"Curiosity spawns questions. Questions are the master key to understanding. Questions clarify confusion. Questions stimulate research efforts. Questions propel us forward and take us deeper…" (Rockower 10).

Background Information

Teaching Context:

As an intern in the PDS program at Boalsburg Elementary School, I have grown and learned a lot about teaching. My learning and growth has occurred in many different contexts and facets, both inside and outside of the classroom. Throughout the year I have experienced continuous wonderings about the school district, the classroom, and myself.

My inquiry project has focused on one of my main wonderings. While teaching my lessons I noticed that the questions students asked (during and after the lesson) had a large impact on how I felt about my lesson. I wondered: What were the causes of students' questions? What types of questions were the students asking? and How do the types of questions students ask reflect the quality of my lesson?

What was occurring in my classroom: There are twenty students in the fourth grade classroom that I work in with Susann Keil, my mentor teacher. The class is composed of nine girls and eleven boys who represent an average group of students in their maturity and ability. There are two children in the classroom that receive learning support (one for reading and one because he is autistic), and no Title I children. The majority of the students love to learn and are highly interested in many different topics, which makes them really fun to teach. The students typically have many questions about what they are learning, and the questions are partly a result of their high level of interest and desire to learn. However, throughout the year I began to see that there were frequently questions that were not the result of the students' love of learning.

What was occurring in the district: State College Area School District has a standards based curriculum that integrates Language Arts, Social Studies, and Science. This creates a more interesting learning environment. The units consist of background information on a particular topic, and lessons for the teachers to use as a resource. State College's units offer a wonderful basis for teachers to use as they create their lessons. The lessons have been particularly useful to me during my research because they provide questions for teachers to ask and they anticipate questions that students might ask in the background information that they provide.

What was occurring in my own teaching: I began evolving as a teacher even before I entered the classroom. I thought about my teaching philosophy, my ideas about teaching, lesson planning, students, school environment, and the

many other elements that are important parts of a teacher's everyday life. All of this has been altered in some way during the year. I firmly believe that it is important for all teachers to adjust their teaching philosophies and rethink their ideas on a continual basis. Teachers are life long learners. As I grew, learned and reflected this year I generated many questions about teaching and the classroom. These questions had a cumulative impact on my wondering about students' questions. This wondering is the focus of my inquiry project.

What Led Me to My Question about Questions (My Wondering):

I began wondering about questions in the classroom during an inquiry science lesson that I taught. I noticed that when students were interested in the subject, they generated a numerous amount of higher-level questions. I wondered what I could do to influence the types of questions that students were asking.

When I began wondering I noticed that students were asking many questions in all of the subjects that I was teaching, but that there was a difference in the types of questions that they were asking. Often they would ask questions that frustrated me because they were questions that pertained to something that I had already taught. I also wondered why so many of the students had questions about the same part of the lesson. I was curious to know: Had I taught the material in a manner that made it difficult to understand? Had the students stopped paying attention at a certain point during the lesson? or Had something occurred at that point in the lesson that made the students miss what I had said or demonstrated?

I noticed the questions that the students asked had a significant impact on how I felt about the lessons that I taught. If the students asked high-level questions, I felt more confident because I felt that they had been engaged. However some of the students' questions made me uncomfortable because I felt that they represented some flaw in my teaching of the lesson. I began to wonder what I was doing that was creating confusion and what was causing questions about instructions, or information that I thought I had explained clearly. My concern was that I was not giving instructions or explanations clearly and that I was causing my students misunderstandings and confusion.

As I began my inquiry project I realized that taking on the research of all student questioning was a very daunting task, and so I decided that my wondering needed to be narrowed down into a specific question that I could focus on. Since I am a beginning teacher and have a lot of learning to do about giving explanations and instructions to students, I decided to focus my research on the types of teaching practices that eliminate confusion.

My Question about Questions:

How can I change my teaching practices to cut down on low-level questions that result from confusion created by my explanations?

