An annual annotated listing of research on mathematics education is presented. The research is organized alphabetically by author(s) within three categories (research summaries, journal-published reports, and dissertation abstracts). Grade and age levels are indicated for each reference. An index of general topics is appended to help readers locate studies of particular interest. Included in the listing are studies in which mathematics education was not the sole or primary focus of the research. While most of these peripheral studies are not annotated, those studies specific to mathematics are annotated, and most annotations indicate one principal finding of the study. (MK)
The Journal of Research in Mathematics Education is devoted to the interests of teachers of mathematics and mathematics education at all levels—elementary school through college.

Each manuscript submitted to the Journal should be prepared in accordance with the guidelines detailed in the Publication Manual of the American Psychological Association. Use a typewriter and keep all text and margins as specified in the Publication Manual.

All manuscripts and editorial correspondence should be sent to:

James W. Wilson, Editor, JRME
105 Adelphi Hall
University of Georgia
Athens, GA 30602

All other correspondence should be addressed to the National Council of Teachers of Mathematics, 1906 Association Drive, Reston, VA 22091.

RESTON HEADQUARTERS STAFF
CHARLES R. HUCKA, Director of Publication Services
JOAN R. COOPER, Production Editor
KAREN AIKEN, Editorial Assistant
ROWENA G. MARTEUNO, Advertising Manager
JAMES R. TEWELL, Circulation Manager

The Journal of Research in Mathematics Education (ISSN 0021-1078) is published six times a year, November, January, March, May, and July, at 1906 Association Drive, Reston, Virginia 22091 by the National Council of Teachers of Mathematics. The subscription price for individual members of the National Council of Teachers of Mathematics is $48.00; the subscription price for all others is $110.00; single copies are $2.00, and $10.00 for mailing outside the United States (1 US currency equivalent). Second-class postage paid at Reston, Virginia, and additional mailing offices. POSTMASTER: Send address changes to the Journal of Research in Mathematics Education, 1906 Association Drive, Reston, VA 22091

Copyright © 1975 The National Council of Teachers of Mathematics, Inc. Printed in the USA.
This ninth annual listing of research on mathematics education published in *JRME* uses the same format as was used last year. The research is organized alphabetically by author(s) within three categories (research summaries, journal-published reports, and dissertation abstracts), with grade or age indicated for each reference. An index of general topics is appended to help readers locate studies of particular interest. Journals searched are also listed.

Included in the listing are studies in which mathematics education was not the sole or primary focus of the research. Most of these peripheral studies are not annotated, but studies specific to mathematics education are annotated, as in previous years.

Most annotations indicate one principal finding of the study, although there may be other findings of interest to individual readers. Again we caution that there is no substitute for careful reading of the complete research report. Readers are urged to check the original report for other results of a study as well as for information that will aid them in assessing the validity of the findings.

Despite the fact that we search journals page by page and use indexes (such as *Current Index to Journals in Education*) to locate articles in journals in which mathematics research reports appear irregularly or in journals to which we have no access, we fail to locate some references until after the listing for a given year is in print. Thus, some reports for 1977 have come to our attention, including the following:


Additional reports (often “peripheral” by our earlier definition) are also listed in Psychological Abstracts, which cites references approximately a year after they have been published. Some readers will want to search that journal directly.

Because of time (ours) and space (JRME’s) constraints, no attempt has been made to provide a continuous updating within the annual listing. At intervals, however, the ERIC Clearinghouse for Science, Mathematics, and Environmental Education publishes a compilation of research references* that contains those listed in JRME plus additional references (including ERIC documents).

We try to produce a listing that will aid readers; it is printed as soon as possible after the year to which it applies. We hope we succeed in helping someone save some time.

Research Summaries

One listing of research reports and 14 articles summarizing or discussing research findings were located.

Burton, Grace M. Mathematical Ability—Is It a Masculine Trait? School Science and Mathematics 78: 566-574; November 1978. Studies on sex differences in mathematical ability are discussed.


Clements, Sam D. and Barnes, Stephen M. The Three Rs and Central Processing Training. Academic Therapy 13: 535-547; May 1978. Theories and principles underlying central processing training for children with specific learning disabilities and minimal brain dysfunction are reviewed.


Studies conducted between 1917 and 1973 in which the introspective-retrospective technique of data gathering was used in determining mental processes are reviewed.


Studies on measurement ideas associated with the count of a collection and the length of an object are reviewed.


Several studies on the effect of calculator use are presented, along with references citing opinions.


Some research results on male-female differences in mathematics achievement and attitude are discussed.


This eighth annual annotated listing includes six research summaries, 176 journal-published reports, and 343 dissertations for kindergarten through post-secondary levels. An index cites articles by focus.


Evidence is presented for the theory that the two brain hemispheres process stimuli differently.

**Dissertation Awards**

The first annual NCTM Dissertation Awards will be given at the 1980 Annual Meeting in Seattle. Applications to be considered in the competition (for dissertations completed between 1 July 1978 and 30 June 1979) must be submitted to the Research Advisory Committee by 1 September 1979. For more information contact Elizabeth Fennema, RAC Chair, 225 N. Mills, Madison, WI 53706.
This section contains 215 articles. The list of journals searched and the number of articles from each source may be found at the end of the total listing.


A significant positive relationship was found between developmental levels and performance on equation solving when different reversible processes were applied. (elementary preservice)


A significant number of students did not use correlational reasoning on the tasks. (grades 9-12)

Alderman, Donald L. Tree Searching and Student Problem Solving. *Journal of Educational Psychology* 70: 209-217; April 1978.

The number of "problem reductions" performed in "tree searching" accounted for most of the variance across examples in error rate and time to solution. (elementary)

Aleamoni, Lawrence M. and Oboler, Linda. ACT Versus SAT Predicting First Semester GPA. *Educational and Psychological Measurement* 38: 393-399; Summer 1978. [college]


Significant effects did not occur for the poor problem solvers as a result of extensive training. (grade 5)


Expected differences for age and type of logic content were not found. (ages 11-16, EMRs)

Disadvantaged Israeli students scored as well as advantaged students on a cryptarithmetic test following instruction on relevant problem-solving strategies. (grade 7)


The effects of both grade level and distraction setting on problem-solving performance were highly significant; children who used a manipulative approach were more prone to distraction than those using a verbal approach. (grades 1-3)


No significant differences were found between groups using or not using manipulative aids on tests requiring responses in representational or manipulative modes. Significant differences favored the "hands-on" group on a mathematics concepts test. (elementary preservice)


The group taught to count by tens did better than those who counted in the ordinary way. Poorest results came from the group who did not count past ten, but grouped objects into tens and ones. (grade K)

Becker, Jerry P. and Young, Courtney D., Jr. Designing Instructional Methods in Mathematics to Accommodate Different Patterns of Aptitude. *Journal for Research in Mathematics Education* 9: 4-19; January 1978.

No significant interaction was found between instruction and aptitude variables, but four disordinal interactions were found. (grade 8)


Data from tests given in 1950, 1965, and 1975 are discussed. (grade 9)

The scales were found to discriminate between subjects according to their cognitive preference. (elementary pre- and in-service, college)


Data on courses were compiled, with information on problems and improvements from use of "modern" mathematics. (secondary)


Use of the token system resulted in increased rate of gain on reading and mathematics tests. (grades K-6)

Bohannon, Tom and Smith, W. B. Student Placement Utilizing Incomplete Data Records. Educational and Psychological Measurement 38: 45-52; Spring 1978. [college]


Words of seven or more letters had a relatively low replacement rate, while words of one to two letters had a high rate. (elementary preservice)


Bridgeman, Brent and Shipman, Virginia C. Preschool Measures of Self-Esteem and Achievement Motivation as Predictors of Third-Grade Achievement. *Journal of Educational Psychology* 70: 17-28; February 1978. [grades K-3]


A 75-item mathematics test was developed in which certain key blocks predicted passing (or failing) other easier (harder) blocks in the hierarchy. (community college)


Three contingency systems each increased performance in subtraction and on-task behavior. (grades 4, 5)


The model is described, with examples of how it helps in diagnosing misconceptions. Data from the computer-based system for Nicaraguan students is given. (grades 4-6)


Children were "very competent" at the tasks though they often did not use numbers. (nursery school, grade K)


The scale distinguished between students with different majors; scores correlated highly with such measures as dislike and anxiety about mathematics. (college)


A post-organizer had a significant facilitating effect on immediate free-recall, but not on immediate content recognition or delayed free-recall in a statistics course. (college)

Neither drawing style nor number of pictures had a significant effect on either story response scores or number sentence response scores. (grade 1)

Carter, Donald E.; Spero, A. June; and Walsh, James A. A Comparison of the Visual Aural Digit Span and the Bender Gestalt as Discriminators of Low Achievement in the Primary Grades. *Psychology in the Schools* 15: 194-198; April 1978. [ages 6-8]


Girls did better on female-oriented problems, while boys did better on male-oriented problems. (grade 1)


No overall difference was found between children taught by Dienes or Fletcher schemes, but those taught by the Dienes method formed real-life concepts more successfully. (ages 8-11)

Cohen, Herbert G. The Scaling of Six Topological Piagetian Groupings, As Well As the Effect that Certain Selected Variables Have on the Attainment of These Groupings and Some of Their Homologs in the Logical Domain. *Journal of Research in Science Teaching* 15: 115-125; March 1978. [grades K-2]


No evidence was found that it would be possible to predict at which type (context) of problem a student would be most successful if prior knowledge of interests were available. (grade 8)

Cohn-Jones, L. and Seim, R. Perceptual and Intellectual Factors Affecting Number Concept Development in Retarded and Nonretarded Children. *American Journal of Mental Deficiency* 83: 9-15; July 1978. [grade 1]


Responses from a survey of lay and business publics and mathematics educators indicated skills considered essential. (--)

Use of the calculator improved students' arithmetic performance significantly, with less-able students showing proportionally about twice the improvement of the more able. (secondary, college)


The analysis "suggests that teachers' expectations caused children's performance [on reading and mathematics measures] to an extent appreciably exceeding that to which performance influenced expectations". (ages 7-10)


This monograph presents a theoretical framework for investigating the thought processes that are involved when students begin the study of algebra, and presents anecdotal evidence and interview protocols gathered over a period of several years. (secondary)


Duby, Paul B. and Giltrow, David R. Predicting Student Withdrawals in Open Learning Courses. *Educational Technology* 18: 43-47; February 1978. [college]


Percentage of correct responses increase with age; comments on types of items are given. (grades 2, 3, 7, 8, 12, preservice teachers)

A significant interaction was found between aptitudes and treatment (geometric or algebraic). (elementary preservice)


Essen, Juliet; Fogelman, Ken; and Ghodsian, Mayer. Long-Term Changes in the School Attainment of a National Sample of Children. Educational Research 20: 143-151; February 1978. [ages 7-16]


Students using calculators were faster and more accurate. (age 8)

Fabre, Ted; McManis, Donald L.; and Stanton, Gary. Stability of Direct and Transfer Effects of Number-Conservation Training with Mentally Retarded Adults. American Journal of Mental Deficiency 83: 69-73; July 1978. [adults (MRs)]


Significant sex-related differences found on high school level were not found for the middle school students in this study. (grades 6-8)


Fitzpatrick, Jody L. Academic Underachievement, Other-Direction, and Attitudes Toward Women's Roles in Bright Adolescent Females. Journal of Educational Psychology 70: 645-650; August 1978. [grade 10]

Questions regarding the type of teacher input and its effect on immediate and delayed performance in student problem solving are examined. (secondary)


"There was no reason to conclude that either strategy was superior to the other." (elementary preservice)


Forman, Susan G. and McKinney, James D. Creativity and Achievement of Second Graders in Open and Traditional Classrooms. Journal of Educational Psychology 70: 101-107; February 1978. [grade 2]

Fowler, Patrick C. and Richards, Herbert C. Father Absence, Educational Preparedness, and Academic Achievement: A Test of the Confluence Model. Journal of Educational Psychology 70: 595-601; August 1978. [grade K]


Teachers' opinions of the materials were generally favorable, but about a third stated they would not actually use the materials in their own teaching. (secondary teachers)


Data on types of courses, teaching techniques, and topics are included in this report of a survey. (two-year colleges)


The majority of teachers in the Ohio sample felt that metrication will be beneficial, although few felt qualified to teach it. (elementary in-service)


Pretraining improved Arithmetic Reasoning Test reliability for Chicano students but not for non-Chicano students. Pretraining had no effect on Missing Words Test reliability, but did improve predictive power. (grade 7)


Planned exposure to a greater number of stimuli has a positive effect on achievement. (ages 7-9)


Children at three conservation levels performed best under a concrete-plus-verbal-prompt condition. Differences when one number was less than the other were noted. (grade K)


Children used five different tactics and 12 different strategies in making 12 comparisons of "more" or "same number". (grades K-2)


Courses and other requirements of industries employing college graduates are listed. (college)


July 1979 253
Experimental and control groups did not differ significantly in achievement, nor was a correlation found with the learning of logic. (grade 5)


