

College Students and Elementary School Students As Partners

in the learning of mathematics

**College of Aeronautics
P.S. 127 Queens
I.S. 391 Brooklyn
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Summary

It was hypothesized that minority college students with difficulty in mathematics who mentor minority 3rd, 5th and 8th graders in mathematics would demonstrate increased performance in mathematics. Narratives from college and elementary students, suggest a reduction in math anxiety, improved communication and a better understanding of mathematics.

NARRATIVE

College Students and Elementary School Students as Partners in the Learning of Mathematics

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College of Aeronautics I.S. 391 B

An unexpected opportunity to help in the retention of minority students at the College of Aeronautics occurred in the Spring Semester of 1991. Fifth grade students from a neighborhood elementary school, P.S. 127, which serves a minority population, were invited to attend an Aviation Seminar at the College of Aeronautics since P.S. 127 has an aerospace program. When Professor Mermelstein saw these children he thought of the possibility of his college students “mentoring” these 5th grade students. In a sense the stage had been set by Mermelstein’s earlier work. Mermelstein and an English professor colleague, Dr. Ingrid Thompson, had been exploring techniques for reducing math anxiety and thereby facilitating mathematics learning. Mermelstein used humor to take the worry out of being mistaken, riddles and cooperative learning. These ideas were tried out and presented at the 18th Annual meeting of the Research Council for Diagnostic and prescriptive Mathematics, California State University, Pomona, California. Feb. 1991. Accordingly, the previous and ongoing presence of the fifth graders prompted the collaboration between the two groups of students. Mermelstein’s experience in teaching elementary children and his communication with the administration and teachers at P.S. 127 suggested that fifth graders would be the best population to begin with.

Narrative Content

Mermelstein and Thompson hypothesized that when college students who have difficulties in mathematics, mentor 5th grade students, their interest and performance in mathematics is enhanced.

In the past four years, each semester, college students in Mermelstein's math class mentored 5th graders every other Friday for one hour. After the hour the 5th graders enjoyed an half hour snack time. The college students' mentoring entailed three types of activity: 1. Tutoring 2. Critical thinking-riddles, puns, and puzzles and 3: Conversations, i.e. children's' questions about the aviation programs, etc. Within the hour all students would be engaged in the same three activities, although not necessarily at the same time.

In the fall 1995 semester, the mentoring program was expanded. In addition to 5th graders meeting every other Friday, eighth graders were included on the other Fridays. Tutors from the Academic Resources Center (ARC), Mr. Said Lamhaouar, Assistant Dean, collaborated with college students from Mermelstein's math class. For each grade, one week, half of thirty students would meet with Lamhaouar's tutors while the other half would meet with Mermelstein's Math class. The following week each grade would alternate. These meetings would take place in the morning. Following the meetings P.S. 127 students were provided snacks in the College cafeteria at which time they shared their classroom experience and interacted with college students, staff and faculty.

In contrast to the 5th and 8th graders who came to the College of Aeronautics, a new program was started in which college students from Mermelstein's afternoon introductory math class tutored 3rd graders at P.S. 127 every week for 40 minutes. Accordingly, the connection between the COA and P.S.

127 has been strengthened this year by including 3rd and 8th graders and by COA students mentoring at P.S. 127.

In all three grades the direction for the tutorial is guided by the PS 127 teacher. This took the form of worksheets indicating areas where students needed help. College students are required to submit reports for each of their meetings indicating the kind of experience they have had. Consultations with the elementary school teacher has also led to the elementary school children writing reports or keeping a journal of their experiences. In addition Mermelstein and Lamhaouar are keeping a record of the meetings.

In view of the success of the program at P.S. 127, the College of Aeronautics commitment to the tutoring program, and Mr. Phil Stanford's promotion from assistant Principal, P.S. 127 to Principal, I.S. 391 in Brooklyn (June 1996), a school which also serves a minority population, our objective is to expand the program to include a class of 7th graders from I.S. 391 who will meet every other week beginning in October 1996. Because of reductions in enrollment, 7th graders, instead of 8th graders will be used from P.S. 127 beginning in October 1996. The selection of 7th grade students provides both elementary schools the opportunity to improve math scores on city wide exams given to the 8th grades.

