Martin County where members of the Williamston Primary staff gathered to be trained in the 10 hour SAM (Adventures with Science and Mathematics) workshop which was provided by NC PIMS. The participants came on a voluntary basis and included administrators, teachers, and teacher’s assistants. From the pictures you can see that the training appears to be thoroughly enjoyed by all! Between the two meetings, all participants took advantage of the opportunity to implement one or more of the activities in their educational setting. The response from the students was overwhelmingly positive! From the response of the participants and the students, Lori is convinced that the standards-based, hands-on activities will continue to be implemented in their classrooms.
On March 19, 2007, NC PIMS was featured in a presentation at The National Council of Supervisors of Mathematics annual conference. Lori Stancill, NC PIMS Student Encouragement/Parental Involvement Facilitator, was granted a double session of two hours to share the NC-PIMS vision, goals and materials. During this time, the participants experienced the game Raging Rectangles from our PUSH I (Parents Utilizing Standards at Home) workshop and the activity How Tall: How Much from our SAM (Adventures with Science and Mathematics) workshop. All of the participants enjoyed themselves and the activities were well received. They were very excited to gather some fun activities that were hands-on for the students to learn through inquiry and problem solving. The consensus from the group was; “This is the best workshop we have been to all day!” NC-PIMS is very grateful for having had this opportunity to demonstrate to members of NCSM one of the major success stories of the initiative. We are also very appreciative of Lori Stancill’s skill and effort at disseminating NC-PIMS beyond the borders of North Carolina.

Announcement: North Carolina Association of Mathematics Teacher Educators Conference—April 20-21

This conference is co-sponsored by NC-PIMS and the NC Council of Teachers of Mathematics (NCCTM) for mathematics teacher educators. The purpose of the conference is to bring together NC mathematics teacher educators and university/college mathematics faculty who have participated in PK-12 schools through the NC-PIMS project. This dissemination conference will provide the opportunity for mathematicians and mathematics education faculty to discuss their contributions to course development, course advisement, instruction and teacher professional development with others in NC who are interested in the involvement of higher education in PK-12 education. Dr. Susan Friel (UNC Chapel Hill) and Dr. Sid Rachlin (East Carolina University) have organized the conference. The conference will begin Friday, April 20 with registration at 4:30 p.m. All conference events are scheduled at the UNC Center for School Leadership Development in Chapel Hill. Registration information and directions to the conference may be obtained from the NC-PIMS website:  http://www.ncpims.org/

All conference fees, including meals, will be provided for the first 100 individuals who pre-register. The conference will end on Saturday at 3:00 p.m. Pre-registration by April 16th is necessary to guarantee a dinner reservation. The Conference Hotel will be the Durham La Quinta Inn & Suites (phone 919-401-9660). When making your reservation you should mention the NCAMTE Annual Conference to receive the conference rate. Directions and information about the Durham La Quinta are also available from the NC-PIMS website.
Mathematical Modeling Course—Update

The Mathematical Modeling course development team met at the UNCW Science Mathematics Education Center (SMEC) March 15-17 to continue its work of creating an exciting learning experience for the 6-12 Lead Teachers this summer. Dr. Shelby Morge (UNCW), Dr. Gabriel Lugo (UNCW), Dr. Chuck Emenaker (University of Cincinnati) and Dr. Ron Preston (East Carolina University) are the university faculty members on the team. NC-PIMS Facilitators Eleanor Pusey and Ray Jernigan also serve on the team, providing their expertise from a master teacher perspective.

The Mathematical Modeling graduate course is the final one in a four-course series that has been designed specifically for grade 6-12 Lead Teachers with NC-PIMS. However, the series is made available for universities to consider including the courses in their mathematics or mathematics education course catalogs. The instructor notes and materials for the courses are to be made available on compact disks. From this meeting of the team, course materials will be submitted to a three-member review team of university/college mathematicians and mathematics educators for suggestions to improve the course. The course is expected to be finished and ready for implementation by May 31. In the meantime, this group gets into some rich and interesting discussions [see caption with photo to the right].

Dr. Shelby Morge will also be an instructor of the course this summer and Ray Jernigan will assist with the live video broadcast of the course. In close association with the content and general framework of the course, Ray and Eleanor have begun to create the professional development for 6-12 teachers. The course developers will also review the scope, sequence and materials for this workshop, which will be provided to the 6-12 Lead Teachers after they complete the modeling course this summer.

NC-PIMS Regional Lead Teachers for 2007

Toward promoting the concept of the cascade professional development model for the immediate future and beyond the current funding period of NC-PIMS, Facilitators were asked to identify prospective Regional Lead Teachers from their pool of Lead Teachers. While among our Lead Teachers, there are many that would be highly qualified to participate in the special training that is being designed, there were limited openings. Ten K-5 Lead Teachers have been selected and have agreed to take on the functions and responsibilities of a Regional Lead Teacher. The selection involved a lengthy process of reviewing
video-recorded lessons, recommendations of Facilitators and Lead Teacher commitment to taking on a school-based mathematics leadership role. Specifically, there are two teams of Regional Lead Teachers: Team 1 will be assigned to work primarily with Facilitators in the development and delivery of NC-PIMS measurement workshops for teachers; Team 2 will support the two-week school-based mathematics leadership course for New Lead Teachers this summer. Both teams are committing to 20-25 days of professional work with NC-PIMS through the summer. One of the important outcomes of the work of some of the Regional Lead Teachers will be a collection of workshops to be accessible on CDs for the partner districts and others who would be interested. The collection is expected to include refinements of two 12-hour mathematics workshops, which were implemented by some NC-PIMS partner districts in Years 2 and 3.