The development of a 32-item test is described; reliability was .79. (grade 5)


Harnqvist, Kjell. Primary Mental Abilities at Collective and Individual Levels. Journal of Educational Psychology 70: 706-716; October 1978. [grades 4-9]


It was concluded that doubling ability is no indicator of the ability to tackle other ratio questions. The addition strategy is fairly consistent on harder questions. (secondary)


The technique was found appropriate to test for a conceptually homogeneous item population, using an algebra test as the trial instrument. (secondary in-service)


Correlations between general creativity scores and mathematical creativity scores were found to be near zero. (ages 14, 15)


During geometry instruction, scores on the Activities Checklist correlated .587 with time-on-task obtained by direct observation and .483 assessed by stimulated recall. Correlations with aptitude, achievement, and attitude were noted. (grade 10)

Hendrickson, Dean and Virant, Milt. A Study of Needs for Further Learning as Seen by Teachers of Secondary School Mathematics. School Science and Mathematics 78: 655-664; December 1978. The needs of teachers in Minnesota were studied using a rating scale. (secondary)

Henry, Loren L. and Rowsey, Robert E. Comparative Study of the Knowledge of Metric Units of Measure and Their Application. *Science Education* 62: 283-289; July-September 1978. Students could perform paper-pencil computation with metric units without being able to apply them. (secondary preservice)

Hiebert, James and Tonnessen, Lowell H. Development of the Fraction Concept in Two Physical Contexts: An Exploratory Investigation. *Journal for Research in Mathematics Education* 9: 374-378; November 1978. Six of nine children were immediately successful in the set/subset task, but only two children succeeded in both length and area tasks. (ages 5-8)

Hitstein, James J.; Lamb, Charles E.; and Osborne, Alan. Student Misconceptions About Area Measure. *Arithmetic Teacher* 25: 10-16; March 1978. Five common types of misconceptions related to area were identified from interviews with children. (grades 3-6)


Houtz, John C. and Speedie, Stuart M. Processes Underlying Divergent Thinking and Problem Solving. *Journal of Educational Psychology* 70: 848-854; October 1978. [grade 5]


Instruction focused on fluid ability may be most beneficial for lower ability students learning a set rule; a focus on crystalized ability may be better for higher ability students. (grade 6)


Two assessment procedures (Four Card problem tasks and a paper-pencil instrument) were found to lack concurrent validity. (grades 8, 10, 12)


Few institutions had a course on applications in teacher training programs. (secondary preservice)


Cooperative learning promoted more positive attitudes toward heterogeneity among peers and toward the teacher, fellow cooperators, and conflict; higher self-esteem; more internal locus of control; and higher daily achievement. However, achievement differences favored the individualistic students after a two-month interval. (grades 5, 6)


A majority of students lacking mathematical sophistication will assign an exclusive meaning to the ambiguous connective. (elementary preservice)


Analyses of how students make errors are presented through records of observations and questioning of students. (secondary, adults)

Significant changes in performance levels and quality on six tasks involving operator representations of fractions appeared between ages 11 and 12 and particularly between ages 12 and 13. (ages 8-14)


Girls' ratings for mathematics ability appear to be uniform and relatively high, while boys generally rate girls' ability lower. (grades 5, 6)


The materials were considered educationally valuable; the play was considered more valuable than the article. Students "underwent significant changes in affective and cognitive outcomes" when using the play. (grade 9, secondary teachers)


Mastery ages for 153 skills/concepts required by entering first graders were ascertained. (ages 3-6)


Competencies expected by kindergarten teachers in Kansas are cited, with percentage of agreement. (teachers in kindergarten)


Instruction of three children for a 10-week period resulted in substantial gains in achievement on a standardized test. (ages 7-9)


Mathematics scores were highest for children in the non-open program. (grade 3)


Many students felt that a good mathematics teacher is one who takes into account a student's learning difficulties; other points are also noted. (secondary)


No difference in ability to make inferences was found between groups given numeric or comparative questions. Meaningful stories resulted in better performance. (college)


Data from a minimum competency test are presented; with additional instruction, scores improved from freshman to sophomore years. (secondary)


Field-independent students did better with minimum guidance, while field-dependent students excelled with maximum guidance. (elementary preservice)


Two standardized tests were analyzed to ascertain the proportion of coverage of various content. (grades 3-9)


Six factors were identified: verbal, two induction, numerical, perceptual speed, and general mathematics. (grade 4)


Performance of females was consistent with the differential rewarding hypotheses, whereas that of males was consistent with an alternative spontaneous competition hypothesis. (college)


Miller, Ted L. and Sabatino, David A. An Evaluation of the Teacher Consultant Model as an Approach to Mainstreaming. *Exceptional Children* 45: 86-91; October 1978. [elementary]


Moors, Fran and Harris, Jerry. Instruction in Basic Concepts and First-Grade Achievement. *Psychology in the Schools* 15: 84-86; January 1978. [grade 1]


Both sexes generally gave higher ratings to the boy who did well in mathematics and the girl who did well in reading. (grades 5, 6)


Anxiety scores were found to be higher for psychology students than for mathematics students. (college)


260) *Journal for Research in Mathematics Education*
Results confirmed that mathematical and cognitive structures are not always in total accord. (ages 4-8)


Oakland, Thomas. Predictive Validity of Readiness Tests for Middle and Lower Socioeconomic Status Anglo, Black, and Mexican American Children. Journal of Educational Psychology 70: 574-582; August 1978. [grades 1, 2, 4]

Packer, Janis and Bain, John D. Cognitive Style and Teacher-Student Compatibility. Journal of Educational Psychology 70: 864-871; October 1978. [college]


A summary of students' perceptions of mathematics instruction is presented. (secondary)


General results from a survey of teachers and leadership personnel are given. (in-service teachers)

Palmer, John; Carliner, Geoffrey; and Romer, Thomas. Leniency, Learning, and Evaluations. Journal of Educational Psychology 70: 855-863; October 1978. [college]


A significant interaction was found for prior mathematics preparation and level of support. (college)


Many tests were found to be low in common types of validity and reliability. (grades 9-12)

In nearly every comparison, mean scores of the 1975-77 group were significantly higher than the mean scores of the 1967-69 group. (elementary pre- and in-service)


A procedure for defining the interrelationship between instructional intentions and test characteristics is described, supported by analysis from mathematics tests. (grades 3-5)


Significant differences favored the treatment in which students used activities with geometric solids over paper-pencil and two-dimensional treatments. (grade 3)


Reanalysis of IEA data indicated that the between-teacher-within-school variance was considerably greater for achievement than for socioeconomic status. (grade 12)


No correlation between performance and text understanding was found for students learning mathematics in a native or non-native language. (college)


Rennert, John W.; Sutherland, Joan; Grant, Roalie; and Lawon, Anton E. Displacement Volume, An Indicator of Early Formal Thought; Developing a Paper-and-Pencil Test. *School Science and Mathematics* 78: 297-303; April 1978. [grades 7-12]

NAEP data on probability items are reviewed, indicating low performance at all levels. (ages 13, 17, adults)


No significant differences were found between normal and retarded pupils on five of six subscales. (grade 1)


In reading and mathematics, children were able to maintain, with supplemental instruction, a rate of academic gain during the mainstreamed year similar to that acquired during their enrollment in a special LD program. (ages 8-12)


Mathematics achievement was significantly related to self-concept, whether or not relative within-classroom achievement standing was considered. (ages 6-12)


Satisfaction and perceived achievement were found to be greater on becoming the tutor rather than the tutee for mathematics, particularly if one was initially the more competent partner. (grades 6, 8)


Both groups understood metric relationships reasonably well, but neither could apply the relationships in everyday situations. (elementary preservice)


Ruhland, David; Gold, Martin; and Feld, Sheila. Role Problems and the Relationship of Achievement Motivation to Scholastic Performance. *Journal of Educational Psychology* 70: 950-959; December 1978. [grades 2, 5]


'Equivalency by collinear correspondence was significantly more difficult than number conservation. (grades K-2)


The development of the Stanford Mental Arithmetic Test is described; reliabilities for the total test range from .80 to .90. (grades 1-6)


Mathematical concepts and laws comprehension account for 67 per cent of the variance in the ability of students to derive a formula for solutions of one unknown variable. This derivation, plus mathematical ability, account for 89 per cent of the variance in verbal computational problem-solving ability. (grade 11)


Correlations between modalities and mathematics achievement were significant, with "striking" variation over IQ levels. (grade 4)

Exploratory activities with small groups of children indicated some content with which calculators might be used and the motivational effect of calculators. (ages 5-7)


The measure of mathematics-specific anxiety differentiated the under-achievers from average and over-achievers more strongly than measures of general and test anxiety. (ages 11, 12)


Students pursuing a mathematics degree had some perceptions that differed from those of other students in mathematics classes. (college)


Increases with age were observed in the organization of children's counting sequences. The row or column arrangement did not affect strategy choice, but increasing the number of items caused some children to revert to a less organized count. (ages 3-6)


Higher teacher scores were associated with significantly higher levels of student mathematics and vocabulary achievement except when teacher race was controlled. (teachers in grade 1)


For the data from a college-entrance examination in mathematics, the model was not adequate. (college)


The frequency of vagueness terms negatively influences achievement. (college)


Results from the Johns Hopkins' Study of Mathematically Precocious Youth are reported. (grades 7, 8)

Steinbauer, Erika and Heller, Marc S. The Boehm Test of Basic Concepts as a Predictor of Academic Achievement in Grades 2 and 3. *Psychology in the Schools* 15: 357-360. July 1978. [grades 2, 3]


Data on the institutions offering courses for elementary teachers are presented; many mathematics departments provide no courses for these teachers. (elementary teachers)


The use of thinking strategies to facilitate the learning of basic facts was supported. (grades 2, 4)

Trent, John H. Need for In-Service and Pre-Service Metric Education. *School Science and Mathematics* 78: 45-52; January 1978.

Teachers had little knowledge of the metric system, but were interested in metric education. (elementary and secondary teachers)


The SAT-M was the best predictor, followed by high school rank, high school mathematics grades, and IQ. (college)


Findings from two studies on the interaction of teaching method and pupil personality are discussed along with comments about the need to plan for individual needs. (ages 10, 12)


Students who have completed a content and a methods course have more informal beliefs about mathematics and how it should be taught than students beginning the content course. (elementary preservice)


Most preservice teachers preferred to use partition rather than measurement division word problems. (elementary preservice)

Walkerdine, Valerie and Corran, G. Cognitive Development and Educational Practice: Pupil Progress in Primary School Mathematics.
Walsh, Desmond M. and Walsh, Michael D. Relationship Between Extra-version and Neuroticism, and Intelligence for Students in Grade Nine English and Mathematics. Psychological Reports 43: 15-19; August 1978. [grade 9]


The Direct method was faster than the look-for-tens method, although they were equally accurate. (grades 4, 7)


Wood, Dorothy F. Can We Require Students to Learn? Mathematics Teacher 71: 135-139; February 1978.

Data from a minimum competency test are presented. (secondary)


Some disagreement was found in opinions on when and how calculators should be used. (teachers (K-9), parents)
This final section of the listing contains 343 dissertations.


