

SOME THOUGHTS ON THE TEACHING AND LEARNING OF MATHEMATICS

Learning requires an involvement of the learner. To involve students we need to have them do something with the new knowledge: explain it, rephrase it, compare or contrast it with what is already known, demonstrate it, even teach it to another. The learner and the teacher should care about the subject.

Learning takes place when ideas new to the learner become part of her own thinking system. Such tasks as explaining the new ideas to a neighbor, expressing the new idea in one's own words, or even suggesting a question can make the subject personally meaningful.

When I began to teach, my ambition was to present the material as clearly as possible, to avoid or eliminate any ambiguities. I wanted to emulate what I thought my best teachers had done, that is to lay out the complete story to the class.

Some experience, lots of reading and reflecting have given me a new perspective on my role as a teacher. As a teacher, I want to help to persuade my students to make a creative response to the class encounter. I want my students to become involved – to care- to go beyond the information given.

If the student is the center of the teaching-learning process then the student should be encouraged and helped to play with the concepts of science and art and to share the experience with classmates and teacher. Part of the process of constructing meaning is by casual conversation as well as purposeful discussion – and the awareness that such discussion is a central part of learning.

Higher and Lower Levels of Mathematics Teaching

In the September 1997 issue of “Mathematics in the Middle School,” Gail Burrill,, President of the NCTM, in her presidential address commented on a study by John Stigler concerning the quality of instruction in randomly chosen 8th grade classrooms in Germany, Japan and the United States. The study categorized the quality of mathematics reasoning as low, medium or high.

In Germany 40 percent of the lessons had a low level of math reasoning, 23 percent had a high level. In Japan 13 percent had a low level and 30 percent had a high level. In the United States 87 percent of math classes were taught at a low level, zero percent were at a high level.

Gail Burrill remarked

“This is how I taught – with a focus on definitions and procedures, and I was pretty good at teaching that way. My students knew their definitions and algorithms and were all comfortable with the process. However, I did not ask the right questions to get my students to do any real math reasoning. I did not design my lessons to force them to

think about math. To have students who can think about math clearly requires a change from the way that I used to teach.

“We must focus on more than definitions and skills. These are important, but we also need to prepare students to move to the next level: - make interpretations, be able to generalize and recognize generalizations. Math is about thinking and reasoning.”