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STUDENT CREATED QUESTIONS TO PROMOTE PARTICIPATION IN THE MATHEMATICS CLASSROOM

Lauren Draper

Mathematics & English Teacher

Pennridge North Middle School

Pennridge School District

Perkasie, PA 18944

ldraper@pennridge.us

Lynn Columba

Associate Professor

College of Education

Lehigh University

Bethlehem, PA 18015

hlc0@lehigh.edu

ABSTRACT

In this study of middle school Algebra 1 classrooms, students were observed for behavioral changes when required to compose questions throughout the class period. The resulting questions were answered by the students, if possible, and some were answered by the teachers, but all were collected and coded as to their level of cognitive understanding of the topic. Relationships, among the survey answers, were examined for the student's level of understanding and participation in the class.

Keywords: Mathematics, Questions, Writing, Bloom's Taxonomy, participation

INTRODUCTION

The benefits of effectively questioning students using the higher levels of Bloom's Taxonomy are an integral portion of the teacher preparation process. A timely, well-phrased question can capture students' attention, arouse their curiosity, focus upon important points, or even occupy a student's thoughts after class has ended (Goodwin, Sharp, Cloutier, & Diamond, 1983). Questions at the higher levels of the taxonomy, analyzing, synthesizing, and evaluation, encourage students to think more deeply and critically (Goodwin et al., 1983). Knowing this important information about questioning, teachers are urged to question students in a way that facilitates all students to learn the material. However, questioning patterns are only one element in the design of creating an effective classroom.

Many different methods have been created to guide teachers in stimulating all students to begin the process of constructing new knowledge. Activities like think-pair-share, journal writing, and ticket-out help students to activate the learning process by organizing and clarifying their thinking. Calling students' names through randomized cards or craft sticks, remind students that they need to be paying attention at all times. Technology tools such as interactive whiteboards or learner response systems (clickers) stimulate students to increase their participation, while giving teachers the ability to

assess the class for their understanding of concepts. All of these approaches have been developed to help students display their knowledge of the subject learned.

The purpose of this study is to explore an approach for encouraging all students in the classroom to participate in the learning opportunities. Acknowledging that active participants in a class are more likely to perform better on quizzes and tests, this study looks into a strategy of keeping students actively engaged by assisting teachers to assess their understanding. While in middle school, most students are required to take Algebra I, this study looks at how to use questioning to assist students and teachers to learn more about the concepts in mathematics. As in any content area, all the students in the class do not have the same degree of interest. In other words, algebra is not everyone's favorite subject and often, it can be challenging for some students. Therefore, by staying actively engaged throughout the class period, more teaching and learning can occur by the teachers and the students, respectively.

REVIEW OF THE LITERATURE

In the context of college-level classrooms, research has demonstrated a connection between student-created questions and increased test scores. Harper, Etkina, and Lin (2003) used structured weekly journals to encourage student reflection about the material in a college level physics course. Berry and Chew (2008) referenced the Harper et al. design (2003) in their study of undergraduate psychology students were given the

chance to earn extra credit by submitting questions to the professor. In addition, Gonzales (1996) used student generated questions with pre-service math teachers to determine their level of questioning ability. All of these studies have shown improvement in student understanding and test scores when college-level students reflect and question their comprehension of the material.

Research supports the fact that if students compose their own questions their understanding of the content is increased. Harper et al. (2003) used structured weekly journals to have students write down questions as they were reflecting on the lectures. Writing in journals encouraged students to ask questions about the material. The resulting questions were collected, coded, and responded to throughout the following lectures. Harper et al. (2003) outlined the supporting research showing how encouraging and emphasizing question-asking, students were better exposed to the fundamental inquiry nature of science (Marbach-Ad & Sokolove, 2000). The instructor benefitted from the insights gained from listening to and reading the students' questions (Etkina, 2000). This led to the instructor observing misconceptions and discovering emerging trends. The questions created in their journals helped both students and professors to think more deeply about the learning that was occurring.

In the study, 200 students in the Freshman Engineering Honors introductory mechanics course at Ohio State University, created weekly reports. The students responded to three different topics, which included the following: (a) What did I learn

this week and how did I learn it? (b) What questions remain unclear? and, (c) If I were the professor, what questions would I ask my students to find out if they understood the material? Each Monday night, the questions were due and two graders read and responded to the reports by Friday. The students answered question B and graders provided feedback for questions A and C. The professor then addressed commonly asked questions in the large group meetings. In addition, some of the questions from part C were used on the test.