Sundry findings on characteristics of learning centers were summarized. (community college)


Adair, James Hartley. An Attitude and Achievement Comparison Between Kindergarten and First Grade Children in Multi and Single Grade Classes. (Boston College, 1978.) DAI 39A: 659-660; August 1978. [7813768] [grades K, 1]

Adams, Dennis Ray. The Effect of Supplementary Geometry Units on Mathematical Attitudes and Achievement of Eighth-Grade Students. (The University of Alabama, 1977.) DAI 39A: 2109-2110; October 1978. [7818845]

The geometry units were ineffective in producing achievement or attitude changes. (grade 8)

Adrian, Marian M. The Relationship of Self-Concept of Ability Science and Mathematics Achievement and the Operative Comprehension of Reading Content. (State University of New York at Buffalo, 1977.) DAI 39A: 764; August 1978. [7813976]

A positive relationship was found between reading and mathematics achievement and between general self-concept and self-concept in mathematics. (grades 9-11)

Aiello, JoAnn. Eighth Grade Students as Teachers of Adults: In Metric Workshops. (Brigham Young University, 1978.) DAI 39A: 3351; December 1978. [7823423]

No significant difference in metric achievement was found between adults taught by students or teachers. (grade 8)

Alderman, Donald Lewis. Artificial Intelligence and Educational Psychology: A Probabilistic Computing Model for Well-Defined Problems. (The University of Connecticut, 1977.) DAI 38A: 4670; February 1978. [7731051]

Computer process measures were significant predictors of students' performance on addition tasks. (elementary)

Success in algebra appeared to be more related to fluency in the use of imagery than the use of the Insightful-Symbolic Mode. Lack of success appeared to involve use of the Mechanical-Symbolic Mode and inadequate imagery. (grade 9)


School-aged children used formal symbols for cardinality and relative quantity, but preferred informal (pictorial) representations. (ages 3-6)

Allen, Harvey Rorbach, Jr. The Use of Cuisenaire Rods to Improve Basic Skills (Addition-Subtraction) in Seventh Grade. (Rutgers University The State University of New Jersey (New Brunswick), 1978.) DAI 39A: 2799; November 1978. [7820308]

Students using rods improved in addition and subtraction skills significantly more than students not using rods. (grade 7)


Children in the program showed a significant gain in attainment of mathematics objectives. (grade K)

Anastasi, Robert Edward. A Kindergarten Curriculum Model Built on the Perceptions of First-Grade Teachers in Randomly Selected Schools in Mississippi. (University of Southern Mississippi, 1978.) DAI 39A: 2044; October 1978. [7818950] [grades K-1]

Andersen, Edwin Dean. An Evaluation of a Teacher In-Service Program on Computer-Extended Mathematics, Grades 7-12. (University of Minnesota, 1977.) DAI 38A: 5970-5971; April 1978. [7802626]

Teachers in the institute implemented more computer activities; their students scored higher on a problem solving abilities test. (teachers in grades 7-12)

High verbal students performed significantly better than low verbal students. Advance organizers and symbolic definitions were also studied. (college)

Anthony, Carl Preston. An Experimental Study of the Effects of Different Amounts of Homework upon Student Achievement in Algebra I, Algebra II, and Algebra III. (Rutgers University The State University of New Jersey (New Brunswick), 1977.) DAI 38A: 4000; January 1978. [77-27,926]

Going over each homework problem in class was superior to going through similar problems. (secondary)

Ardi, Dana Beth. The Relationship of Functional Academic Achievement to the Clinical Categories of Brain Injury and Emotional Disturbance. (Boston College, 1978.) DAI 39A: 806; August 1978. [7813771] [ages 6-11]

Armstrong, James Sutton. Effects of a Preservice Professional Knowledge and Skills Course on College Mathematics Instructors and Students. (Georgia State University-College of Education, 1978.) DAI 39A: 2110; October 1978. [7817570]

No significant differences in student attitudes on achievement were found, but instructors' attitudes were affected by the training course. (college)

Arougheti, Joel Leon. The Effects of Formative Evaluation with Different Levels of Feedback and Remediation on Student Achievement and Attitude in the First Semester of Tri-Semester Algebra. (New York University, 1977.) DAI 38A: 5971; April 1978. [7803047]

Students who received knowledge of correct results scored higher than those having "instructional feedback". (grades 9, 10)

Austin, Virginia Lee. Discriminant and Descriptive Analyses of Neuropsychological, Electroencephalographic, Perinatal and Developmental History Correlates of Children with Math or Reading Disability. (The University of Wisconsin-Madison, 1977.) DAI 38B: 5554; May 1978. [7728235]

Overall, the math-disabled children had more (and more severe) deficits than the reading-disabled children. (ages 6-16)


Teachers developed and retained needed behaviors for implementing an activity-oriented classroom. (elementary in-service)


Results from two forms of a Piagetian test, one in science-mathematics content and one "in content more familiar to college students", indicated inconsistencies with Piagetian theory. (college)

Ballain, Myron Lee. The Effect of the "Individualized Mathematics System" on the Mathematics Achievement of Pupils in Selected Public Schools. (The University of Nebraska-Lincoln, 1977.) DAI 38A: 703; June 1978. [7808154]

Achievement in algebra was found to be directly related to ability to learn arithmetic and to cognitive operational ability. (community college)


Information processing behaviors of students guessing words in a geometry passage were studied at various stages of instruction. (grade 7)

Battista, Michael Thomas. Measuring Subjective Information in Geometry Instruction. (Purdue University, 1977.) DAI 38A: 6037; April 1978. [7803196]

Results from two forms of a Piagetian test, one in science-mathematics content and one "in content more familiar to college students", indicated inconsistencies with Piagetian theory. (college)

No significant difference in accuracy scores was found between groups taught by "verbal rote" or "verbal explanatory" instruction. (grade 3)

Berman, Dale Kleinman. Myoelectric Activity as a Measure of Mental Effort During Cognitive Tasks. (The Catholic University of America, 1978.) DAI 39B: 3032-3033; December 1978. [7824160]

Results indicated that there exists a universal or general pattern of EMC (muscle) activity as a function of time for tasks including mental arithmetic. (ages 25-40)

Bird, Ben Allan. Effect of a Systematic Drill System on Computational Ability: Of Primary Children. (Brigham Young University, 1977.) DAI 39A: 1317; September 1978. [7816188]

No significant differences in gain scores were found between groups using or not using a drill system. (grades 1-3)

Bleyer, Dorothy Rushing. An Assessment of Attitudes of Students Toward Mathematics and an Investigation of the Relationship of the Attitudes to Learning in Selected Required Mathematics Courses in a State University, a Community College, and a Technical Institute. (Southern Illinois University at Carbondale, 1977.) DAI 38A: 5972-5973; April 1978. [7804247]

A majority (58%) of the students held attitudes toward mathematics that were significantly negative, with responses "observations different" between the sexes. (college freshmen)

Boehmer, Donald Patrick. The Effect of a Monitoring System on the Math Achievement of the Educable Mentally Retarded. (Utah State University, 1978.) DAI 39B: 2864; November 1978. [7821115]

Significant differences on the criterion-referenced test favored the group using the monitoring program, although no difference was found on a standardized test. (EMRs)


The difficulty in producing various arrays, predictors of success, and factor loadings were studied. (grade K)

A significant difference was found in the number of systematic errors made by third and fourth graders, but two weeks of specific remediation did not result in significant differences from control groups. (grades 3-4)


Characteristics of PSI users were surveyed and summarized. (college)

Bradley, Peggy Ellen. Effects of Individual Diagnosis and Remediation in the Treatment of Children with Learning Disabilities. (University of Houston, 1978.) DAI 39B: 1932; October 1978. [7818234] [age 8]

Brannen, Pamela Parker. A Study of the Potential Role of Economics as an Applicational Area for Mathematics. (Georgia State University, 1977.) DAI 38A: 4001; January 1978. [77-29,323]

Materials on 22 economics topics were compiled, after ascertaining in a pilot study that students could use the materials but teachers were unfamiliar with economics applications. (secondary)


None of six null hypotheses pertaining to the relative effectiveness of "Polya's heuristic method" and "the traditional method" was rejected. (college)


No significant difference in readability was observed between (1) "conventional" bar and circle charts and (2) bar and circle charts modified to enhance perceptually their readability, although males were observed to read both charts more accurately than were females. (post-secondary)

Briggs, John Warren. A Study of Teacher Elicited Responses and Actions of Students of Seventh and Eighth Grade Mathematics Classes Related to the Achievement of These Students. (University of Northern Colorado, 1977.) DAI 38A: 4637; February 1978. [730804]

Observations indicated that students encouraged to learn through "high level", "many", or a "variety" of actions achieved better. (grades 7, 8)
Brockmann, Ellen Mary. Memory Search Processes Used by Second-Grade Children in the Comprehension of Place Value. (Fordham University, 1978.) DAI 39A: 1395; September 1978. [7816561]

Mean reaction times on a serial search task were greater for children with weak place value skills. (grade 2)

Brook, Robert M. Ability to Recognize Nonverbal Affirmation and Negation Amongst Learning Disabled Children. (University of Kansas, 1977.) DAI 38B: 3464; January 1978. [77-28,841]

Brooks, Sarah. A Comparison of the Classification of Students by Two Methods of Administration of a Mathematics Placement Test. (Syracuse University, 1977.) DAI 39A: 733; August 1978. [7811636] (community college)

Broer, Lynda Cozette. The Use of Academic and Non-Academic Variables in Predicting Grade Point Average Profiles of Black Students. (Stanford University, 1978.) DAI 39A: 737; August 1978. [7814161]

High school rank was concluded to be the most important indicator of who would survive the freshman year. (college)

Caillier, James Allen. A Comparative Study of Two Approaches to Teaching Low-Achieving Students at the College Level. (The Louisiana State University and Agricultural and Mechanical College, 1978.) DAI 39A: 1502; September 1978. [7815615]

Expectation for academic success in remedial courses was judged to be greater for students in a structured remedial program than for those in a non-structured one. (college)


Abstract problems were significantly more difficult than concrete problems; the factual-hypothetical factor was significant in five of six analyses. (grades 4-12)

Calvey, Sister Helen. The Effects of a Process Oriented Elementary School Science Program on Piaget's Operative Content Comprehension. (State University of New York at Buffalo, 1977.) DAI 39A: 2165-2166; October 1978. [7813981] (grades 6, 8)

Campbell, Ruby Guidorz. Number Theory Instruction as a Factor in the Learning of Computational Skills with Fractions. (The Louisiana State University and Agricultural and Mechanical College, 1977.) DAI 38A: 7192-7193; June 1978. [7807540]

No significant difference in adding and subtracting fractions was found between groups having or not having number theory instruction. Significant differences in attitude favored the full-exposure group. (grade 5)

38

July 1979 275
The Relationship Between Attitude Toward School, Sex, Intelligence, and Academic Achievement. (The University of Rochester, 1978.) DAI 39A: 2824-2825; November 1978. [7820410]

Attitude was not found to be related to mathematics achievement, but sex was related. (grades 3, 6)


An 11-lesson unit was found to be successful in terms of both achievement and attitude. (college)


No significant differences in attitudes toward mathematics were found between girls using or not using CAI, but boys using CAI were less negative toward mathematics. (grade 8)


Teacher-communicated content was generally higher in "kinetic structure" than prose-communicated content. Students' cognitive structures changed with instruction, but were unlike teacher or prose structure. (grade 10)

[grade 3]

Chang, Ping-Tung. On Relationships Among Academic Performance, Sex Difference, Attitude and Persistence of Small Groups in Developmental College Level Mathematics Courses. (Georgia State University, 1977.) DAI 38A: 4002; January 1978. [77-29,325]

Small-group instructional procedures were found to have a "significantly greater positive impact" on achievement in arithmetic, elementary algebra, and combined arithmetic and algebra than a lecture-demonstration method. (college)


Analytic students demonstrated better performance than non-analytic students. A combination of definition and positive instance was more effective than either alone. Pretraining on subordinate concepts facilitated concept learning. (grade 3)

Training affected students' knowledge and use of moves. Use of the moves enhanced concept acquisition and clarity of the presentation. (elementary preservice)

Ciriza, Frank. The Prediction of Classroom Instruction Time Required to Pass the GED and GED Test Performance of Migrant Workers. (New Mexico State University, 1977.) DAI 38A: 4471-4472; February 1978. [7732065] [adults]

Clothiaux, Clara Ann. An Investigation into the Ordinality-Cardinality Controversy Between the Theories of Brainerd and Piaget. (Auburn University, 1978.) DAI 39A: 2111; October 1978. [7818630]

Children receiving the ordinal instructional treatment improved significantly more than those given cardinal or combined forms. However, most children used a cardinal approach in a problem situation. (grade 1)

Cohen, Carol Golden. The Effect of Lesson Verbal Structure on Student Ability to Organize and Compute Quantitative Data. (Columbia University, 1978.) DAI 39A: 2166; October 1978. [7819315] [secondary]


The development of measurement, quantification, and statistics is traced through cause and effect from colonial times to 1830.


The effect of training on the "focusing rule" was studied, using geometric figures and a concept-identification task. (ages 8 - adolescence)


The extent to which 11 strands were treated in five textbook series was analyzed. (grades 4-6)

Cookson, Connie Seaman. Predicting Developmental Level from Achievement and Intelligence Scores. (Auburn University, 1977.) DAI 38A: 6615; May 1978. [7806079] [grades 4, 5]
Cooley, Larry Wayne. An Experimental Analysis of the Role of Equilibration in the Development of Conservation of Continuous Quantity. (The University of Manitoba (Canada), 1978.) DAI 39B: 1008; August 1978. [elementary ?]

Cooper, Annette J. An Analysis of the Effect of the Use of a Hand-Held Calculator on Attitude and Achievement in Selected College Algebra Classes. (Oklahoma State University, 1977.) DAI 39A: 85; July 1978. [7811034]

No significant differences in attitude or achievement were found between groups in two different semesters using or not using calculators. (two-year college)

Coppes, Sally A. An Investigation into Computer Programming as an Academic Discipline Which Provides Education for Both Sides of the Brain. (University of Massachusetts, 1978.) DAI 39A: 1395-1396; September 1978. [7816249] [college ?]


