

Jonita Sommers

Statistics in the Classroom: Written Projects Portraying Real-World Situations

“Why do I have to do this math? This is not something I need to know. I will not use it when I get out of school!” exclaimed Jesse and some of his classmates. Have you ever heard these comments? In the past, my students were learning the concepts, but they were not associating the importance of mathematics and its uses in the real world. This year, I have tried to show the students in my eighth-grade mathematics class how mathematics will apply to their lives, whether they work on a ranch, work in the oil fields, or get a higher education after high school.

At the National Council of Teacher of Mathematics conference in Salt Lake City, Utah, I attended the session “Real Problems + Useful Math = Real Learning” conducted by Murray Siegel. He discussed how students took activities that were of interest to them in their own communities and developed mathematics projects pertaining to those activities by using statistics. This approach sounded like the perfect tool to make my students understand how mathematics is applicable to the real world and to teach them the mathematics concepts they needed to function successfully in society. I adapted Siegel’s ideas to the needs of my students as I designed a real-world-mathematics-project unit.

*Students
picked their
topics and
collected
data*

NCTM’S CURRICULUM STANDARDS

The students’ mathematics projects were an excellent way to incorporate and concentrate on the NCTM’s curriculum standards for grades 5–8 (NCTM 1989), which the school district’s mathematics-curriculum committee was stressing. The standards of mathematics as problem solving, communication, and reasoning were the main focus of the mathematics projects, along with those of mathematical connections, number and number relationships, number systems and number theory, computation and estimation, patterns and function, and statistics. Some of the projects used the algebra, probability, geometry, and measurement standards, depending on the information collected.

WRITING ACROSS THE CURRICULUM

These projects were an effective way to incorporate writing across the curriculum into my mathematics program. The students not only used mathematics operations ranging from basic addition to statistics but also learned to integrate mathematics with their writing skills. By using the computer, students could easily make sure that their reports were structurally and grammatically correct. While the projects were being completed, I employed whole-language and cooperative-learning teaching techniques.

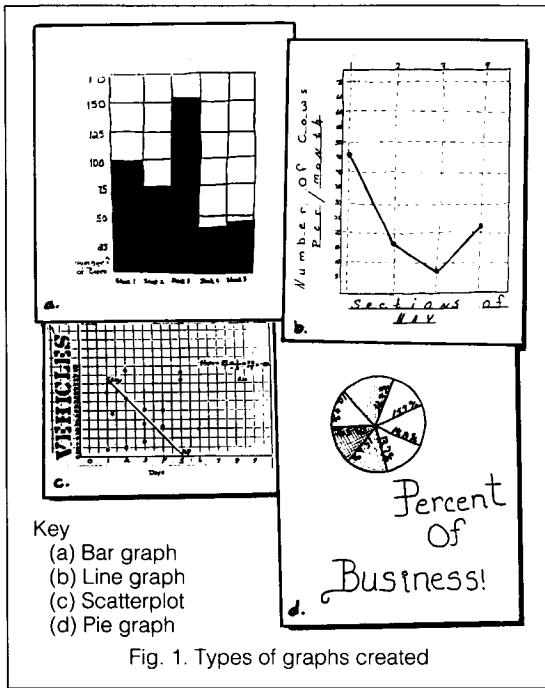
SETTING UP PROJECTS

To start the projects, the students were asked to pick a topic of interest to them. The topics ranged from the amount of hay produced on a ranch to the number of shoppers at different businesses in town. If the students were at a loss for a topic, I offered them the following choices (Henderson and Butler, n.d.):

1. Colors and types of automobiles
2. Safe-driving records
3. Daily traffic
4. Number of toothpicks or other items in boxes
5. Comparisons of costs at different stores
6. Students’ height, weight, and age relationships
7. Rainfall, temperature, and weather records
8. Tardiness and absenteeism at school
9. Political surveys
10. Age of pennies in circulation
11. Time of births in families
12. Salaries and averages in professional sports

The students decided how mathematics could be applied to their topics by writing a question that

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asked when, where, what, how, and why. The question needed to be worded so that the information was gathered in an organized and workable way. One of the students asked, "How many cars, trucks, and semis went by the Budd Avenue and Piney Drive intersection for forty-five minutes during a five-day period?"

The students developed a data sheet to collect the information and a rough draft explaining how they were going to present their project. All these activities made the students aware of why each part of their question was important and why they had to collect their data in a systematic way.

DEVELOPING THE PROJECT

The students took the data and decided how to display the collected material in the form of a graph. Bar graphs, line graphs, pie graphs, and scatterplots were some of the graphs that were used. The graphs were an excellent way for the students to visualize the abstract and concrete comparisons. Students needed to have most of the information in concrete form to understand it. Examples of the different graphs can be seen in **figure 1**.

Students' reports contained the following five sections:

1. The question
2. Description of how the data were collected
3. Report of the data collected
4. Analysis of the data
5. Discussion of what was discovered

"Analyzing the Data" was the main section of the report. To acquire the information needed for this