The questions were double coded, once for the level of difficulty and then a second time for its topic. The level of difficulty was broken into four levels; minimal, low, middle and high- similar to Bloom's taxonomy. There were six topic areas that the questions were broken into: equation, concept, application, knowing, experiment, and limitations. The researchers found that most of the questions were in the equation category and related to a minimal level of difficulty. Conceptual questions promoted medium level of difficulty, along with coherence, knowing, and experiment. However, limitations-based questions promoted high level of difficulty. Harper et al. (2003) found that questioning should be connected, if only loosely, to some type of grade. The questions are only beneficial if the students take the time to think about them. The instructors, thinking reflectively, commented that they should have devoted at least some of the class time to develop their expectations for what they were looking for in the

students' questions. Without a grade and proper instruction, the research shows that students do not put forth their best effort.

Studies by Berry and Chew (2008) chose two different strategies to research. In the first study, based on the research completed by Harper et al. (2003), the learning strategy was the generation of student questions about the material on a weekly basis. The second study incorporated the generation of concept maps on course topics. Berry and Chew (2008) compared the two studies to see how the student generated outcomes affect their overall performance on the given exams.

In the first study, 102 freshman participants were enrolled in two sections of general psychology at Samford University. After the second exam, the researchers let the students know that they were conducting a study about their abilities to ask questions related to the material covered in the course (Berry & Chew, 2008). The researchers collected the questions every week until the third exam. The students were allowed to ask questions in order to gain extra credit. After the questions were received, the researcher did not provide feedback except that they had gotten extra credit.

Although the exam results did not differ significantly between the three exams, those that completed the questions, did show a small positive relationship of doing better in the exams. The researchers independently coded the questions submitted by the students. The coding scheme was adapted from Harper et al. (2003) in reference to the depth of the questions asked. Contrary to predictions, the depth of the questions

submitted was unrelated to exam performance. However, the researchers looked linearly at the amount of questions asked by comparing their exam scores and standardized test scores. As the number of questions asked increased, so did the correlation of the test scores and the standardized exam scores. Even though, the two studies by Berry and Chew (2008) did not show significant improvement of student performance, the task of generating questions appealed to lower performing students compared to the second study of concept map generation which appealed to high performing students.

Gonzales (1996) researched the depth level of questions composed by pre-service teachers enrolled in Mathematics for Elementary and Middle School Teachers III. This study was adapted from Brown (1984) where the student's job was to create questions or pose a problem. The students in this study were given a graph in which they instructed to write five different types of questions using the information. The students composed 255 questions which were coded through emerging trends. The trends were labeled as given, modified, extended, added, or unclear based on the graph. The majority of students asked given questions (low level of depth). This led to the realization that prospective teachers need to learn how to conceive, formulate, and post a question that will lead to a coherent problem to solve.

These studies provided the grounding of the current study in the understanding that when students are encouraged to write questions using the higher levels of Bloom's taxonomy, their cognitive skills will be more advanced. Students who are applying their

understanding using evaluative type questions will show more confidence in the class and presumably more comfort in being active participants in their learning. Through the design of this study, students were encouraged to use the higher levels of Bloom's learning domains to write questions to determine if they felt more successful when learning a new topic. Also, if students were required to write a question in a class period, were they more likely to pay attention or participate in class? Are the questions that are written useful tools to determine the students' comprehension of the lesson taught? This information would be useful for teachers in planning the next day's lesson. What is role of student created questions and appropriate classroom participation?

Research Questions

When students write a question each period, the following areas were investigated:

- Do students play a more active role in the classroom dynamics by being a part of classroom discussions?
- Do students believe they learn more by being more active participants?
- Do the questions help the teacher know what was learned in each class?

If students were to create questions using the levels of Bloom's taxonomy, the following questions were examined:

- Does the students' level of understanding of participation change?
- Would the students be able to apply the full range of levels?