Lessons on topological topics were developed and found to be successful. (grade K)


No significant differences in achievement or attitudes were found between groups using or not using activities. (grade 10)

Cossio, Maria-Jesus Garcia. The Effects of Language on Mathematics Placement Scores in Metropolitan Colleges. (Columbia University Teachers College, 1977.) DAI 38A: 4002-4003; January 1978. [77-27,882]

A positive relationship between mathematics performance and second language ability was observed. (college)

Coulter, Peggy Mullins. Selected Instructional Modules Designed for Prospective Secondary Mathematics Teachers. (The University of Alabama, 1978.) DAI 39A: 2171-2172; October 1978. [7819166]

Six modules were developed, based on a model incorporating both competency and humanistic concerns. (secondary preservice)

Courtney, Dan Eugene. The Effect of Male Teachers on the Academic Achievement of Sixth Grade Father-Absent Boys. (Kansas State University, 1977.) DAI 38A: 5232-5233; March 1978. [7808207] [grade 6]
Cox, Boyd Ray. An Evaluation of the Brigham Young University Elementary Mathematics Teacher Preparation Program. (Brigham Young University, 1977.) DAI 38A: 4567; February 1978. [7731097]

Students scored significantly higher as they proceeded through the program. (elementary preservice)

Crockett, Rubie Eileen. The Relationship of "Mainstreaming" to Self Concept and Academic Achievement of the Upper Elementary Special Education Pupils in a Large Mid-West Middle School. (Indiana University, 1977.) DAI 38A: 5233; March 1978. [7801011] [ages 12-15 (EMRs)]


Significant differences in type of gain were found among students taught by teacher, parent, or researcher. (elementary)

Crumpton, Sharon Dietsch. A Mathematical Anxiety Reduction Project. (The University of Tennessee, 1977.) DAI 38A: 5310; March 1978. [7801992]

An increase in students' mathematical competence was accompanied by a decrease in their mathematical anxiety; non-mathematical treatments had little apparent effect on anxiety. (college)


Both length and density cues, integrated by simple algebraic rules, were used in judgments of large quantities at all age levels. (ages 3-9, adults)

Cunningham, Mark Douglas. The Effects of Bilateral EEG Biofeedback on Verbal, Visual-Spatial, and Creative Skills in Learning Disabled Male Adolescents. (Oklahoma State University, 1977.) DAI 39B: 373; July 1978. [7811037] [adolescents]

Cypher, Terrance Ralph. A Study of Selected Characteristics of the Public Secondary Mathematics Teachers of Montana. (Montana State University, 1977.) DAI 38A: 7193-7194; June 1978. [7808304]

Background levels and class loads were among the data obtained. (secondary in-service)

No significant difference in achievement was found between groups using or not using the computer to aid in problem solving. (college)


A hierarchy, presumably on computation, was evaluated. (grade 2)


The described program includes the requirement that each person pass a mathematics examination (understanding of whole numbers, fractions, decimals, and percentages). (adults)

Davis, Jane Hawk. A Study of the In-Service Education Program of Elementary School Teachers in Knoxville City Schools. (The University of Tennessee, 1977.) DAI 38A: 3905; January 1978. [77-27,653] [elementary in-service]


Few significant differences were found for treatments varying the addition-subtraction sequence. Retention of addition dropped when subtraction intervened. (elementary)


Formal students used a larger variety of problem-solving processes than concrete students. (grade 8)

Dejarrettne-Ondrus, Patricia Sue. A Study of the Effect of a Laboratory Approach in Conjunction with Classroom Instruction on Student Performance and Attitude Toward Mathematics. (The University of Toledo, 1977.) DAI 39A: 3432; December 1978. [7822024]

No differences were found in achievement, but the laboratory group had better attitudes than the lecture-discussion group. (grade 9)

Computer-augmented instruction was observed to have a significant positive effect on the mathematical attitudes of disadvantaged students, but not upon their achievement. (college)


Dianna, Michael A. Effects of an Open Classroom Instructional Program Versus a Traditional Classroom Instructional Program on the Academic Achievement and Attitude Toward School of Elementary School Children. (Temple University, 1978.) DAI 39A: 2024; October 1978. [7817377] [grades 3, 5]


Doyle, Beverly Ann. The Relationship Between Self Concept and School Achievement Maternal Self Esteem and Sensory-Integration Abilities in Learning Disabled Children, Ages 7-12. (The University of Nebraska-Lincoln, 1977.) DAI 38A: 7267-7268; June 1978. [7808159] [ages 7-12]


Dubriel, John Benjamin. A Study of Two Plans for Utilization of Class Time in First Year Algebra. (University of Missouri-Columbia, 1977.) DAI 38A: 4638; February 1978. [7731719]

The group having 70 per cent developmental work and 30 per cent practice had higher achievement and retention scores than the 30-70 or control groups. No differences in the amount of time spent on developmental activities were found before or after the treatment period. (grade 9)


The existence of teacher bias against females was not supported by this study in which teachers graded a geometry test. (secondary in-service)
Dyce, Byron Alphonso. The Effect of Incorporating the Mini- or Hand-Held Calculator into a Community/Junior College Basic Mathematics Course. (The University of Florida, 1977.) DAI 39A: 43; July 1978. [7810942]

Analysis of pre-posttest data from four classes using calculators indicated that "there was insufficient evidence to conclude that there was any particular advantage to using mini-calculators". (community/junior college)

Eckmier, Janice Logan. An Investigation of the Use of Calculators with Low Achieving 4th Grade Students in Mathematics Achievement and Attitude. (University of Southern California, 1978.) DAI 38A: 7109; June 1978. [---]

No significant differences in attitude or achievement gains were found between calculator and non-calculator groups. (grade 4)

Ehnis, Carol R. Visual and Auditory Memory Components of Reading and Arithmetic in Learning Disabled Children. (New York University, 1977.) DAI 38B: 6145-6146; June 1978. [7808521]

Arithmetic stores were significantly correlated with performance on a visual sequential memory task. (ages 8-11)


In this study of some factors thought to influence processing of geometric diagrams and statements, certain within-subjects factors attained significance. (grade 11)


Over half of the students exhibited rule selection behaviors on "artificial tasks" (grades 9 and 10) or addition and multiplication tasks (grade 4). (grades 4, 9, 10)


Differences at each grade level and between ability groups and sexes were reported before and after training. (grades 6, 8, 10)

Fayock, Paula Marie. The Relationship Between Cognitive and Non-Cognitive Measures and Employment in Mathematically Related Careers Among Female and Male Project Talent Participants. (The Pennsylvania State University, 1977.) DAI 38A: 5882-5883; April 1978. [7803322]

On cognitive and non-cognitive measures, those that discriminate between mathematicians and non-mathematicians were found to be different for females and for males. (post-secondary)
Ferguson, Laurel Celestine Charleston. An Exploratory Investigation of Actual and Allotted Instructional Time. (University of Illinois at Urbana-Champaign, 1978.) DAI 39A: 2721; November 1978. [7820930]

The major portion of the school day was devoted to language arts and arithmetic. Other findings on use of time are also reported. (grade 5)


The mathematics test was found to be significantly more difficult than the other four GED tests. (adults)

Fisher, Naomi Dove. Visual Influences of Figure Orientation on Concept Formation in Geometry. (Northwestern University, 1977.) DAI 38A: 4639; February 1978. [7732300]

Students consistently emphasized the upright orientation of figures, regardless of instructional experiences. (grades 6, 9, college)

Fisher, Stanley. The Role of Illustrative Errors in Learning to Solve Problems. (City University of New York, 1977.) DAI 38A: 4042; January 1978. [77-28,649] [mean age 16]

Fitzgerald, Mary Lee. The Relation Between Field-Dependence-Independence and Student Attitude and Achievement in an Open Space Elementary School. (Rutgers University The State University of New Jersey (New Brunswick), 1977.) DAI 38A: 6518-6519; May 1978. [7804592] [grades 4-5]


The training was effective in producing gains in content knowledge and in helping teachers to "think metric". (in-service)

Flowers, James Roy. A Comparative Study of Students in Open Space Individually Guided Education (IGE) and Traditional Schools. (University of Northern Colorado, 1977.) DAI 38A: 4679-4680; February 1978. [7730818] [grade 3]


SAT mathematics scores accounted for four per cent of the variance in the prediction of final grades in courses. (college)
Both linear and spiral teaching groups scored significantly higher than the control group in applying the heuristics of situational problem solving. Differences between the two groups were noted. (secondary)
No significant differences in mathematics or reading achievement were found between tutored or untutored groups. Tutoring did improve self-concept. (grades 1-4, 6)


At least 70 per cent of the students queried used the center in some way, with eight per cent making daily use of it. (grades 9-12)


No significant difference in multiplication achievement was found between teams-game and "interpersonal" competition, but individual competition resulted in better achievement than did not using games at all. (middle grades)

Gerling, Max Otto. The Effects of Two Types of Visual Stimuli on First and Second Graders' Perceptions of Addition and Subtraction Number Sentences. (The Florida State University, 1977.) DAI 38A: 5310-5311; March 1978. [7801479]

Second graders performed significantly better than first graders on combined videotape and picture sequence scores. (grades 1-2)

Gessner, Judith Kirmayer. Sex and Attitudes Toward Women as Factors Affecting Attitudes Toward Mathematics of Elementary School Teachers in Two Districts of New Jersey. (Rutgers University The State University of New Jersey (New Brunswick), 1977.) DAI 38A: 4003; January 1978. [77-27,943]

Attitudes toward women's roles affected attitude toward mathematics. (elementary in-service)

Giesbrecht, Edwin Cornelius. The Attainment of Selected Mathematical Competencies by High School Students in Saskatchewan. (The University of Saskatchewan (Canada), 1977.) DAI 39A: 2722; November 1978. [--]

Some significant differences for certain grades, programs, school size, and sex were noted. (grades 9-12)

Gironda, Ronald Joseph. Equivalency of WISC and WISC-R Scores Related to Achievement of Urban Educable Mentally Retarded Students. (Fordham University, 1978.) DAI 38A: 7228; June 1978. [7808997] [elementary (EMRs)]

Use of calculators as an instructional aid was no more effective than using pencil-and-paper techniques to increase mathematics achievement. No significant loss of proficiency with paper-and-pencil skills resulted from calculator use. (community college)


A decrease in computation-minus-word-problem scores of boys, but not girls, was significantly related to an increase in oral language performance. (grade 4)

Gordon, Bobby Will. *A Profile of High and Low Achievers in Mathematics Among Selected Sixth-Grade Students.* (Duke University, 1977.) DAI 38A: 4639-4640; February 1978. [7731667]

All factors studied were found to be related to students' levels of achievement. (grade 6)


Strategies which varied problem-solving procedures appeared to be more effective than strategies employing a set of guidelines or steps. (grades 5-6)

Greenwood, Michael Earl. *Effects of Small Group Help Sessions on an Individualized Program in Community College Mathematics.* (University of Illinois at Urbana-Champaign, 1977.) DAI 38A: 6044-6045; April 1978. [7804005]

No significant differences on most criterion measures were found between groups given help by the regular instructor or another instructor, or given no help. (community college)

Grimshaw, William Frederick. *The Effects of the Community Education Program on Student Academic Achievement.* (The University of Michigan, 1978.) DAI 39A: 1318; December 1978. [7822902] (grades 2, 4, 6)

Gross, Lucille Madeline. Relationships Between Reading Achievement, Knowledge of Specific Study Skills, and Success in the Content Areas for Seventh-Grade, Middle School Students. (Temple University, 1978.) DAI 39A: 2116-2117; October 1978. [grade 7]

Grossman, Ira. Contingent Stimuli and Order of Presentation as Determinants of Learning Arithmetic. (California School of Professional Psychology, San Diego, 1975.) DAI 38B: 4457; March 1978. [——]

Rate of learning may be hampered by instructing a student to "review" an earlier assignment because of errors on a current assignment. (grade 2)

Gullen, George Edgar, III. Set Comparison Tactics and Strategies of Young Children in Kindergarten, First Grade and Second Grade. (Wayne State University, 1977.) DAI 38A: 6585-6586; May 1978. [7805185]

Five tactics and 12 strategies were used by children to compare sets in terms of "more" or "same number". Differences in their use were noted. (grades K-2)


For the particular disjunctive concept involved, it was concluded that any one of the six teaching strategies investigated will enhance attainment of the concept. (college)

Hall, Eleanor Grace Perry. Sex Differences in IQ Development and Correlated Variables for Intellectually Gifted Students. (The University of Michigan, 1978.) DAI 39A: 775; August 1978. [7813662] [elementary, secondary]

Ham, Wayne Albert. Effects of a Volunteer Tutor Program on Self-Esteem and Basic Skills Achievement in the Primary Grades of a Southern Rural School System. (The University of Florida, 1977.) DAI 38A: 6497-6498; May 1978. [7806704] [grades 1-3]

No significant differences between groups given one or up to three tests with feedback were found in achievement, retention, or study time. (elementary preservice)

Meta-analysis methodology was used to synthesize findings from 153 studies pertaining to four techniques for mathematics instruction: computer-assisted instruction, cross-age and peer tutoring, individual learning packets, and programmed instruction. (elementary preservice)

Hayatgheib, Khosrow. A Study of the Relationship Between Tendency to Teach Mathematics Inductively and Creative Thinking. (University of Houston, 1978.) DAI 39A: 2112; October 1978. [7818222]
No significant relationships were found between creative thinking and the tendency to teach mathematics inductively. (elementary preservice)

Hayden, Joseph Dunstan. The Effectiveness of Instance Helps in Rule-Using Activities in Learner-Controlled Computer-Assisted Instruction. (The Catholic University of America, 1978.) DAI 39A: 2209; October 1978. [7818524] [adults]

Heatherly, Franklin Davis. A Determination of Cognitive Growth of Selected Students and Teachers Using a Prototypic Metric Program. (The University of Alabama, 1977.) DAI 39A: 90; July 1978. [7809858]
It was found that the majority of the students had some knowledge of metrics prior to participation in the program, but the program was effective in increasing the knowledge of both students and teachers. (elementary ?)


