



INNOVATION ABSTRACTS

Published by the National Institute for Staff and Organizational Development (NISOD) • College of Education • The University of Texas at Austin

MATH IS, MATH WAS

It would be nice if, in most cases, I could take someone with minimal math skills and make him comfortably competent with basic skills, all in one term. This does not happen regularly for students with 10-12 years of marginal or negative math experiences. They bring fragmented knowledge and the belief that math is only for smart people. They simply believe they cannot do it and have had this belief reinforced by teachers and fellow students.

I do not believe in the concept of “edutainment,” that education must also be entertaining in order to be effective. “Edutainment” focuses on an external condition to which the person may respond, but it is not as valuable as the internal state of a sense of awareness, control, understanding, and mastery from having had a positive math experience. There can be too much entertainment and not enough learning. Of course, math education also can be entertaining, resulting in a sense of accomplishment and joy.

This sense is one we might usually notice in students who have managed to “get it.” Their level of classroom participation increases, they hang around after class to talk, they sometimes arrive early to review, they attach themselves to you in a mathematical way, and they take every opportunity to show you, with pride, that they have somehow permanently crossed that barrier from “do not get it” to “got it.”

These are nice rewards for an instructor, particularly when, by definition, you know that the students coming into the class at the beginning of the term are likely to have low performance, low opinions of math, and a low math self-image.

The obvious goal is to improve the skills, but I rarely see a significant shift in skills without a corresponding shift in attitude or affective state. It does not always occur. But the likelihood is that if you see students’ performance improve, you will see a shift in their identifying math as more approachable and themselves as more comfortable with math.

I thought I would ask for some feedback from students on this idea about those shifts in cognition

and affect. I am not searching for statistically significant findings; rather, I am looking for “just noticeable differences.”

I constructed a very simple instrument, asking students to reply to a few questions near the end of the term.

Please thoughtfully complete the following statements. (Name not requested.)

1. When I started math this term I believed math was...
2. Now that I am near the end of the term, math is...

Although I do not ask for names, some students identify themselves. They typically report a positive shift in affect and want me to know that they have had a good experience. A quick look at their performance (those who provide a name) indicates a link between increased affect and increased skills. But that is not the real point I want to share.

The following responses are representative samples.

Math Was...

- Evil.
- A bunch of numbers with different values that equal different amounts. It was also not the most fun or interesting thing to do.
- Boring and not that important. I had not taken a math class in a few years, because of lack of interest, and a prior experience with a bad teacher.
- A course I would struggle through and pray for a “C.” I suffer from major math anxiety.
- Complicated but needed. I also believe that even though I was going to try my hardest, I was going to fail.
- Hard and frustrating. I never enjoyed math and was happy when I got a “C” on a test.
- Something I didn’t remember. It had been a long time since I had used it. I was afraid I couldn’t get fractions and percents.
- Something that you have, rather than something that you learn and do. The lucky gene club gave math to others not me. Math was impossible, my last fear to face, a constant dread, a source of insecurity—an enemy.
- Easy.



Math Is...

- Evil.
- Something I am learning to have fun with and not only see as numbers, but as something that can be useful for many other areas of my life.
- A lot of fun and interesting. This class has renewed an interest with the science of number relationships.
- Something I can comprehend and get better than a “C” grade. I have gained confidence in my abilities to move on to the next math course.
- Still needed but actually...fun! Now I know I was wrong and I am passing.
- Able to be done. This is the first time in a while I have done well even though it’s basic stuff. I have a bit of confidence back.
- I am proud of what I know and remember. I can do problems I didn’t think I could. I have actually had fun with this!
- A tamable monster—my toy.
- Easy.

I intentionally made “bookends” of the words “evil” and “easy” because, for some students, this clearly is the case. But, I suspect that you see and hear some of your own students. I am beginning a library of statements that, although anecdotal, are direct expressions that students can overcome an aggregation of bad experiences. I am an eternal optimist about students having the capability and the spirit to want to know and enjoy themselves as performers in math.

Student comments are self-explanatory. Some faculty might contend that, of course, students with negative experiences and then positive experiences would say such things. But as self-evident as they may be, a record of them is important because of what might be called the “experimenter effect.” Giving students an opportunity to tell things anonymously that they might otherwise be too shy or ashamed to tell is valuable. As several students later commented, they felt that my asking was more important than what they expressed. The best summary I can give so far was provided by one of the students who simply said, “How can I learn math if no one cares if I believe I can?”

Mark Schwartz, *Adjunct Instructor, Math*

For further information, contact the author at Southern Maine Community College, Fort Road, South Portland, ME 04106. Email: mschwartz@smccme.edu

Suane D. Roueche, Editor

February 5, 2010, Vol. XXXII, No. 3

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Innovation Abstracts (ISSN 0199-106X) is published weekly following the fall and spring terms of the academic calendar, except Thanksgiving week, by the National Institute for Staff and Organizational Development (NISOD), Department of Educational Administration, College of Education, 1 University Station, D5600, Austin, Texas 78712-0378, (512) 471-7545, Email: abstracts@nisod.org