METHODOLOGY

Participants and Data Collection

The middle school in this study is in a school district which is predominately a rural and suburban in northeastern Pennsylvania with students from diverse socio-economic backgrounds. The participants were seventh and eighth grade students enrolled in Algebra I. (See Appendix A for a full Units Treatment Observation & Setting (UTOS) diagram.) The participants included honors students from seventh grade and non-honors students in 8th grade. Typically, middle school is a time when the students are social outside of class and are inclined to ask questions less frequently in class. Middle school is a time when students are finding "themselves" and determining how they "rate" according to their friends. Many seventh graders are reluctant to participate in math class unless they know the answer and are rewarded. Some students do not seem to be willing to dialogue their way through to the answer nor do they voluntarily raise their hand unless there is an incentive attached. Encouraging them to write using higher levels of Bloom's Taxonomy would be an appropriate instructional strategy for middle school students. The students have some understanding of higher levels of thinking within Bloom's taxonomy but they do not know how to apply the language of each level. A chart or visual was used to help encourage students, both seventh and eighth graders, to use higher levels of questioning (Appendix B). Giving the students sample questions helped to encourage their own thinking to occur on the higher levels. Also, this helped to

accommodate for their lack of cognitive development when compared to the college level students using a similar methodology.

Three teachers, who teach a total of five Algebra classes, volunteered to be a part of the study. The teachers were from the same middle school but there was a range of socioeconomic statuses among the students in the classes. The teachers and their practices were the *units*. The students were being measured only to show if the teaching instructional practices were effective. This research design is known as an *intervention study* because the questioning strategy is intervening as the primary strategy implemented in the class to promote active participation.

For the treatment in the study, classrooms were chosen based on whether the teacher was willing to participate in the questioning technique. In the control group, the teacher was to continue to teach the same way, just the same as previous years, throughout the chosen unit. This classroom was used as the baseline class in order to show the comparison between the classes that are writing questions.

The experimental group consisted of four classrooms, in which the teachers volunteered to participate in the questioning technique. In these classrooms the students responded with a question(s) by the end of the period. If the question was answered by the end of the period, the students were encouraged to write down the answer. Another requirement was for students to write a different question than someone sitting near them, at least phrased in a different way. (How these emerging patterns will be sorted is

explained later in the process.) Each week, the questions were collected and the researcher coded them as to their level of Bloom's Taxonomy.

In the experimental groups, the teachers made a conscious effort to make sure that every student was involved in the classroom and that every student wrote a question or made a comment before the class period was over. The teachers encouraged the students to write on higher levels of Bloom's taxonomy. Another component of the treatment was dividing the teachers using questioning to encourage classroom participation into two groups. Subgroup A required students to write down questions throughout the period and their level of participation was monitored. In this group, the teacher simply collected the questions, monitoring that they were not all the same, but did not respond in any way to the questions. However, the researcher used these questions to code the level of Bloom's Taxonomy, but the teacher did not adapt their teaching to reflect any of the questions. Subgroup B, required the students to write a question, and the teachers took the time to look over the questions and respond to the questions by using them in the next class or used them to adapt the instruction for the next class. In subgroup B, students were informed of the results of their questions, in order to develop a sense of reason for writing the questions.

The observations were completed randomly, two-three times per week, in each class throughout the unit of study. The classrooms were observed to see how the students were responding, how students were working in class, and/or how much of the students'

time was on-task and activated. Generally, classrooms were observed in order to see if there was a difference between the distinct groups. All students and teachers who participated in the study, no matter what group they were in, were required to take a survey at the end of the study. These surveys asked the students about their perceived levels of participation through classroom discussions and their feelings about writing questions (see Appendix B).

Training and Implementation

During the preparation stages for this study, three teachers volunteered to participate. One of the teachers was in the control group and all algebra classes taught by that teacher made up the control group. The other two teachers, and their algebra classes, were in the experimental group. The experimental group was further divided into two groups. One teacher, subgroup A, required their students, in all of their algebra classes, to write question(s) by the end of the class period. However, the teacher did not respond to the questions after they collected them. The questions were handed to the researcher to be coded. Two teachers, subgroup B, required the students to write questions and the teacher used the questions in order to plan for the next day's instruction. The teacher had the option to use these questions in review of the lesson or for their own purposes to adapt instruction or assessment.

Prior to beginning the study, a poster was created with sample questions to model the levels of Bloom's Taxonomy for the students' reference (see Appendix B). The

teachers were introduced to the poster prior to being utilized by the students. The teachers were instructed on how to explain the study to their students in efforts to enhance the students gaining a sense of continuity. However, teachers were able to decide when or how they implemented the strategy. The only requirement was that the teachers needed to make sure that the students started using the strategy by the time period approved by the school district. During the first week, teachers were to review the questions with their students, which could have been used as closure, and give feedback for the level of questions being written down. In addition, students were encouraged to write more than one question and to answer the question(s) if they were able to by the end of the class period. Teachers were required to make sure that their students did not have the same questions as someone around them. By using the questions as a ticket out the door, they could check the questions as the students exited the classroom.

