EXTERNAL EVALUATION OF THE PROGRESSIVE MATHEMATICS INITIATIVE

NEW JERSEY CENTER FOR TEACHING AND LEARNING

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Introduction

Overview of the Program

In 2007, the New Jersey Center for Teaching and Learning's (NJCTL) launched its Progressive Mathematics Initiative (PMI). The intent of this initiative was to support the development of school-level Professional Learning Communities (PLCs) comprised of middle school educators to address student achievement gaps in mathematics and promote the development of students' mathematical skills so they would be able to successfully complete algebra in the eighth grade.

During the first year of the program (2007-2008), NJCTL awarded grants of up to $25,000 per year to each of three schools for up to each of three years, with continuance beyond the first year depending upon performance. All three received renewal funding for the second and third years. In the program's third year, an additional cohort of three schools joined the program under the same budget and time conditions. Thus, the cohort one schools were each completing their third year of operation and the cohort two schools were beginning their initial year of activities during the time of the current evaluation. In essence, each cohort also comprised its own extended PLC, and for one year, all six became an even more extended PLC – especially through their interactions at joint meetings and other less formal exchanges. This report focuses on the six school grantees that are listed according to cohort in Exhibit 1.[1]

Table 1. *Cohorts One and Two by School and District.*

Cohort 1: 2007-2010	Cohort 2: 2009-2012
▪ Lawrence Middle School *and* Lawrence Intermediate School, Lawrence Township School District ▪ Monongahela Middle School Deptford Township School District ▪ Fanny D. Rittenberg Middle School, Egg Harbor City School District	▪ Mountain View Middle School, Mendham Township School District ▪ Kenneth Olson Middle School, Tabernacle Township School District ▪ Riverfront School, Florence Township School District

[1] Lawrence Township included two schools in its PLC in order to address grades 6-8, since the intermediate school includes grades 4-6 and the middle school is composed of grades 7 and 8.

Prior to discussing the PMI evaluation methods and activities – and the findings emanating from it, a brief mention of why the NJCTL, and others, are promoting eighth-grade algebra, and why NJCTL has chosen the professional development model of professional learning communities to promote it merit some mention.

Why Algebra and Why Middle Schools?

Taking algebra in eighth grade was once reserved for mathematically gifted students. For example, in 1990, only 17 percent of eighth graders were taking algebra, leading the Clinton administration to make the enrollment of all children in an algebra course by eighth grade a national goal – one that still remains far from being achieved. The importance of such a goal is reflected in national transcript studies by Westat, that indicate that "83 percent of students who take geometry in ninth grade, most of whom completed algebra in eighth grade, complete calculus or another advanced math course during high school" (Shettle, et al., 2007, p. 11). Other research also suggests that students who take algebra earlier rather than later subsequently have higher math skills (Smith, 1996; Burris, Heubert and Levin, 2006; Nyre, 2006; Loveless, 2009). Some have labeled algebra "The New Civil Right," highlighting the social consequences of so many poor and minority students taking remedial and general math courses instead of algebra (Moses, 1995: Matthews, 2007; Perry, et al., 2010).

Studies conducted at Johns Hopkins University found that "the extent to which students [in middle grades 5-8] found mathematics classes interesting and exciting had significant effects on both students' level of effort in math class and their attendance," and that "the extent to which students believed that the mathematics they were studying would be useful in life was the strongest predictor of student effort" (Balfanz, 2009, p. 10)

According to Herzog, Balfanz and MacIver (2007), "The most critical challenge is finding ways to improve the quality of middle grades coursework and course performance. Students who receive high-quality instruction and course assignments will learn and advance and, ultimately, graduate college-ready. Those who do not, will not" (p. 223). Similarly, ACT researchers maintain that "the level of academic achievement that students attain by 8th grade has a larger impact on their college and career readiness" by grades 11-12 "than anything that happens academically in high school" (ACT, 2008, p. 2).

Why Professional Learning Communities?

Professional Development

One cannot begin discussing PLCs without at least briefly mentioning professional development (PD) –a broad term that encompasses all types of facilitated learning opportunities and includes a wide range of people, interests and approaches. However, those who engage in PD share the common purpose of enhancing their ability to do their work. In education, although the teachers profit the activities, the ultimate beneficiaries are their students. PD is far from a new concept. ASCD) (the current brand of the Association for Supervision and Curriculum Development) – an educational leadership organization dedicated to advancing best practices in PD – was founded in 1943.

In addition to after-school meetings, as well as conferences and seminars of varying lengths and foci, both early and current PD activities tend to include consultations, coaching, mentoring, technical assistance, and reflective supervision (Rose and Nyre, 1983; Nyre and Marantz, 2002; National Professional Development Center, 2008). More than a decade ago, Loucks-Horsely (1996) discussed some of conclusions from the Professional Development Project of the National Institute of Science Education, presenting ***seven principles that are found in excellent professional development experiences for science and mathematics educators***:

1. Developing a clear, well-defined image of effective classroom learning and teaching;
2. Providing teachers with opportunities to develop knowledge, skills and teaching approaches;
3. Using instructional methods to promote learning for adults which mirror the methods used with students;
4. Strengthening the learning community of science and mathematics teachers;
5. Preparing and supporting teachers to be leaders;
6. Providing links to other parts of the educational system; and
7. Making continuous assessment part of the professional development process.

Professional Learning Communities

The evolution of PD to include something more akin to that which is being promoted through the NJCTL has its roots in psychology, with one of its earliest and foremost proponents (Newman, 1991) suggesting that:

> [S]ociety in general, and education in particular, could benefit substantially from efforts to transform impersonal, fragmented bureaucratic organizations into places where participants share goals and pursue a common agenda of activities through collaborative work that involves stable, personalized contact over a long term. In communities of learning, all teachers and students feel included as full-fledged participants in the school; teachers and students relate to one another in less specialized roles, but more as whole persons; they participate and take responsibility for the collective life of the school; and they can count upon one another for help in meeting both individual and collective needs (p. 3).

Within Newman's comments, we see the beginnings of PD being viewed as expanding to include activities that are ***done to teachers*** to something cooperatively ***done by teachers*** (and other educators) for themselves and students. In fact, the National Staff Development Council's standard for PLCs is that they "improve the learning of all students and organize adults into learning communities whose goals are aligned with those of the school and district" (Fullen, 2001, p.13). PD approaches such as lesson study[2] and communities of practice[3] were among the first such activities added to the PD taxonomy, and later subsumed by most under the rubric of PLC.

The professional learning community model flows from the assumption that the core mission of formal education is not simply to ensure that students are taught but to certify that they learn. According to DuFour (2004), "this simple shift—from a focus on teaching to a focus on learning—has profound implications for schools" (p. 1).

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[2] Working in a small group, teachers collaborate with one another – meeting to discuss learning goals, to plan an actual classroom lesson (called a "research lesson"), to observe how it works in practice, and then to revise and report on the results so that other teachers can benefit from it.