Further Questions about Questions:

- What were the causes of students' questions?
    - What part of the lesson are the students not understanding?
    - What makes explanations and demonstrations confusing for students?
    - What causes students to not understand directions on assignments?
- What types of questions were the students asking (high-level or low-level)?
- How do the types of questions students ask reflect the quality of my lesson?
- How can I lower the number of low-level student questions during instruction?
- What can I do to help eliminate students' confusion about content material?
    - How can I make explanations clearer for students?
    - Is classroom management a part of students' misunderstanding?
    - Would better questioning techniques improve students understanding of the explanations?

Literature and Experts:

Experienced Classroom Teachers: While I was conducting my research and gathering evidence for my inquiry project, my mentor teacher and student teaching supervisor (PDA) were a constant source of information. These two individuals helped me to reflect about my lessons; to raise new questions; and to think about my questions from a different angle.

My mentor teacher and I discussed the impact of nearly all of my lessons on my inquiry research. Often, her thoughts were the inspiration for the wonderings that I developed as the project went on. As she and I discussed my lessons and my journals she helped me to think deeper and further about my research. Many times she suggested new ways to test my claims and gather evidence.

My PDA provided feed back in his responses to my lessons and to my journals. He and I discussed different types of questions and his thoughts inspired me to probe further with my wonderings about the types of questions that students were asking.

These two people were invaluable resources as I conducted my research. Their ideas and opinions contributed to the formation of my claims and the evidence that supports them.

The Cognitive Dissonance Theory: The Cognitive Dissonance Theory is one theory that addresses the need for humans to ask a question when something occurs that does not make sense to them. Leon Festinger developed the Cognitive Dissonance Theory based on a concern with the relationships among cognitions. Cognitions may be defined as a piece of knowledge, an attitude, an emotion, a behavior, a value, and so forth. For example, knowing that you like the color yellow is a cognition; the knowledge that the Supreme Court outlawed school segregation is a cognition; and the knowledge that you scored a goal at soccer practice is also a cognition. People hold a multitude of cognitions simultaneously. Sometimes cognitions are unrelated (called irrelevant cognitions), however cognitions may also fit together (called consonant cognitions), or be contradictory (called dissonant cognitions) (Rudolph).

People prefer cognitions that are consonant, or fit together, over those cognitions that are dissonant, or do not fit together. When a person has dissonant cognitions, they are said to be in a state of psychological dissonance. This state is experienced as an unpleasant psychological tension that has drive like properties similar to hunger or thirst. People experiencing psychological dissonance are motivated to reduce the unpleasant tension; however reducing the tension is often not as simple as reducing hunger or thirst (Rudolph). Cognitive dissonance is what motivates individuals to ask questions, in order to relieve the resulting state of psychological discomfort.

There are four factors that can affect the severity of an individual's state of psychological dissonance:
1. The more that the cognitions are discrepant, the more dissonance a person experiences.
2. If the person has a lot of dissonant cognitions at the same time they will experience a higher level of psychological dissonance.
3. If a person has a lot of consonant (non-discrepant) cognitions, they will experience less psychological dissonance when there is a dissonant cognition.
4. When a person believes that one of their cognitions is very important they will experience more psychological dissonance (Rudolph).

Therefore, when a teacher answers a question they can relieve students' psychological dissonance by:
1. Changing students' cognitions: If a student has two cognitions that are discrepant, then changing one cognition to make it consonant with the other will relieve the student's psychological dissonance.

2. Adding cognitions: If a student has two discrepant cognitions that cause a high level of dissonance, the teacher can reduce that level by adding one or more consonant cognitions to reduce psychological dissonance.
3. Altering the importance of the students' cognitions: Because discrepant and consonant cognitions are impacted by how important the person considers them to be, a teacher can reduce the student's psychological dissonance by changing the importance that a student places on various cognitions.

PREG: A Model of Question Asking: PREG is a computational model of question asking that attempts to anticipate the questions that readers will ask as they read different kinds of texts and when the readers will ask the questions. This model holds that "questions are constructed when readers come across information in a text that presents contradictions, anomalies, obstacles to goals, discrepancies, and other triggers of potential cognitive disequilibrium" (Lu 2). Cognitive disequilibrium drives people to ask sincere information seeking questions. Answers to questions are expected to restore equilibrium and homeostasis.

