



# EARLY MATHEMATICS TEACHING LEADERSHIP PROJECT

## CLASSROOM EVALUATION: ANNUAL EVALUATION REPORT – YEAR 1

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This report includes four sections: The first section briefly describes the program. The second section includes the methodology of the evaluation. The results of the spring observations are described in the third section. Finally, a summary is presented in the fourth section.

### **Introduction**

This evaluation report, prepared by the Delaware Education Research and Development Center, includes a description of the performance of a group of Delaware mathematics teachers who participated in the Early Mathematics Teaching Leadership project in the school year 2008-2009. This is the first year of the evaluation.

The goals of the project are: (1) to build teacher knowledge of elementary mathematics concepts, (2) to develop district leadership structures that promote collegial planning, (3) to build leadership skills of elementary math specialists, (4) to promote the use of formative assessment, (5) to gather and analyze students and teacher data, and (6) to improve cohesiveness and effectiveness of elementary mathematics instruction. To achieve these goals, teacher attended supporting activities throughout the year. For example, every other month lead teachers provided "Math Nights" where selected teachers piloted formative assessments and shared their observations. Teacher leaders from multiple districts also met for planning and training every other month and met for two days in the summer to increase their leadership and content skills.

The role of the Delaware Education Research and Development Center was to evaluate teacher instructional practices. The evaluation question is:

- What is the quality of mathematics instruction provided by elementary teachers participating in the Early Mathematics Teaching Leadership project?

The assessment of change in teacher content knowledge and the number of target intervention students who met the standard on the DSTP were not part of the activities assigned to the Delaware Education Research and Development Center.

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## Methodology

To assess the quality of teaching, we used the observation protocol called "Determining the Quality of Mathematics Instruction". This observation protocol was developed by University educators from the Mathematics & Science Education Resource Center in conjunction with researchers from the Delaware Education Research and Development Center. The protocol consists of the three main components: The design and implementation of the lesson, mathematics content, and classroom culture.

The items or questions for each of the components are as follows:

### **The design and implementation of the lesson:**

1. Teacher clearly defines and communicates a purpose of the lesson.
2. Teacher effectively engages students with important ideas.
3. Teacher provides adequate time and structure for investigation and exploration.
4. Teacher provides adequate time and structure for "wrap-up."
5. Teacher achieves a collaborative approach to learning.
6. Teacher enhances the development of student understanding.
7. Teacher assesses the students' level of understanding.
8. Teacher plans and/or adjusts instruction based on students' level of understanding.

### **Mathematics content:**

1. The content is balanced between conceptual understanding and procedural fluency.
2. The content is challenging and accessible to the students.
3. Teacher provides content information that is accurate.
4. Elements of mathematical abstraction are included when appropriate to do so.
5. Appropriate connections are made to other mathematics and/or to real world content.

### **Classroom culture:**

1. Active participation of ALL is expected and valued.
2. There is a climate of respect for students' ideas, questions, and contributions.
3. Teacher's classroom management style/strategies enhance productivity.
4. The classroom climate is encouraging to students
5. Intellectual rigor and/or the constructive challenge of ideas are evident.

Using the "Determining the Quality of Mathematics Instruction" protocol three observers were trained until they achieved an adequate inter-rater reliability. During observations, items were scored using three principal descriptors, "close to ideal," "getting there," and "not even close." While these concepts are illustrated through examples within the context of each of the separate indicators, it is

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possible to characterize them in more general terms. An indicator is rated as “close to ideal” if there is a good bit of strong supporting and little or no contradictory evidence. “Getting there” suggests a convergence on exemplary practice but also an incomplete realization thereof. Practices that are clearly at odds with the ideal within an indicator may still be present but no longer represent the norm. Teaching that is rated as “not even close,” however, is consistently impoverished with little indication of progress toward the exemplary.

In April of 2009, as part of the first year of the Early Mathematics Teaching Leadership project evaluation, observers were sent into math classrooms to gather data about math instruction across the state. We gathered data from 11 teachers. The lessons observed occurred in kindergarten through fifth grade classrooms, and ranged from 40 to 60 minutes in length with an average of 55 minutes. There were between 15 and 27 students in each classroom with an average of approximately 19 students.

### Results

The results of the teacher observations are presented in this section. Percentages of teachers rated in each category: “close to ideal,” “getting there,” and “not even close” are represented in graphs throughout this section.