[3] Communities of practice are groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly (Wenger, McDermott and Snyder, 2002).

In the early 1990s, researchers and practitioners alike switched to the idea that knowing and "knowledgeability" are better thought of as cultural practices that are exhibited by practitioners belonging to various communities ((Brown, Collins and Duguid, 1992; Roth and Bowen, 1995; Bos-Cuissi, Augier and Rosner, 2008.)

Evaluation Questions and Activities

Evaluation Questions

An external evaluation of a program is tasked not only to document the activities, outputs, outcomes and impacts of a program, but to find the answers – and the reasons for those answers – to the following basic questions:

- *Is the program doing the right things?*
- *Is the program doing those things right?*

Within the context of these two broad questions are found several more specific evaluation questions, such as those with which the PMI evaluator was charged with answering:

1. Can a Professional Learning Community be created and maintained within an individual school for the purpose of developing middle school mathematics curricula?
2. Can a Professional Learning Community be created and maintained across a small group of schools for the purpose of developing middle school mathematics curricula?
3. Does the use of SMART technology – i.e., Boards, Notebooks and Transponders – contribute to and enhance the work of a PLC?
4. Which of the SMART components contributes the most to the development of middle school mathematics curricula?
5. Are the SMART components separable, or are results more positive when they are used together?
6. To what extent do the Regional Conferences enhance each PLC's work?
7. To what extent do the Regional Conferences enhance cross-school connections and collaborations?
8. What district and in-school practices enhance or hinder the workings of PLCs?

Of course, the ultimate evaluation questions have to do with the program's impact on student learning, which is not yet the focus of this one-year contract, but is a long-term goal toward which the program is concentrated.

Evaluation Activities

Given the number of evaluation questions, this evaluation called upon a variety of evaluation techniques and measures – allowing for a triangulation of data around any one question in order to draw more valid solutions. In this instance the following activities were used:

- **Attending PLC program regional conferences** to observe activities, informally interview participants, and participate in debriefings with NJCTL staff and consultants.
- **Surveying** PLC team members –
  - at the beginning of the fall 2009 semester (2 surveys),
  - at the conclusion of the fall 2009 and spring 2010 conferences, and
  - at the end of the school year.
- **Conducting site visits** to each school in the fall and spring to observe PLC working sessions and hold discussions with participating teachers.
- **Providing periodic written and oral reports** for NJCTL.[4]
- **Developing forms** such as common agenda and meeting minute's templates for the PLCs to use to chronicle their activities, accomplishments, and challenges – as well as means used to overcome challenges.[5] [6]
- **Conducting interviews** with principals of the schools that received the grants – informally in the fall and formally in the spring.
- **Reviewing annual reports** submitted by the PLCs.
- **Conducting electronic follow-ups** with key PLC members to help further clarify operations and outcomes and to "fact check" the accuracy of certain quotations and claims made in this report.

Teaching Experience of PLC Teachers

Before discussing the evaluation findings, it should be noted that the teachers in Cohort One had been teaching for an average of 11.5 years – 7.4 of them teaching math in middle school. The teachers in Cohort Two had an average of nearly 3 more years of teaching experience (14.1),[7] but virtually the same number of years teaching middle school math (7.6). Finally, whereas the Cohort One teachers had taught middle school algebra for an average of 4.5 years, that same statistic for Cohort Two teachers was only 1.7 years.

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[4] In evaluation, the use of the word "triangulation" means the multiple employment of various methods and sources of data.

[5] Completed agendas and minutes were to be sent to the program's math consultants and the evaluator.

[6] The template for recording meeting minutes is included in Appendix A.

[7] The extra Cohort Two teachers' additional years of experience teaching were no doubt due in part to having entered the math grant program two years after the Cohort One teachers.

Evaluation Findings

Change in Program Focus

There was a major change in PLC activities in year three of the PMI program – again, the third year for those schools in Cohort 1, and the first year for those in Cohort 2. A new activity was required of all PLCs in both cohorts – participation in a joint effort of all six PLCs to create Algebra 1 curricula, specifically instructional units using SMART technology – i.e., boards, notebooks and transponders. This posed immediate equipment acquisition problems for some of the PLCs (one did not yet have their equipment as of the November 2009 evaluation site visit) and skill acquisition challenges for others whose members needed to learn how to use the equipment.[8]

This change in program emphasis was met with a combination of resentment, reticence and relief on the part of the grantees. Among those in Cohort One, this was met as an abrupt surprise by most (one person used the term *bombshell*), as they generally felt that they were being taken off the PLC track that they had been on for the previous two years. A few others were okay with the change, as they felt their original objectives had been mostly met, and they were pleased to have a new goal. When these two views were held within the same PLC, teachers reported that group decisions that ensued had made compromises and trade-offs easier by virtue of their having developed a camaraderie and a comfortable level of discourse during the previous two years. One of the teachers categorized the discussions taking place during PLC meetings and in general among the math teachers as a "sea change" from previous deliberations "about virtually anything."

The teachers in Cohort 2 PLCs were obviously less entrenched in their PLC foci, operations and activities. Furthermore, they could not really look to the Cohort 1 teachers for guidance, as they had not been engaged in the development of instructional units previously either. One of them summed up the feelings of the PLC of which she was a member – as well as others – by thanking NJCTL staff for "giving us a focus."

[8] Only one school already had some SMART technology equipment when they wrote their grant proposal.

The change in focus prompted a question on one of the surveys administered to PLC members at the end of the academic year regarding the percentage of PLC time devoted to various activities during the year, and the average of responses to that question are presented by each cohort and by the individual PLCs within them in Table 2.

Table 2. *Average percentage of time devoted to various activities during 2009-2010, by cohort and individual PLCs.*

	Activities in Application	Developing Lessons	Other Activities	Total
❖ Cohort 1*	32%	62%	6%	100%
➢ Deptford	30%	60%	10%	100%
➢ Egg Harbor	69%	25%	6%	100%
➢ Lawrence	10%	80%	10%	100%
❖ Cohort 2*	36%	56%	8%	100%
➢ Florence	20	63	17	
➢ Mendham	10	80	10	100
➢ Tabernacle	61	32	7	100

* The total percentages for each of the PLCs do not necessarily add up to 100 percent for the cohorts as a whole because there were different numbers of respondents in each of the PLCs.

The PLCs in Cohort 1 averaged spending 62% of their time on developing lessons for the algebra curriculum, as opposed to 32% on the activities they had proposed in their applications for the grant, and six percent for other activities. The combined Cohort 2 PLCs averaged 56% of their time to lesson development and 36% on proposed activities, with eight percent on other activities. Ranges within cohorts were very wide. In Cohort 1, Egg Harbor devoted 69% of its time to its proposed activities, while Deptford and Lawrence reported 30% and 10% to these efforts, respectively. In Cohort 2, Tabernacle devoted a good deal of its time to proposed activities (57%), while the proportion of Florence's and Mendham's PLC energies focused on their proposed activities comprised 20% and 10%, respectively.