To evaluate the effectiveness of the mentoring program, college student narratives, P.S. 127, 5th and 8th grade elementary school student narratives, and P.S. 127 teacher observations are used. (No data are yet available from the 7th grades from I.S. 391 or P.S. 127) The 5th and 8th grades findings suggest a reduction in math anxiety, improved communication among students in both age groups, and a better understanding of mathematics. Portions of these narratives will be shared and discussed. Attention will be focused on student (college and elementary school) motivation, reduction of math anxiety and understanding.

OBJECTIVES

The objectives of the mentoring program are to:

1. Enhance student's interest in Mathematics and Science
2. Increase retention in the Colleges' Math and Science program
3. Promote dialogue as a process toward understanding and thus improve the quality of teaching in the classroom
4. reduce math anxiety in college and elementary school students

Description of Activities - College of Aeronautics visiting P.S. 127 Q:

Nineteen students from Prof. Mermelstein's introductory math class tutored 3rd graders every Tuesday from 12:00 noon to 12:40 pm for the Fall 1995 semester. The first session began on October 10, 1995 and the last scheduled session was on December 05, 1995. Approximately twenty 3rd grade students from several different classes were brought up to the Great Hall by the school math specialist. She provided activity sheets for the third graders. Some of the worksheets focused on shape recognition, graphs and verbal problems. The college students worked with the third graders on these activities. In some instances one college student worked with 2 or 3 3rd graders while others worked on a one to one basis. The college students' math teacher as well as the math specialist participated in the tutoring sessions. Discussions among college students, third graders and teachers regarding the material and learning environment were in evidence each session.

Description of Activities - P.S. 127 Q visiting College of Aeronautics:

Approximately thirty students from P.S. 127 came to the College of Aeronautics each Friday between the hours of 9:00 am and 11:00 am. The first session was on October 06, 1995 and the last session was on December 08, 1995. A similar format was used in the Spring 1996 academic year and is also in effect for 1996-1997 academic year.

Two individual classes, consisting of 5th grade students and eighth grade students, alternated every week visiting the ARC with Mr. Lamhaouar and college tutors, and Dr. Mermelstein and his class. Students were tutored in basic math skills with the use of worksheets and activity sheets. Homework problems were reviewed with students having difficulty in solving particular assignments. The 5th grade students were helped in understanding fractions, decimals, division, and multiplication. To enhance their skills students in Dr. Mermelstein's class performed math problems in groups at the blackboard.

Qualitative Analysis

Comments from P.S. 127 Teachers:

“I have seen an improvement in the current Math scores. The students are more confident and it shows.

They are anticipating their return to the College of Aeronautics in 1996.

I thank you and your students for the help and encouragement, as well as Mr. Lamhaouar and his group.”

Ms. M. Karipas, 8th grade Teacher

“All my students are very excited about the tutoring program. Even the students that do not like math.

They like the fact that nobody is singled out or grouped in terms of ability. Everyone gets personal help and everybody completes the math assignments. It really builds their self-confidence.

They also have a chance to see what a college looks like. For some it is their only opportunity to experience a college setting.

Thank you for all your help. I look forward to working with you again next year.”

Ms. Sotelo, 5th grade Teacher

Comments from P.S. 127 Teachers Content:

“I wanted to take this time to thank your students for their dedication to our students. The children of our third grades always looked forward to their weekly visits. I know, too, how greatly they benefit from their tutorial services.

I sincerely hope that you will be able to include our students in your plans for the spring semester.

Thank you again for your kindness and courtesy. It was a pleasure working with you.”

Ms. Jean Quinn McGrane, Math Specialist

College Student Comments (Tutors):

“We worked with two of our classmates and four of the eighth graders at the board and this was another point. I think it is more easier to solve a problem at the board, especially when you have to work with more than one or two students. It was a relaxed atmosphere and I enjoyed it very much and it was a good training for us too!”

“I found the teaching very helpful because they have learned a way to solve an improper fraction that I did not know of, which means I have learned something I did not know before and they make me very proud of them.”