Throughout the intervention study, the classrooms were observed for student interactions which followed the format of action research. The questions were coded to determine the level of Bloom's Taxonomy as the teachers received the questions from the students. The coding pattern was similar to the design followed by Harper et al. (2003). Questions, which were completely off topic, were coded as unclear to show the lack of questioning on Bloom's Taxonomy. Any other trends were viewed as being emergent.

After the study was complete, the students completed a survey depending on their assigned group (see Appendix B). This survey gave insights into the perceptions of the students throughout the study.

RESULTS AND DISCUSSIONS

Students in the experimental group, in which the teacher responded to their questions, stated in their surveys that writing questions in class was an easy task to accomplish and a productive one which enabled their questions to be heard. Whereas, students in the control group did not always feel that their questions were answered. There were many students in the experimental group who did not feel the question writing was beneficial. But according to the data, the students appreciated the extra line of communication with the teacher and stated that the time spent to write a question was minimal. In general, it is beneficial to allow students as many lines of communication as possible, and this would be another strategy to add to the repertoire.

However, in the experimental group, where the teachers responded to the questions, the experimental group with no response, showed overall less interest in writing questions because they did not know how it benefitted them. These students felt as though the questions were just a waste of time and this was reflected in their questioning patterns. Most of these students did not feel that their questions were getting answered and felt that they did not benefit from writing questions.

The results of the questioning strategy proved to be beneficial to most students. Those who invested their time into choosing questions that really reflect their learning and understanding were able to generate the best results from the study. Some comments from students included being able to write down the question before it was forgotten, or being able to review the response in order to remember it on the test. A student commented, "I was pretty comfortable writing questions, and I usually didn't want to ask them in class. So by writing them for the assignment, I was able to get my questions answered." Another student wrote, "Even if I had a stupid question, I was able to write it down and get it answered-- that made me feel better--more prepared." The students who were not invested wrote unclear or knowledge level questions. Many of them commented that by writing questions it did not help them feel prepared for the test and stated their time was not well spent. In general, students who participated in the experimental group were more likely to comment, they participated more in the unit, and they felt their questions were answered. In addition, this strategy supports writing questions in class for emotional and mental comfort.

The first research question asks, "If students were to write questions, would that encourage them to participate more actively in the class?" Many students in the experimental group felt that they did pay more attention in class during and after the unit, whereas the scores in the control group did not change as much. (See Table 1)

Table 1

Average Percentages of Student's Attention Rates Before, During, and After the Study

	Before	During	After
Experimental Group A	65%	73%	83%
Experimental Group B	55%	59%	72%
Control Group A	53%	62%	64%
Control Group B	64%	66%	67%

The mean scores of the students' attention rates in the experimental group were 60% before the unit began, about 65% during the unit, and about 75% after completing the unit. In the control group, their numbers stayed, on average, in the 65% range. Through completing the unit, where question writing was including, students were more interested in paying attention to the class in order to write questions or make sure that their questions were answered. In the experimental group, in which the teacher responded to the questions, the teacher stated the possibility of an external motivation, in that the teacher included high-quality questions as part of the next lesson. Some students may have been motivated to have one of their questions mentioned in class. As to the observations of students throughout the unit, they basically matched the students' responses. Although the changes were not dramatic, all students in the experimental group played an active role in the class by writing a question down throughout the class. Student participation in the control group fluctuated.

The second question studied was whether writing questions, did the students perceive that they learned more. Even though many students initially did not find the usefulness of the question writing; when they were asked individual questions, they did. When posed the question about their comfort levels when writing questions or asking them, students, on average, gave 7.5 out of 10 levels for writing questions and only 6 out of 10 for asking them. This data supports that by giving multiple outlets to ask questions, they were able to feel more comfortable finding a method that worked for them instead of never getting their questions answered. When students were asked about how prepared they were for a test, more than double the students in the experimental group in which the teacher responded to their questions, felt they were more prepared. In one case, the results were 13 to 7 students and in the other 21 to 9. However in the experimental group, in which the teacher did not respond to the questions, the responses of the students were more split 50-50. In one case, the results were 18 to 17 and in the other class, the results were split 16 to 17. This serves as a reminder for all teachers to make sure that students have a way of expressing themselves along with getting feedback so that they are better prepared for assessments.