Under this model is the belief that questions that are connected to explanatory reasoning are particularly indicative of deep comprehension. Explanatory questions often begin with the question stems; *why*, *how*, *what are the consequences of*, *what if*, and *what if not*. Since asking explanatory questions is connected with deep comprehension, researchers in cognitive science and education frequently advocate learning environments that encourage students to ask questions. The belief is that the process of question generating plays a central role in learning and promotes active learning and construction of knowledge. Question asking also has the potential to motivate learners because learning becomes student centered. It also encourages the learner to develop complicated metacognitive skills (or methods of monitoring their own learning). In order to ask questions, learners have to identify the places where there are gaps in their understanding, and answer questions by exploring reliable information sources (teachers, books, etc).

According to Graesser and Olde, the detection of cognitive disequilibrium is not sufficient in itself to generate questions. After detecting the cognitive disequilibrium the potential question asker must make it over two additional hurdles: the articulation of the disequilibrium into words (known as verbal coding), and the initiative to ask the question in the specific social setting (known as social editing). Therefore there are three stages that need to be in place for sincere information-seeking questions to be asked; disequilibrium detection, verbal coding, and social editing.

Project Design

Procedures (Data Collection and Analysis):

After developing my wondering I began my research by utilizing reflection and discussion with my mentor teacher and my supervisor. Initially I did not alter my lessons because I wanted to see what I was already doing that might be helpful in eliminating questions, and what I was doing that was producing questions. Since students often had many questions after lessons, I decided that the best way to record all of the questions students asked was to videotape the lessons. I had been warned that videotaping could be a tedious process, but I felt that other methods of data collection would not be as effective for allowing me to experience my own lessons. After utilizing the videos for data collection, I agree that this can be a tedious process, however, I am glad that I chose to collect data in this way. I feel that I gained a lot of insight about teaching by watching these tapes. The tapes enabled me to record the questions that the students were asking accurately, and to get a good understanding of what I was doing that was causing my students' confusion.

In the instances where I was not able to videotape the lesson, I took anecdotal notes and tried to record the questions that students asked on post-it notes. I would then take the lessons home and examine my plans and notes and then reflect in my "Inquiry Journal" about what I had done that had made my lesson effective, and what had made the lesson confusing. I would keep record of questions that students asked in order to study them for trends in their question asking.

Often I would carry around the worksheet that students were working on and mark down what questions caused the students the most confusion. These worksheets were useful for determining what types of questions and instructions were the most confusing. I began to notice a trend in the wording of the questions and the confusion that it generated for students. Problems on the worksheet that used words that students were unfamiliar with, or were lengthy, or that used words in a more sophisticated, adult-like way, often generated the most confusion. Multi-step questions were also problematic and generated a higher level of confusion and misunderstanding. My mentor and I discussed this observation and began wondering how I could test different types of questions and their effects on students.

My observations caused me to reevaluate the worksheets that I was giving students. My mentor had often helped me make the worksheets that I wrote more understandable for fourth graders. After discussing our observations about how wording of questions and instructions affected students confusion, I began testing some of my observations by giving worksheets with more sophisticated instructions.

At the same time, that I was watching my lessons on videotape and discussing them with my mentor, I realized that I was already doing some things that were probably helping to cut down on students' questions. During lessons I often used structured worksheets, or visuals (including charts, and outlines on the overhead) to help my students. I frequently gave mnemonic devices to help them remember specific procedures. For instance, in math I used a drawing of the different units of measuring capacity to help students remember which units were larger. Instead of simply explaining a procedure, I would model the procedure for my students several times, and do several problems or examples as a class before I sent them to work independently. Many of these practices are considered scaffolding for student learning and they are generally accepted as being aspects of effective teaching, I began to wonder what would happen to students' questions if I took the scaffolding and support away.