Although all PLCs devoted some non-meeting time to accomplishing their various tasks, it was found during site visits and discussions with PLC members at the conferences, during site visits, and through emails that much of the time Egg Harbor and Tabernacle devoted to developing instructional units by was done outside of their regular PLC meeting times. Responsibility for developing specific portions of units were volunteered/assigned to one or two members, and at a subsequent meeting or two brief

updates on progress and initial critiques were made, leaving enough time for the teachers to then focus on their original PLC plans. When initial drafts of all components of an instructional unit were completed, one or two sessions were devoted to final critiques and integrating them into a lesson. Some of the other PLCs spent more of their meeting times on preparing and critiquing the lessons as a group, and therefore less time was available for activities they had actually proposed.

Regional Conferences

NJCTL brought the six grantees' PLC math teachers together on three occasions during 2009-2010 – for two days in summer 2009, and for one day each in fall 2009, winter 2009, and spring 2010. These meetings provided several activities in support of the overall goals of the PMI program:

- An opportunity for the PLC teachers to interact with counterpart PLC teachers from the other participating schools/districts, with whom they had created a virtual ***meta***-PLC, if you will, linking them together via an NJCTL interactive website created and designated for that purpose.
- An opportunity for the PLC teachers to describe and demonstrate their instructional units to other PLCs.
- An opportunity for the PLC teachers to provide and receive feedback on the instructional units from other PLCs.
- An opportunity for the PLC teachers to interact with mathematics professional learning community consultants who provided both group and individual assistance throughout the meetings.[9]

The evaluator engaged in informal conversations with the teachers at these events, and the teachers completed surveys at the completion of the conferences. The results of the fall conference surveys were reported in an evaluation document previously submitted to NJCTL, and the overall findings were roundly supportive on every dimension, from content to networking opportunities. For example, the teachers were asked to complete a survey that asked them to indicate the extent to which they agreed or disagreed with certain statements about formative evaluation of student work, the use of action research projects, and the use of technology in the mathematics classroom – the latter being a cornerstone of NJCTL's current math and science initiatives. Their responses are presented in Table 3.

[9] The Math Fellows also met with individual PLCs on a regular basis throughout the year.

Table 3. *The extent to which teachers at the November conference agreed or disagreed with certain statements concerning mathematics teaching and the use of technology on a four-point scale, by cohort.*
(1 = Strongly Disagree; 4 = Strongly Agree)

Statement	Average Rating	
	Cohort 1	**Cohort 2**
a. It is important to determine needs by evaluating student data and student work samples.	3.7	3.6
b. It is important to determine, validate and share effective practices in the teaching and learning of mathematics.	3.7	4.0
c. It is important to determine and meet the professional development needs of each teacher in the learning community.	3.6	3.8
d. It is important to participate in action research projects to monitor student achievement and progress.	**2.9****	**3.6****
e. The Smart board is a valuable tool to help students learn certain concepts.	3.6	3.7
f. Students can learn more mathematics more deeply with the appropriate use of technology.	3.4	3.8
g. Technology tools provide visual models that many students are unable to generate independently.	3.5	3.8
h. Technology in the *mathematics classroom* is best used for remediation, or reinforcement of skills.	**2.2***	**2.1***
i. Technology is best used to promote students' analytical, creative, and other "higher order" thinking skills.	3.2	3.2
j. Technology allows more time for conceptualizing and modeling mathematical ideas.	3.7	3.6
k. Technology interferes in the "human" interactions between teachers and students.	**1.7***	**1.8***
l. The use of a Smart board can increase student understanding and performance.	3.2	3.7
m. Technology offers teachers options for adapting instruction to meet the individual needs of students.	3.5	3.3
n. Technology hinders collaborative learning in mathematics.	**1.7***	**1.9***
o. There is so much to cover in math curriculum that it's hard to justify the use of technology too.	**1.5***	**1.6***
p. It is important to use research results to improve the teaching and learning of mathematics in my middle school.	3.4	3.6

***** ***Low*** ratings are ***positive*** for these four statements.
****** The rating with the widest divergence between Cohort 1 and Cohort 2.

The Table 3 responses demonstrate that, after attending the summer and fall conferences, the teachers were in sync with the overall philosophy of the program – i.e.,:

- Technology does not hinder collaborative learning and does not detract from teacher-student interaction;
- Technology can be effectively used to promote students' analytical, creative and other "higher order" thinking skills;
- The appropriate use of technologies that enhance instruction and student learning benefit student learning rather than detracting from it;
- Formative evaluation of student work is essential to determine and address student needs; and
- The sharing and validation of effective teaching and learning practices are paramount in a PLC.

At the conclusion of the fall conference, the teachers were also asked to evaluate what had taken place in terms of benefits to them by rating the extent to which they agreed or disagreed with a series of statements that reflected what the program considered positive outcomes. Table 4 presents their responses. Two general findings are especially noteworthy in Table 4. For Cohort One, 11 of the 14 items in that table received ratings above 3.0, with nine of them above 3.5. Similarly, 10 items were rated at or above 3.0 by Cohort Two respondents – all but one of which was above 3.5. In addition, the ratings of both cohorts were remarkably similar across the 14 items, with only two of them showing differences of 0.5 on the four-point scale, and the rest either exactly the same rating (5 items) or within 0.3 points of one another (7 items).

Examples of the teachers' responses to two of the open-ended questions in that same survey are presented in Tables 5 and 6. They were asked to indicate ways in which what they learned at the conference ***will influence their professional work*** (Table 5), and ways in which what they learned at the conference ***will impact student learning and achievement*** (Table 6).

In Table 5 (***self-benefits***), responses given by seven or more teachers were:

- Receiving feedback from the other schools
- Learning more about the Smart Board and Smart Notebook (Mostly Cohort2)
- How to work as a team/work with others/use criticism constructively
- The need for cross-grade/vertical articulation (Again, mostly Cohort 2)

In Table 6 (***student benefits***), responses given by six or more teachers were:

- Smart Board/technology ideas/uses
- How to improve scope and sequencing through short/formative assessments
- Learning how to implement more interactive experiences with technology/Seeing how interactive technology can boost student interest and investment in learning
- Better/more effective ways to work with my colleagues/co-workers

Table 4. *Teachers indicating the extent to which certain elements of the Fall 2009 conference benefitted them, by cohort.*
(1 = Not at All; 4 = To a Great Extent)

