Developing Number Sense in Kindergarten

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Introduction: Statement of Inquiry

Kindergarteners come to school at the beginning of the year with varying amounts of mathematics knowledge. There are many factors that affect this knowledge. Some of those factors may include a child's natural curiosity to make discoveries about numbers in their play, how much parents work with their children at home, whether or not the child went to preschool, and the age of the child (as some enter kindergarten at age four, and others are almost six).

My job as a kindergarten teacher is to encourage a positive attitude towards learning in general. Many people may think that the basics of kindergarten math education are simply counting by rote and identifying and writing numbers, which students may find boring after awhile. While these skills are important, and we review them everyday, it is even more important for students to understand the meaning behind the numbers they count, or in other words, it is important for them to gain number sense. The curriculum my school uses is rather mundane and consists of students completing worksheets, allowing for little exploration dealing with numbers.

In order to delve deeper into the concepts of math and help students move past rote memorization and worksheets, I developed some supplemental, more exploratory activities to complete mostly in small groups during center time. These groups are each comprised of students with similar abilities. I wanted to know how my students think about numbers other than just counting. Therefore, for this inquiry, my question is: "How do kindergarteners develop number sense, and what kinds of activities can I use to support this?" Number sense as I define it for this project is number conservation, relating physical amounts to numbers (or one-to-one correspondence), parts of numbers, and number relationships (more, less, equal). This question is important to me because I do not want my students to begin their formal math education based only on rote memorization. Students must move beyond merely counting in order to understand more difficult math concepts.

Review of Literature

This inquiry project consists of research based on my own data as well as four outside sources. The source I used to base most of by lesson planning and data research on was a journal article from *Teaching Children Mathematics* by Kathy Richardson (1997) entitled "Too Easy for Kindergarten and Just Right for First Grade." Working with students from kindergarten to second grade, Richardson established a hierarchy of difficulty to determine what kind of math reasoning students were doing. She states that, "Tasks cannot be put into a hierarchy of difficulty based solely on the size of the numbers. What made a task hard or easy was the kind of thinking that the children were doing when they were working" (p. 434).

Richardson (1997) explains students' reasoning from the standpoint of three levels (p. 434). Level 1, Count and Land, requires little reasoning, as students count and point to objects, yet do not always match the amount with the correct number. Richardson suggests that teachers work at this level with kindergarteners using higher numbers (up to fifty), as it requires the least reasoning. Practicing this will help students understand the principle of one-to-one correspondence. Working at Level 2, Number Sense and Relationships, allows students to think about numbers in comparison to each other. It also encourages them to think whether or not their answers to problems are reasonable. Estimation and number ordering are good Level 2 activities, and Richardson suggests working with numbers from fifteen to twenty. Level 3, Parts of Numbers, is the most challenging, and therefore, Richardson suggests using numbers only up to four or five in kindergarten. Students practicing number combinations work to understand that bigger numbers can be broken apart into smaller numbers and put back together. Grasping this concept will help students later with their addition and subtraction skills. Most of my references will relate to Richardson's three levels.

Kline (1998) describes several supplementary activities that teachers can use to help students recognize sets of numbers quickly. Called "quick-images," Kline discusses showing students sets of objects from one through ten for a few seconds and asking students how many were there. Teachers can also help students recognize sets of numbers quickly using dice and dominoes, since these are familiar objects to students (p. 84). The purpose of these images is to help students move beyond counting every single item and recognize amounts of objects right away by developing a mental image of the numbers. Not only can this help students recognize sets of numbers, but they can also practice decomposing and putting back together parts of numbers.

Wynn (1982) studied how young children learn number words and counting. Her study focused on two- and three-year-olds, but some of her findings carry over into the kindergarten classroom. Throughout her article, Wynn refers to the three parts of the "Counting Principles" Theory:

> The *one-to-one correspondence* principle states that items to be counted must be put into one-to-one correspondence with members of the set of number tags [or number words] that are used to count with (e.g., a set of number words); the *stable-order* principle states that the number tags must have a fixed order in which they are consistently used; and the *cardinality* principle states that the last number tag used in a count represents the cardinality [or the total amount] of the items counted (p. 222).

I will refer to parts of the theory throughout this paper.