#### *The design and implementation of the lesson*

The first domain, pertaining to the design and implementation of the lesson, is represented in Figure 1. Overall, the frequency of a “close to ideal” performance was high for most of the indicators in this section. Similarly, the incidence of a “not even close” performance was present in only three out of eight indicators. In five of the indicators between 80 and 90% of teachers were classified as “close to ideal” (Items 1, 2, 3, 7, and 8). This means that teachers understood and communicated the purpose of the lesson to students consistently (Item 1). The task introduction was short and clear to students. Students were constantly engaged with the lesson (Item 2). In most cases teachers provided an adequate structure for students to investigate and explore the mathematical concepts of the lesson (Item 3). In 80%

of the lessons we observed, teachers evaluated students' level of understanding by assessing prior experiences and different learning styles (Item 7). Ninety percent of the teachers adjusted their instructional practices based on student's level of understanding (Item 8).

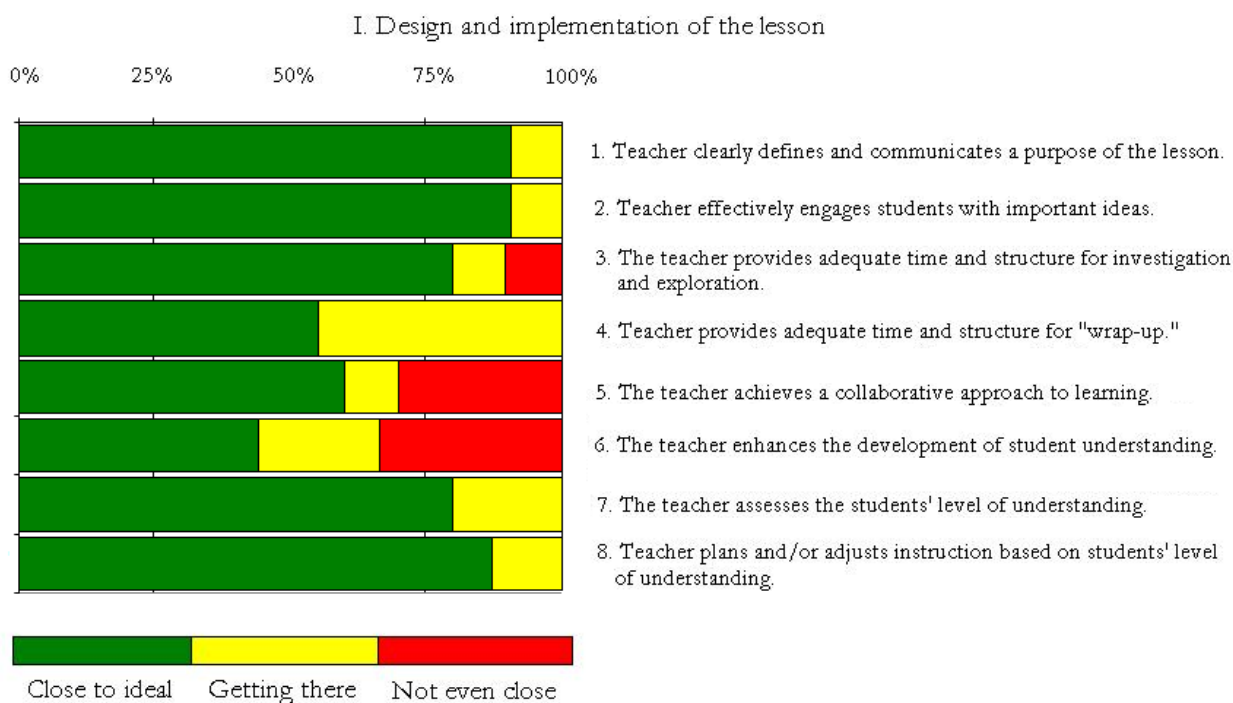


FIGURE 1. Design and implementation of the lesson

Even though the majority of teachers achieved high scores in this category, there is still room for improvement in some indicators. Teachers did not always achieve a collaborative approach in their classrooms (Item 6). To increase students' collaboration, teachers could encourage students to interact with each other more often. The interaction has to be meaningful and the dynamic of students' groups has to be that of a team and not of a leader and followers. Another area that could be improved is teachers' questioning strategies (Item 6). Teachers' questioning should enhance the development of conceptual understanding. To achieve this goal, teachers should constantly ask their students to explain their responses and wait a sufficient amount of time for students to process the question and generate a thoughtful response.