Statement	Average Rating	
	Cohort 1	**Cohort 2**
a) It provided knowledgeable facilitators and staff genuinely interested in helping me.	3.9	3.7
b) It will be helpful for our professional learning community work in the school.	3.8	3.9
c) It helped me understand why curriculum articulation is so important.	3.7	3.7
d) It showed me that technology should be regularly integrated with mathematics instruction	3.7	3.7
e) It stimulated me to think about ways I could improve my instructional practices.	3.5	3.4
f) It helped me understand how a professional learning community can function most effectively.	3.5	3.6
g) It helped me understand why backmapping and curriculum realignment are so important.	3.5**	3.0**
h) It provided me with a better understanding of what it means to be a member of a professional learning community.	3.5	3.4
i) It increased my ability to see and/or explore ways to articulate the math curriculum across grade levels.	3.5	3.5
j) It provided ideas on how I can better identify and meet the needs of my students.	3.1**	3.6**
k) It expanded my pedagogical knowledge.	3.1	2.8*
l) It reinforced the value of using formative assessment to improve student mathematics achievement.	2.9*	2.9*
m) It taught me that formative assessment can help improve student mathematics achievement	2.9*	2.9*
n) It deepened my content knowledge.	2.8*	2.5*

***** Ratings falling below 3.0.

****** Ratings with the widest divergence between Cohort 1 and Cohort 2.

Table 5. *Number of teacher responses to an open-ended question asking them to indicate ways in which what they learned at the fall conference will* ***influence their professional work****

Number	Response
13	Receiving feedback from the other schools
12	Learning more about the Smart Board and Smart Notebook (Mostly Cohort2)
10	How to work as a team/work with others/use criticism constructively
7	The need for cross-grade/vertical articulation (Mostly Cohort 2)
4	The need for group norms
4	Less words/text can be more effective
4	I learned content/I understand my content area better
3	How to share what we are doing with others at the school/non-team members
3	I will use the notebook more often
3	Learning more hands-on activities for my students

*Only multiple responses are included in this table. All responses are shown in Appendix B

Table 6. *Number of teacher responses to an open-ended question asking them to indicate ways in which what they learned at the fall conference will* ***impact student learning and achievement ****

Number	Response
19	Smart Board/technology ideas/uses
11	How to improve scope and sequencing through short/formative assessment
7	Learning how to implement more interactive experiences with technology/Seeing how interactive technology can boost student interest and investment in learning
6	Better/more effective ways to work with my colleagues/co-workers
5	Notebook lessons enhance student learning/The units help students conceptualize the topics/I now see how to use these units with students/Learning new ways to present material/I can take everything I learned back to my
4	Hearing teachers from different grade levels discuss the concepts and how to teach them
4	Slides should be made so that they teach – ***and re-teach***
4	The use of Senteo / understanding the full potential of Senteo / how to incorporate Senteo questions during a lesson, not just at the end
4	Students will develop a deeper understanding of the material through the use of the Internet/interactive questions/games/embedded videos
2	My students will escape from the "textbook only" approach to math/I learned some good examples of alternative ways of teaching
2	Using videos/the Notebook tool for capturing videos of student work

*Only multiple responses are included in this table. All responses are shown in Appendix B

At the conclusion of the spring conference, the teachers were asked again to complete an evaluation survey. Table 7 shows the comparative ratings given to items that were common to both the fall and spring surveys. The spring survey did not repeat many of the former survey's items because we wished to ask more questions about impacts of the total PLC experience at the end of the 2009-2010 school year. While it is noteworthy that the teachers awarded such high ratings to both conferences, it is even more remarkable that the ratings on these items separated by seven months were almost identical.

Table 7. *Comparison of teachers' responses to common items on the Fall 2009 and Spring 2010 conference evaluation surveys.* (1=Strongly Disagree; 5=Strongly Agree)

Statement	Fall 2009	Spring 2010
a) It will be helpful for our continuing PLC work in the school.	3.8	3.8
b) It increased my knowledge of how a professional learning community can function most effectively.	3.5	3.6
c) It provided ideas on how I can better identify and meet the needs of my students.	3.1	3.3
d) It stimulated me to think about ways I could improve my instructional practices.	3.5	3.6
e) It provided knowledgeable facilitators and staff genuinely interested in helping me.	3.8	3.8
f) It provided me with a better understanding of what it means to be a member of a professional learning community.	3.5	3.6
g) It reinforced the value of using formative assessment to improve student mathematics achievement.	3.0	3.3

End-of-Year Teacher Surveys

Degree of Implementation of PLC Characteristics in Schools That Received NJCTL Math Grants

Shortly before the 2009-2010 school year ended, the PLC members in Cohorts One and Two were asked to complete a survey taken from the New Jersey tool kit for professional learning – **COLLABORATIVE PROFESSIONAL LEARNING IN SCHOOL AND BEYOND.** This particular tool – ***#13.8*: *Professional Learning Communities: Getting Started*** – is a

survey containing 24 statements deemed by New Jersey educators to be typical of well-functioning professional learning communities.[10] It asks the respondents to indicate the degree to which they believe that their school has implemented certain PLC practices or processes on a five-point scale, with a one indicating "beginning implementation," and a five demonstrating "full implementation." This was done both to get a 'reading' of the school environment in which each of the math PLCs was operating, and to gain some insights into influences the math PLCs might be having on their schools at large.

Table 8 displays the responses of the PLC math grant recipients by cohort. It shows that PLC members who were concluding the third and final year of their NJCTL grant (Cohort One) gave their schools many more positive ratings (higher average scores) than their counterparts who were in Cohort Two schools completing their first year of operation under the grant. This was the case in 22 out of 24 instances, or 92 percent of them. What is even more striking is that in 16 of those 22 items (73%), the Cohort One school ratings were at least one-half a point higher than those of Cohort Two, with 7 being at least one full point higher. Those items where the Cohort One average level of agreement with the statement are **one-half *or more* rating points higher** than those of Cohort Two are indicated by numbers in bold with larger fonts.

[10] The **TOOL KIT** was developed in partnership with the National Staff Development Council (NSDC), the New Jersey Department of Education (NJDOE), and the New Jersey Professional Teaching Standards Board (PTSB).

Table 8. *PLC members' responses to statements regarding the degree to which their schools have implemented certain characteristics considered typical of well-functioning PLCs, by cohort.* ▲*

(1=Beginning Implementation; 5=Full Implementation

Statement	Cohort One 3rd Year	Cohort Two 1st Year
a) The staff of our school has embraced the idea that the primary purpose of schooling is to ensure high levels of learning for all students.	4.3	4.1
b) The staff of our school has developed a shared sense of the school we are trying to create in order to help all students achieve at high levels.	**4.0**	**3.2**
c) The staff of our school has clarified the commitments we are willing to make in order to create the school described in our shared vision.	**4.5**	**3.4**
d) There are a few big ideas that drive the daily work of the people in our school.	**3.6**	**2.8**
e) The staff of our school has identified specific, measurable, attainable, results-oriented, and time-bound goals that serve as indicators of our school's progress.	**3.6**	**2.6**
f) In our school, teachers responsible for the same course content and/or students work together to clarify intended learning, develop common assessments, and identify strategies for improving student achievement.	**3.5**	**2.7**
g) The staff in general and the teaching teams in particular make decisions by seeking out best practices rather than by sharing opinions.	3.1	2.7
h) Our school has created processes that engage our staff in a continuous cycle of improvement, e.g. verifying current levels of student achievement, generating strategies for improvement, implementing the strategies, and collaboratively assessing the impact of the various initiatives on student achievement.	**3.6**	**2.6**
i) The staff in our school demonstrates a willingness to consider new strategies for achieving school and team goals.	**4.0**	**3.3**
j) The school and teacher teams assess the success of improvement initiatives on the basis of the initiative's impact on student achievement results rather than levels of adult satisfaction.	**3.7**	**3.2**
k) Teachers who share the same course content and/or students work together to clarify essential learnings for each class, course, grade level, or unit.	**4.1**	**3.1**
l) Teachers who share the same course content and/or students agree upon the criteria they will use in assessing the quality of student work.	**3.6**	**3.0**

Continued⟶

▲From *Collaborative Professional Learning in School and Beyond: A Tool Kit for New Jersey Educators.* Trenton: December, 2008.