My last main source was the 2001 book entitled *Teaching Problems and the Problems of Teaching*, written by researcher and teacher Magdalene Lampert. Throughout her book, Lampert gives examples of class conversations. She describes the kinds of questions she asks and the ways she pushes her students' thinking. As opposed to only asking students for the answer to a question, and then confirming or correcting them, she accepts students' ideas and then discusses everyone's answers. She asks students to explain their thinking to one another, whether they are correct or not; this also often helps students understand their mistakes and then self-correct their answers. "Lampert-type" questions are ones such as, "Who has something to say about this?", "What do you notice about this problem?," "Does anyone want to add anything to So-and-so's thinking?", and "Can you explain your thinking?" (Lampert, 2001). Throughout my lessons, whether they were small-group or whole-class, I tried imitating Lampert's questioning style so that I could help my students think beyond just getting the answer.

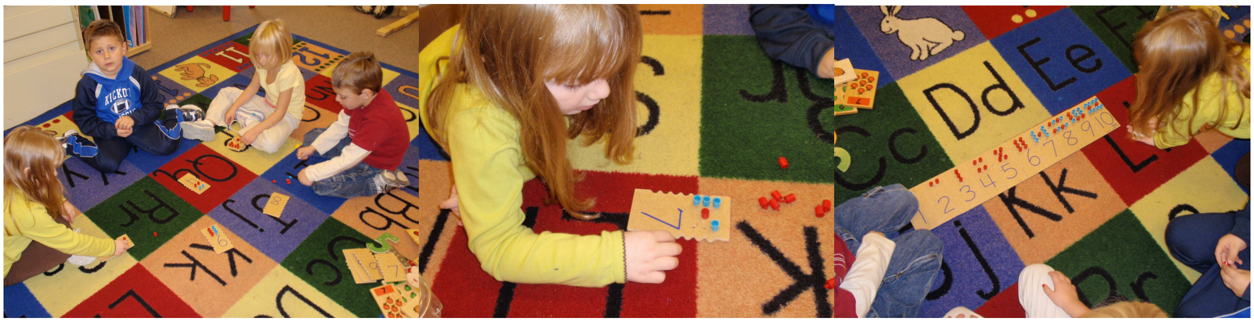
The above readings, especially the Richardson article, helped shape my inquiry by giving me a better sense as to what question I should be asking; in other words, what did I really want to know? Richardson's discussion of the levels of hierarchies went beyond simply counting, and I wanted to focus on students' number sense at all three levels. Instead of asking only how kindergarteners learn to count with reason instead of rote, I expanded my inquiry to how kindergarteners gain number sense, which was broader and explored several aspects of understanding numbers, including the hierarchies.

Methods of Inquiry

I have been a long-term substitute teacher for my kindergarten class since the beginning of the school year. My class is comprised of nine girls and thirteen boys, including twenty Caucasian children, one Hispanic child, and one bi-racial child. The school is located in a middle to upper-middle class suburban area of tri-county Detroit. All of my students come from two-parent homes, and at least one parent in each family works. In general, these parents are very involved with their children's interests, and many are active in the school. Overall, my students are very high-functioning. However, I have one student who shows severe symptoms of ADHD and one who has very high anxiety, which have greatly slowed each respective student's progress. I also have an English as a Second Language (ESL) student who speaks very little English.

My inquiry experiments included three small-group activities and one whole-class activity, each about twenty minutes long. The small-group lessons consisted of putting number puzzles together, recognizing number patterns on dice, and working with parts of numbers using small plastic teddy bears. The whole-class activity was a two-part estimation lesson. I based these activities on Richardson's (1997) hierarchy of difficulty, and also included some aspects of Kline's (1998) quick-images strategy. I took this approach because the levels of hierarchy broke down the levels of math thinking that young students go through; it seemed like a logical step-by-step kind of process that I could assess, either formally or informally, and one that made sense to me for planning out my lessons. Each level gave me something concrete upon which to gather and analyze data.

The number puzzles combined Levels 1 (Count and Land) and 2 (Number Sense and Relationships) by having students not only count the number of pegs each piece held, but also relate the physical amounts to the written numbers and compare greater and lesser amounts. Before students put the whole puzzle together, I gave each of them only one piece and had them compare which ones were bigger or smaller than the others. I wanted them to understand that even if we were missing some numbers, we could still compare them and put them in order. Then I asked them to put all ten pieces in order and asked what they noticed about the pegs.



