

Changes in Mathematics Curriculum

John Buiter

The term "Arithmetic" as one of the three R's has been replaced by the more modern term "Mathematics." This is a sign of the changes which have taken place in mathematics instruction over the last fifteen to twenty years. These changes have often gone under the banner of the new math or modern mathematics. After this length of time it is inevitable that these changes are coming under study and critical evaluation. There is also a movement to return to the old methods of teaching math. This too has its slogan: back to the basics—an expression that is often heard in these days. This reaction to the changes of the past decade should be examined and I shall attempt to give a few observations. In connection with this development we should also be aware of another change which is taking place at the same time. This other element is the introduction of the hand-held electronic calculator. The marvels of modern technology have placed in the hands of every school child a new powerful tool and servant. This too will have a profound effect on the mathematical scene of our present age and cannot be ignored in our instruction.

A critical analysis of the present math teaching situation demands that we proceed with caution. What are our goals in teaching math? Do we seek to make efficient calculators of our children or do we want them to know math? Answers to these fundamental questions are important. The introduction of the new math was a reaction to math instruction which was primarily that of training students to be efficient calculators and users of math skills. The new math was an attempt to place more emphasis on the understanding of the structures of math. The expectation was that if students understand mathematical principles they will be able to use these principles in their computational work and have gained a deeper understanding of the nature of mathematics. The goal was a student who understood his math so well that he could use this new insight to

make greater use of math in application. The present controversy is whether this goal has been reached or have we succeeded in producing a generation of students who do not understand the principles and in the bargain have become poor computers and users of math.

I do not wish in this article to be an arbitrator of this controversy. The evidence is uncertain. There is serious question whether the adults which have come out of the new math teaching are poorer computers than the generation before. There is no question that the new math has not produced the results and improvements which were heralded with its introduction and promotion. That is why we are ripe for changes in the teaching of math today.

Another question before us is how students learn math. Not only must we know our goals but we must understand what is happening in the process of teaching to reach these goals. The new math set as its goal the understanding of the principles and structures of math and set about to produce a methodology that would attain these ends. The results have been rather mixed. Some students have gained the desired results but too many have not. These who have not gained the understanding have often been confused and in addition become poor in math computational skills due to more time being devoted to the structures of math.

Those who are now calling for a return to the basics of teaching and drilling computational skills hope to remedy this situation. If the goal of math instruction is to produce efficient and accurate computers this method will probably work. It must be added that a one-sided emphasis on computational skills will result in some of the old problems that the new math was intended to cure. It must be also added that the situation today is not what it was twenty years ago. The present day general availability of the low cost electronic calculator has changed the practical need of computational skills. Not that students do not need to learn computation but the need for fast and accurate skills at computation are no longer primary goals of math training.

To return to our question of how students learn math, we must face the situation that not all students learn math concepts and understand structures in the same way and at the same rate. This was a mistake on the part of the new math advocates. They

tried to devise a method of teaching understanding of principles and structure which was to give all students these insights in a graded presentation. It did not work except in these situations where math was individualized and a wide degree of latitude provided in the mastery of principles and structures. Many different methods had to be used in the teaching of mathematics from this approach to learning. The general results of the many forms of teaching of new math resulted in a wide variety of results, not all of them undesirable. With the greater attention given to structures and principles of math there was a general decline in the development and maintenance of computational skills. This is the basic cause for the present reaction to the new math curriculums of the last decade.

What is to be done now in the field of math instruction? Some call for a return to the "good old days" when arithmetic was primarily a matter of learning computational forms. This was accomplished by drill to gain mastery and by applying these forms to everyday use of arithmetic. It should be noted that often our ideas of the "good old days" are colored by a nostalgic memory of what was desirable, but a tendency to forget the faults. A return to those days gone by is often not even possible because of changes which have taken place. In the case of arithmetic instruction a major change is the general availability of a new math tool, the electronic calculator.

Where do we go at this point? Without a doubt we must return to a greater emphasis on teaching the methods of computation. A fundamental reason for this return is the nature of the learning process. Students for the most part need experience with concrete materials before they are able to begin work in the area of seeking and understanding structures and principles.

Students need work with numbers and the easiest way to gain this experience is the application of these skills to concrete situations.

We must not lose sight of one of the fundamental reasons for the study of mathematics. One of the legitimate goals of the new math was that the students should know math. That means more than being able to use arithmetic in our lives. Knowing math means to gain insight into the structure and systems of numbers, to gain some appreciation for its place in the creation of God.

Back to the basics means that we know what is basic to the

mathematical instruction of the covenant child and then seek that goal. What is basic is not simply that we train our children to be very expensive human calculators.

The Crisis in Music

Gerald Kuiper

The aim of this article is two-fold—to point out the need for music instruction in the schools and homes of today, and more importantly, to make each of us, especially parents and teachers, aware of our responsibility to be an example to our children and students regarding our use of music.

Our children and we are constantly exposed to music, much of which is unfortunately very poor music. The recording industry annually takes in over \$2,500,000,000. 60% of these sales are rock music, 6% of the sales jazz, and 5% is classical music. This total of over 70% does not include country music recordings and the so-called gospel music industry which is rapidly growing. Young people of today, and our children too, are spending a larger share of this 2½ billion dollars than they did before.

Ten to fifteen years ago the Reformed covenant youth with a record cabinet or tape storage full of rock music was an exception rather than the rule. Amazingly, today the situation is virtually reversed. Most of our children's rooms have become their "castle", and parents in most cases either do not know the stuff their children listen to in their rooms and cars, do not care, or are afraid to comment fearing yet another unpleasant confrontation. If you do not believe this, check out the tapes on the front seats of cars in your church or school parking lot, or in your own driveway. In the world today, rock music has become a confession, a way of life. Too many of our own young people make their frequent seven or eight dollar offerings in pursuit of