Mathematics Council
NEWSLETTER
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Mathematics for the Young Child—Not Arithmetic

by Donna M. Wolfinger

Editor's Note: For many years, I have been concerned about what I consider the inappropriate way in which mathematics is taught to young children. The following article, reprinted from the February 1988 issue of the Arithmetic Teacher, addresses the topic very well and should be of particular interest to kindergarten and primary teachers.

For young children, those in preschool through first grade, the world is a stage complete with props and scenery, a world to be manipulated and discovered. But because of the emphasis on standardized curricula and testing, this discovery through manipulation has been seriously curtailed in many mathematics programs for young children. Instruction is focusing on correct answers to computational problems. First graders are frequently taught material once covered in second or third grade, and they learn through paper-and-pencil exercises and memorization--activities that are too abstract for them. Young children are being presented with a mathematics program in which the computations of arithmetic are excluding the conceptualizations of mathematics.

Because the terms "mathematics" and "arithmetic" are so often used interchangeably outside the realm of early childhood education, a distinction between these two aspects of a quantitative program needs to be made. On the one hand, Baratta-Lorton (1976) defines arithmetic as being oriented toward skill development and mastery, requiring the teacher to act as a diagnostician and including such topics as symbol recognition, sums and differences, place value and regrouping. This collection may be viewed as a computation component of the curriculum from a more traditional perspective. Arithmetic may be approached in the early childhood setting through materials and through memorization, but the outcome is the same: a particular answer to a particular problem using a structured approach.

On the other hand, Baratta-Lorton defines mathematics as being oriented toward concept development, as having no pressure for mastery and as allowing the teacher to act as an observer and guide. The mathematics aspect of the curriculum includes exploring materials, patterning, comparing, graphing, sorting and classifying. This collection includes far more than the simple manipulation of materials to determine correct answers to computational problems. Mathematics is concerned with the development of concepts.

Unfortunately, the trend in many early childhood education settings is to include more and more arithmetic. This trend needs to be reversed. A sound program dealing with the quantitative aspect of the school program for young children should emphasize mathematics rather than arithmetic, should develop understanding rather than answers and should generate concepts rather than folders of completed worksheets. Young children should be guided to understand through activity rather than pushed toward computational mastery. Our understanding of the cognitive development of children as described by Piaget, Kamii, Ginsburg, Copeland and others requires that we take this approach.

References

Baratta-Lorton, Mary. Mathematics Their Way. Menlo Park, Calif.: Addison-Wesley Publishing Co., 1976.

Copeland, Richard W. How Children Learn Mathematics. 4th ed. New York: MacMillan Publishing Co., 1984.

Ginsburg, Herbert. Children's Arithmetic: The Learning Process. New York: Van Nostrand Reinhold Co., 1977.

Kamii, Constance. Young Children Reinvent Arithmetic. New York: Teachers' College Press, 1985.

Piaget, Jean. The Child's Conception of Number. New York: W. W. Norton and Co., 1965.

News from MCATA

Two publications were mailed recently to MCATA members. The first, Make It, Take It, is the ninth in MCATA's monograph series. Edited by John Percevault and Bill Bober, this publication will be of interest to all math teachers.

The second publication, Teaching Mathematics in the Early Childhood Classroom, is a joint publication of MCATA and the Early Childhood Education Council. Edited by Gordon Orlick and John Percevault, this publication is intended for primary and elementary teachers.

Congratulations to the editors for doing an excellent job in both cases. Additional copies of these publications can be purchased from the ATA. Make It, Take It sells for $6; Teaching Mathematics, for $5.

The June issue of delta-K will focus on the theme "Language in Mathematics." John Percevault is interested in receiving articles on this topic from members. If you would like to contribute to this issue, please send your article, by May 15, 1988, to John Percevault, 2510 22 Avenue S, Lethbridge, Alberta T1K 1J5.

What's New?

Joan Worth, Alberta Mathematics Educator of the Year in 1985, has edited a book entitled Preparing Elementary School Mathematics Teachers: Readings from the Arithmetic Teacher, intended for elementary teachers. This collection of 48 articles from the Arithmetic Teacher will help prospective teachers and mathematics teacher educators learn from the experiences and thoughts of their colleagues. The selections not only cover broad issues that need to be considered in preparing elementary school mathematics teachers but also specify ideas and activities that can be invaluable for the beginning or preservice teacher. The book, which contains 177 pages, sells for $10.

Kindergarten and primary teachers will find the February 1988 issue of the Arithmetic Teacher particularly beneficial.

Both of these publications are available from the National Council of Teachers of Mathematics (NCTM), 1906 Association Drive, Reston, Virginia 22091. NCTM members receive a 20 percent discount on teaching materials. (An NCTM membership application form was included in the January newsletter.)

Teachers planning a mathematics workshop or inservice and looking for resource people will be interested in Mathematics Council of the ATA: Speakers' List. This list may be obtained by contacting

Dick Kopan
23 Lake Crimson Close SE
Calgary, Alberta T2J 3K8
Phone: 271-5240 (res.)
271-8882 (bus.)

Have you been thinking about . . .