Number puzzles: matching the number of pegs with the written number and placing the pieces in order

The second small-group activity I executed dealt with recognizing number patterns on dice. I based this idea on Kline's (1998) quick-images as well as using Richardson's (1997) hierarchy. Again, I combined Levels 1 and 2 for all groups and also added in Level 3 for my higher and middle groups to push their thinking even further. In this lesson, I wanted students to begin recognizing number patterns and groupings without having to count and land every time. I used dice since the numbers only go up to six, and I thought the numbers would be easier to recognize in smaller groups without counting.

I also introduced the concept of "counting up" or "adding on." This is really more of a first or second grade concept, but I wanted to see if my students could do it with small numbers. After we practiced recognizing the numbers on one die, we rolled the other die, and I showed them how to add on to the first die, later having them try it on their own. For example, I rolled a five and then a four and said, "OK, I know I have five dots on this one, so I'm going to start at five and count up four more on the next die…six, seven, eight, nine [pointing to each dot]. I have nine altogether." Lastly, for the dice activity, I introduced the Level 3 concept of parts of numbers. We identified the number of dots on the die after each roll, and then I would cover up different amounts of dots and have the students tell me how many were left over, encouraging them to do so without counting the dots.

Adding on to 4 (above, left); taking away 1 from 2 (above, center); taking away 2 from 4 (above, right)

The third-small group lesson mostly focused on learning at Level 3. I wanted to provide students exploration time with taking numbers apart, putting them back together, and creating different combinations of numbers. Working at Level 3 requires higher-order thinking, so Richardson (1997) and Kline (1998) both suggest working with smaller numbers, usually up to four or five. Using small plastic teddy bears, I showed students combinations of two (1+1 and 2+0), made addition problems of those combinations with magnet numbers, and wrote the same problems on a whiteboard. By doing this I showed students three different ways of representing the numbers and subsequent math problems. I repeated the process with three, this time guiding students to find the combinations. Then I allowed them to try combinations of four on their own or with a partner. One of the goals of the lesson was for students to understand how they could manipulate numbers in the same way they manipulated the objects with which they worked. I wanted to try combinations of five, but I ran out of time with every group.

Studying parts of numbers—1+1=2 (above, left); 1+2=3 (above, center); 1+1+1=3 (above, right)

Finally, my whole-class lesson introduced the concept of estimation, and I taught it in two parts. Estimation is a Level 2 concept, as students must use their number sense to decide if their thinking is reasonable, as opposed to simply counting a set of numbers or objects. They must use what they know of number relationships in order to suggest a good estimate (e.g., knowing that "100 is a really big number, and 2 is a really small number, so maybe my estimate should be somewhere in the middle"). I showed students a quart-sized clear tub of grapes. After explaining the meaning of estimation and how we might use it in different situations, I asked students to think about an estimate for the number of grapes. I wrote everyone's guesses on the board. Then, I asked students to think about which estimates were not reasonable, saying, "Which numbers should we take away because we know there is no way we could have that number of grapes in the tub?" The point of this question was for students to think about eliminating really high or low numbers.

Once we had all of our reasonable estimates, we counted each grape as I held it up. This brought in some Level 1 thinking, and I made sure that students' counting corresponded with each grape I held up. We ended up with twenty-two grapes. I repeated the entire process with a lower number (ten) and a higher number (thirty-seven). When I put a lesser amount in the tub, I asked students questions to help them reason through the fact that there could not be more than twenty-two because the tub was less full. Likewise, when I put a greater amount in the tub, I asked similar questions in order to help students understand that because the tub was fuller, we had to have more than twenty-two. Once we had all three final numbers, we compared them in terms of more and less, using the hundred chart as a visual to help us.

Holding up the tub of grapes (students' estimations on the board)

On the second day of this lesson, I had students try some estimation on their own. I presented them with an individual assignment. Before doing it independently, we did some examples together on the board.

Even more important than teaching the lessons, assessing students' understanding demonstrates their individual progress. Considering the young age of my students, many of the inquiry results came from informal assessments, such as observation and whole-class discussions. Students did complete one paper and pencil assignment from part 2 of my estimation lesson, which I will include samples of in the next section. During the informal assessments, I either took notes, photos, or video, upon which I will base much of my analysis. The most difficulty I had in the data collection process was during the teddy bear activity. Unlike the puzzles and dice lessons, where each group was on the carpet, away from the other centers, I thought it would be better for students to sit at a table for this lesson. However, each of the other centers takes place at tables as well. When reviewing my video of the lesson, it was sometimes hard to hear what students said because of the other activity in the background.