While it may seem cruel to deliberately make worksheets more confusing for students, or to take away the support that I was giving them, I did not let the students stray for long, and I did not take away support from the students who I felt could not complete the work without it. For instance, every day after reading the book we were using for instructional reading, I gave my students a journal assignment with a checklist of things that they needed to include in their writing journal. I had written these checklists from my level of understanding, and then my mentor and I had gone through and edited them to be more appropriate for the students in the class. To test the level of confusion that a wordier and more sophisticated checklist would cause, I decided to give the students an unedited checklist one day. On the day that I did this I also prepared an edited copy of the same assignment. When I distributed the assignment I gave the learning support students the edited version. I also had copied enough versions of the edited checklists for the whole class in case the non-edited checklist generated an extreme amount of confusion.

After giving out the worksheet to the students I walked around the class and monitored the students writing. The point of giving the more difficult worksheet was to see if it generated more confusion, not to throw my students completely off track. As I walked around the room I checked to see that their responses were headed in the right direction. I learned some very interesting information when I switched to the higher-level worksheet with my students. What I found was that even though all of the questions on the worksheet were longer than normal in length, and used more sophisticated language, there was only one question on the worksheet that seemed to generate confusion. This observation raised some questions for me and for my research. I wondered what had made all of the questions on the checklist (all but one) easy to understand even though they were more difficult questions?

After discussing this observation with my mentor teacher, she and I realized that I had done an extensive amount of preparation with the students before distributing the worksheets. We noticed that the only question on the worksheet that I hadn't discussed with the students before hand was the question that the students had difficulty with. I realized that the preparation I had given my students helped them to do the assignment even if they hadn't really understood the checklist.

 As a part of my research I was curious to see what my students felt contributed to their own confusions and misunderstandings. I distributed a survey at the beginning of my inquiry research (see Appendix A). The information that I gathered from this survey became very valuable as I researched and critiqued my explanations.

After collecting all of the data, spending extensive time watching video tapes, reading and rereading my "Inquiry Journal," examining surveys, and varying my lessons to examine different components effects on students' questions, I was ready to begin organizing what I had learned into a more coherent group of data.

The Results

As I began organizing my data it was obvious to me that there was not one single component of a lesson that contributed to a student's understanding and misunderstandings. In fact, I found that every component of a lesson has the potential to influence students' misunderstandings and questions. I have organized these into categories. Along with each category is a claim and evidence to support the claim. The evidence comes from; my journals, the experiences of my mentor teacher and my supervisor, literature on the topic, the survey that I conducted in class, and from observations of the videotaped lessons.

Category: Teacher Questioning

Claim 1: The questions the teacher asks are useful in eliminating students' confusion in several ways:
1. They help the teacher gauge what the students do and don't understand so that the teacher can clarify before allowing the students to do independent or group work.
2. When the teacher questions the students about what they are unclear on, the students are more likely to volunteer their misunderstandings.

Evidence: It is common practice among teachers to ask questions throughout lessons in order to gauge students' understanding. If the students are able to answer the questions correctly and with confidence then the teacher knows that the students are ready to work independently. If the students cannot answer the teacher's questions, then the teacher knows that the students need further instruction before they are able to work independently. By asking questions throughout the lesson teachers can assess students understanding and clarify misunderstandings.

According to Graesser and Olde, in the PREG model of question asking:

> "The extremely low likelihood of question asking under self-induced conditions *(conditions where questions are asked spontaneously)* suggests that questions do not surface when it is physically effortful or socially awkward to ask them. The social constraints no doubt partly explain why questions are so rare in classroom settings. If learners are not instructed to generate questions under task-induced conditions, the incidence of questions is extremely low" (Graesser & Olde).

My students seemed to agree with Graesser and Olde when answering the questions in the survey that I distributed in class. As a response to the prompt "During explanations Miss Campbell could make topics easier to understand by…" one of my students responded, "Saying something like 'Does everyone

understand?'" Students feel more comfortable asking questions when I ask them to because I have made it socially acceptable to do so.

