References to Calculator Uses in Education. Reference Bulletins Nos. 29 and 30.

Ohio State Univ., Columbus. Calculator Information Center.

National Inst. of Education (ED), Washington, DC.

7p.; For related documents, see ED 167 426, ED 206 452

Reference Materials - Bibliographies (131)

Annotated Bibliographies; Calculators; Educational Research; Elementary Secondary Education; Higher Education; Instruction; Literature Reviews; Mathematics Curriculum; Mathematics Education; Mathematics Instruction; Postsecondary Education; Reference Materials

These two bulletins list references on the uses of calculators in education. They were published in April and October 1982 to provide teachers and other interested persons with sources of information about calculator activities and research findings. Sections list references on activities for students, K-12; research reports, K-12; miscellaneous, K-12; and references at the college and other post-secondary levels. Most references are annotated. (MNS)
REFERENCES TO CALCULATOR USES IN EDUCATION

References were selected from those collected since Bulletin No. 28 was compiled in August 1981. They are grouped by type and by level.

ACTIVITIES FOR STUDENTS, K-12

Adkins, Bryce E. Using a Calculator to Find the "Greatest Common Factor". *School Science and Mathematics* 81: 603-606; November 1981.

Bestgen, Barbara J. Calculators - Taking the First Step. *Arithmetic Teacher* 29: 34-37; September 1981. This step-by-step plan for introducing calculators in grades 1 through 6 includes a sequence of activities.

Bitter, Gary. Five, Six Math is Kicks When You Seven, Eight CALCULATE! *Instructor* 91: 130-133; September 1981. A step-by-step guide to teach elementary children how to use a calculator is presented.

Duea, Joan and Ockenga, Earl. Classroom Problem Solving with Calculators. *Arithmetic Teacher* 29: 50-51; February 1982. Students are encouraged to write their own problems to be solved with a calculator.


Hartman, Janet. Approximating Logarithms Intuitively. *Mathematics Teacher* 74: 276-277; April 1981. A process for developing the approximate values of the logarithms for 2 through 9 is presented; these values are compared with calculator-generated logarithms.


Miller, Goeffery. Working Backwards to Achieve Understanding. *Arithmetic Teacher* 29: 48; September 1981. Fifth- and sixth-graders worked through calculations on their calculators until they arrived at a word answer; then they learned to design similar problems.


Prigge, Glenn R.; Gawronski, Jane D.; and Vos, Kenneth E. *Using the Calculator in Geometry*. Portland, ME: Walch, 1981. This set of 50 visual masters illustrates more than 25 geometry topics.


Wiebe, James H. *Using a Calculator to Develop Mathematical Understanding*. Arithmetic Teacher 29: 36-38; November 1981. Using four-function calculators to develop understanding of square roots and basic operations on whole and rational numbers is described.


Writt, Elinor J. *Mr. Manning's Money*. Arithmetic Teacher 29: 47; September 1981. A problem demonstrating the usefulness of a calculator is given, with answers at two levels of difficulty.

**RESEARCH REPORTS, K-12**

Albina, Melvis Ann. *The Effects of Using Two Types of Calculating Devices on the Computational Skills of Selected Third and Fourth Grade Students*. (University of Akron, 1981.) Dissertation Abstracts International 42A: 1038; September 1981. Twenty-seven learning-disabled students in grades 3 and 4 were randomly assigned to one of three experimental groups: using four-function calculators, using preprogrammed feedback "calculators", or control. The two calculator groups used calculators 20 minutes a day for 20 days to practice basic facts. Performance of those using four-function calculators was significantly better than that of the other two groups.

Behr, Merlyn J. and Wheeler, Margarite Montague. *The Calculator for Concept Formation: A Clinical Status Study*. Journal for Research in Mathematics Education 12: 323-338; November 1981. Children in kindergarten and grade 1 (n = 30) used successive punches on a calculator as a means for counting. Each child was given 16 tasks in two individually taped interviews. They could maintain a one-to-one correspondence between punches and objects and could model counting strategies known to be used to process addition and subtraction facts.