*** Bold numbers with larger fonts** indicate that Cohort One's average agreement with the statement is **one-half *or more*** rating points higher than that of Cohort Two.

Table 8. *PLC members' responses to statements regarding the degree to which their schools have implemented selected characteristics considered typical of well-functioning of PLCs, by cohort* (continued). ▲ *

(Rating Codes: **1**=Beginning Implementation; **5**=Full Implementation)

Statement	Cohort One 3rd Year	Cohort Two 1st Year
m) Teachers who share the same course content and/or students agree upon the criteria they will use in assessing the quality of student work.	**3.6**	**3.1**
n) Teachers who share the same course content and/or students practice applying agreed-upon criteria for assessing student work until they are consistent in their application.	**3.5**	**2.9**
o) Students have the opportunity to acquire agreed-upon essential learnings regardless of who is teaching the class, course, grade level, or unit.	3.6	2.3
p) Our school has a consistent and systematic response when it becomes clear that students are not learning what we expect them to learn?	2.6	2.3
q) Our school has systems in place to monitor each student's attainment of essential learning on a timely basis.	**3.1**	**2.5**
r) Our school has consistent, school-wide systems in place that ensure students receive additional time and support when they experience initial difficulty learning.	3.0	3.0
s) Teachers who share the same course content and/or students have developed common assessments.	**3.4**	**2.7**
t) There are school-wide systems in place that monitor each student's learning on a timely basis.	**3.2**	**2.4**
u) There are school-wide systems in place to provide students who experience difficulty in learning with additional time and support in a directive way.	3.0	3.0
v) Teacher teams have clarified their expectations regarding the roles, responsibilities, and relationships of each team member in order to promote effective team practices.	**3.6**	**2.8**
w) Teacher teams articulate and work interdependently to achieve specific, measurable, attainable, results-oriented, time-bound goals that are linked to school and/or school district goals.	**3.5**	**3.0**
x) Teachers are provided with information regarding the achievement of their students in meeting an agreed-upon standard on a valid test in comparison to the other students in the school who are attempting to achieve that same standard.	**3.4**	**2.5**

▲From *Collaborative Professional Learning in School and Beyond: A Tool Kit for New Jersey Educators.* Trenton: December, 2008.

*** Bold numbers with larger fonts** indicate that Cohort One's average agreement with the statement is **one-half *or more*** rating points higher than that of Cohort Two.

The findings in Table 8 should not be misconstrued to suggest that the Cohort Two schools are doing poorly on these dimensions according to their PLC teachers, as there were only six statements in which they rated their schools as a whole below a 2.5, which would be considered 'above average' on a 4-point scale. There were also two instances in which both cohorts *rated their schools equally,* giving them a 3.0 rating on a five-point scale as follows:

#*18.* *Our school has consistent, school-wide systems in place that ensure students receive additional time and support when they experience initial difficulty learning.*

#21. *There are school-wide systems in place to provide students who experience difficulty in learning with additional time and support in a directive way.*

The only instance in which Cohort One ***did not*** have a rating one-half point higher than their counterparts (only 0.3 points higher) was as follows:

#1. *The staff of our school has embraced the idea that the primary purpose of schooling is to ensure high levels of learning for all students.*

At the other extreme, the Cohort Two teachers exceeded their Cohort One counterparts' ratings by one full point or more (again, on a 5-point scale) on the following seven items:

#15. *Students have the opportunity to acquire agreed-upon essential learnings regardless of who is teaching the class, course, grade level, or unit.*

#3. *The staff of our school has clarified the commitments we are willing to make in order to create the school described in our shared vision.*

#4. *There are a few big ideas that drive the daily work of the people in our school.*

#5. *The staff of our school has identified specific, measurable, attainable, results-oriented, and time-bound goals that serve as indicators of our school's progress.*

#8. *Our school has created processes that engage our staff in a continuous cycle of improvement, e.g. verifying current levels of student achievement, generating strategies for improvement, implementing the strategies, and collaboratively assessing the impact of the various initiatives on student achievement.*

#11. *Teachers who share the same course content and/or students work together to clarify essential learnings for each class, course, grade level, or unit.*

#24. *Teachers are provided with information regarding the achievement of their students in meeting an agreed-upon standard on a valid test in comparison to the other students in the school who are attempting to achieve that same standard.*

During interviews with the principals of these schools during site visits, the findings of fairly substantial differences between the two cohorts reported in Table 8 were reinforced. They all spoke very favorably about their PLCs, lauding their current accomplishments, future plans and their positive impacts on the schools in which they were operating. However, the Cohort Two principals could point to certain influences on their schools in general, especially during the initial two years of the math grants, though and this did not diminish even when the PLCs were refocused more on the development of instructional units. In fact, several non-PLC teachers in schools from both cohorts asked for demonstrations of the Smart technologies they were using, and this was done for both individuals and departments – and also at School Board meetings.

Many of the non-PLC teachers followed the activities of the PLCs closely, and asked questions of their principals, such as, "Can we do that?" and "When can we get Smart boards?" Based upon their principals' comments, the Cohort One PLC teachers were reported to be "this school's leaders," "at the apex of our school's reform efforts, and ""exerting a great influence on the other teachers." According to the principals of the Cohort Two schools, at the beginning, the PLC teachers "were clearly being closely watched" and some of the others were reportedly "jealous of them." By the end of their schools' initial year in the program, the Cohort Two principals were saying much the same things as the Cohort One principals – that they were becoming leaders in the schools.

Table 9 displays teachers' responses to four questions on the end-of-year survey that focused on the construction and use of the instructional units that had been prepared, as well as the overall value of their respective PLCs to their schools' math programs. It shows that the teachers were adamant that their PLCs had benefitted their schools math programs – responding to such as question with a 3.9 ranking (*To a **great** extent*.) by both cohorts. However, they rated the development of the instructional units to their PLCs to have been somewhat less valuable, with a ranking of 3.1 by Cohort One and 3.2 by Cohort Two. Not many had actually used the instructional units yet, as their used was ranked as 2.5 by both cohorts.

