

## Calculator Information Center

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The Calculator Information Center at The Ohio State University has received funding from the National Institute of Education for another year of operation. The NCTM has a subcontract with the Center to aid in the distribution of information about calculator uses in education. *Reference Bulletin No.25*, citing selected references on calculator activities and research at all levels, has been mailed to those on the Center's mailing list. If you would like a copy (and would like your name added to the mailing list to receive future reference bulletins), contact the Calculator Information Center, 1200 Chambers Road, Columbus, Ohio 43212.

Several annotated reference bulletins will be developed this year, and another is scheduled for mailing in January. The Center will also produce three information bulletins (in August, January, and February). Write to the Center or to NCTM for these bulletins, which are designed for readers with specific interests. The first one will contain secondary-level activities.

In early 1981, the Center will prepare an annotated bibliography containing references located since the June

1979 bibliography (available from ERIC/SMEAC at a cost of \$5.50), and a set of critical abstracts of research with calculators. Finally, a state-of-the-art review was to be sent to all on the mailing list in August.

Previous materials produced by the Center are available from the ERIC Document Reproduction Service (Box 190, Arlington, Virginia 22210):

- Reference Bulletins from the Center - ED 167 426
- Information Bulletins from the Center - ED 171 574
- State-of-the-Art Reviews on the Use of Calculators - ED 171 573
- Investigations with Calculators: Abstracts and Critical Analyses of Research - ED 171 572
- Investigations with Calculators: Supplement - ED 171 585

If you want to continue to have your name on the Center's mailing list, you must inform them. If you have not done so, your name was removed from the mailing list as of July 1.

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### **References on Instructional Activities, Research Reports, and Other Topics Related to Calculator Use**

Excerpts from the Calculator Information Center *Reference Bulletin No.25*, May 1980.

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References have been selected from those collected during the past year. They are grouped to aid you in locating materials which you might find particularly useful.

## **Activities for Students, K-12**

Bitter, Gary. "Count on the Calculator!" *Teacher*, 96:67-68ff, February 1979.

Use of calculators for elementary students is recommended, so that they may concentrate on the sense of a problem. Activities on place value, estimation, and operations are suggested.

Dickson, T.R. *The Hand Calculator Handbook*. Aptos, California: Alchemy Press, 1978.

Calculator algorithms for problems ranging from root findings of equations to trigonometry, surveying, navigation and finances are included.

Elich, Joseph, and Carletta Elich. *Trigonometry Using Calculators*. Reading, Massachusetts: Addison-Wesley, 1980.

This book is designed for a one-semester or one-quarter course in trigonometry, with calculator use integrated.

King, Ronald S. "Concurrent Processing with Calculators." *MATYC Journal*, 14: 13-16, Winter 1980.

Two types of problems that could be used to develop the idea of concurrent processing with calculators are presented.

Maor, Eli. "A Summer Course with the TI 57 Programmable Calculator." *Mathematics Teacher*, 73:99-106, February 1980.

A six-week course for students aged 8-11 and 12-15 is outlined, and how some topics were explored is described.

McCarty, George. "Display Calculators Bring a New Dimension to Teaching." *Audio-Visual Instruction*, 24:20-21, September 1979.

A method of using a display calculator for communicating algorithms in classroom mathematics instruction is described.

Shields, Joseph J. "Mini-Calculators and Problem Solving." *School Science and Mathematics*, 80:211-217, March 1980.

How the calculator can facilitate the development of problem-solving skills is discussed.

## **Research Reports, K-6**

Balka, Don S. "A Survey of Parents' Attitudes Toward Calculator Usage in Elementary Schools." South Bend, Indiana: University of Notre Dame, 1979.

Teachers in a workshop sent a 12-item questionnaire to parents and teachers of Grades K-9; 334 responses were received. Parents were skeptical about the use of calculators in elementary grades. They agreed that calculators

could be used for motivation, and along with paper-and-pencil computation, but expressed moderate disagreement with the use of calculators for homework and were very negative about replacing paper-and-pencil computation.

Cohen, Martin P., and Robert F. Fliess. *Mini-Calculators and Instructional Impact: A Teacher Survey*. Pittsburgh: University of Pittsburgh, 1979. ERIC: ED 178 360.