### Mathematics content

Items regarding mathematics content of the lesson are represented in Figure 2. In all of the indicators in this section, 50 to 100% of the teachers in the project were rated as “close to ideal”. In all but one indicator teachers were classified “close to ideal’ or “getting there.” The highest ratings obtained by teachers were regarding the content being challenging and accessible to students (Item 2), and teachers providing accurate content information (Item 3). We observed teachers supporting a variety of student strategies that provided access to content.

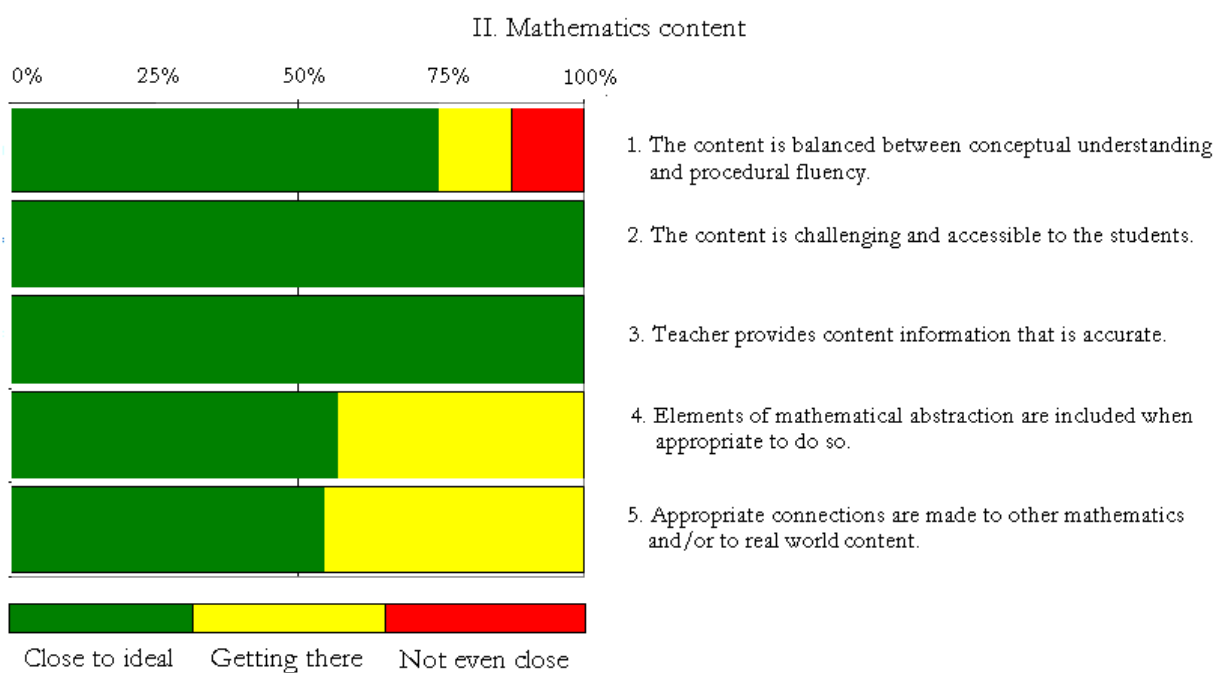


FIGURE 2. Mathematics content

Regarding this domain, the only recommendations we have are to improve elements of mathematical abstraction (Item 4) and increase appropriate connections to other mathematical concepts or real world content (Item 5). Although more than 50% of teachers obtained the highest rating, many teachers were rated as “getting there.” We recommend teachers use generalization from concrete to

abstraction as a routine in their lessons. This way, students can apply the idea in a new context. Also, we recommend teachers to step away from vague, superficial, or contrived connections that impede appropriate mathematical connections.

### *Classroom culture*

The third section, Classroom Culture, is represented in Figure 3. The first three indicators were rated very highly. Almost all the teachers were classified as “close to ideal” and a very low percentage was classified as “getting there.” These three questions deal with student participation, climate of respect in the classroom, and classroom management. It is apparent that active participation of all students is almost always expected or valued (Item 1). Also, all the lessons showed a climate of respect for students’ ideas, questions and contributions (Item 2). All teachers we observed were classified as “close to ideal” in regards to classroom management style (Item 3).