* Nominating someone to be 1988 Mathematics Educator of the Year? A nomination form will be mailed with the next newsletter.

* Attending the NCTM Conference to be held in Chicago, April 6 to 9, 1988? More than 500 sessions will be offered, as well as a variety of relevant displays. An application form is included with this newsletter. Participants wishing to do so may register at the conference.

* Getting ready to participate in the exciting annual MCATA Conference to be held November 3 to 5, 1988, in Edmonton?

* Solving the problem in last month's Newsletter? (John Percevault says the answer is 301. This is, in fact, the first number that is a multiple of seven and leaves a remainder of one when divided by two, three, four, five and six.)

Thoughts of an Outsider

by Alvin Baragar

Editor's Note: Alvin Baragar is MCATA's Mathematics Representative. His paper is of particular interest to mathematics teachers at the secondary level. At the end of his article, Alvin asks for responses. Please send your responses to the editor. They will be published in a future issue of the Newsletter.

I recently attended my first MCATA meeting, bringing with me a thoughtful letter from a distraught Denise Schweitzer of Sedgewick, addressed to the chairman of the University of Alberta Mathematics Department. Why were some of her students who did well on the Diploma Examination having trouble with university mathematics courses, and what could be done to help future students succeed? The current-issues committee discussed the matter. As the new kid on the block, I was then asked to write an article on aspects of high school mathematics curricula, examination techniques and educational attitudes that might warrant reconsideration. Members of the MCATA executive are interested in your reactions to what I have to say, but I want to make it clear that I am not reporting or even reflecting their views.

The Elective Component of Mathematics Courses

Is it reasonable to expect an inexperienced teacher to breathe life into topics that will not be examined on the Diploma Examination--especially when dealing with a group of students, some of whom really do not care? Can an experienced teacher do justice to these topics when pressured to maximize the pass rate on upcoming examinations? Does the knowledge that the Diploma Examination will not test elective material leave students free to daydream and tempt teachers to address topics of more immediate concern? The freedom a teacher has to cover topics outside the body of ideas regarded by the province as of primary importance certainly appears desirable, but does this freedom give some students the opportunity to learn more than others? Two solutions occur to me. The number of approved electives could be reduced to three or four, a number that would make the testing of competence on the Diploma Examination feasible. The other solution is to abolish completely elective topics, thereby leaving room for topics deemed important for university mathematics to be incorporated into the core. Are there other alternatives? In proposing ways of ameliorating the problem with the elective component that has been generated by the Diploma Examination, one must keep in mind that externally set examinations of known structure will always be a de facto determinant of the curriculum.

The Proposed Core High School Program

Having questioned the viability of the elective component of individual courses, let me now try to defend the elective course component of the high school program. A recent proposal is to increase the number of credits allocated to core courses, leading to a reduction in the effective elective component for most Alberta students. I am told that such a proposal will not only pose a particular hardship for students in technical programs but also force academically oriented students to make difficult choices from among music, drama, physics, chemistry, biology and mathematics. The disincentive to select Mathematics

31 will place more pressure on some university-bound students interested in studying science or engineering, further exacerbating the difficulties many of them experience in adapting to an environment significantly less structured than the high school milieu. I believe that the corollary to the extra emphas is on social studies will be a decrease in the understanding and appreciation of science by the youth of Alberta. Is this change in educational priorities in the best interests of a province trying to expand its agrarian and resource-based economy to include manufacturing, which will develop as a result of discoveries and developments in science and technology?

The Gifted and Talented

If elitism is interpreted to mean the adulation of the elite in our society, then elitism certainly has no place in our schools. We cannot deny that bright young people form a part of the intellectual elite of a society, and it is from that group that the teachers, physicians, scientists, artists and legislators, who are expected to be the leaders in our society, should come. We have been well conditioned to accept special programs for the intellectually and/or physically handicapped, but, until recently, we have tended to assume that the regular school program can adequately serve the needs of all intelligent young people. Few people realize that the ability to solve problems quickly and to visualize diverse avenues of thought sets these young people apart from the majority just as handicaps set the disabled apart from the majority. Many bright young people need help in adjusting to their differences, in forming relationships with individuals from the majority and in finding their intellectual peers (not only in the areas that most interest them but in all areas of academic endeavor). Of these needs, the latter is perhaps the most urgent, for such people need friends who understand them and who can provide them with intellectual stimulation almost as surely as they need challenging academic school programs. Until we have a viable program for these students, we must convince them and their fellow students that it is all right to be smart and that the contributions to society of the intellectual elite are as valuable as those of the physically elite. Perhaps graduation ceremonies would be a good place to start! I know of one school that has already adopted this point of view.

Am I just imagining these problems, or are they real? If the problems are real, do they have solutions? Do you see problems that are more important than these? What do you think MCATA should do? Teachers must be very dedicated to sit down on their own time after an exhausting day to organize and put to paper the thoughts that will stir others to action. I am glad that Denise Schweitzer made that effort. Do you have ideas that are worth that much effort?

