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**Reflection on 6th grade public research lesson on May 22, 2004  
at the National Teachers Academy Professional Development School**

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About the lesson:

Donna- Worked on teaching algebra to 6<sup>th</sup> graders. Familiarize with what a variable is and put it into context. Challenging because students did not have a clear idea of what a variable is.

Planning the lesson: Focus on anticipated solutions and really thinking deeply about all the different ways students explain their answers. We constantly ask the students where did that number come from? What does it represent? Openness of sharing their ideas and explaining their reasoning.

Even with all of our planning, the students still came up with other formulas. The next step will be substituting a variable into the equation.

- Q. From Boston group's lesson was used for linear equations instead of algebraic thinking. Did you put thought into the way you grouped the students? How can prior mathematical misconceptions be addressed through this lesson?
- R. Groups were thought out prior, but some students did not show up so they were juggled at the end. I try to put stronger students with those that may struggle. However, the weaker groups received 25 pattern blocks to assist. (Did they ask for the blocks or were they given?)
- Q. Bill-What is the relationship between the number of tables and the number of seats and which variable do you want them to focus on? And do you think this was accomplished?
- R. It is interesting to see that when a student discovers an equation, they stick with that equation. There is value in letting the students have a choice. Donna let one student present their way, and then a second explain it. If there are different ways to find the solution, students can choose the way they prefer, but they are also exposed to the various methods.
- Q. Did you consider using a table to see the pattern?
- R. The pattern is very apparent from the beginning. It was easy for the students to see the pattern, but not the relationship. They did not see the variable that caused it to increase-only that it increased by four each table that is added. Without the table they are able to see different ways to solve the same problem.
- Q. Why did you chose the number 5 and 25 for the number of tables?
- R. Last week we practiced the lesson with other classes, teaching it differently where students kept a table as they went. Each time we added a table we added it to the table. Another option was to start with the second problem, but this created difficulty in understanding and in writing the formula. They needed the total seats (30) in order to do the second problem.
- Students were given the large number of 25 when they should be given the opportunity to use the other methods they were exposed to . By having them focus on multiplying such a large number, they must use the method they are most comfortable with because they can no longer count on the hexagons to test their formula. Most importantly, students need to be able to see what the numbers mean and see what happens when the number of tables change, rather than work on

multiplying large numbers.

The front table did calculate the problem one way at first and after sharing, they did switch and use the other groups method.

Upon reflection, I should have used a second number other than a multiple of five. However the major focus was adding the tables and the relationship to the amount of seats available, not multiplying.

Dr. T. feels 25 was a good number!

-We did notice that the some students struggled with the number 25. If they had more time, they would have figured it out, but if they used smaller numbers this would not be an issue.

-The number 25 did serve a good purpose since it was a multiple of the original five tables given. However it added to the misconception

#### Questions from the Audience

- Q. I liked that you represented on the board exactly what the students were trying to say. Do you think they have a good idea of order of operations which then leads to the variables? As far as the chart, have the student explain the meaning and representation of the numbers on the chart.
- Q. Board presentation- student work is in a vertical form rather than a horizontal form. When explaining to the student that it is  $5 \times 4 = 20$ . Then they draw dots around the blocks on the board, which is not an accurate depiction of the multiplication problem
- Q. Excellent teacher guided questions. How do you feel about giving students more opportunities to discover based on their own questions? Also, I noticed students erasing, blotting out, answers in their journals after they saw other methods.
- R. Yes, I would like to go into their questions. It would give me an opportunity to clear up their misconceptions.
- Q. I agree that the large number of 25 was tough, the students were still familiarizing them selves with formula.
- Q. I was interested in the table that was checking the formula with the number 3 and 7, and did you consider letting the students experiment and move their own hexagon tables.
- R. We did talk about this, but decided that logistically with all these people, it would be difficult, but if we were in a classroom, it would be an option.
- Q. I noticed that you were not correcting the students. Did you do this for a reason?
- R. The students ran out of room in their journals trying to do the writing vertically. I think it is more rewarding to have the students catch their own errors, or another student.
- Q. Written and oral language – symbolic and natural form their natural language seemed to be in multiplication with the word “each”. It may lead to difficulty later. (I don’t really understand what this means, but I wrote it anyway)
- Q. This could be a very natural problem. I like how you started talking about family.

Final comments: I would just like to say that the Chicago Lesson Study Team Rocks. You all look beautiful up there on the panel.

Table vs. charts issue kept coming up and I appreciate that this lesson gives us a lot to think about when we go back to our schools. It is not always necessary to give the students a chart, they can do it without one.

The notion of variables. It is one of the challenges we face, how we move from numbers to variables. There were actually 3 variables involved in the problem.

Five was a good choice of numbers, because the 5 represented different things, five tables, five people at the end tables, or five tables with 4 people, plus the 2 ends. Maybe we should change the number so we won't see the number 5 so often, but this simplifies the problem. One problem is we don't always see things that are obvious. Should we focus on the number of tables or number of seats? We should focus on the relationship of quantities.

The other thing is that Donna wanted to help her students see connections between variables. We saw this in the grade 3 lesson with the expressions : the number of days x the number of units = total.

Applause! Applause! Applause!

I nominate Katie to be the facilitator next time.

We use multiplication to see the variable not find the easiest way to solve the problem. It is a way to express complicated relationships. It's algebra, Baby!