As I analyzed my data, I asked myself, "What are my video/photos/notes showing me? Who understood the concepts, and who did not? If not, why did they struggle? Was there anything that was unclear from my data collection? Did any students show understanding beyond the concepts I taught?" The following section gives some overall results, as well as specific results for each lesson.

Results

My inquiry question, again, is "How do kindergarteners develop number sense, and what kinds of activities can I use to support this?" Although not an exhaustive answer, I determined that students can gain number sense by working at all three levels of Richardson's (1997) hierarchy of difficulty (using appropriate sets of numbers). Activities that work best are those that allow students time to discover using manipulatives and should usually be done in small groups.

After having students count their pegs in their piece of the number puzzle, I asked them if what they counted matched with the number written on their puzzle; they all agreed that it did, which showed me that all students were proficient at counting and landing (Level 1) at least to ten. When I asked students how they knew which number was the biggest out of the particular pieces they had, I mostly received answers similar to, "Because there are more pegs in that one," which demonstrated that they understood the concept of more and less. Students in every group were able to show me their understanding of this concept, although it was more difficult for my lower groups to express this understanding verbally, perhaps because they had not yet developed enough math vocabulary.

After students put all of the puzzle pieces together, one through ten, I asked the groups what they noticed about the pegs. Answers from my high and middle groups included: "It gets bigger and bigger and bigger and keeps going," "We add another peg," "It goes up; (counts) 1; 1, 2; 1, 2, 3; 1, 2, 3, 4;…" "There's more every time." These responses show an understanding of the *one-to-one correspondence* principle and the *stable-order* principle, according to Wynn (1992). In other words, they matched the number words with the amount of pegs, and they put those numbers and amount of pegs in order. My lower groups had a more difficult time expressing their thoughts. I asked them more specific questions about the numbers of pegs, rather than just asking them to make general observations, and then they told me that there were more pegs in the higher-numbered pieces.

One thing that concerned me was when a student in my middle group tried counting all of the pegs once we had all ten pieces together. If she had counted correctly, she should have counted fifty-five pegs (1+2+…+10=55). She instead did not put to use any of the three counting principles (Wynn, 1992). She was clearly working at Level 1, as she continued counting and landing without any reason. She counted faster by rote, which did not match the pegs as she pointed. She finished counting at 100, as she skipped most numbers past twenty. Based on past experience listening and watching students count, I believe she thought there were a lot of pegs, so it made sense to her that she "counted" to 100, since it's a big number. However, I have determined this to be fairly common amongst kindergarteners, as students tend to rush through counting by rote and do not always match up their items in a one-to-one correspondence. I notice it more with students who have trouble counting past twenty or thirty.

An unexpected result of the number puzzles activity was that several of my students placed their colored pegs in an A-B pattern or other pattern-like combinations and pointed them out to me (see 7, 8, and 10 in the number puzzles pictures). Around the time that this activity took place, we were also learning about A-B, A-B-C, and A-A-B patterns, so it was a nice surprise to see that students had connected this concept beyond the formal lessons we had done on patterns.

During the dice lesson, everyone but three of my lowest students could recognize the numbers on the dice without counting the dots every time. However, the "counting up/adding on" concept was quite difficult for thirteen out of twenty-two students. Many students just wanted to count all of the dots to get the total. My two higher groups, however, were able to use the counting up concept. When I covered some of the dots, introducing subtraction and number combinations, all students could tell me how many dots were left when I covered some dots. In fact, when working with one group, one student remarked before I could even say anything, "If you take all six away you have zero!" This was rather unexpected, as we had not really discussed the concept of zero yet in class. Looking back, in addition to asking how many dots were left on the die, I should have also asked, "How many are under my hand?" because that would have really shown me whether or not students understood all parts of the numbers.