Hebbeler, Kathleen Marie. The Development of Addition Problem Solving in Young Children. (Cornell University, 1978.) DAI 38B: 6117-6118; June 1978. [7809489]
Preschool children could solve addition problems, although accuracy increased with grade level. Counting was the most frequently used strategy among the three youngest groups, systematically replaced by use of number facts over grades 1 and 2. (pre-kindergarten, grades K-2)
Heil, Edith Sortor. Correlational Study of the Wide Range Achievement Test, Peabody Individual Achievement Test, and the Key Math Diagnostic Arithmetic Test with Learning Disabled Children with a Modality Deficit. (Texas Woman's University, 1977.) DAI 38A: 5394; March 1978. [7801760]

Learning disabled children with auditory modality deficits made significantly higher scores on the WRAT and PIAT than on the Key Math test; those with visual modality deficits had moderately higher scores on the Key Math test. (ages 8-11)

Herman, Joan Leslie. The Relationship of Individualized Instruction Variables and Second Grade Students' Reading, Mathematics and Affective Outcomes. (University of California, Los Angeles, 1977.) DAI 38A: 6667-6668; May 1978. [7806489]

SES was positively related and whole-class instruction was negatively related to achievement in mathematics. Other mixed findings failed to provide a satisfactory fit for a logically developed model. (grade 2)


Students using calculators for instruction gained equally as well in computation and significantly higher in problem solving as students not using calculators. (grade 9)

Horak, Virginia Witt. The Effects of Inductive-Deductive Teaching Methods and Field-Dependence-Independence Cognitive Style upon Student Achievement in Mathematics. (The University of Iowa, 1977.) DAI 39A: 169; July 1978. [7810352]

The inductive method was found to be better for producing transfer of learning in new situations. Field-dependent students learned better with an inductive method. (elementary preservice)


Howell, Kenneth Burch. A Skeletal Development of Introductory Differential and Integral Calculus for One Variable, Utilizing Logic, Model Theory and Non-Standard Analysis. (Auburn University, 1977.) DAI 38A: 6586; May 1978. [7806084] [college]

Huff, Ronald Overt. The Effect of Prekindergarten Experiences on Intellectual and Academic Performance of Culturally Deprived Children. (Drake University, 1977.) DAI 38A: 4031; January 78. [77-28,814] [grade 1]

Hurley, Alfred, Jr. The Effect of General Attentional and Specific Relevant Cue Training on Several Piagetian Tasks of Number Development. (New School for Social Research, 1978.) DAI 39B: 2541; November 1978. [7820600] [grade K]


Jemmott, Rupert. The Use of Internal-External Locus of Control in the Prediction of Academic Success of Disadvantaged Black College Students. (Columbia University Teachers College, 1978.) DAI 39A: 2834; November 1978. [7821276] [college]

Johns, Antoinette Frances. Classification Tasks with the Mentally Retarded and Their Predictor Variables for Success. (University of Northern Colorado, 1977.) DAI 38A: 4731; February 1978. [7730836] [ages 9-59 (EMRs)]


No significant relationship was found between success in college algebra and Piagetian stage of cognitive development, with the latter being of little value in predicting the former. [college]


The average cost/effectiveness ratio for mathematics was .946. Ratios were high in grades 10-12 and low in grades 2-8. (grades 2-12)


Students studying mathematics in open-space classrooms achieved better growth than those studying in self-contained classrooms. (secondary)

A significant positive correlation was found between teachers' and pupils' distributivity scores, but this was influenced by IQ scores. A significant correlation was also found between distributivity scores and success on two- and three-digit multiplication. (teachers, grade 4)

Jolly, Richard Donald. A Study of the Use of a Laboratory Approach to the Teaching of Selected Concepts of Perimeter, Area, and Volume, to Seventh Grade Students. (Auburn University, 1977.) DAI 38A: 6586; May 1978. [7806085]

No significant difference in achievement was found between total groups taught by a laboratory approach or lecture-discussion, although male students scored significantly higher using a laboratory approach. (grade 7)

Jones, Annie S. Mathematics Achievement of Children in Title I Open Space and Title I Traditional, Non Open Space, Elementary Schools. (The University of Maryland, 1977.) DAI 38A: 3933; January 1978. [77-28,740]

On only two sub-hypotheses did differences in mathematics scores favor one group, students in traditional, non-open-space schools. (grade 3)


For a particular antidifferentiation, use of an advance organizer facilitated neither initial learning nor retention; however, use of an advance organizer facilitated retention by haptic individuals better than by visual individuals. (college)

Juarez, Jacinto Pablo. American College Test (ACT) Scores and High School Grade Point Average as Predictors of Performance on the Nursing State Board Test Pool Examination. (East Texas State University, 1978.) DAI 39A: 1279; September 1978. [7816614]

Karimpour, Rahim Ghannadi. Programs for the Improvement of the Secondary School Mathematics Teacher Education in Iran. (University of Oregon, 1977.) DAI 38A: 6069; April 1978. [7802533]

Kasnic, Michael James. The Effect of Using Hand-Held Calculators on Mathematical Problem-Solving Ability Among Sixth Grade Students. (Oklahoma State University, 1977.) DAI 38A: 5311; March 1978. [7801276]

No significant differences in number of problems completed or correct answers were found between groups using or not using calculators, nor were there differences between low and high ability groups. (grade 6)
Kazarian, Shirley M. The Allocation, Distribution, and Use of School Time by Elementary Teachers in Selected Subject Areas. (University of California, Los Angeles, 1977.) DAI 38A: 6520; May 1978. [7806498] [elementary in-service]


The "unit curriculum mastery approach" was judged to be more effective than the "traditional" approach. (community college)


Kendall, Marian Scott. The Interaction of Secondary Teacher Verbal Aptitude and Personality Characteristics with Pupil Verbal Ability and Student Achievement. (Kent State University, 1977.) DAI 38A: 6014-6015; April 1978. [7802773] [secondary in-service]


Teachers need and want metric in-service training. (elementary in-service)

Knudsen, James Bruce. The Relationship of Conformity and Non-Conformity in Children to Preference for and Achievement in Mathematics and Spelling. (The University of North Dakota, 1977.) DAI 38A: 6621; May 1978. [7805414]

Neither conformity nor non-conformity appeared to be associated with mathematics achievement or preference. (grades 3-6)


No significant difference in achievement was found between calculator and non-calculator groups. (grades 4-6)

Few significant differences were found between groups using three modules for metric instruction. (elementary preservice)

Koos, Jerry Alan. A Comparison of Reading and Mathematics Achievement of Seventh Grade Students Enrolled in a Block Time Schedule and Seventh Grade Students Enrolled in a Traditional Schedule. (Ball State University, 1977.) DAI 38A: 5826; April 1978. [7803825]

Students in the two time schedules scored equally well on a mathematics test. (grade 7)

Krakow, Joanne Birkhold. Concrete Operational Development, Figurative Thought and Arithmetic Achievement in Learning Disabled Boys. (Boston University Graduate School, 1978.) DAI 39B: 2476-2477; November 1978. [7819815]

The relationship between concrete operational reasoning and arithmetic achievement was confirmed. (mean age 10.8)

Kruglick, Karen F. Systematic Desensitization of Test Anxiety in Children by Elementary School Teachers. (The Florida State University, 1977.) DAI 38A: 7286; June 1978. [7808961]

[teachers in grade 5]


[ages 12-14 (EMRs)]


Students using calculators made greater achievement gains. No significant differences in attitude or attendance were found. (grade 9)

Lawson, Glen Allen. Number, Language and Cognitive Development. (McMaster University (Canada), 1978.) DAI 39B: 3023; December 1978. [--]

Some children consistently used a length strategy while others used a number strategy to judge both number and length. (ages 1-7)

Use of calculators did not affect performance in estimation. Students of lowest ability made the most errors when using calculators, compared with other ability levels. (grade 7)


The quality of process behaviors and problem-solving performance are causally linked. Process training helped students to become better problem solvers. (grade 9)


Groups taught heuristics used them noticeably more and achieved significantly more correct solutions than control groups did. (grade 4)


There was considerable agreement among four referent groups regarding the importance of the competencies studied. (secondary in-service)

Lloyd, Baird Wigton. The Identification of Cognitive Abilities Needed by Students for Success in a First-Level College Chemistry Course for Science Majors. (Georgia State University-School of Education, 1977.) DAI 38A: 4072; January 1978. [77-29,314] [college]


A comparison of classification between external indices of mastery and item performance to validate criterion-referenced tests was found to be feasible. (grade 5)


No significant differences in attitude or achievement were found between activity and textbook modes, although results favored the activity mode. (grade 8)
Lorenz, Kenneth Robert. An Investigation of the Correlations Between the Dependent Variable of Student Achievement on Standardized Tests and the Three Independent Variables of Teacher Experience, Amount of Graduate Work Completed and the National Teacher Examinations Grade. (University of South Carolina, 1977.) DAI 38A: 5166-5167; March 1978. [7801161] [teachers in grade 4]


Patterns of achievement on the measurement tasks paralleled results obtained on number by Collis. (ages 10-17)

Lunan, Mackenzie Alexander. A Study of the Relationships Between Florida Statewide Twelfth Grade Test Scores and High School Subject Area Grades as Predictors of Academic Success in a Particular Community Junior College. (University of Southern Mississippi, 1977.) DAI 38A: 5828-5829; April 1978. [7802921] [community junior college]

Lyon, Betty Clayton. Selected Characteristics of Adult College Students in Relation to Mathematical Competencies. (The University of Nebraska-Lincoln, 1977.) DAI 38A: 7194; June 1978. [7809158]

Age, sex, and mathematical background were found to "reflect on" the mathematical competencies measured, with many adult students lacking the basic competencies in question. (college adults)

Malone, Diana F. A Study Regarding the Use of Mathematical Achievement Test Scores as Predictors of Success in First-Year Chemistry and the Effectiveness of a Chemical Mathematics Preparation Course Designed for Students Inadequately Prepared in Mathematics. (The University of Iowa, 1977.) DAI 38A: 4073; January 1978. [77-28,483] [college]

Marchegiani, Boris Vasir. Effects of Two Calculus Treatments upon Achievement and Critical Thinking Ability. (The University of Tennessee, 1977.) DAI 38B: 3233; January 1978. [77-27,680]

Null hypotheses pertaining to the effects of proof and non-proof treatments were neither accepted nor rejected. (college)


More frequent schedules of praise increased attending behavior but did not produce differential effects on computation rate. (grade 3)
Martin, Mary Ellen Jacobson Fish. Describing Classification Skills of Sixth, Seventh, and Eighth Graders. (University of Illinois at Urbana-Champaign, 1978.) DAI 39A: 171; July 1978. [7811263]

The order of difficulty of six tasks was determined. (grades 6-8)

Mason, Gerald Eugene. An Analysis and Evaluation of the Credit-By-Examination Program in Mathematics at a Community College. (University of Miami, 1977.) DAI 38A: 4115; January 1978. [77-28,945]

Responses to a questionnaire and achievement information indicated that the program did not affect the education of participants adversely. (community college)


Significant differences in achievement favoring the standard-calendar schools were found, but no attitudinal differences resulted. (grade 9)

McAffee, John Wilson. Sex as an Indicator in the Mathematics Performance of Selected Seventh- and Eighth-Grade Students. (East Texas State University, 1977.) DAI 38A: 6521; May 1978. [7805469]

No significant differences between males and females were found on computation or reasoning tests except when grade levels were combined (and then females scored higher than males on computation). (grades 7, 8)

Mcanelly, James Robert. A Study of the Mathematical Competencies Considered Important by Supervisors in Large Retail Firms in the Metropolitan Area of Chicago. (Northern Illinois University, 1978.) DAI 39A: 3314-3315; December 1978. [7823110] [adults]

McBride, John Wynn. The Relationship Between Proportional Thinking and Achievement of Selected Science and Mathematics Concepts at the Knowledge, Comprehension, and Application Levels. (University of Houston, 1977.) DAI 38A: 7254; June 1978. [7809184]

Quantitative proportional reasoners achieved greater understanding of equivalent fraction concepts than qualitative proportional reasoners. (grade 9)

McCallum, Lawrence Wayne. Response Latency as a Means of Assessing Conservation Behavior in Young Children. (The University of Iowa, 1978.) DAI 39B: 3026; December 1978. [7822428] (ages 5-10)

McBertott, Hazel Travillia. The Effect of Reduction in Class Size on Achievement Among First and Second Grade Students. (Texas Woman's University, 1977.) DAI 38A: 5237; March 1978. [7801772]