In conversations with the teachers, this average response was found to have been tempered by three reasons: 1) some of the PLC teachers represented grades that did not teach Algebra I; 2) the eighth-grade students in some schools were not yet ready to undertake Algebra I; 3) other teachers were waiting until they could use the whole series

of units in the following year. The last reason is substantiated by the fact that the teachers gave an average rating for future use as 3.5 by Cohort One, and 3.4 by Cohort Two. Virtually everyone had tried out one or two, or at least portions of them, reflecting the fact that they wanted to try some of them out even if they were not teaching algebra.

Table 9. *Average responses to questions about the construction and use of the instructional units by cohort.* (1 = Not at All; 4= To a Great Extent)

Questions	Cohort One	Cohort Two
o To what extent do you believe the PLC has benefited your school's math program in general?	3.9	3.9
o To what extent did you find the development of the instructional units ***valuable to your PLC***?	3.1	3.2
o To what extent ***have you used the*** instructional units created by your PLC or other PLCs in your classes?	2.5	2.5
o To what extent do you ***intend to use*** the instructional units created by your PLC or other PLCs in your classes?	3.5	3.4

Finally, a set of questions dealing with the teachers' levels of confidence in teaching middle school mathematics was administered. It included certain skills and understandings related to teaching arithmetic and algebra, and asked each to indicate on a scale of one to five, ***with one representing the highest***, their level of confidence related to each. The teachers' responses, by cohort, are presented in Table 10.

The Cohort One teachers exhibited higher levels of confidence than their cohorts in Cohort Two in every instance. This pattern was to have been expected, as they already had two more years of experience working in their PLCs. What is somewhat unexpected is that their self-reported levels of confidence are not further apart. For eight out of the 10 items, the Cohort One teachers collectively have given themselves a better (in this table, a lower number) confidence rating than did their counterparts. In one instance they rated themselves equal (their ability to teach arithmetic), and in one case, the Cohort One teachers gave themselves a slightly better confidence rating (their ability to teach algebra II).

Table 10. *Teachers' levels of confidence in certain skills and understanding elated to arithmetic and algebra.*
(1= Very Confident**; 4 = Not at all** Confident**) ***

Item	Cohort One	Cohort Two
a) My understanding of the curriculum standards for arithmetic	1.1	1.5
b) My understanding of the curriculum standards for algebra I	1.9	2.1
c) My understanding of the curriculum standards for algebra II	2.9	3.0
d) My ability to solve arithmetic problems	1.0	1.2
e) My ability to solve algebra I problems	1.2	1.5
f) My ability to solve algebra II problems	2.1	2.5
g) My ability to teach arithmetic	1.1	1.1
h) My ability to teach algebra I	1.5	1.7
i) My ability to teach algebra II	2.7	2.5
j) My ability to use a Smart board	1.3	1.8

*** In Table 3, the lower the number, the higher the level of confidence.**

CONCLUSION

To create a professional learning community, focus on learning rather than teaching, work collaboratively, and hold yourself accountable for results.
Richard DuFour (2010)

We didn't know what one was, and now we are one.
NJCTL Math Grant PLC Participant (2010)

Introduction

Bloom and Vitcov (2010) characterize an operationally functional and successful PLC as "an embedded practice built on trust and the intrinsic motivation for everyone to hold themselves accountable to one another through deprivatized and transparent practice" (p. 1). That definition is in general agreement among those who deal with PLCs as teachers, consultants, and evaluators. The current evaluation has examined the six PLCs funded by the NJTLC through the lens of that definition, in the process of answering the questions put forth in the *Evaluation and Activities* section of this report.

Other instructional or curricular fads or programs *du jour* have historically been imposed upon schools or instructional units by well-intentioned district and school administrators – sometimes even legislators. They often fail because they typically are accompanied by to-do lists, bureaucratic forms and compliance checks that tend to temper teacher enthusiasm and minimize their involvement. In such instances, efforts such as PLCs become something to do rather than a process of shaping a learning culture and individual habits of mind that lead to higher levels of teaching and learning, with the emphasis on student learning. Otherwise, as some suggest, let us just call it *A Bunch of Professionals Who Frequently Meet in Formal and-Informal Processes to Improve Teaching and Learning* (adapted from Bloom and Vitcov, 2010, p. 3).

That was certainly not the case with the NJCTL "math grant" PLCs. Even though administrators were typically the first to become aware of the availability of the grant, none were applied for without the expressed interest and support of the teachers. In some instances school personnel with more experience with, and job descriptions that included, grant writing and submission took on stronger roles than in others, but in most cases teachers were very involved in the development of objectives, goals and processes

shaping the grant proposals. During initial site visits it was found that members of one of the PLCs were not fully aware of the details in the grant application until the evaluator made them aware of them. But even in that case, this situation ended up being a moot point because that school was in Cohort Two and ended up choosing to spend most of its PLC time on developing instructional units introduced in the math grants' new focus.

As mentioned in a previous section of this report, the change in program emphasis from "homegrown" goals, objectives and purposes to developing algebra instructional units under the overall guidance of the NJCTL and in consort with the other PLCs was met with both reticence and relief on the part of the grantees. It was eventually agreed by most that this change had positive elements by giving Cohort One "something else/new to do" and Cohort Two "some direction," which was lacking in their early meetings.

Evaluation Questions

QUESTION ONE	***Can a Professional Learning Community be created and maintained across a small group of schools for the purpose of developing middle school mathematics curricula?***

ANSWER. Without question, this ***can be done***, and through the efforts of the PLCs examined in this evaluation, it ***has been done***. The below mathematics curriculum for Algebra I has been completed with the instructional units highlighted below, and is being taught using Smart technologies:

Algebra I - Instructional Units	
• **Variables and Expressions** • Solving Linear Equations • Graphing Linear Equations • Solving Linear Inequalities • Graphing Linear Inequalities • Systems of Linear Equations and Inequalities • Solving and Graphing Absolute Values • Algebraic Exponents and Exponential Functions	(*Continued*) • Algebraic Roots and Radicals • Polynomials • Quadratic Equations • Probability • Systematic Listing, Counting, and Probability • Statistical Analysis and Data Displays • Open-Ended Application Problems (Supplemental

Furthermore, through the attendant processes used in the creation of these instructional units, other goals of the individual PLCs have been aided and abetted as well, such as:

- Classroom doors have been opened for peer visitation, sharing and critiques, and what has been gained from those actions has been brought back to the PLC as a whole and been further enriched.
- Articulation has not only been accomplished (*Cohort One*) or found to be well on its way (*Cohort Two*) within the middle-school grades, but also including backmapping into the elementary grades – and in one instance thus far, within a high school.
- Teachers outside of middle school math – and well outside of math and middle schools as well – have observed the operations and benefits of these PLCs, and are asking to their principals if they may emulate them.

For almost all of the PLCs, neither of the first two undertakings – visitation and articulation – had ever been attempted, much less been successful, previously – at least not with such a focus and determination. Nor, according to the PLC members, with such enthusiastic cooperation from the teachers in grades not the original focus of the grant. As one teacher said, "I had never spoken to a high school math teacher about the curriculum or articulation before." And another, "We didn't really know what they were teaching in the elementary school, but we thought we did."