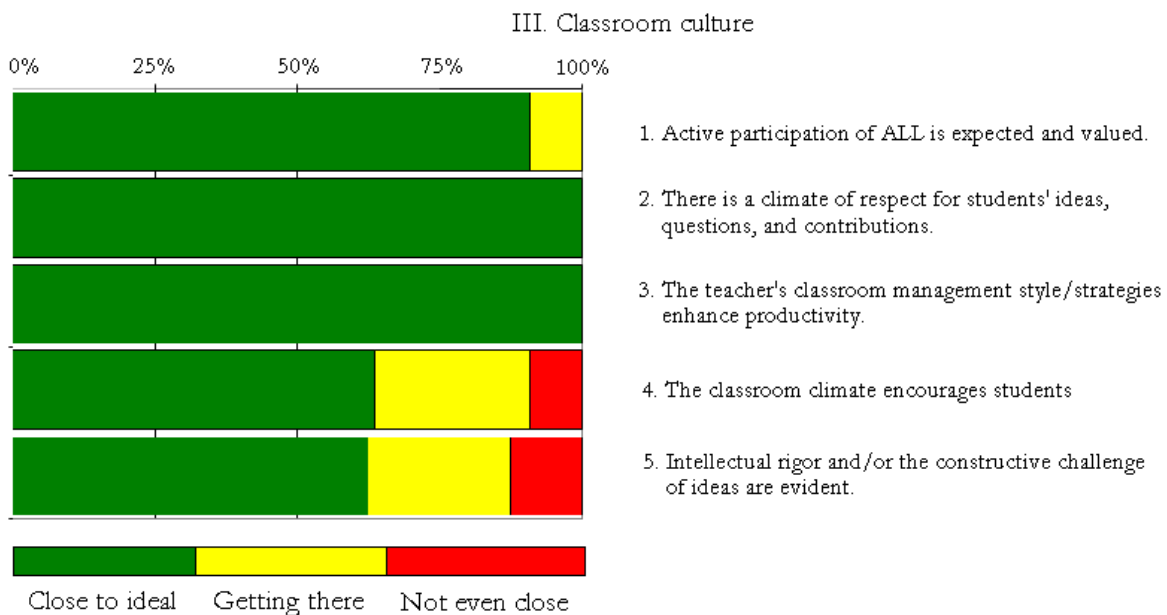


FIGURE 3. Classroom culture

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Teachers evidenced diverse performance on the last two questions in this domain. More teachers were classified as “getting close” and a few were even classified as “not even close.” Item 4 is about the teacher acting as facilitator so that students can play the role of problem solvers. Item 5 is about intellectual rigor and teachers expecting students to explain their reasoning. In some instances we observed problem solving being teacher-directed or highly scaffolded. Some teachers outlined step by step solutions in problems they posed to students. These types of activities hold back students from generating idea and questions by themselves. The same situation happened with intellectual rigor, students were expected to explain their reasoning but they were not held to the standard of justification and proof.

### Summary

*What is the quality of mathematics instruction in Delaware elementary schools participating in the Early Mathematics Teaching Leadership project?*

Regarding the **design and implementation** of the lesson, teachers showed a **good performance** on the following items:

1. Clearly defining and communicates a purpose of the lesson.
3. Providing adequate time and structure for investigation and exploration.
7. Assessing the students' level of understanding.
8. Planning and/or adjusting instruction based on students' level of understanding.

Regarding the **design and implementation** of the lesson, teachers **could improve their performance** on the following items:

4. Providing adequate time and structure for "wrap-up."
5. Achieving a collaborative approach to learning.
6. Enhancing the development of student understanding.

Regarding the mathematics content of the lesson, teachers in the project showed a **good performance** in the following items:

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1. The content is balanced between conceptual understanding and procedural fluency.
  2. The content is challenging and accessible to the students.
  3. Teacher provides content information that is accurate.

Regarding the **mathematics content** of the lesson, observed teachers **could improve their performance** on the following items:

4. Elements of mathematical abstraction are included when appropriate to do so.
5. Appropriate connections are made to other mathematics and/or to real world content.

Regarding the **classroom culture** of the lesson, teachers showed a **good performance** on the following items:

1. Active participation of ALL is expected and valued.
2. There is a climate of respect for students' ideas, questions, and contributions.
3. Teacher's classroom management style/strategies enhance productivity.

Regarding the **classroom culture** of the lesson, teachers **could improve their performance** on the following items:

4. The classroom climate is encouraging to students.
5. Intellectual rigor and/or the constructive challenge of ideas are evident.