Claim 2: When a teacher is asking higher-level questions, then students will respond by asking higher-level questions.

Evidence: Graesser and Olde note in their article "How Does One Know Whether a Person Understands a Device? The Quality of the Question the Person Asks When the Device Breaks Down" that very few student questions reflect deep comprehension. The authors add that "This low incidence of deep questions by students reflect the classroom environment. Only about 4% of the questions asked by teachers are deep questions" (Graesser & Olde). Researchers of the PREG model believe that the level of students' questions will reflect the level of the questions that teachers are asking. According to this model, teaching students how to ask questions will lead to significant learning gains.

Category: Visual Aids

Claim: Visual aids help to eliminate questions.

Evidence: Visual aids are a resource for students to refer back to in place of asking the teacher questions. Visual representations make information easier to remember because they are designed to help the students organize information and remember what was taught. After teaching a math lesson on capacity that I didn't feel went very well I wrote in my journal:

> "The lesson was not a complete failure because I did present manipulatives and visuals so that the children could see the differences between the different containers. This seemed to help the students to grasp the concept" (Journal March 22).

In this lesson the visuals helped my students to understand the different units of measuring capacity better than the explanations that I gave. Without the visual representation of the measurements students would have had a much harder time remembering the different units.

It is important to note that visuals need to be used correctly in order to be effective. I learned this while teaching a geometry lesson where I tried to teach too much information at once. The lesson was on the vocabulary of geometry and I thought that a visual aid would be effective in eliminating a lot of students' questions. Later I wrote in my journal "I had not really explained how the visual chart was organized and it may have even added to the confusion" (Journal April 16). It is important to properly explain visuals so that they can be used as effective teaching tools.

Category: Worksheets and Questions are Worded Clearly and Concisely.

Claim: When worksheets, questions, and assignments have directions that are unclear, too wordy, or not on the level appropriate for the students, it becomes difficult for children to understand exactly what they are being asked to do.
1. Breaking directions down into multiple steps, eliminating excess words, and making vocabulary and wording more appropriate helps to cut down on students' confusion.
2. Giving students learning tools help with the understanding of questions.

Evidence: As I began helping to write spelling homework assignments, I realized that I had a very hard time articulating directions clearly and concisely. My mentor teacher helped me to revise assignments and make them more "kid friendly" by cutting out superfluous words. She helped me to see that breaking directions down into smaller steps helps students understand directions better. Also, she pointed out that the format of the question (the order of the directions and bolding or underlining certain words) helps to cut down on misunderstandings. (Edited versions of homework and worksheets are in Appendix B). After giving a worksheet that I had not edited I noticed that the students had many more misunderstandings. When poorly given directions cause students to do their worksheets or homework incorrectly, the level of confusion and frustration increases dramatically and I become frustrated. This claim was evident when (as I mentioned earlier) I gave students the Morning Edit without clarifying the directions.

During reading the students were required to read and answer questions. Many of the students would get lost in the questions, and their responses would not answer the question. My mentor introduced me to the tool in which students reword the question to begin their answer. For instance if the question asked, "How does Mr. Popper get out of jail?" then the students would respond by saying "Mr. Popper gets out of jail when…" By finishing the sentence the students' responses were more directed toward the question.

Category: Classroom Management and Having Students' Attention

Claim: A poorly managed classroom makes for more confusion and questions.

Evidence: If the classroom is chaotic and the teacher gives directions, often students miss the directions or misunderstand them. Classroom management involves the noise level, seating children appropriately and organizing materials ahead of time for lessons. For instance, if a student interrupts the lesson to sharpen his pencil, this causes a disruption and takes the teachers attention away from the main thrust of the lesson.

Remarking on the effects of a well-managed lesson I wrote in my journal, "This (*management*) helps students to understand because they can hear me when I speak (since I don't have to speak over other students) and the lesson seems more connected because I don't have to pause to correct misbehaving students" (Journal March 30).

