
How I Use Portfolios in Mathematics

An algebra teacher finds an alternative form of assessment gives her insights into her students' maturity and motivation for learning.

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Last summer I became fascinated with the possibility of using something other than the standard math test for assessment. The algebra classes I teach seemed to lend themselves to no other form of assessment than what had been done for the last 50 years. Despite the fact I hadn't a clue about how to begin, the more I read about the concept of the math portfolio, the more interested I became. Finally, I decided to give portfolios a try.

First, I purchased boxes and file folders from the local discount store. I labeled a box for each period of math and assigned a file folder to each student. Well, this gave me a place for storage, but to store what? I thought I would be safe and keep everything the students handed in.

My county department of education had established a portfolio network for math teachers who each month shared ideas. The first meeting was wonderful! There must have been 60 people there. By the third meeting the number had dwindled to 20; the last meeting had just enough people to sit comfortably around one table.

I was disturbed by the narrow scope of what my colleagues were suggesting should go into the portfolios. They wanted to include only their students' efforts at problem

solving. While problem solving is a portion of the mathematics I teach, there is a lot more to algebra than problems of the week. As the semester came to a close, I was surprised at the absolute quantity of work my students had done. Examples of this work included long-term projects, daily notes, and journal entries about troublesome test problems. All this work we faithfully filed.

One day I handed the folders to the students, then went to the board and wrote the word *portfolio*. I asked the class what should be included in a portfolio. What would show their effort and learning in algebra? What activities had been the most meaningful? I noted their suggestions: daily notes, the Personal Budget long-term project, Lottery Project, scale drawing, their best tests, their worst tests, problems of the week, daily class notes, and homework. Next, I had them search through their folders and collect five items that they believed represented their math knowledge and effort. At this time I was really glad I had all their work for the semester because the students attached significant value to assignments that I would not have.

The class then discussed the format of a good portfolio. We decided it should be neat, typed or in ink, in a

cover, and include a table of contents. In addition, each entry was to contain a personal statement as to why this piece was important to the learner. I gave the class a week to organize portfolios.

After I collected the portfolios, I immediately handed them out again to a different person in the class. I wanted my students to see their classmates' work. Almost instantly those who had put little time into this project became uncomfortable when they saw the effort of others. I asked my students whether they would like four extra days to revisit their portfolios. There was obvious relief.

I was truthful with my students when I told them that using portfolios was a new experience for me. I had no idea what would come in, nor did I have a clue how I would go about assessing them. I told them that I didn't know if I was going to include a portfolio grade in their average. For all they knew, they were doing this purely as an intellectual exercise. Looking at

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their portfolios, I realized that many had crawled out on quite an intellectual limb for me. About a third of my students had turned in a superior job on the first due date. Many of their reflective statements told me much about them as people and about their math learning. We were learning portfolio together.

I eventually decided to have the portfolios peer graded. Students were to write comments and suggestions for improvement on grading sheets, not on the actual portfolio. I devised a grading matrix and weighted the portfolio grade to be equivalent to about one-fifth of a test grade. After the students wrote comments, I added my own.

Having students grade one another's portfolios served two purposes. First,

they received immediate, constructive feedback from a peer. Second, graders had an opportunity to read another student's work carefully. Some student graders felt that the introductions they read were so insightful that they asked me to read the comments aloud to the whole class. This is an excerpt from an 8th grader's portfolio:

I chose these papers for my portfolio because they show my best work and my worst work. They portray both sides of my academic performance in math this last semester.

The 45 percent math test is in my portfolio because it shows that I have some problems in math. It shows my bad work. It shows that sometimes I have a bad day. It shows also that I forgot to study (ha ha ha).

I can sum up three papers in this paragraph. Those are the Personal Budget, the James project, and the \$2,000 lottery project. On all of these papers I did really well. That shows I tend to do much better on those projects, especially the creative ones. I have a bit more fun doing them rather than doing just normal take home math assignments. These papers definitely show me at my best.

My students are now collecting work for their next try, which they are calling "Son of Portfolio."

As a result of trying to implement portfolio assessment, my classroom has definitely changed. It became apparent early on that if I wanted variety in my children's portfolios, I had to provide variety in assignments. I have changed my curriculum to include more problem-solving opportunities with written explanations. I have also had my students do two long-term situational problems. In the past, although I knew my algebra classes found such projects entertaining, I had questioned their lasting

value. Now I see that these problems are the ones the kids remember most.

I now believe portfolio assessment is a way to assess total student performance. Not only do portfolios offer teachers insights into their students' maturity, self-esteem, and writing abilities, but they are also an important tool for student self-evaluation. While

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portfolio assessment is extra work, the work is enlightening. Math portfolios are a wonderful way for students to celebrate their learning. □

References

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FIGURE 1

QUESTIONS TO ASK ABOUT MATH PORTFOLIOS

1. What is the difference between a folder of a child's work and a portfolio?
2. Can a portfolio of a limited number of pieces accurately reflect student growth over time in mathematics?
3. Should a student receive a grade for a portfolio, or would this double grading work?
4. Is it possible to use portfolio assessment in conjunction with current math teaching practices?
5. Must the grade of a portfolio correspond to what a child would attain under traditional grading standards?
6. If we use writing as a portion of math problem solving, will a child who is poor at written expression but skilled in math be penalized?
7. Could we standardize the format of portfolio assessment so that it would carry a universally understood meaning from site to site?
8. Should portfolios be scored by individual teachers or should a district-wide portfolio assessment group be formed?
9. Would standardized assessment criteria and grading of portfolios spoil portfolio assessment's special qualities?

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