> When you can measure what you are speaking about and express it in numbers, you know something about it; but when you cannot measure it in numbers, your knowledge is of a meagre and unsatisfactory kind; it may be the beginning of knowledge, but you have scarcely, in your mind, advanced to the stage of science, whatever the matter may be.
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> --Lord Kelvin

MCATA Executive Nominations

It's time to elect a slate of officers for the 1988-89 school term. Attached is a letter from Bob Michie asking for nominations for four elected positions.

In addition to the four elected positions, the MCATA executive comprises several appointed positions, including those of delta-K editor, Mathematics Council Newsletter editor and four directors.

Serving in these positions is an excellent opportunity to learn how a specialist council operates and to make a contribution, which is always welcome. If you are interested in one of these positions, or if you know of someone who would be prepared to serve in one of these positions, please contact

Bob Michie
MCATA Past President
149 Wimbledon Crescent SW
Calgary, Alberta
T3C 3J2

Mathematics is the science of doing necessary things in the easiest way.

--Bertrand Russell

March 1, 1988

Dear Fellow MCATA Member:

Nominations of candidates for the following offices for the 1988-89 school year are now being accepted:

- President
- Vice-President
- Secretary
- Treasurer

If you wish to nominate a candidate, please complete the form below and mail it, by **May 9, 1988,** to Bob Michie, 149 Wimbledon Crescent SW, Calgary Alberta T3C 3J2.

If an election is necessary, it will be conducted by mail. Ballots will be sent to all members on or about May 25, 1988.

Ensure an active council by nominating people who will take an active part in making the Mathematics Council a benefit to all mathematics teachers.

This form may be duplicated if additional nomination forms are required.

Bob Michie
Past President, MCATA

MCATA Executive Nomination Form

WE, the undersigned members of the MCATA, nominate _____
(name)

of _____
(address)

as a candidate for the office of _____ in the MCATA for the year 1988-89.

Signatures and addresses of two nominators:

NAME: _____ ADDRESS: _____

NAME: _____ ADDRESS: _____

(Please include a brief resume of the nominee's qualifications for the position on the reverse side of this sheet.)

I accept this nomination: _____
(signature of nominee)

NATIONAL COUNCIL OF TEACHERS OF MATHEMATICS

66TH ANNUAL MEETING

6–9 April 1988
Chicago, Illinois

INFORMATION FOR NAME BADGE

Name _____

Location

REGISTRATION FEES:

- Individual NCTM/MAA member registration at $45.00 (No. _____ Exp. date _____)
- Registration including NCTM membership or membership renewal:

  With two journal subscriptions:
  (Arithmetic Teacher and *Mathematics Teacher)*
  U.S. addresses—$93.00; Outside U.S.—$100.50

  -OR-

  With one journal subscription (check one):
  ☐ *Arithmetic Teacher* or ☐ *Mathematics Teacher*
  U.S. addresses—$80.00; Outside U.S.—$85.00

- Nonmember registration at $75.00
- Full-time college student registration at $22.50
- Member—one day at $27.00 (Day attending _____)
- Nonmember—one day at $45.00 (Day attending _____)
- Elementary schools with institutional membership including a subscription to the *Arithmetic Teacher*
  (No. _____ Exp. date _____)
  Advance registration only—$45.00 per teacher (no limitation on the number of persons who may register)
- Organizations and institutions with institutional membership including a subscription to the *Arithmetic Teacher* or *Mathematics Teacher* (No. _____ Exp. date _____)
  Advance registration only—$45.00 (restricted to one registrant)

REGISTRATION (Give applicable fee) ..... $ _____

NONTEACHING GUEST Name _____ Location _____ @ $10 ..... $ _____

WORKSHOPS/MINICOURSES (See Announcements)

Indicate below in order of preference the identifying numbers from the program for each workshop or minicourse you wish to attend. Tickets are limited to four per person, only one of which may be for a minicourse.

Workshops/Minicourses

_____ # _____ # _____ # _____ # _____ # _____ # _____

FRIDAY NCTM BANQUET (No. of persons) _____ @ $30 ..... $ _____

TOTAL AMOUNT OF PAYMENT ENCLOSED ..... $ _____

Return this form with check in U.S. funds or credit card information to NCTM, 1906 Association Drive, Reston, VA 22091.

☐ My check is enclosed ☐ MasterCard ☐ VISA Credit Card No. _____

Exp. Date _____ Signature _____

To register by telephone, call (703) 620-9840 with your MasterCard or VISA information.

DO NOT WRITE IN THIS BOX

CK # _____ CHG _____ AMT $ _____ REG $ _____ MEMB $ _____ MISC $ _____ M $ _____

CM # _____ $ _____ REF DATE _____ AMT $ _____ ACCT # _____

Advance registration **MUST BE RECEIVED** by the NCTM no later than 14 March to allow time for processing. Any person requesting a refund must cancel in writing to the NCTM. Fifty percent (50%) of the advance registration fee will be refunded on cancellations received prior to the conference. Cancellations received after 5 April will not be eligible for refunds.

Name _____
(Please print or type)

Mailing Address _____

_____
ZIP/Postal Code

Level: ☐ K–6 ☐ Middle/Jr. High ☐ High School ☐ College ☐ Supervisor ☐ Exhibitor ☐ Other _____