QUESTION TWO	***Does the use of SMART technology – i.e., Boards, Notebooks and Transponders – contribute to and enhance the work of a PLC?***
QUESTION THREE	***Which of the SMART components contributes the most to the development of middle school mathematics curricula?***
QUESTION FOUR	***Are the SMART components separable, or are results more positive when they are used together?***

To a person, the Smart technologies were judged as essential to the work of the PLCs, not only in developing the curriculum – determining the supporting Senteo[11]

[11] The Senteo interactive response system is designed to enhance interactive teaching and learning. The teacher displays or speaks prepared or ad hoc questions, students anonymously key in answers with their remote, and responses are tallied and displayed on the Smart Board. To assess student understanding, one can use a variety of question types, including true or false, multiple choice, numeric response and more-than-one-right-answer. The system allows frequent questioning and feedback, which engages students more actively in the material being studied. When the data is used to provide relevant in-class feedback, and to adjust instruction according to identified needs, then large gains in student understanding can be achieved. Feedback can be displayed in a bar graph or pie chart that statistically summarizes the student responses. Students send their responses privately, so they are free to answer without feeling judged by peers.

and graphics, and inserting items from other sources and tailoring certain aspects of a lesson to particular groups of students – but also in their success using them in the classroom. Those PLC members who teach non-math classes as well are correspondingly using these technologies to support those courses. Many are also assisting other math and non-math teachers in their schools in learning to use and integrate Smart technologies. Since the instructional units were built using Smart technologies, it was agreed that they were all essential when using the units. Once they have been subjected to greater use over time, one may find some evidence to the contrary.

QUESTION FIVE	To what extent do the Regional Conferences enhance each PLC's work?
QUESTION SIX	To what extent do the Regional Conferences enhance cross-school connections and collaborations?

As demonstrated in the *Regional Conferences* section of this report, the teachers were very appreciative of all aspects of the conferences – the organization and planning to the presentations and critiques of draft instructional units, the discussions on PLC meeting norms, formative assessments and integrating Senteos, and the informal exchanges during breaks. Innovative approaches used by other PLCs were exchanged and later evidenced in other PLC meetings and approaches. The teachers were especially appreciative of their interchanges with other PLCs, and this led to visits to other PLC's schools, as well as aspects of what the program called "virtual PLC-ing," as they shared further collaborations through emails and telephone calls.

QUESTION SEVEN	What district and in-school practices enhance or hinder the workings of PLCs?

Much of what surfaced in in this evaluation with regard to this question is not all that different from what one often finds in evaluations of schools in general and special initiatives in particular:

- **Principals**
- **Time**
- **Resources**
- **Structure**
- **Purpose**
- **Norms**

Each of these elements that can help support, augment and extend the operation of and enhance the success of a PLC is discussed below. It should be noted that the Math Fellows – veteran math teachers and coaches – provided invaluable assistance to the PLCs during 2009-2010, attending meetings, leading sessions at regional meetings, and proving finishing touches to the instructional units prior to their being finalized for distribution. Generally,

1. Sharing information among projects but during visits and at the regional meetings.
2. Being knowledgeable about the subject and acquainted with a multitude of helpful resources
3. Being able to "read" the group – when to interject; when to let them work through a discussion even when knowing "the answer," etc.
4. Having developed a good level of professional rapport with the teachers as 'one of them' while at the same time being an NJCTL consultant.

Principals are clearly a key component, as their explicit support and initial guidance is essential to the implementation, stability and sustainability of a PLC. A great idea with good leadership must bring the principal on board early, or the hurdles encountered alone will be too daunting for success. The literature on educational leadership and school change clearly recognizes the role and influence of the campus administrator (the principal, and sometimes an assistant principal) on whether or not change will occur in the school. Transforming a school or even a department or unit within it into a learning community can be done only with the leaders' sanction and active nurturing of the endeavor (Trail, 2000). As mentioned previously, all principals of the schools where these PLCs were functioning professed strong support for them. Most "dropped in" on at least one or two PLC meetings each semester, although one came so frequently, he was considered a regular member of the PLC. Others principals arranged for occasional extra meeting times during the school day in addition to the regular PLC after-school meetings, such as allowing them to meet as a group during other multi-group or whole-school meetings during the school day.

Time to meet and time demands can dampen or derail the most enthusiastic PLCs. It was certainly advantageous for these PLCs that grant funds were allotted for them to meet after school. This time was expanded in those schools that already had school-wide grade-level or subject-based common meeting times, as some principals would occasionally allow the PLC members to use this time for themselves if needed.

Some also allowed the PLC members to absent themselves from professional development or other school-wide functions if they needed more time to meet a deadline – such as completing their regional meeting assignments.

PLC time was also enhanced in those PLCs whose members accomplished a good deal of work outside of formal meeting times – using those meeting times to 'touch base' update, show, discuss and critique the portions of the instructional units each had been assigned. This allowed their PLCs to tend to other goals as well. Other PLCs spent a majority, if not most, of their formal meeting times working on their instructional units.

Time is a challenge for everyone. For meaningful collaboration to occur, merely presenting teachers with state standards or district curriculum guides will not guarantee that all students have access to a common curriculum. Even school districts that devote tremendous time and energy to designing the *intended* curriculum often pay little attention to the *implemented* curriculum (what teachers actually teach) and even less to the *attained* curriculum (what students learn). Schools must also give teachers time to analyze and discuss state and district curriculum documents. More important, teacher conversations must quickly move beyond: What are we expected to teach?" to "How will we know when each student has learned?" (Marzano, 2003).

Resources. The resources provided by the NJCTL grant empowered corps of teachers in the six PMI sites and enabled the PLC meetings and attendance activities to take place. The outlay of these resources also sent a clear message of intent, purpose and support to the grantees' schools, districts, and School Boards[12] – to say nothing of the larger audiences that became aware of the Progressive Math Initiative through the NJCTL website, presentations at conferences and other means. Finally, the resources from the grant and additional resources within the NJCTL supported the functioning of a broader cross-school/district PLC – both physically (regional conferences) and virtually (through electronic communications) – in which the whole was greater than the sum of its individual PLCs. To wit, the complete Algebra I curriculum – not to mention in addition to the other outcomes these communications helped bring about, such as information being shared among the PLCs regarding other activities each was undertaking, such as articulation processes, involving elementary and high schools in their activities, and inter-school visitations that included observing and participating in PLC meetings and classroom observations.

Structure. There was not a basic structure to which the PLCs were required to adhere. Some included elementary teachers in their PLCs, and although none

[12] At least two PLCs had given presentations to their district School Board as of the writing of this report.

included a high school teacher as a member, one did work with the district's high school math teachers. The three PLCs that began in 2009-2010 (Cohort Two) are considering inviting a high school teacher to their meetings as well. The structure of the meetings themselves was not predetermined, but all adopted the arrangement of meeting twice a month, in compliance with their budget requests. The meeting themselves were to some extent patterned after the meeting agenda and reporting methods determined by NJCTL and the evaluator.