“I took my group out of the classroom while the others stayed inside. We went to the cafeteria - we measured the counter; we measured the tables, the television and the walls. Most of the fifth graders said I am their favorite tutor and that made me feel good about myself.”

“It was really a great pleasure teaching these children. I am starting to believe that you can make a difference in their lives.”

“I think that his way of teaching works and that for me, his students, are trying to do the same with the kids.”

“Most of the time I find myself making the kids laugh in order to help them grasp the math in a new light. I guess I learned this from my professor. . . Thank you for a great idea.”

College Student Comments (Tutors) Con t:

“The most helpful learning experience was not in the lab, not in lecture, but in P.S. 127.”

“The part I loved about this class was tutoring the kids at the local elementary school.”

“Overall, everything went smoothly this time and I left that school (P.S. 127) with a good feeling.”

“Working with the kids is a wonderful experience.”

“I feel that the work we are doing in the elementary school is good for the kids, as well as for us. We can teach the kids things we know and it helps us to review the work ourselves. I felt good about helping the kids.”

“Sometimes when I’m depressed, I feel more relaxed and relief when I am with the kids.”

“I anticipate that me helping these students will enable them to pass any given test.”

“I always believed that there is a way to teach a child to enjoy hard work if you can come up with a method of making it like a game.”

Comments from P.S. 127 Students (3rd graders):

“I like your tutoring because you help people do things and you can teach us a lot. I hope I can come again and have some of my friends with me. Please take me.”

“I like to come here because I learn a lot of math. I hope to come here again. The math was easy and I learned more.”

“I think you can teach us division and I like your tutoring because you help people do thing and you can teach us multiplication and subtraction and addition a lot because some people do not know that.”

“I like coming up to the great hall and I like to do math. It is a lot of fun.”

“Thank you for tutoring me. I like math.”

“I like to come here because I learn a lot of math. I hope to come here again, the math was easy and I learned more.”

Comments from P.S. 127 Students (5th graders):

“I learned how to do math. I learned how to do ten, ones, hundreds, thousand.”

“I learned how to count by two, three, and five 2, 3, 5. I also learned how to solve verbal problems.”

“I had fun with my teacher. We did math together.”

“My favorite thing I did is adding thousands and I had to count by 2, 3, 4, 5, 10, and I learned how to split thousands up into places.”

“We did addition and rounding numbers and count by 2’s. I like it and it was so much fun.”

Comments from P.S. 127 Students (8th graders):

“The things that I would like to change is my grades in math. I want them to increase. I was impressed with my grade in math, it was a 70 and it is my first good grade and I’m happy, but I want them higher. That’s why we (our class) are taking tutors. I am really grateful because they are taking their time out to help us.”

“We’ve gone to the College of Aeronautics and I’ve really learned a lot. We got to know a lot of new things like new people, new shortcuts in doing math problems and other new ways you can do with math.”

“During the last few times that we’ve been going to the College of Aeronautics. I feel that it has helped me a lot. What the college has been doing is reinforcing what we have already done, and the things that we have been doing in school, I needed reinforcing in.”

”I love going to the College. My grades have improved a lot. I enjoy going there because they know how to teach. I think that’s a good way to learn and I hope that they miss me because I’m going to miss them.”

“I would improve the way they teach us at the college; which is to do math with computers.”

CONCLUSIONS

The quality of teaching in the college classroom has shifted from an instructional method dominated by the delivery of information to one in which the college student is an active worker with the teacher being more a coach and facilitator of learning. The teacher and college students use of puns and riddles helped promote a sense of community among both college and elementary school students. Dialogue as a process toward understanding flourished in this environment in the sense that students were encouraged to explore their own as well as the mistakes of others. These kinds of activities contribute to the student becoming the foremost interpreter of their own experiences. In this manner the student develops a sense of who he is and consequently a sense of understanding the world around him. This leads to an improvement in learning in general and mathematics learning in particular.

The larger context in which learning took place was characterized by cooperation among the faculty, staff, and administration of the COA and P.S. 127. In this manner, the students in both schools were better served.