The next question was answered from the teacher's perspective, "Did the question writing help the teacher to know what the students learned in class?" The teacher, who responded to the class, stated that yes, knowing the students' questions were helpful. Looking at the levels of questions students wrote in a class period gave the teacher the

ability to determine the depth of the students' thinking about the material. Most of the students who wrote an application or even comprehension level question remembered more of the material, perhaps, because of the memory that was associated with writing the question and the material covered. The students, who did not write using the higher levels or wrote a question that was unclear to Bloom's level, had given little thought to the lesson. These students were most likely not going to remember specific details or rules taught during that lesson. This was an indication to the teacher which students needed to be monitored more closely during the next lesson. Another way to know who to monitor were the students who wrote questions about the specific material covered. If they were not sure why a step was completed the way it was, then it was helpful to discuss that reasoning with the student, or address it with the whole class, if there were multiple questions on one problem. All of these positive results came from the teacher who responded to the class' questions. The teacher who just collected the questions stated that it would have been of value to see those questions in order to know what learning had occurred. They also felt that their students would have had a better response to the project if they received a reply from the questions they wrote.

The next question was, "If students used the higher levels of Bloom's Taxonomy, did their levels of understanding change?" This question was answered favorably; the higher level questions did promote more understanding. The students were cognizant that the teacher could tell their level of understanding through the questions they wrote.

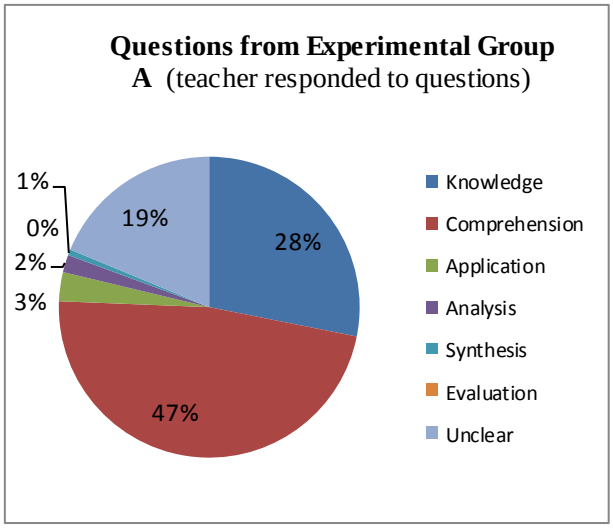
Although, none of the students wrote on a level higher than Analysis, perhaps, this could be explained by the difference between college level and middle school students. The students who wrote on the levels of Bloom's Taxonomy gave an indication as to their level of understanding of the material.

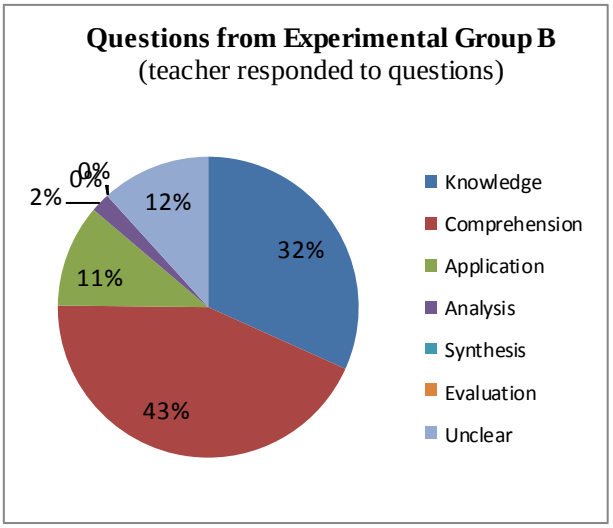
The last question in the study was whether middle school students' have the ability to write at all levels of Bloom's Taxonomy. As previously stated, the students did not choose to write on all levels of Bloom's Taxonomy. Some showed the thinking patterns to be in the right direction, but the questions did not reach the higher levels. In most cases, the students wrote on the comprehension or knowledge level. Some of the questions were not on a level of Bloom's Taxonomy due to being not on the topic or were asking inappropriate questions for the subject matter. When comparing the two experimental groups, a divide can be observed between the types of questions that students wrote (See Table 2). Perhaps this was because of the feeling of necessity for writing the questions. The groups who found writing questions to be a benefit wrote mostly comprehension questions 45% of the time. They wrote using the knowledge levels 30% of the time, application 5% of the time, and then 2% of questions written on the analysis level. The remaining questions were labeled as unclear because they did not fit into Bloom's level of Taxonomy. In comparison, the groups who were not given feedback on their questions, for the most part, wrote on similar levels of knowledge, comprehension, and then unclear questions, each totaling 30%. The rest of the questions