Purpose. Initial PLC purposes and foci arrived with the grant applications, but they all required some adjustments. First and foremost there was a need for refocusing, as the need to address the addition of preparing the requisite instructional units needed to be addressed. As mentioned previously, at least one of the Cohort Two grantees was a bit unclear regarding its purpose and procedures until the curriculum development component became clear to them – one might recall an earlier quote in this report of that activity "giving us a purpose." Visiting that PLC prior to this "eureka moment" evidenced that they were indeed rather unfocused. After an initial meeting with another site the evaluation notes included the following: "This meeting was largely a mess, as they were not yet sure what they were doing."

Judging by site visits, conversations and reviews of meeting minutes, those PLCs that decided that their primary purpose during 2009-2010 was to develop instructional units most adhered closely to the following model when arriving at their purpose or purposes, whether they specified or realized it or not:[13]

- Identifying desired outcomes (results) – or clarifying them in for those PLCs that needed to be clearer or more specific than their proposals desired results (learning outcomes)
- Determining "acceptable evidence" to determine if they have been achieved, (assessing if learners have learned).
- Planning what steps will be taken to accomplish the outcomes, goals and objectives of the PLC. (Having a goal is not enough; groups (and individuals) need to identify how they will reach that destination.)

Some PLCs refocused on one or more occasions as the year progressed, such as needing to decide the "appropriate" balance between focusing on the instructional

[13] Cohort One schools had already gone through this process for their work in the initial two years of the grant, and needed to revisit it as some or much of their attention was redirected to the instructional units.

units versus other math department needs. As shown previously in the *Findings* section of this report, those foci varied to a great degree among the grantees.

Norms for the operation PLC meetings are essential, and must be developed, agreed upon, and adhered to. This allows everyone with an opportunity for input, minimizes the undue influence of more vocal participants, and helps the PLC move through an agenda without unnecessary distractions or digressions. Discussion and modeling of this topic at one of the regional meetings helped make a remarkable difference in subsequent meetings of the individual PLCs, which was evident in observations of subsequent individual PLC meetings, except in a couple where this continued to be somewhat problematic, but not debilitating. Although strong leadership is required to motivate everyone to help get the PLC up and going, but that person needs to step back into being a peer facilitator once it is functioning – or at least beginning to function.

Going Forward

Once the Algebra I units are more fully integrated into classroom practice, the PLCs will need to again refocus around the following questions:

- What enabling knowledge (facts, concepts, and principles) and skills (procedures) will students need to perform effectively and achieve desired results?
- What activities will equip students with the needed knowledge and skills?
- What will need to be taught and coached, and how should it best be taught in light of performance goals?

Also going forward, the PLCs will need to continue to rely on:

- Supportive and shared leadership,
- Collective creativity,
- Shared values and vision,
- Supportive conditions, and
- Shared personal practice.

These are not group characteristics that are achieved early or easily – or easily maintained. However, these PLCs will sustain their momentum, outcomes and influences as they continue to be teachers working together on curriculum development, articulation, and student learning through open discussions and with open classrooms and open minds.

APPENDIX A

PLC Meeting Minutes Template

These do not need to be formal business meeting minutes, but rather, more of a chronicling of the group's activities, achievements, decisions made, action items and which members are assigned to carry them out. In short, what has happened with what degree of success, and what upcoming activities are planned, what needs to happen for them to be realized, and who is responsible for them. Use of the following template will help the research/evaluation team (and, hopefully, the members) better understand the workings of their Professional Learning Community.

1. **Meeting date, time and place:**

2. **Attending:**

3. **Absent:**

4. **Recorder (does not have to be the same person every meeting):**

5. **Report and discussion of action items from previous meeting(s). Reminder of meeting norms.**

    a. **Activities conducted, accomplishments achieved, and challenges or obstacles encountered relative to the PLC's goals, including how the latter might be overcome.**
    b. **Who reported and a brief summary of discussions and any decisions made.***

6. **New and continuing action items, including discussion(s) target dates and which member(s) have assumed responsibility for them. Another reminder of meeting norms, if necessary.**

    a. **Which members will take responsibility for this item, and who will take the lead.**
    b. **A brief summary of discussions and any decisions made relative to each item.***
    c. **These should be specific tasks with tangible outcomes – not just something like "continue to work on the math curriculum."**
    d. **The deadlines for tasks will serve as the milestones for tracking progress in the project, so be as specific as possible and hold your PLC to these milestones.**

7. **Time of Adjournment:**

***Discussions should be succinctly summarized; they should not be a record of 'who said what'. Minutes are meant to give an outline of what happened in the meeting. Focus on understanding what's being discussed and on recording what's been assigned or decided upon. Record key points and conclusions only.**

APPENDIX B

Teachers' Responses to Open-Ended Questions Following a Regional Workshop

Describe at least two ways in which what you have learned at this conference will *influence your professional work*.

Number	Response
13	Receiving feedback from the other schools
12	Learning more about the Smart Board and Smart Notebook (Mostly Cohort2)
10	How to work as a team/work with others/use criticism constructively
7	The need for cross-grade/vertical articulation (Mostly Cohort 2)
4	The need for group norms
4	Less words/text can be more effective
4	I learned content/I understand my content area better
3	How to share what we are doing with others at the school/non-team members
3	I will use the notebook more often
3	Learning more hands-on activities for my students
1	Made me question why I do certain things and how I can improve my teaching
1	How to use the units in the classroom
1	Be sure to steal everyone else's good ideas
1	How to apply concepts that tie into high-level math
1	I know I need a Smart board in my room to become better at using it
1	New ways to explain slope
1	The importance of unit sequencing
1	How to adapt units to my grade level
1	Discussing teaching methods that can enhance instruction

Describe ways in which what you have learned at this conference will *impact student learning and achievement* in your classroom and in your school

Number	Response
19	Smart Board/technology ideas/uses
11	How to improve scope and sequencing through short/formative assessment
7	Learning how to implement more interactive experiences with technology/Seeing how interactive technology can boost student interest and investment in learning
6	Better/more effective ways to work with my colleagues/co-workers
5	Notebook lessons enhance student learning/The units help students conceptualize the topics/I now see how to use these units with students/Learning new ways to present material/I can take everything I learned back to my
4	Hearing teachers from different grade levels discuss the concepts and how to teach them
4	The use of Senteo (*sic*)/understanding the full potential of Senteo (*sic*)/how to incorporate Senteo (*sic*) questions during a lesson, not just at the end
4	Students will develop a deeper understanding of the material through the use of the Internet/interactive questions/games/embedded videos
2	My students will escape from the "textbook only" approach to math/I learned some good examples of alternative ways of teaching
2	Using videos/the Notebook tool for capturing videos of student work
11	Slides should be made so that they teach – and re-teach
	How to Develop a collaborative curriculum
1	At the end of this meeting, our school has become a real team.
1	How to integrate these units into my lessons

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