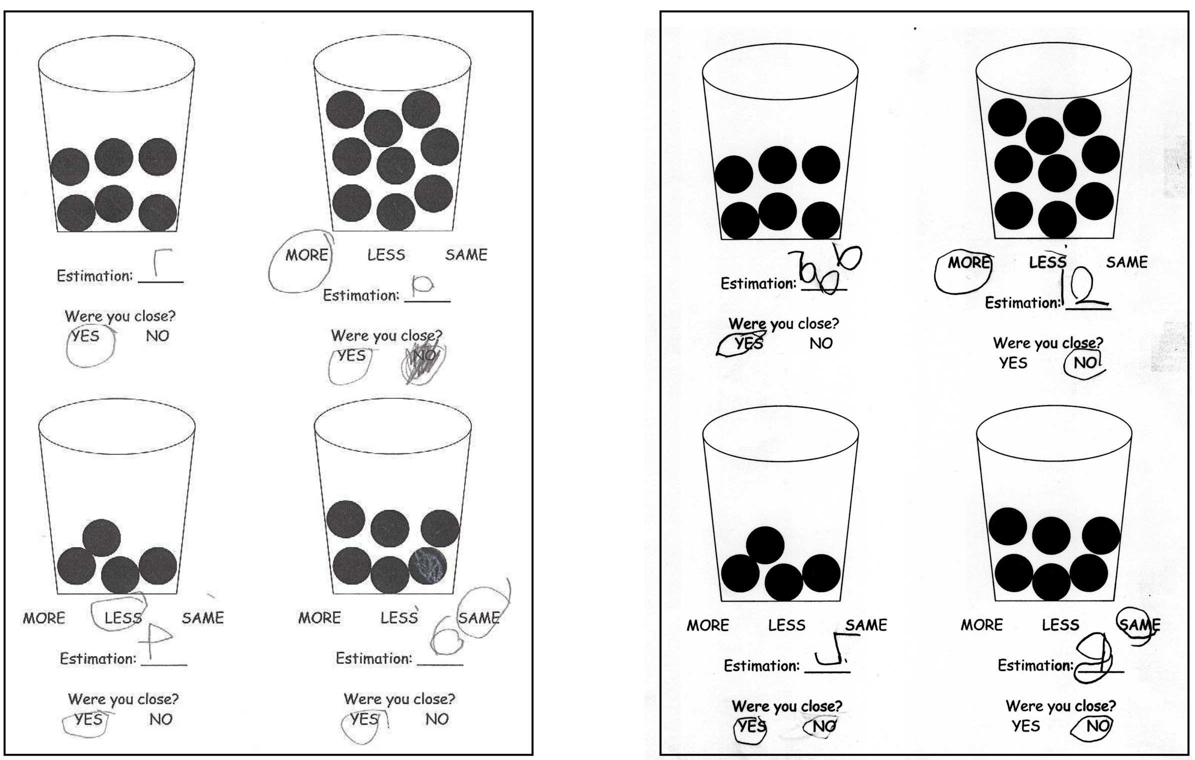
The teddy bear lesson was the most difficult for all students, as I really focused on working at Level 3 throughout the lesson. This lesson required even more higher-order thinking than the others. Although working with parts of numbers is a difficult concept, especially for students who have never worked with numbers in this way, all students were able to show me at least one number combination for two, three, or four. However, I do not think most of my students could perform this activity independently after only one lesson. They would still need a lot of guidance from me, but I wanted to introduce the concept to them to increase their understanding that working with numbers is more than just counting.

My lower groups needed the most guidance from me, whereas my higher students were a little more independent. For example, when working on combinations of four with one of my higher groups, one boy took five bears and began manipulating them on his own. While the others still worked with four, he showed me with his bears that 3+2=5 and that "four plus one more is five." His comments and actions illustrated that he is a little more advanced than the rest of the class when working at Level 3.

I made a few other unexpected observations during this lesson as well. When first presented with their own sets of bears, several of the students sorted them by color or placed them in a pattern. They connected what we had learned in previous lessons to what they were doing in this lesson. This verified that they were making real-life connections to the concepts we had learned. Also, my ESL student cannot always verbalize his understanding of concepts and sometimes seems lost, but he did show signs of understanding when he moved apart his four bears into 1+3 and counted them with me. Lastly, one student demonstrated his understanding of number conservation throughout this activity. I had not planned on talking about this, but he kept showing me that no matter how he moved his four bears around, "there's still four," so I acknowledged his observation by asking him to show his group mates what he was doing.