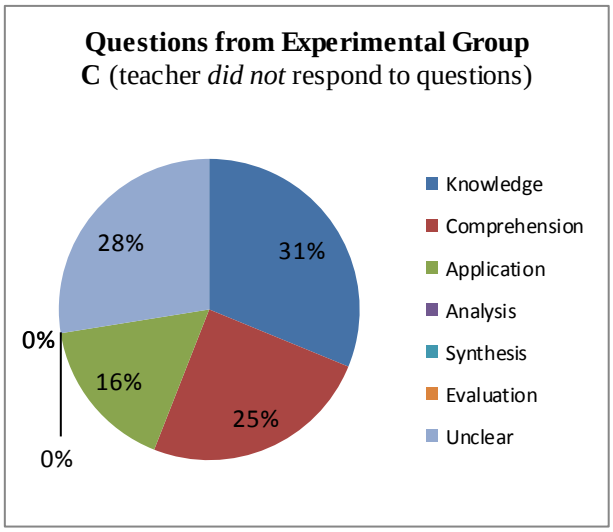
were application type questions and there were no students in this category who wrote on any of the three higher levels of Bloom's Taxonomy. A reason for this difference could be the level of interest that the student had for the experiment. If they found a reason for writing questions, they wrote using the higher levels and gave more thought to the questions that they wrote. However, if they did not feel a connection, this was reflected in their questions.

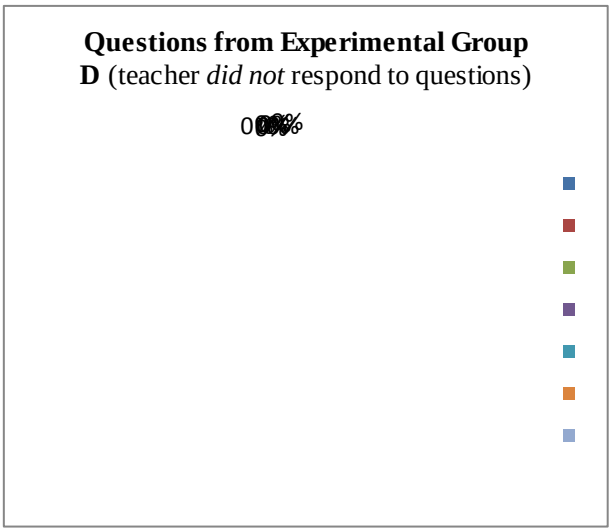
Table 2

Types of Questions the Students Wrote









LIMITATIONS

As a result of the methods used in this study, there were limitations. One aspect that affected the integrity of this study is the teachers' explanations or the students' responses could not be controlled. Although both teachers stated that they introduced the chart and began the first few days talking about what would make a higher level question, students in the two experimental groups did not write similar questions. The level of how invested a student chose to become was another limitation. Further, student created questions have only been created by college students thus far in the review of the literature. This could be an explanation for the reason why students struggled to write on the higher levels of Bloom's Taxonomy. Another limitation was that the students were encouraged to only write a response to their own question. By having the students respond to their questions, higher levels of Bloom's taxonomy could have been reached in their responses. Although it is valuable for the teacher to see the questions every night, allowing students time to respond to their questions might prove to be more beneficial. To promote students to find their own responses, the teacher of the experimental groups responding to the questions could complete the task once a week instead of everyday. There were limitations because the teachers were the subjects, but the data was collected from the students. If this study were to be repeated, many of these limitations may still occur. Another option for this study would be if a researcher/observer could be in each classroom throughout the study in order to note the differences.

CONCLUSIONS

The purpose of this study was for students to feel more comfortable participating in classroom learning activities by writing questions which provided them with another outlet to find answers. If students already felt comfortable participating in class, those patterns continued. For students without that voice, they were able to write and be heard through the daily question collection. For students who did not feel their questions were being heard, their levels of Bloom's Taxonomy did falter. However, in the classroom in which the teacher used the questions to give feedback potentially in the next class, these students felt there was a definite benefit to being able to write their questions to their teacher.