On the survey I distributed several of the students responded to the prompt "I don't understand demonstrations and explanations ..." with "when someone (*another student*) is talking." These responses helped me to understand that students feel frustrated when I am giving directions and there is talking going on. Disruptive behaviors in the classroom take away from the flow of the lesson and make it harder to hear directions and explanations. If a classroom is not well managed, then even the best explanation can cause students to become confused.

Category: Students Background Knowledge

Claim: Background knowledge refers to what the students know about a topic before the teacher begins the lesson. If the teacher tries to teach a lesson and the students don't have enough prior knowledge then there will be a high level of confusion and questioning.

Evidence: It would be unwise to teach a lesson about double-digit multiplication if students don't understand single digit multiplication. Lessons need to build off of each other and students must have a basic understanding before they are ready to move into higher-level concepts. While teaching a geometry lesson I made the mistake of assuming that the students were familiar with the vocabulary of geometry (line, line segment, ray, etc.) and so I only gave a brief review of those words and then moved on to angles. My students did not know the vocabulary of geometry and this resulted in a large amount of questions. After the lesson I wrote in my journal: "Being very familiar with Geometry myself, it never occurred to me that students would be overwhelmed with too many vocabulary terms, and shapes" (Journal April 16). This is why the teacher needs to assess students' prior knowledge and understanding before beginning a lesson or making an assignment.

An interesting thing about questions is that students must have some background knowledge in order to know what they are misunderstanding. "To ask a question, one must know enough to know what is not known" (qtd. in Graesser). This is an interesting point to consider. There is a high level of metacognition required for a student to recognize gaps in his or her own cognitions. In the article "How Does One Know Whether a Person Understands a Device? The Quality of the Questions a Person Asks When the Device Breaks Down," Graesser and Olde wrote that:

"The volume and quality of students questions may substantially increase when students experience cognitive disequilibrium… a sufficient amount of domain knowledge and reasoning ability is apparently necessary for individuals to generate questions in the face of cognitive disequilibrium."

Students must know enough about a topic that they can ask questions about it. Chances are if a teacher were to teach Calculus to fourth graders, the fourth graders would not have many questions. The lack of questions wouldn't mean that the students had understood Calculus; it would mean that the students were lacking the background knowledge necessary to recognize or articulate their confusion.

Category: Preparation and Knowledge of the Teacher

Claim: If the teacher is not well prepared for the lesson, then the teacher's disorganization often causes a lot of confusion.

Evidence: After missing a week of school due to the death of my grandmother I taught a math lesson that I felt went particularly poorly. I wrote in my journal:

"I came back to school feeling emotionally drained and behind. I had written the Math lesson on Capacity almost a full two weeks before I taught the lesson. … Previous to teaching the lesson I had only read over my lesson two times. I had thought I was pretty prepared and comfortable with the lesson content because of the time I had spent preparing for the lesson when I wrote it… As the lesson began I realized that I was feeling flustered. I couldn't get my mind to focus and recall the plans. After the lesson I felt very frustrated with myself because I knew that the students' questions were a result of my own poor planning. Their questions regarded the pages in the book that I had assigned but had not reviewed" (Journal March 22).

After teaching this lesson I realized that every teacher is allowed to have an "off day" every once in awhile. However, in the future I can compensate for my off days by planning lesson organizers for myself.

This lesson helped me to realize that when I am uncomfortable with the lesson content, the students show more confusion. Preparing for a lesson includes thinking over each step and planning demonstrations and explanations so that they are clear. In their survey responses my students told me that I could make lessons less confusing by "making topics easier to understand," "using words correctly," using less complicated words," and "giving more directions." Because my lack of preparation causes me to speak less clearly, the students' responses support the claim that teacher preparation contributes to student understanding.

Following another lesson in which I felt well prepared, I wrote in my journal: "By being prepared I didn't have pauses in my lesson, which nearly eliminated excess talking, and improved the manageability of my lesson" (Journal March 30).

Category: Teaching the Material Clearly and Anticipating Students' Questions

Claim: If the teacher does not prepare students for seatwork by giving directions and anticipating places where there may be misunderstandings, the students will have more questions.