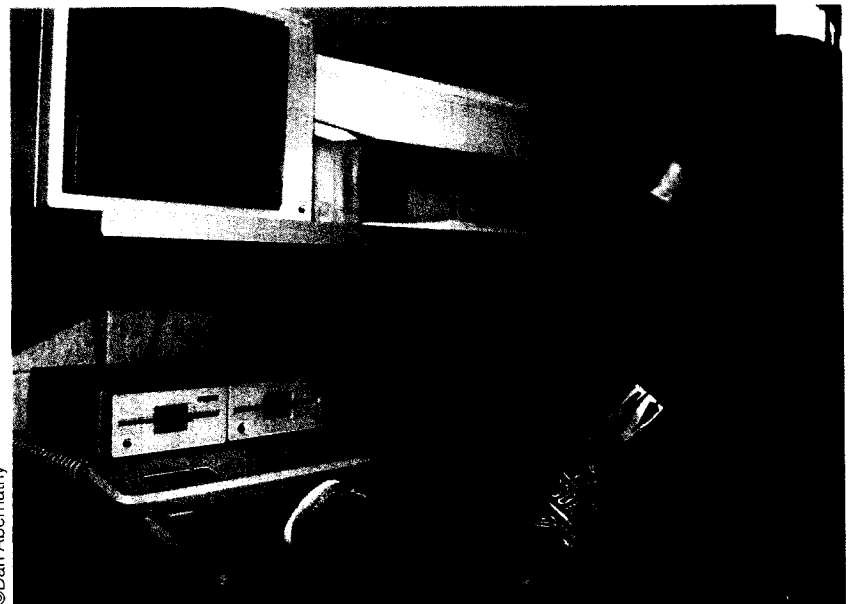
section, the students did statistical mathematical calculations. Students figured averages, proportions, ratios, and percents with the Texas Instruments Math Explorer calculator. If the students did not know how to use this calculator, it was an excellent opportunity to teach them. Students made graphs to go along with the written paragraph and then showed how the information was relevant. Scatterplots and pie graphs with percents were frequently used.

The last section, wherein the students explained what they had discovered, tied the entire report together. The students sometimes did not realize what they had learned until they generalized the information. This section was also an excellent way to review the material learned. One of the students, who would not do mathematics without being forced and who complained continually about how mathematics did not apply to his life, wrote, "I learned how to multiply, divide, and get an average in math. It was very useful in life because the ranchers have to know if they have enough hay, so they can raise their cattle." He came into the classroom on his own to work on the project during his study-hall periods, which was the opposite of what had been happening with his other mathematics assignments.

DISPLAYING THE REPORT

Once the reports were completed, the students presented them to an audience. The students spent several days practicing their speeches and critiquing each other's reports, so they felt confident delivering their report to an audience. I evaluated the reports on the following criteria:

Students gave their reports at a local senior center



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A student incorporates writing across the curriculum by using the computer to write her report.

*The
prealgebra
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things they
haven't*



Two students work on statistics by figuring means and medians.

1. Originality
2. Creativity
3. Evidence of effort and time expended
4. Relevance to the topic
5. Development of the project
6. Neatness

I also evaluated students' style of presentation with the following criteria:

1. Student's posture
2. Student's audibility and enunciation
3. Student's eye contact
4. Introduction of speech
5. Body of speech
6. Conclusion of speech
7. Number of facts given
8. Neatness
9. Originality
10. Conducting of post-presentation discussion

The students wrote letters to the people who contributed to the report and asked them to attend their presentations. Students gave their reports at the local senior-citizen center. The local newspaper published an article about the event.

A class of the students' peers attended the at-school program. Their

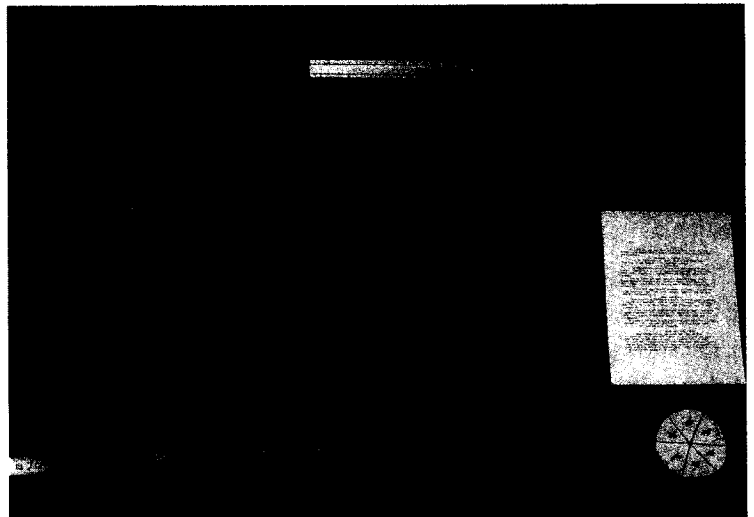
friends were asked by their teacher to pick out one project and write something positive about it. This experience was terrific for boosting self-esteem. One of the peers wrote, "I learned how ranchers know how much hay farmers should get for the cows. The farmers need to find averages to find how much hay they need for their cows, so they do not get too much hay or too little hay. Cows eat 25 pounds of hay a day. I think that Jesse's report was good because it took a lot of time to do it." One of my students came bouncing into the classroom the day after the projects were given and stated, "The kids in Ms. Costello's class say we are doing things they aren't doing. We are doing harder things than they are."

Later, I displayed the projects in the hallway at parent-teacher conferences. The mathematics-curriculum committee displayed the projects at a school board meeting to illustrate how the mathematics standards were being addressed in the classroom.


CONCLUSION

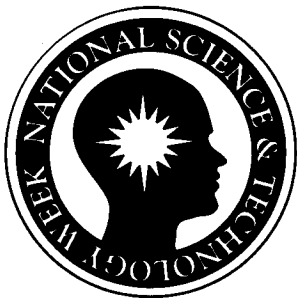
The mathematics projects were a very positive learning experience. Not only did the students learn mathematics concepts and generalize them because they realized their importance, but they experienced a boost in their self-esteem. They knew that they could do mathematics, and they knew that other people were aware of their mathematical abilities. Monte said, "The prealgebra class knows we are doing hard math. They said we were doing things they had not done yet." After the projects were done, I heard Jesse and several other students comment, "I know why we have to learn this math. We had to use this in our project." Mathematics had become a meaningful part of the students' real world.

A student uses the communication standard by presenting her report to another seventh-grade mathematics class, parents, and senior citizens.



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