Some conclusions which could not be drawn from this study are that higher level questions will work to improve test results in a middle school classroom. For this result, the study would need to change to incorporate a pretest and posttest to track the students' understanding. This study was unable to demonstrate that writing questions is the only way or best way to improve classroom participation. However, this study does give teachers other options in finding ways to open lines of communication with their

students. Teachers need to be aware that they must also devote the time to communicate with the students by responding to their questions or by discussing them in class.

This study was an intervention study that supports students who write questions to participate more in classroom discussions. The students realize they will have something to say when called upon in class or that they are getting their questions answered without needing to talk or call out in class. Also, when a student's question is recognized, they felt more encouraged to write another question using Bloom's higher levels. This helps them to feel more comfortable which empowers them to participate in class discussions. The purpose of this study was to find a strategy for students to feel comfortable communicating with the teacher. Writing questions in class is a successful strategy to achieve this goal.

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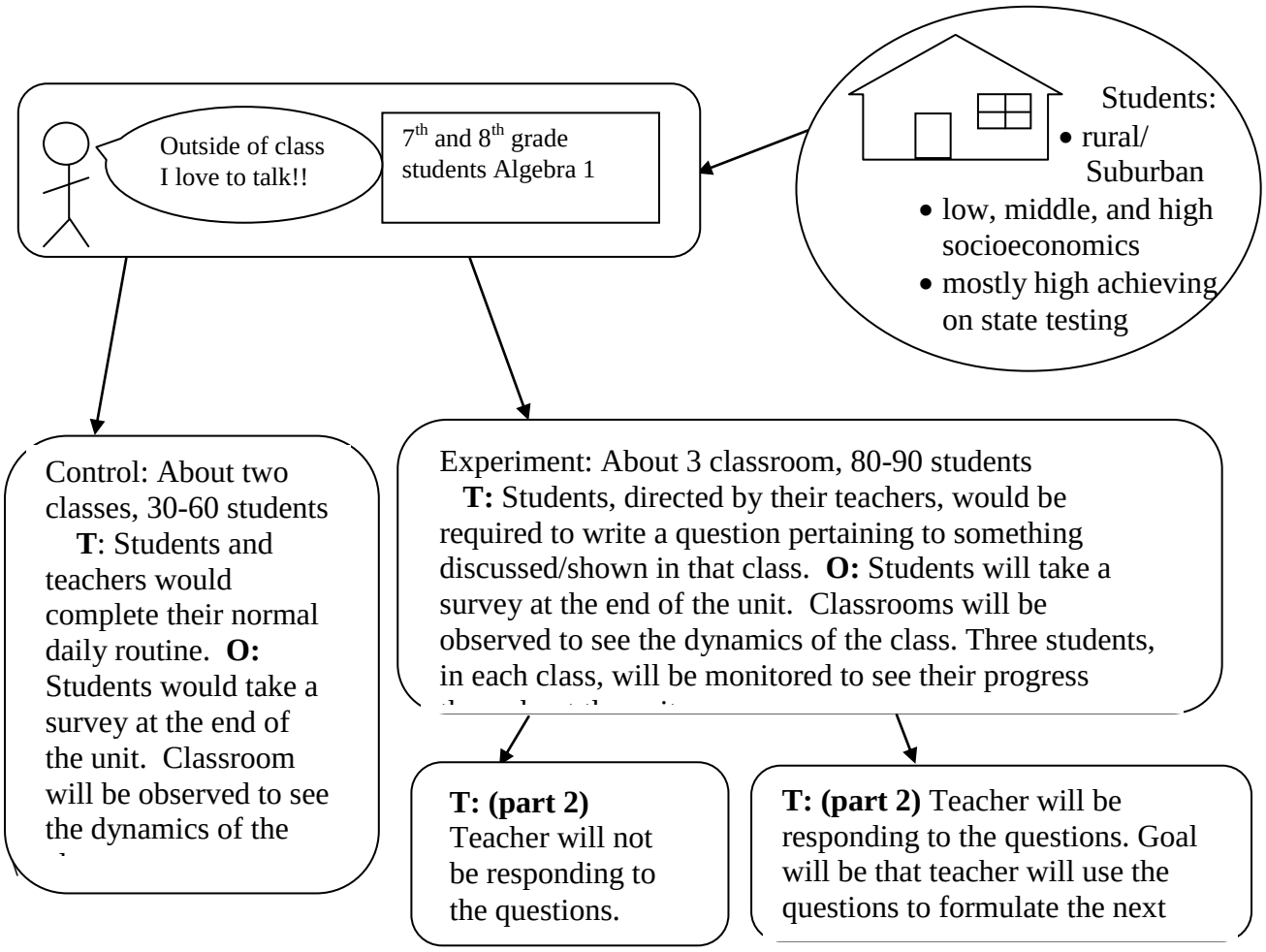
Appendix A