Evidence: As a part of our morning routine the students do a "Morning Edit." The Morning Edit contains four to five Language Arts and Math questions. Before the students begin the Morning Edit, I review the difficult questions to make sure that they understand them. In order to test my theory that preparing students for the assignments made for less questions, I decided to give a Morning Edit without any preparation one day. The result was a high level of confusion and a continual stream of questions. Eventually I had to stop my students and explain what I was doing. After going over the difficult questions the students were able to complete the Morning Edit.

This claim was evident in the reading lesson that I spoke about earlier where I gave students a worksheet with confusing questions. Students were able to answer the questions because of the preparation I had given before I let them work independently.

While I was reading my students' surveys there was a resounding message that I needed to speak clearly if I wanted to be understood. This was not news to me, but I hadn't realized that I had a problem with speaking clearly until my students told me. Students said that I am hard to understand when I "use confusing words," "talk to fast," "leave out details," and when I "use the wrong words" (Student Surveys, Appendix A). The students' responses made me aware that I should choose my own words more carefully and speak slowly.

Claim: Modeling is very effective for preparing students to do their work.

Evidence: In one reading lesson, previous to having the students write in their journals, I read the students an example entry that I had written. After reading my entry I went through it and critiqued it according to the rubric that I had set up. Modeling an entry for the students and showing them its strengths gave the students a clear idea of what I was expecting from their journals and helped to eliminate confusion about requirements. As a result I received a roomful of great journal entries.

Claim: The flow of the lesson is important to the way the students make sense of the information. Fragmented and broken up lessons are less clear and harder to understand.

Evidence: My mentor and I have discussed the drop in student comprehension when lessons are fragmented due to interruptions. For instance, during reading lessons if I dismiss the students to go to the bathroom while they are in the middle of reading a chapter, they have a harder time comprehending what they read.

The problem of fragmented lessons is obvious on days where constant streams of students are pulled for instrumental lessons. When these students leave class and return, they are frequently confused and need assistance. I have learned that it is beneficial to plan for these interruptions.

Category: The Amount of Information Taught

Claim: The amount of information that the teacher teaches in one lesson is important.

Evidence: Too much information is overwhelming for students and can generate a lot of confusion. I learned this point during the Geometry lesson that I taught in which I tried to teach too many new vocabulary words and concepts at once. Students responded to the overload with a level of confusion that could almost be equated with panic. My mentor teacher and I discussed this lesson and decided that the best way to remedy the confusion was to break down the concepts into smaller parts and reteach them. When I retaught the lessons in this manner the students had fewer questions and misunderstandings.

Category: The Classroom Environment

Claim: When students feel safe and respected in the classroom they are more willing to voice their confusion and ask questions.

Evidence: The PREG model reflects upon what causes students to ask specific kinds of questions. Research in this model has supported the claim that the classroom environment strongly influences the rate of student questions. In the article "How Does One Know Whether a Person Understands a Device? The Quality of the Question the Person Asks When the Device Breaks Down" the authors Arthur Graesser and Brent Olde write that "when there is an attentive question answerer, the rate of student question asking goes up over 200-fold." Thus, if the teacher is answering students' questions the students will be encouraged to ask more questions.

As I mentioned previously, Graesser and Olde noted in their article that students will ask fewer questions if question asking is socially awkward. The

classroom needs to be a place where students feel welcome and respected to voice their misunderstandings without fear that someone will make fun of them.

In our classroom there is one student who sticks out in my mind when it comes to question asking. This student is well liked by his peers, but has a tendency to ask questions that don't make sense. His peers respond with friendly exasperation. To compensate for this, he has begun to intentionally ask questions that are goofy. My mentor and I discussed this situation and decided that he does this so that when he asks a goofy question accidentally his peers will think it is intentional. The social awkwardness of asking a question makes this student insecure.

Category: The Students' Familiarity with the Lesson Format

Claim: When students are familiar with classroom routine they have less procedural ("what should we do next?") questions.