The estimation lesson was my last for this inquiry. I used Lampert's methods (2001) for whole-class discussions; I accepted all estimations of the number of grapes I had in the tub and wrote the numbers on the board. Then together, we looked at our estimations and decided which ones were unreasonable. Students said that we should erase 100; when I asked why 100 grapes would not be a good estimate, they shared answers such as, "That would be a lot of grapes, and you wouldn't be able to eat them all," or, "It's too many for [the tub]," or, "It's not that much (referring to the size of the tub)." My students used their number sense to adjust their estimations, and based on the above conclusion, they also told me that we should erase 200, 300, and 1,000. I could have just accepted their correct answers without question, but asking them to reason through their answers showed me how they were using their number sense. Also, when I put fewer grapes in the tub I asked, "What are you thinking now, just by looking at it? Do you think we need to guess more or less grapes this time?" Students agreed that fewer grapes would be correct. When I asked why, one student said, "Because [the grapes] are not as high as twenty-two," meaning twenty-two grapes filled up the tub more. His comment demonstrated good number sense; he agreed that we had to have fewer than twenty-two in the tub because the grapes took up less space the second time.

The second day of the lesson consisted of doing some estimation examples together, and then the students completing the following assignment:



Results of two students' estimation assignments

All students wrote estimates that were very close or exact. The first paper represents a typical one that I received from students. Based on this and previous data, I believe many students were able to quickly recognize six and four "marbles" in the cup. When I worked with students during the dice activity, all but three students could recognize, either right away or after some practice, the numbers one through six on a die. Also, when I demonstrated some examples of the above assignment on the board, again, students were able to tell me quickly how many marbles were in the cup, as long as it was six or less. Although I would have liked for students to try out their new estimation knowledge, I was happy to see that most of them were able to recognize these smaller numbers in groups.

One of the few exceptions in the class was the second paper. This student clearly followed all directions and did not count the marbles. In fact, when she estimated twelve marbles in the second cup and eight in the last cup, she did not think she was close enough to give herself credit for a good estimate. If she had given those estimates during a class discussion, I would have credited her with good estimates. No student deviated further than three numbers for any of their estimations. Indeed, everyone was either exactly right or only one away from the lower numbers. I was not looking for a mastery of estimation after just one lesson. I was looking for some beginning understanding of estimation, which many students expressed during our discussion. I was also looking for students' ability to compare their estimates and numbers on their papers. All students were able to show which numbers were more, less, or the same by circling their choice, or they were able to show me if their estimations were close to the actual number of marbles in each cup by circling yes or no. All of these skills demonstrate students working at level two, as they used their knowledge of number relationships.

Lastly, a surprising overall result that I found very interesting is that my particular students' ages have not been a determining factor in academic ability or development, as I had expected them to be at the beginning of the year. All three of the students in my class who began the year at age four have worked in either the highest or second highest centers groups; I base these groups on students' assessment scores in various areas of reading and math. I attribute this partially to parental involvement, as I know all three of these students have parents that work with their students often on academic and other skills.

Conclusions and Limitations

Based on my data collection and analysis, I determined that most students in my class have attained some number sense at all three levels, especially when I adjusted the numbers we worked with for each level. The students who showed the least understanding during the lessons were my ADHD student, because of his lack of focus, and my ESL student, because of his lack of English language knowledge. My initial conclusion reiterates to me that, even at a young age, children are very capable of higher-order thinking. This agrees with the following statement from the National Council of Teachers of Mathematics (NCTM): "Mathematics learning for students at this level must be active, rich in natural and mathematical language, and filled with thought-provoking opportunities. Students respond to the challenge of high expectations…" (2000-2004, p. 77).

In order to accomplish this, teachers need to design learning activities that match the kind of hierarchical thinking students will be doing. For example, as Richardson (1997) suggests, young students should begin manipulating numbers up to five only, when working at Level 3. Once they are proficient with those numbers, teachers can move on to mastering higher numbers with students. This kind of teaching is also a good opportunity for differentiation among groups of students. If I could stay with my students for a longer period of time, I would likely be able to help my higher students work at Level 3 with numbers six through ten later in the year, while my lower students might take longer mastering one through five. Another skill about half of my students need to practice is that of counting to higher numbers, using the three counting principles (Wynn, 1992). Although it is necessary to count by rote in terms of memorizing the numbers, I need to help these students better understand the *one-to-one correspondence* principle.