No significant difference in achievement in mathematics was found when class size was reduced from 27 or more to 25 or less. (grades 1, 2)

McFarland, Gerald Lee. A Comparative Study of Academic Achievement of Students Moving from an Open Space or Architecturally Traditional Design Elementary Building to an Open Space or Architecturally Traditional Design Junior High School Building. (Saint Louis University, 1977.) DAI 38A: 5167; March 1978. [7800509] (grades 4-10)

Medusky, John William. An Analysis of the Ability of Selected Variables to Predict the Probability and Degree of Success in a Community College Intermediate Algebra Course. (Florida Atlantic University, 1979.) DAI 39A: 2015; October 1978. [7818627]

A set of five classification functions was able to predict 34.5 per cent of all course grades correctly, 65.4 per cent of all grades within one grade level, and 60.0 per cent of students who failed the course. (community college)


Diagnosis and problem posing were key components in the developed methods course. (preservice)


No significant difference in ratings of teachers was found between groups given or not given written feedback. Student attitudes may be related to the attitudes of their present teachers. (secondary)


The experimental program was judged effective. (community college)
Miller, Patrick William. The Effects of Selected Industrial Arts Activities on Educable Mentally Retarded Students' Achievement and Retention of Metric Linear Concepts. (The Ohio State University, 1977.) DAI 38A: 4627-4628; February 1978. [7731934] (junior high (EMRs))


Mohammad, Haji. The Development of an Affine Geometry Program for Secondary School Students. (Kent State University, 1977.) DAI 38A: 5974-5975; April 1978. [7802771]

A sample unit was developed, and judged to be appropriate.
(secondary)

Monteiro, Maria Therezinha de Lima. Programmed Instruction of the Decimal Number Concept with Variations of Stimulus Control and Reinforcement. (Georgia State University-School of Education, 1977.) DAI 38A: 6018-6019; April 1978. [7804217]

"Active manipulation of stimuli" was favored over "perception of stimuli manipulated by others" and "non-manipulation perception of prepared stimuli" (for Brazilian students). (grade 3)

Montgomery, Leo. Number Concept Development in Black Children from High, Middle, and Low Socio-Economic Status Backgrounds. (University of California, Irvine, 1978.) DAI 39B: 1460-1461; September 1978. [7815329]

Significant differences in performance favored high and middle SES groups over low SES groups, and boys over girls. Frequent explanations for number tasks were noted. (grades 1-3)


The rate of on-task behavior was higher when instruction was given at an appropriate level with knowledge of results. (grade 9)

Moretti, Victor A. Piagetian Cognitive Level and Its Relationship to Sex, Aptitude and Achievement, and Exposure to High School Subject Matter Disciplines. (Rutgers University The State University of New Jersey (New Brunswick), 1977.) DAI 38A: 6669-6670; May 1978. [7804599] (post-secondary)

Morgan, Michael Ernest. The Influence of Vocationally-Oriented Applications on the Achievement and Attitude of Community College Algebra Students. (Oregon State University, 1978.) DAI 39A: 2802; November 1978. [7819710]
No significant achievement or attitude differences were found between students using vocationally oriented applications or the usual text. (Community college)


Memory capacity and organization were found to be important variables in problem solving for learning disabled children. (Ages 7-10)


Spatial ability correlated significantly with problem-solving performance and, to a lesser extent, with visuality. Instruction had a strong, positive effect on spatial ability. (Grade 5)

Mueller, JoAnne. The Effects of Remedial Prescriptions and of Grade Expectation on Academic Achievement Within a Given Learning Strategy. (The University of Iowa, 1977.) DAI 38A: 4005; January 1978. [77-28,497]

No significant difference in achievement was found between grading treatment groups or between prescription and no prescription groups. (Elementary preservice)

Murry, Michael Dernis. The Relationship of Classroom Behavior to Academic Achievement and Aptitude. (The University of Tennessee, 1977.) DAI 38A: 7156; June 1978. [7807711]

Strong relationships were found between behavior in arithmetic classes and arithmetic achievement and aptitude. Differences between achievement groups were noted. (Grade 5)


Nielsen, Sally Hemphill. Effects of Parent Consultation Seminar Sessions on Academic Achievement of Kindergarten Children. (University of New Orleans, 1977.) DAI 38A: 6608; May 1978. [7802878] [Grade K]

Nolen, William F. Teachers' Attitudes as Mediators of Students' Attitudes and Achievement. (Boston University School of Education, 1977.) DAI 38A: 5362-5363; March 1978. [7732779]
Neither teachers' attitudes toward mathematics nor their attitudes toward teaching mathematics "met the criteria for construct viability". (elementary teachers)

Nowlan, Helen Ruth Chatburn. Successful Completion of a Developmental Mathematics Course at an Open Door Institution as a Criterion for Success in a College Level Mathematics Course. (The University of Mississippi, 1978.) DAI 39A: 3432-3433; December 1978. [7824058]

Although a significant difference was found among groups, it was not sufficient for success. (college freshmen)


Ohe, Sister Jong-Son Pia. Learning Aptitudes: Some Ethnic-Group Differentials in Learning Piaget's Spatial Tasks. (The Catholic University of America, 1977.) DAI 38A: 4693-4694; February 1978. [7727787] [ages 5, 6]

Oliyae-Zand, Shahin. The Effects of Differential Feedback on Expected and Actual Mathematical Achievement of Male and Female College Freshmen. (The University of North Dakota, 1977.) DAI 38B: 5545; May 1978. [7805416]

A high positive relationship was observed between expectation of and actual mathematics achievement of both males and females, although women scored significantly lower than men on both measures. However, significant increases in expected and actual mathematical achievement of males and females were observed when they were given false positive feedback. (college)


Differences favored the group taught by an eclectic approach over the group taught by a deductive approach. (grade 10)

O'Mahony, Rosalie Mary. Relationship of Trigonometry Achievement to Selected Characteristics of California Public Community College Students. (University of Southern California, 1977.) DAI 38A: 5872; April 1978. [--]

Instruction based upon the wrapping function was judged to be the most effective content approach, with a combination college algebra and trigonometry course recommended over a trigonometry-only course. (community college)


"A non-significant correlation" was found between reading and mathematical problem solving for Chicano students with either Spanish or English language predominance. Processes were also studied. (mean age 14)


A positive correlation was found between ability to reason abstractly and to construct mathematical models. The curriculum materials did not affect reasoning ability, but were "generally effective" in teaching modeling skills and concepts. (grade 7)

Patterson, James Grey. Order of Emergence of Number Conservation, Seriation and Transitivity of Length, Using the Criteria of Judgments, Verbal Countersuggestions, and Explanations. (The University of Nebraska-Lincoln, 1977.) DAI 38A: 7236-7237; June 1978. [7808171] [ages 4-8]


Item arrangement (on an easy-to-difficult continuum) had little effect on test statistics for a mathematics skills test. (grade 9)

Perkins, Raymond David. The Relationship of Certain Mathematics Skills to Success of Students in Introductory Community College Chemistry. (Oregon State University, 1978.) DAI 39A: 798; August 1978. [7811992] [college]

Peterson, Richard V. A Study of the Relationship Between Selected Personal Variables and the Academic Achievement of Black Students at Purdue University. (Purdue University, 1977.) DAI 39A: 591; August 1978. [7813101] [college]


No evidence was found that the time of introduction of symbolism affected the attainment of probability concepts. (grade 5)
Ways in which two groups of children performed number tasks were analyzed; one consistent finding was the "superior" performance of schooled compared to unschooled children. (ages 5-10)

A significant difference in achievement was found favoring students having the individualized program. (grade 10)

Some significant correlations between attitude and achievement were found. (grades 3-6)

Some significant differences in achievement were found favoring students having the individualized program. (grade 10)

College preparatory students were favored over non-college preparatory students on attitude measures; sex and race were also considered. (grade 12)


[ages 6-12]


Students using the computer-assisted test with repeatable testing achieved higher than students taking a "traditional" course. (grade 9)


A significant but low relationship was found between scores on a logical thinking test and success in algebra. (grades 8, 9)


Low-aptitude students were more dependent on the topics formally taught than were high-aptitude students. Hierarchies were also analyzed. (grades 9-11)


Robinson, Evelyn Barron. The Effects of a Concrete Manipulative on Attitude Toward Mathematics and Levels of Achievement and Retention of a Mathematical Concept Among Elementary Students. (East Texas State University, 1978.) DAI 39B: 1335; September 1978. [7816623]

Use of Cuisenaire rods was found to be effective for introducing concepts in grade 3; the more rods were used, the greater was retention. (grades 3, 4)

Low-aptitude students were about one and one-half times as expensive to educate than were high-aptitude students in a mathematics setting. (grade 5)

Rogerson, Lennie Crocker. The Relationship Between Academic Self-Concept, Locus of Control and Achievement Expectancy in Mathematics. (University of South Carolina, 1978.) DAI 39A: 1407-1408; September 1978. [7816524]

A correlation of 0.33 was found between academic self-concept and mathematics report grade expectancy; locus of control had only a slight relationship. (grades 5, 6)

Romine, William Darvel. Individualized Instruction: A Comparison of Achievement Between Students in U-SAIL and in Traditional Programs. (Brigham Young University, 1978.) DAI 39A: 593; August 1978. [7813805]

No significant achievement differences in reading or arithmetic were found between the two groups. (elementary)


Instruction in divergent thinking procedures resulted in significantly different creativity test scores than no such instruction, but no significant difference in student teaching performance. (elementary preservice)


Safran, Martha. Locus of Control, Task Perception, Source of Reinforcement and Their Effects on Achievement of Fifth-Grade Students. (Fordham University, 1978.) DAI 38A: 7239; June 1978. [7809013] [grade 5]


A positive correlation was found between attainment of conservation concepts and mathematics achievement test scores. (grade 2)

Differences in U.S. and Thai textbooks were noted for 11 topics. (grades 1-4)

Sanjivamurthy, Pasupaleti Thimmiah. Test Anticipation, Test Mode and Performance in a College Algebra Class. (Case Western Reserve University, 1978.) DAI 39A: 1445; September 1978. [7816488]

Results "appear to suggest" that processing requirements for a recall-mode test are appropriate or adequate for a recognition-mode test, but not conversely. (college)

Savage, Sandra Skeen. Selected Topics in Applied Mathematics for Middle Grade Mathematics Classes - An Exploratory Study. (Columbia University Teachers College, 1977.) DAI 38A: 6586-6587; May 1978. [7807036]

Trial use of three applied mathematics teaching units indicated no significant change in achievements. Students preferred working in small groups rather than individually or as a whole class. (grade 8)


A difference in the recognition performance of good and poor problem solvers was found. (elementary EMRs)

Schlesier, Mary Antoinette. Locus of Control and Academic Achievement in Remedial Chemistry. (University of Maryland, 1977.) DAI 38A: 4077-4078; January 1978. [77-28,005] [college]

Schmitt, Philip A. Understanding in Mathematics: Some Philosophical and Psychological Considerations. (Syracuse University, 1977.) DAI 39A: 734; August 1978. [7811679]

Definitions of "understanding" are discussed, with examples from secondary school mathematics. (secondary)

Schultz, Karen Andrea. Variables Influencing the Difficulty of Rigid Transformations During the Transition Between the Concrete and Formal Operational Stages of Cognitive Development. (Northern-Western University, 1977.) DAI 38A: 5313; March 1978. [7800750]

Attributes of transformations in geometry were analyzed, with discussion of the causes of disequilibrium. (ages 6-10)

No significant differences in knowledge or attitudes were found; background, sex, and other factors were considered. (elementary preservice)


It was concluded that when item-analyzed test results are returned to teachers, correlation to text material has a positive effect on achievement. Meeting with teachers only at the time test results are returned does not significantly affect achievement. (grade 6)

Scrofani, Emanuel John. Academic Achievement and Student Attitudes in Selected California Early Childhood Education School (University of Northern Colorado, 1977.) DAI 38A: 6516-6517; May 1978. [7805522] [grades 2, 3]


No significant differences in achievement were found between the three methods. Changes in attitude and achievement for each group were noted. (grades 10-12)

Seifnaraghi, Mariam. Conservation of Liquid, Mass, and Weight with Learning-Disabled Children. (University of Southern California, 1977.) DAI 38A: 4101; January 1978. [97758,095] [ages 6-12]

Szumski, Patricia Anne. A Preliminary Investigation of Two Presentation Modes on Dynamic Problems in Algebra in Relation to Individual Differences. (The University of Texas at Austin, 1977.) DAI 38A: 4005-4006; January 1978. [77-29,095]

Motion picture presentation was found to be superior to still picture presentation of problems. Spatial visualization and general reasoning were also considered. (grade 9)


Srivastna, Madan Man. An Evaluative Study of the Ongoing Mathematics Program for Prospective Primary School Teachers in Nepal. (The States University, 1977.) DAI 38A: 7194-7195; June 1978. [780425] [elementary preservice]

Students generally associated problems along four dimensions—structure, context, question form, and pseudostructure. Correlations of ability and sorting tendency were also studied. (grade 8)