Connor, Philip J. *A Calculator Dependent Trigonometry Program and Its Effect on Achievement in and Attitude Toward Mathematics of Eleventh and Twelfth Grade College Bound Students*. (Temple University, 1981.) Dissertation Abstracts International 42A: 2545-2546; December 1981. A trigonometry course was developed which was dependent on the use of a calculator. A comparison of two calculator and two noncalculator trigonometry classes indicated no significant difference between groups in achievement and no significant change in attitude toward mathematics. However, achievement on supplementary topics by the calculator group was significantly better.

one form of a mathematics assessment instrument. Control students did not have access to calculators. One experimental group was issued calculators for the test and the other was allowed to bring and use calculators if desired. On only 8 of the 42 test items could calculators be used to advantage. The use or nonuse of a calculator did not make any difference in the final score.

Murphy, Nancy K. The Effects of a Calculator Treatment on Achievement and Attitude Toward Problem Solving in Seventh Grade Mathematics. (University of Denver, 1981.) Dissertation Abstracts International 42A: 2008-2009; November 1981. Students (n = 162) were divided into calculator or noncalculator groups for 6 weeks of problem-solving study. At the end of the experiment, both experimental and control groups were divided into calculator or pencil-paper posttest groups. The students who were provided with unrestricted use of calculators achieved higher in problem-solving posttest scores and also in several specific components of problem-solving skills. The treatment did not significantly affect student attitudes.


MISCELLANEOUS, K-12

Gourdouze, Robbyn. Keeping Calculators Ready. Mathematics Teacher 74: 529-531; October 1981. Instructions are given for constructing a calculator bin storage rack.


Weaver, J. F. On Design Differences of Some RPN Calculators. MATYC Journal 15: 190-193; Fall '81. Two designs of RPN calculators are compared: in one, the contents of the T register are always retained; in the other, the contents are lost whenever the problem involves a stack of more than three levels.

REFERENCES AT THE COLLEGE AND OTHER POST-SECONDARY LEVELS

Chirpich, Thomas P. Analysis of Student Laboratory Data - An Illustration of the Usefulness of an Inexpensive Programmable Pocket Calculator. Journal of Chemical Education 58: 436-437; May 1981. A programmable calculator is used to perform calculations in experiments on freezing point depression data.


Hector, Judith H. and Frandsen, Henry. Calculator Algorithms for Fractions with Community College Students. Journal for Research in Mathematics Education 12: 349-355; November 1981. No significant differences were found in the scores of groups using conventional algorithms, the algorithms plus calculators, or only calculators (converting to decimals).


Koop, Janice D. Calculator Use in the Community College Arithmetic Course. Journal for Research in Mathematics Education 13: 50-60; January 1982. No significant differences were found between groups using or not using calculators for instruction.


This bulletin was prepared by Marilyn N. Suydam, with the aid of Marsha Mueller and Kathryn McCulloch.

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REFERENCES TO CALCULATOR USES IN EDUCATION

References were selected from those collected since Bulletin No. 29 was compiled in April 1982. They are grouped by type and by level.

ACTIVITIES FOR STUDENTS, K-12


Olson, Melfried and Sindt, Vincent G. Examining Rates of Inflation and Consumption. Mathematics Teacher 75: 472-473; September 1982. Calculators are used to complete tables for three worksheets illustrating concepts.

Seber, Robert E. Systems of Linear Equations with Mini-calculators or Computers. School Science and Mathematics 81: 512-516; October 1981. A successive approximation method is presented, with curricular implications noted.
Sigg, Paul O. The Hand Held Calculator: Effects on Mathematical Abilities and Implications for Curriculum Change. South Bend, Indiana University at South Bend, June 1982. ERIC: SE 038 272. Over 20 studies are abstracted and summarized in this review.

Turinese, David M. A Use of the Hand Calculator in the Second Year Algebra Curriculum. (Boston University, 1982.) Dissertation Abstracts International 43A: 102, July 1982. Calculator materials were more effective for achieving a basic level of understanding than was a textbook approach, but only equally effective for achieving a higher level of understanding.


REFERENCES AT THE COLLEGE AND OTHER POST-SECONDARY LEVELS


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