Units Treatment Observation & Setting



Appendix B

Example Questions for Bloom's Taxonomy

Adapted from Goodwin et al. (1983) and Way (2008)

Knowledge- Remembering previously learned material. (I.e. definition, concepts, principles, and formulas)

a. What is the definition of a right angle?
b. What is the formula for finding area?
c. What are the rules for solving equations?

Comprehension- Understanding the meaning of remembered material, usually demonstrated by explaining in one's own words or citing examples.

a. How do you find the answer to a two-step equation?
b. What does the graph on pg. 19 mean?
c. Explain the process of long division.

Application- Using information in a new context to solve a problem, to answer a question, or to perform another task. The information used may be rules, principles, formulas, theories, concepts, or procedures.

a. What does the answer to problem tell you?
b. How does the line of best fit help you to predict future outcomes?
c. Based on your knowledge, what method of problem solving is appropriate to solve this problem?

Analysis- Breaking a piece of material into its parts and explaining the relationship between the parts.

a. How does a graph relate to its table or equation?
b. How do the two sides of an equation affect each other?
c. What made you decide to do it that way?

Synthesis- Putting parts together to form a new whole pattern of structure.

a. How would you use the steps to solving equations to solve inequalities?
b. How are x and y variables applied to determine the slope?
c. What would happen if this changed?

Evaluation- Using a set of criteria established by the student or specified by the instructor to arrive at a reasoned judgment.

a. Have we found all of the possibilities? How do we know?
b. Do you think we have found the best solution?

c. How would you compare the foreign automobile market to the American automobile market on the basis of gross profit?
d. How well does your performance on the Problem of the Week help you to increase your overall math number sense?

Appendix C

Surveys for Perceived Levels of Participation

Non participants (Control group) in the study:

1. If you had questions, did you feel like your questions were answered? (choose one)
    a. Yes, on average they were answered throughout the class period based on what the teacher said.
    b. Yes, on average they were answered the next day or later but by the teacher.
    c. Yes, on average I discovered the answers.
    d. No, my questions never got answered.
2. What percent did you pay attention in class?
    a. Prior to the last unit?
    b. During the last unit?
    c. After the last unit?

Participants (Experiment group) in the study:

2. What percent did you pay attention in class?
    a. Prior to the last unit?
    b. During the last unit?
    c. After the last unit?
3. In an average class, how many questions would you write down?
4. On a scale of 0-10, how comfortable did you feel when writing down your questions?
    a. comfortable writing questions
    b. likely to ask the questions in class
5. Explain the reason you gave the score(s) you did on the last question.
6. If you had questions, did you feel like your questions were answered? (choose one)

a. Yes, on average they were answered throughout the class period based on what the teacher said.
b. Yes, on average they were answered the next day or later but by the teacher.
c. Yes, on average I discovered the answers.
d. No, my questions never got answered.

7. Based on the scale of questioning that was presented to you in the beginning of the study, as a majority, how analytical were your questions?
    a. Choice between Knowledge, Comprehension, Application, Analysis, Synthesis, Evaluation, N/A
8. Through writing questions, did you feel more ready for the test/ more prepared?

Teachers in the study:

1. On a scale of 0-10, how comfortable do you feel your students are when writing down questions?
    a. Comfortable writing questions?
    b. Likely to ask the questions in class?
2. Did you answer/ respond to the questions asked by your students?
    a. Yes, on average the students answered the questions prior to the end of class.
    b. Yes, on average the students' questions were answered the next day or later.
    c. No, I never answered the questions.
3. Did you find the questions that the students wrote useful to help you decide where/how the next day's lesson should go?
    a. Yes/No. Explain.

4. On a scale of Bloom's Taxonomy of learning domains, how, based on majority, analytical were the questions of your students?
    a. Choice between Knowledge, Comprehension, Application, Analysis, Synthesis, Evaluation, N/A