A set of variables distinguishing between concrete and formal thinkers was ascertained. Formal operational thinkers tended to prefer a consistent mathematical system. (elementary and secondary preservice)

Simmons, S. Dallas. A Study of Selected Characteristics of Minority and Majority Students Attending Predominantly White and Predominantly Black Universities. (Duke University, 1977.) DAI 38A: 4497-4498; February 1978. [7731692] [college]

Smith, Buddy Lee. A Study of the Effectiveness of the Use of the Electronic Calculators in Teaching the Simplex Method to Business and Economics Majors. (North Texas State University, 1977.) DAI 38A: 3986; January 1978. [77-29,574]

Regardless of sex or mathematics aptitude level, little difference in mathematics achievement or attitude was observed between students using or not using calculators in the classroom. (college)


A formative evaluation program was judged to have a positive effect on achievement, despite lack of significant differences. (college)


The study-guide review group and the edited audiotape review group had significantly better retention than the non-review group and the compressed-speech review group. (community college)
Smith, Jamie C. Relationships Among Figural Creativity, Concrete Operational Logic, and School Achievement in Young School-Age Children. (University of Georgia, 1977.) DAI 38A: 4700-4701; February 1978. [7730523] [ages 5-8]

Smith, Mildred Free. Comparison of the Reading and Arithmetic Progress of Mainstreamed, Decertified Educable Mentally Retarded Students with Slow Learners Within the Same Classrooms. (University of Maryland, 1978.) DAI 39A: 3338-3339; December 1978. [7824027] [grades 2-6 (EMRs)]

Smith, Richard Lawrence. Figure Types and Problem-Solving Achievement in Computational Activities. (The Ohio State University, 1978.) DAI 39A: 2706; November 1978. [7819666] [post-secondary]

Smith, William Harold. The Readability of Geometry and Algebra/Trigonometry Textbooks as It Relates to Scholastic Aptitude, Sex, and Book Position. (University of Southern California, 1977.) DAI 38A: 4558-4559; February 1978. [---]

Textbooks were found to be readable, and revised passages were equally readable. (secondary)

Spresser, Diane Mar. The Relationship Between High School Calculus and Achievement in Engineering/Applied Science for First Year Engineering Students at the University of Virginia. (University of Virginia, 1977.) DAI 38B: 3285-3286; January 1978. [77-28,592]

When mathematical aptitude was taken into account, all between-treatment differences in university calculus achievement disappeared. (college)


Staszkiewicz, Mark John. The Effect of Learner's Cognitive Style and Classroom Climate on Student Achievement and Attitudes in First-Year Algebra. (University of Cincinnati, 1977.) DAI 39A: 653-654; August 1978. [7812962]

No significant differences in attitudes were found for either cognitive style or classroom climate, but differences in achievement were found favoring field independent students and indirect students. (grade 9)

Stein, Paul Carver. Elementary Properties and Applications of the Fibonacci Sequence. (Oklahoma State University, 1977.) DAI 38A: 5229; March 1978. [7801342]

It was concluded that the materials presented in the dissertation could be used as enrichment with secondary and college students. (secondary, college)
Stewart, Joy Miller. An Analysis of Academic Achievement of High Ability Pupils in Two Instructional Situations and Their Stated Feelings About School. (The University of Alabama, 1977.) DAI 39A: 2055; October 1978. [7818902] [grades 5-8]

Stewart, Ward Robert. The Passage of Upward Bound Students into Postsecondary Education. (University of Maryland, 1977.) DAI 39A: 735; August 1978. [7813878] [college]


As the amount of relevant knowledge increased, so did test performance. Interaction of relevant knowledge with type of pure teaching strategy used in a concept venture was significant. (grades 11, 12)


Among the nine findings reported, it was noted that a mean gain of 1.48 (items correct) was observed from pretest (mean of 35.70) to posttest (mean of 37.18) on the 48-item criterion measure of mathematical competencies. (college, community college)

Straham, Clarence Clifford. Factors That Contribute to Senior Students Electing Not to Complete a Mathematics Course Sequence. (The University of Michigan, 1978.) DAI 39A: 735-736; August 1978. [7813742]

Subjects evidenced little or no fear of enrollment in a mathematics course, or little, if any, negative attitude toward mathematics; their educational opinions and decisions were not strongly influenced by any particular group, condition, policy, person, or need. (grade 12)

Stuart, Hayes Laverne. A Study of Factors Related to the Mathematics Achievement of Eighth-Grade Students in the Public Schools of St. Tammany Parish, Louisiana. (University of Southern Mississippi, 1978.) DAI 39A: 2115; October 1978. [7818986]

The best single predictor of achievement was the student's general self-concept of ability; other factors were also noted. (grade 8)

Swan, Kenneth Laverne. Comparison of Achievement Test Scores in Grade Four. (Saint Louis University, 1978.) DAI 39A: 1499; September 1978. [7814644] [grade 4]
Swatsenbarg, Paul Arnold. Validation of a Program for Increasing Study Skills and an Analysis of Its Effect on Conduct and Arithmetic Achievement. (Utah State University, 1977.) DAI 38A: 7275-7276; June 1978. [7808141]

Significant differences were found favoring use of the skills program. (grade 6)

Sziij, Maria Haftkowycz. On the Graphic Representation of Musical Sound. (Rutgers University The State University of New Jersey (New Brunswick); 1978.) DAI 39A: 2803; November 1978. [7820348]

Szykula, Steven A. Self-Control, Maintenance and Generalization: Some Effects on "High" and "Low Risk" Children's Arithmetic Performance. (The University of Tennessee, 1977.) DAI 38A: 5370; March 1978. [7802041]

The performances of two pupils were analyzed in terms of a self-control method. (grade 5)

Tanguma, Ramon Hector. Bilingual Education: The Effects of Selected Variables on the Achievement in Selected School Subject Areas of Mexican American Fifth- and Sixth-Grade Students. (The University of Texas at Austin, 1977.) DAI 38A: 3872; January 1978. [77-29,106] (grades 5, 6)

Tapp, Brenda Cockrill. The Effect of an Individualized Mathematics Laboratory Approach on the Self-Concept and Achievement of Low Achievers in a Semi-Rural Junior High School. (Georgia State University-School of Education, 1977.) DAI 38A: 6512; May 1978. [7804945]

The laboratory approach resulted in a significant gain in self-concept in mathematics; no other significant differences were found. (grades 7-8)

Tate, Jerry Franklin. The Relative Effectiveness with Respect to Knowledge and Attitude of Three Instructional Strategies for Teaching the Metric System to Preservice Elementary School Teachers. (University of Houston, 1977.) DAI 38A: 7195-7196; June 1978. [7809173]

The lecture/demonstration, lecture/laboratory, and mediated strategies were equally effective for teaching the metric system for one week. (elementary preservice)


Several answers to the question "What is mathematics?" are compared. (--)
Thomas, Ossie Mae Banks. Direct Instruction on Three Reading Variables Related to Verbal Arithmetic Problem Solving of Educable Mentally Retarded Pupils. (Georgia State University-College of Education, 1978.) DAI 39A: 229; July 1978. [7810766] EME pupils who had direct instruction on word identification and reading comprehension became more proficient in solving problems. (elementary, EMRs)

Thomas, Paul Douglas. A Comparison of Three Methods of Teaching Multiplication in Nondecimal Numerations to Community College Students. (East Texas State University, 1978.) DAI 39A: 3434; December 1978. [7824152] Use of formulas was superior to rote memorization and to use of flow charts. (community college)

Thomas, Janice Louise. Conservation: More or Less. (University of Kansas, 1977.) DAI 38A: 4103; January 1978. [77-28,918] [ages 3-6]


Tilson, Thomas DeWitt. Teaching First-Grade Mathematics by Radio: Observations in Six Nicaraguan Classrooms. (Stanford University, 1978.) DAI 39A: 3434-3435; December 1978. [7822584] [grade 1]

Tokuno, Kenneth Alan. The Young Child's Use of Topological Relationships in Making Judgements About Spatial Orientation. (University of Hawaii, 1977.) DAI 39B: 365; July 1978. [--] [ages 4, 6, 8]

Travis, Betty Polly. The Diagnosis and Remediation of Learning Difficulties of Community College Developmental Mathematics Students Using Computer Technology. (The University of Texas at Austin, 1978.) DAI 39A: 2115; October 1978. [7817722] The diagnostic and remediation plan was found to be efficacious for identifying and correcting student errors with multiplication. (community college)


Turner, Philip Michael. A Comparison of the Effectiveness of Two Types of Presentations in Teaching Fractions to Low-Ability Junior High School Students. (East Texas State University, 1977.) DAI 38A: 6480; May 1978. [7805474] No significant differences (except in one instance) were found between groups using manipulatives or pictures. (junior high)


Students using the CAI drill-and-practice program had significantly better achievement and attitudes than those not using CAI. (grades 9-12, EMRs)

Wagner, Sigrid. Conservation of Equation, Conservation of Function, and Their Relationship to Formal Operational Thinking. (New York University, 1977.) DAI 38A: 5975; April 1978. [7803038]

Significantly more students conserv ed equation but not function than conversely. Attributes of formal operational students were also noted. (ages 12, 14, 17)


Children were found to be "very sensitive" to Euclidian invariants, but "less sensitive" to projective and topological invariants. (grades K, 3)


Performance on application problems was not affected significantly by the form in which background conceptual material was written (ordinary vs. mathematical English, with or without symbols). (college)

Weaver, Earl Hagood. A Descriptive Evaluation of a Special Mathematics Program for Low-Achieving Seventh and Eighth Grade Students. (Auburn University, 1978.) DAI 39A: 1397; September 1978. [7815864]

Approximately one-half of the students had two year or greater gains in all score categories during the two years of the study. Cost of the special program was $110 compared with $55 for the regular program. (grades 7, 8)

Webb, Nancy Ann Lyons. Freshman Achievement at Louisiana State University at Eunice in Terms of Certain Factors. (The Louisiana State University and Agricultural and Mechanical College, 1978.) DAI 39A: 1353-1354; September 1978. [7815644] [college]
The order of best-to-worst grouping conditions for lower-ability students was mixed-ability, individual, and uniform-ability; high-ability students performed less well in uniform-ability groups, while the order was reversed for median-ability students. (grade 11)

Webber, Brian John. A Study of the Retention by First Year College Students of Selected Rules of Proportion in Physics Which Differ in Mathematical Complexity and Are Learned Using Programmed Instruction Either With or Without Laboratory Experiences. (The Florida State University, 1978.) DAI 39A: 3343; December 1978. [7822213] [college freshmen]

Weber, Clifford Paul. An Analysis of Teachers' Perceived Barriers to Metric Change in Relation to Their Readiness to Change. (Michigan State University, 1977.) DAI 39A: 243; July 1978. [7810132]

Teachers who are more ready to change perceived fewer barriers to metric change. Age, sex, training, and experience had no relationship to number of perceived barriers. (teachers in grades K-5)

Webster, Russell James. The Effects of Emphasizing Composition and Decomposition of Various Types of Composite Functions on the Attainment of Chain Rule Application Skills in Calculus. (The Florida State University, 1978.) DAI 39A: 3439; December 1978. [7822211]

Students presented with all types of functions throughout the instruction did better than those presented with predominantly one type. (college)

Weeks, Cecil Stoney. Long Term Differences in Achievement Associated with Extended Participation of Educationally Disadvantaged Children in a Structured Primary Program. (Mississippi State University, 1977.) DAI 38A: 3939-3940; January 1978. [77-28,568] [grades 3-6]

Weiland, Linnea Jo Anne. A Description of How Selected Seven Year Old Children Learn to Reason to Solve Partitive Division Problems. (New York University, 1977.) DAI 38A: 5976; April 1978. [7803041]

Seventeen distinct strategies were identified through interviews as children solved division problems. Difficulties and arguments used were also identified. (age 7)

Werstlein, Robert Charles. Effects of Type and History of Reinforcement on Magnitude of Vicarious Reinforcement. (Auburn University, 1978.) DAI 39B: 2532; November 1978. [7821542] [grade 2]


Differences between arithmetic and algebra students using quizzes before or after instruction, or using audiotape lessons, were analyzed. (college)


Williams, Luther Francis. A Study of the Introductory Mathematical Analysis Sequence in the Business Administration Degree Program at Cleveland State Community College. (The University of Tennessee, 1978.) DAI 39A: 1309; September 1978. [7815032] [community college]


No significant differences were found between groups using or not using calculators. (grades 5-6)

Woodward, Linda Rae White. The Relationships Between Children's Ability to Conserve Substance and Number and Their Ability to Solve Addition and Subtraction Problems for Missing Place-Holders. (North Texas State University, 1977.) DAI 38A: 4006; January 1978. [77-29,579]

Significant relationships were found between conservation of number and missing-placeholder scores. (grade 1)


Neither game participation nor perceived instrumentality level (high/low) nor achievement motive orientation (success/avoidant) had an effect upon course achievement. (community college)
Yang, Chi-Yuan. The Predictive Validity of the Scholastic Aptitude Test for Chinese College Students. (Columbia University Teachers College, 1978.) DAI 39A: 3538; December 1978. [7822103] [college]


Eight variables were found related to problem-solving achievement. Other variables effective in predicting problem-solving achievement were also noted. (grade 4)

Zilkha, Phyllis Siegel. Training Children to Conserve Volume: An Experimental Acceleration of Cognitive Development. (New York University, 1977.) DAI 38B: 4997-4998; April 1978. [7803046] [grades 3-6]


Innovations to make the geometry course more interdisciplinary, diverse, and "humanistic" are discussed and evaluated. (grade 10)

Journals Searched

The following journals were searched in developing this listing. An asterisk indicates that the journal was searched page by page; articles from those without asterisks were located through an index such as ERIC's CIJE or Psychological Abstracts. The number in parentheses indicates the number of references listed.