Teacher attitudes, practices, and perceptions about school policies on calculator use were surveyed. Over 63 percent were strongly or mildly in favor of using calculators. The need for instructional materials using calculators was apparent.

Engelmeyer, William James. "The Effectiveness of Hand-Held Calculators for the Remediation of Basic Multiplication Facts." (University of Maryland, 1978.) *Dissertation Abstracts International*, 39A:5381, March 1979.

Three groups of underachieving seventh-graders (n=193) participated. One group received 15 minutes extra of practice on multiplication facts with calculator feedback. A second group had 15 minutes extra group instruction on the facts, while a third group had only "normal" mathematics instruction. No significant difference in achievement was found between the two extra practice groups.

Moser, James M. *The Effect of Calculator Supplemented Instruction Upon the Arithmetic Achievement of Second and Third Graders*. Technical Report No. 502. Madison: Wisconsin Research and Development Center for Individualized Schooling, September 1979. ERIC: ED 180 764.

Four classes in Grades 2 and 3 used calculators with the ongoing instructional program, while four classes did not have access to calculators. Significant differences favored the second-grade calculator group only on subtraction, and third-grade group only on place value and division; no other differences were significant.

Pederson, Dean Anthony. "The Effect of the Calculator on the Elementary Mathematics Student." (University of Northern Colorado, 1978.) *Dissertation Abstracts International*, 39A:4794, February 1979.

Students in Grades 2, 3, and 6 (n=309) were assigned to groups using or not using calculators for eight months. No significant difference in achievement was found.

Roesch, Carl J. "Reflecting the New Computation in Eleventh Year Mathematics." Buffalo: State University of New York at Buffalo, 1978.

This report presents comments and data from a teacher using the Math 11 programmable calculators materials by Rising et al.

### **Miscellaneous Concerns**

Kiehl, Charles F. and Ann B. Harper. "My Child the Math Whiz! Or Buy Your Child a Calculator." *Education*, 100:18-19, Fall 1979.

An overview of advantages and disadvantages of using calculators is provided.

Moursund, David. "It's OK to Use Calculators (A Message to Elementary School Teachers)." *Computing Teacher*, 6:3-5, May 1979.

A clear rationale, encouraging teachers to accept and explore uses of calculators in elementary school classrooms, is presented.

Reiling, Mary J. and Gerald R. Boardman. "The Hand-Held Calculator Is Here: Where Are the Policy Guidelines?" *Elementary School Journal*, 79:293-296, May 1979.

A review of articles on the use of calculators is given, with an emphasis on research conclusions. The need for policy guidelines is discussed, and eight guidelines are suggested.

Werner, Marijane. "The Hand-Held Calculator and Its Impact on Mathematics Curricula." *School Science and Mathematics*, 80:29-36, January 1980.

Suggestions from reports on calculators are presented, including conference recommendations.

### **Post-Secondary Level References**

Berg, Gary A. *Using Calculators for Business Problems*. Chicago: Science Research Associates, 1979.

Biondi, M., V. Midoro, and D. Pescetti. "Use of Programmable Pocket Calculators in Engineering Introductory Courses." *International Journal of Electrical Engineering Education*, 10:128, 1979.

DuRapau, V.J. and John Bernard. "From Games to Mathematical Concepts via the Hand-Held Programmable Calculator." *International Journal of Mathematical Education in Science and Technology*, 10:417-424, July-September 1979.

Three games involving functions and proof are presented, with the aim of stimulating creative thinking.

Hector, Judith H. *Using a Calculator to Teach Fraction Computation in Basic Arithmetic: Research and Observations*. Knoxville, Tennessee, June 1979. ERIC: ED 171 520.

Learning calculator-based algorithms produced no difference in computational skill, understanding, attitudes or length of time to learn when compared with conventional algorithms.

Koop, Janice B. "Calculators and the Community College Arithmetic Class." *MATYC Journal*, 14:113-120, Spring 1980.

The aims of remedial arithmetic courses for community college students are considered, with reasons for using calculators in such a course given.

McCarty, George. "Calculator-Demonstrated Math Instruction." *Two-Year College Journal*, 11:42-48, January 1980.

A demonstration for a calculus class on Newton's method is described, with general principles for planning demonstrations noted.