Additional rationale for the Regional Lead Teacher concept includes building a cadre of mathematics teacher-leaders who, along with the NC-PIMS Facilitators, would be accessible to districts in the service area of the three primary university regions served by the project. With our current Lead Teachers, the Regional Lead Teachers and the Facilitators, and with several freshly designed 12-hour workshops to conduct in the wake of the project’s official departure, the partner universities through their Mathematics and Science Education Centers should be well-positioned to take advantage of these resources in a next phase of teacher professional development support. The Centers should be able to advance toward building professional development support teams from this cadre of well-grounded master teachers and work with districts to determine their next set of priorities in mathematics teaching and learning.

### The NC-PIMS K-5 Regional Lead Teachers for 2007

<table>
<thead>
<tr>
<th>Team</th>
<th>Lead Teacher</th>
<th>Current Home District</th>
<th>NC-PIMS Region</th>
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<tbody>
<tr>
<td>Workshop</td>
<td>Kayonna Pitchford</td>
<td>Cumberland</td>
<td>Fayetteville State University</td>
</tr>
<tr>
<td></td>
<td>Brandi Newell</td>
<td>Cumberland</td>
<td>Fayetteville State University</td>
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<tr>
<td></td>
<td>Amy Janning</td>
<td>Wayne</td>
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<tr>
<td></td>
<td>Tracy McKeel</td>
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<td></td>
<td>Rubenia Graham</td>
<td>Duplin</td>
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<td></td>
<td>Alice McArthur</td>
<td>Pitt</td>
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<td></td>
<td>Joan Buck</td>
<td>Columbus</td>
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</tr>
<tr>
<td></td>
<td>Hollie Pritchard</td>
<td>Brunswick</td>
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</tr>
<tr>
<td>Leadership</td>
<td>Michele Alford</td>
<td>Onslow</td>
<td>UNCW/ECU</td>
</tr>
<tr>
<td></td>
<td>Kathy Morris</td>
<td>Cumberland</td>
<td>FSU/UNCW</td>
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### New Lead Teachers—A Response to Annual Attrition and Sustainability

While in recent years the annual rates of teacher attrition among our 12 partner school districts have ranged between 18-32%, fortunately the NC-PIMS Lead Teacher attrition rate has been relatively modest at 10.8% annually. The most prevalent reasons reported by Lead Teachers who have not continued from one year to the next have been (1) personal/family reasons related to professional time commitment, (2) transferring to another district or another assignment in the same district, and (3) retirement or leaving the teaching profession. On a limited basis in the past, NC-PIMS has had occasion to admit new Lead Teachers, especially when a school would not otherwise have had any other district or Facilitator support to conduct the annual 12-hour professional development workshops. However, as NC-PIMS was constituted to provide a sustained program of courses along with mathematics school-based leadership, bringing in relatively small groups of new Lead Teachers has not been practical until recently. Indeed, the original project budget and schedule did not include provisions to do so.

In 2007, with encouragement from our NSF program officer, we have taken the best material from our mathematics school-based leadership program and formulated a path for the development of New Lead Teachers. This option for partner districts is a natural outgrowth of the lessons we have learned from the
first three years, and will provide the regional universities with a model program that would support a renewal of mathematics school-based leaders from year to year. Along with the Regional Lead Teacher concept, the professional development program for New Lead Teachers will provide a legacy of district and regionally-based teachers who will be prepared to implement quality mathematics professional development to their peer-teachers. The programming model has been well-prepared and tested through NC-PIMS; the means for future implementation will fall to the initiative of the MSEN university centers and the districts in their service areas. Stemming from the lessons learned with NC-PIMS, we are currently prepared to make a specific recommendation for the essential elements of a sustainable model for mathematics professional development, the Student Encouragement/Parent Involvement component and regional leadership, and a close estimate of the costs.

How Do We Do It!

One way is Videoconferencing. Frequently the NC-PIMS staff, including Facilitators, Co-PIs, Program Coordinators, University Site Coordinators and the Project Director need to have extended conversations, professional development or planning sessions, and the collective distances we would have to travel is just too great to make it practical. Furthermore, the time needed to travel even to a central point would often be too much to enable NC-PIMS to maintain the tight schedules of individual project activities. Videoconferencing has become common for many of our meetings, and provides a modicum of “face-to-face” interaction that goes missing entirely when large groups try to teleconference. The most recent videoconferences have been used for Facilitator professional development, planning discussions, and reviewing Facilitators’ white papers.

Upcoming Dates:

- Apr 5: PUSH III Review and Pilot
- Apr 11-12: Spring & Summer Leadership Development
- Apr 17: NC-PIMS Management Team Meeting
- Apr 20-21: NCAMTE Conference
- Apr 25: Lenses on Learning Cumberland County

A Straightforward Number and Operation Puzzle:

If you listened to NPR’s Car Talk recently, you may have heard Tom and Ray Magliozzi (aka, “Click” and “Clack”) pose the following little puzzle for their listeners. What can you do with it?

Set the positive integers from 1 to 9, in their natural order only, and use exactly one addition sign (+) and two subtraction signs (-), in such a way as to make the result equal to 100.

[More importantly, what strategies do you use to solve the puzzle? Is there more than one solution?]