Evidence: Students know the procedure when they come into the room every morning. Their familiarity with the morning routine helps to eliminate confusion about what needs to be done. When the morning routine is switched or altered the students respond to the change with questions and confusion. For instance, upon walking into the room one morning and finding that the schedule for the day was not written on the board, the students began a frenzied series of question asking. When we reassured them that we just hadn't written the schedule yet, they became calm again and the questions subsided.

After one science lesson where students were doing experiments with pulleys I wrote in my journal:

> "I felt like at times the students could have carried on the lesson without me. I believe the reason for this is because the students were very familiar with the lesson content since they had done two lessons that were almost identical to the third …" (Journal March 30).

Therefore, the routine of the lesson was useful in helping students understand the procedure of the experiment, which lead to less questions and confusion.

Concluding Thoughts on the Question of Questions

Reflection:

What I have observed during my inquiry research has led me to believe that there is not a single element of lesson planning and implementation that does not effect the type of questions that students ask and the level of understanding/confusion that the lesson or material generates. The listed claims all have a significant impact on the types of questions that students ask and the reasons why they ask questions.

Thinking about it now, many of my observations seem to be common sense solutions. However, as I was doing my research I found that each one of these solutions were a huge revelation in my understanding of how to plan and implement lessons for a higher level of student understanding and a lower level of student confusion.

The primary result of my Inquiry Project has been the integration of these ideas into my own beliefs about teaching. Previous to my Inquiry Project I had known that all elements of a lesson effect students' understanding. However, after spending time reflecting upon lessons I feel more capable of acting upon that knowledge.

The Future of My Inquiry:

In the future I would like to continue to explore students' questions. My research lead me to believe that teaching students how to ask good questions also teaches them how to monitor their own cognitions and understanding. Due to time constraints I was not able to explore this idea as fully as I would have liked. The primary direction of my Inquiry Project for the future is aimed at teaching students how to ask higher-level questions.

Further, during my research I noticed that the manner in which students asked questions affected my response to the question. Many students have a tendency to yell out the teacher's name, wave their hands madly in the air, or to follow the teacher around if they have a question. I would like to pursue changing students' question asking behaviors because I believe that it would help to improve the classroom atmosphere and decrease my level of frustration.

The reason why we teach children is so that they learn. Therefore, it makes sense that every element of teaching should have the aim of eliminating students' questions and confusion. Teaching should also be aimed toward giving students the ability to raise their own questions and the resources to eliminate their own confusion. Completing the Inquiry Project has helped me

to become my own student by giving me the power to raise my own questions and find the resources to answer them.

My Inquiry Project has been integrated into my understanding of lesson planning and the teaching and learning processes. The knowledge that I have gained will be reflected in every lesson that I teach. Now I see students' questions as a diagnostic tool that I can use to examine the reasons why a lesson may have been flawed or why it may have been effective.

Further Wonderings:

1. How can I help my students to ask better questions?
2. How can I use Morning Meeting to help my students ask better questions?
3. Do all questions need answered?
4. Are students' questions different across subjects?
5. Are questioning strategies that teachers use different across subjects?
6. Would my claims vary if I were to focus in on a specific subject?
7. How do questions vary across grade levels?
8. How can I change my students' question asking behaviors?

Works Cited

Graesser, Arthur, and Brent A. Olde. "How Does One Know Whether a Person Understands a Device? The Quality of the Questions a Person Asks When the Device Breaks Down." Journal of Educational Psychology 95(3) (2003): 524-536.

Keil, Susann. Personal interview. March and April 2004.

Lu, Shulan, et al. Individual Differences in Reasoning about Broken Devices: An Eye Tracking Study. University of Memphis, 2000.

Rockower, Dave. I Declare A Debate! State College Area School District. Apr. 2004: 10.

Rudolph, Frederick M. Cognitive Dissonance. 18 Apr. 2004 <http://www.ithaca.edu/faculty/stephens/cdback.html>.

Smith, Rodger. Personal interview. March and April 2004.