Continuing my data analysis, I compared my students' engagement during center time when they often used math manipulatives, to that of completing worksheets based on the textbook curriculum. I concluded that the class in general was much more engaged when given an opportunity to make discoveries with manipulatives. Most students tended to be chattier and less focused when doing a whole-class lesson based on the book, whereas most actively attended to the lessons during centers. Based on these observations, I was able to gain more insight about students' thinking during lessons where they had time to explore math concepts using manipulatives. They shared their thinking when I asked them questions and when left to explore on their own. A perfect example of this was one I had mentioned earlier: one student told me that if we take away all of the dots on the dice there would be zero left; he had made a discovery on his own, using manipulatives, and showed me that he understood a beginning concept of zero.

It is important for teachers to make use of this gained knowledge in order to correct any misconceptions students may have. On the other hand, when I have difficulty interpreting what a student is thinking or doing during a math lesson, a hands-on activity allows that student to demonstrate their alternative way of thinking about a problem; that shows me that they understand, and it may give me an alternate way of explaining a concept in the future. Although not impossible, it is more difficult to understand students' thinking from a pencil-and-paper assignment, which is why I found the hands-on centers so much more insightful.

The above statements agree with the NCTM (2000-2004). It states that, "Schools should furnish materials that allow students to continue to learn mathematics through counting, measuring, constructing…, playing games and doing puzzles…" (p. 75), as much valuable learning takes place when manipulatives are used correctly. Even beyond my research for this inquiry, I have used manipulatives all year during math centers, and overall, my students have been very successful in completing and showing understanding of their tasks.

As I reflected on all of the activities and my analysis, I realized that the biggest limitation of my inquiry was time. I would have liked to have done more than one lesson for each level of hierarchy, but I did not have enough time. Additional activities would have given me more insight into my students' thinking. If I could stay with my class longer into the school year to see how students progress in their math reasoning, I would continue using Richardson's (1997) and Kline's (1998) methods to work on the following objectives with them: mastering bigger numbers with my higher students as soon as they showed proficiency of one through five when working at Level 3; set a goal for my lower students to master one through five before the end of the year; create more lessons on estimation and comparing numbers in order to help students think at Level 2; recognition of patterns in groups of numbers using dice, dominoes, and ten-frames so that more students can identify amounts of objects without counting every time; and, work with my lower students still struggling with counting and landing to higher numbers, as some do not yet show an understanding of the three counting principles as they count higher.

Following all of the conclusions I made from my data, I still have a few questions based on Richardson's hierarchy of difficulty: Do the three levels mostly pertain to very young students (pre-K-2), or can these be adapted for higher grade levels? If so, what ranges of numbers would be appropriate to use for other grades? I would like to continue teaching math using this as one of my methods, no matter what grade I end up teaching, but I would like to know how Richardson might adapt her lessons for older elementary students.

Next Steps

Thinking about all of the pre-existing factors of my class population (one or two years of preschool and much parental involvement, in particular), I would be curious to know if kindergarteners with little or no preschool experience and/or little parental involvement would be as successful with these math activities as my current students were. Do pre-existing factors affect students so much that less fortunate children would have a harder time with these math concepts, even if I taught them in the same way as I did with my current students? Of course, I would not make any pre-judgments or generalizations, as there are always exceptions in every classroom. I think these are important questions because I did my internship in a lower-class area in a second grade classroom; not only did the school have little parental involvement, but it was obvious that many of the students had much less parental involvement at home than my current students do. At least half of my students in that second grade class struggled in all academic areas. If pre-existing factors do affect how well students learn, how can I offset these conditions and differentiate my math lessons and activities to help struggling students be successful?

In the future I will continue asking what I have deemed "Lampert-type" questions. The results from my study, whether in small-group or whole-class discussion, show that these kinds of questions prompt students to share more of their thinking instead of just a simple answer to the question. Additionally, I would like to incorporate Richardson's hierarchy of difficulty into any grade-level curriculum I teach. Even if I am bound by a strict curriculum, I will still try to create supplementary activities based on the three levels, and include manipulatives, as I saw these methods working well in my current classroom. Lastly, this inquiry and its results provided me with much insight into how kindergarteners gain number sense, as well as some activities that encourage the kinds of higher-order thinking that gaining number sense requires. As a teacher with my students' best interests in mind, I plan to continue reflecting on how these methods and other best practices will help my students be successful in mathematics.

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