* Academic Therapy (1)
* Alberta Journal of Educational Research (4)
* American Educational Research Journal (9)
* American Journal of Mental Deficiency (4)
* American Journal of Pharmaceutical Education (1)
* American Mathematical Monthly (2)
* Arithmetic Teacher (4)
* Australian Mathematics Teacher (1)
* Behavior Modification (1)
* British Journal of Educational Psychology (7)
* Child Development (7)
* Cognitive Science (1)
* College Board Review (1)
* Colorado Journal of Educational Research (2)
- Contemporary Education (1)
  Developmental Psychology (1)
- ECTJ (formerly AV Communication Review)
- Educational and Psychological Measurement (9)
- Educational Research (6)
- Educational Research Quarterly (1)
- Educational Researcher
- Educational Studies in Mathematics (2)
  Educational Review (1)
- Educational Technology (1)
- Elementary School Journal (6)
- Exceptional Children (3)
- Genetic Psychology Monographs (1)
- Harvard Educational Review
- International Journal of Mathematical
  Education in Science and Technology (7)
- Journal of Children's Mathematical Behavior (1)
- Journal of Educational Measurement (4)
- Journal of Educational Psychology (22)
- Journal of Educational Research (9)
- Journal of Experimental Child Psychology (2)
- Journal of Experimental Education (7)
- Journal of Genetic Psychology (6)
- Journal for Research in Mathematics Education (29)
- Journal of Research in Science Teaching (7)
- Journal of School Psychology (3)
- Journal of Social Psychology (1)
- Mathematics in School (2)
- Mathematics Teacher (6)
- Mathematics Teaching (3)
- MATYC Journal (2)
  Physics Teacher (1)
- Psychological Reports (6)
- Psychology in the Schools (6)
- Review of Educational Research (3)
  Science and Children (1)
- School Science and Mathematics (22)
- Science Education (2)
- Two-Year College Mathematics Journal (1)
INDEX

This index is designed to help the reader locate references to designated mathematical topics. Not all studies are included, nor is the cross-referencing exhaustive. The studies have been grouped by source (J, journal; D, dissertation); level is indicated by E, elementary; S, secondary; and C, college and other postsecondary.

### Achievement Evaluation

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aleamoni and Obeler</td>
<td>C</td>
</tr>
<tr>
<td>Beckmann</td>
<td>S</td>
</tr>
<tr>
<td>Berry</td>
<td>S</td>
</tr>
<tr>
<td>Bohannon and Smith</td>
<td>C</td>
</tr>
<tr>
<td>Bowman and Fillios</td>
<td>E/S</td>
</tr>
<tr>
<td>Braswell</td>
<td>S</td>
</tr>
<tr>
<td>Bridgeman and Shipman</td>
<td>E</td>
</tr>
<tr>
<td>Brooks and Hart</td>
<td>C</td>
</tr>
<tr>
<td>Carter et al.</td>
<td>E</td>
</tr>
<tr>
<td>Cornelius and Cockburn</td>
<td>S</td>
</tr>
<tr>
<td>Cowan and Clary</td>
<td></td>
</tr>
<tr>
<td>David and Pelavin</td>
<td>S</td>
</tr>
<tr>
<td>Essen et al.</td>
<td>E/S</td>
</tr>
<tr>
<td>Ferguson and Schmeiser</td>
<td>S</td>
</tr>
<tr>
<td>Fitzgerald</td>
<td>S</td>
</tr>
<tr>
<td>Fitzpatrick</td>
<td>S</td>
</tr>
<tr>
<td>Flynn and Flynn</td>
<td>E</td>
</tr>
<tr>
<td>Fogelman</td>
<td>E/S</td>
</tr>
<tr>
<td>Fogelman and Gorbach</td>
<td>E</td>
</tr>
<tr>
<td>Harnaqvist</td>
<td>E/S</td>
</tr>
<tr>
<td>Hart</td>
<td>S</td>
</tr>
<tr>
<td>Hornik</td>
<td>S</td>
</tr>
<tr>
<td>James and Kniej</td>
<td>E</td>
</tr>
<tr>
<td>Jerse and Fakoun</td>
<td>E</td>
</tr>
<tr>
<td>Klein</td>
<td>E</td>
</tr>
<tr>
<td>Kraneer</td>
<td>E</td>
</tr>
<tr>
<td>Lloyd</td>
<td>C</td>
</tr>
<tr>
<td>McCully</td>
<td>S</td>
</tr>
<tr>
<td>Modjeski and Michael</td>
<td>C</td>
</tr>
<tr>
<td>Moore et al.</td>
<td>E/S</td>
</tr>
<tr>
<td>Oakland</td>
<td>E</td>
</tr>
<tr>
<td>Rakow et al.</td>
<td>S</td>
</tr>
<tr>
<td>Remick and Miller</td>
<td>C</td>
</tr>
<tr>
<td>Reys</td>
<td>S/C</td>
</tr>
<tr>
<td>Spiegel and Bryant</td>
<td>E</td>
</tr>
<tr>
<td>Stanley</td>
<td>S</td>
</tr>
<tr>
<td>Steinbauer and Heller</td>
<td>E</td>
</tr>
<tr>
<td>Troutman</td>
<td>C</td>
</tr>
<tr>
<td>Velanda et al</td>
<td>S</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walsh and Walsh</td>
<td>S</td>
</tr>
<tr>
<td>Wikoff and Kafka</td>
<td>C</td>
</tr>
<tr>
<td>Wood</td>
<td>S</td>
</tr>
</tbody>
</table>

### Algebra

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amthor</td>
<td>E</td>
</tr>
<tr>
<td>Brooks</td>
<td>C</td>
</tr>
<tr>
<td>Brower</td>
<td>C</td>
</tr>
<tr>
<td>Cellon</td>
<td>E</td>
</tr>
<tr>
<td>Ciriza</td>
<td>C</td>
</tr>
<tr>
<td>Cookson</td>
<td>C</td>
</tr>
<tr>
<td>Cossio</td>
<td>E</td>
</tr>
<tr>
<td>Courtney</td>
<td>E</td>
</tr>
<tr>
<td>Fayock</td>
<td>C</td>
</tr>
<tr>
<td>Fischer, J.</td>
<td>C</td>
</tr>
<tr>
<td>Foshay</td>
<td>C</td>
</tr>
<tr>
<td>Fowler, E.</td>
<td>S</td>
</tr>
<tr>
<td>Giesbrecht</td>
<td>S</td>
</tr>
<tr>
<td>Gironda</td>
<td>S</td>
</tr>
<tr>
<td>Goodrum</td>
<td>S</td>
</tr>
<tr>
<td>Gordon</td>
<td>S</td>
</tr>
<tr>
<td>Hall</td>
<td>E/S</td>
</tr>
<tr>
<td>Huff</td>
<td>C</td>
</tr>
<tr>
<td>Jackson</td>
<td>C</td>
</tr>
<tr>
<td>Johns</td>
<td>E/S/C</td>
</tr>
<tr>
<td>Johnson, P.</td>
<td>S</td>
</tr>
<tr>
<td>Juarez</td>
<td>C</td>
</tr>
<tr>
<td>Kelly</td>
<td>C</td>
</tr>
<tr>
<td>Luan</td>
<td>S</td>
</tr>
<tr>
<td>Lyon</td>
<td>C</td>
</tr>
<tr>
<td>Malone</td>
<td>C</td>
</tr>
<tr>
<td>Mason</td>
<td>C</td>
</tr>
<tr>
<td>Medusky</td>
<td>C</td>
</tr>
<tr>
<td>Murry</td>
<td>S</td>
</tr>
<tr>
<td>O'Manony</td>
<td>C</td>
</tr>
</tbody>
</table>

### Analysis of Tests

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Behr and Eastman</td>
<td>E/C</td>
</tr>
<tr>
<td>Perkins</td>
<td>C</td>
</tr>
<tr>
<td>Peterson</td>
<td>C</td>
</tr>
<tr>
<td>Racette</td>
<td>C</td>
</tr>
<tr>
<td>Radloff</td>
<td>C</td>
</tr>
<tr>
<td>Reed</td>
<td>S</td>
</tr>
<tr>
<td>Richbart</td>
<td>S</td>
</tr>
<tr>
<td>Roecks</td>
<td>E</td>
</tr>
<tr>
<td>Simons</td>
<td>E</td>
</tr>
<tr>
<td>Smith, C.</td>
<td>C</td>
</tr>
<tr>
<td>Stewart, J.</td>
<td>E/S</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bohnnapp and Smith</td>
<td>C</td>
</tr>
<tr>
<td>Bowman and Fillios</td>
<td>S</td>
</tr>
<tr>
<td>Braswell</td>
<td>S</td>
</tr>
<tr>
<td>Bridgeman and Shipman</td>
<td>E</td>
</tr>
<tr>
<td>Brooks and Hart</td>
<td>C</td>
</tr>
<tr>
<td>Carter et al.</td>
<td>E</td>
</tr>
<tr>
<td>Cornelius and Cockburn</td>
<td>S</td>
</tr>
<tr>
<td>Cowan and Clary</td>
<td></td>
</tr>
<tr>
<td>David and Pelavin</td>
<td>S</td>
</tr>
<tr>
<td>Essen et al.</td>
<td>E/S</td>
</tr>
<tr>
<td>Ferguson and Schmeiser</td>
<td>S</td>
</tr>
<tr>
<td>Fitzgerald</td>
<td>S</td>
</tr>
<tr>
<td>Fitzpatrick</td>
<td>S</td>
</tr>
<tr>
<td>Flynn and Flynn</td>
<td>E</td>
</tr>
<tr>
<td>Fogelman</td>
<td>E/S</td>
</tr>
<tr>
<td>Fogelman and Gorbach</td>
<td>E</td>
</tr>
<tr>
<td>Harnaqvist</td>
<td>E/S</td>
</tr>
<tr>
<td>Hart</td>
<td>S</td>
</tr>
<tr>
<td>Hornik</td>
<td>S</td>
</tr>
<tr>
<td>James and Kniej</td>
<td>E</td>
</tr>
<tr>
<td>Jerse and Fakoun</td>
<td>E</td>
</tr>
<tr>
<td>Klein</td>
<td>E</td>
</tr>
<tr>
<td>Kraneer</td>
<td>E</td>
</tr>
<tr>
<td>Lloyd</td>
<td>C</td>
</tr>
<tr>
<td>McCully</td>
<td>S</td>
</tr>
<tr>
<td>Modjeski and Michael</td>
<td>C</td>
</tr>
<tr>
<td>Moore et al.</td>
<td>E/S</td>
</tr>
<tr>
<td>Oakland</td>
<td>E</td>
</tr>
<tr>
<td>Rakow et al.</td>
<td>S</td>
</tr>
<tr>
<td>Remick and Miller</td>
<td>C</td>
</tr>
<tr>
<td>Reys</td>
<td>S/C</td>
</tr>
<tr>
<td>Spiegel and Bryant</td>
<td>E</td>
</tr>
<tr>
<td>Stanley</td>
<td>S</td>
</tr>
<tr>
<td>Steinbauer and Heller</td>
<td>E</td>
</tr>
<tr>
<td>Troutman</td>
<td>C</td>
</tr>
<tr>
<td>Velanda et al</td>
<td>S</td>
</tr>
</tbody>
</table>

### Achievements Evaluation

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walsh and Walsh</td>
<td>S</td>
</tr>
<tr>
<td>Wikoff and Kafka</td>
<td>C</td>
</tr>
<tr>
<td>Wood</td>
<td>S</td>
</tr>
</tbody>
</table>

### Algebra

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amthor</td>
<td>E</td>
</tr>
<tr>
<td>Brooks</td>
<td>C</td>
</tr>
<tr>
<td>Brower</td>
<td>C</td>
</tr>
<tr>
<td>Cellon</td>
<td>E</td>
</tr>
<tr>
<td>Ciriza</td>
<td>C</td>
</tr>
<tr>
<td>Cookson</td>
<td>C</td>
</tr>
<tr>
<td>Cossio</td>
<td>E</td>
</tr>
<tr>
<td>Courtney</td>
<td>E</td>
</tr>
<tr>
<td>Fayock</td>
<td>C</td>
</tr>
<tr>
<td>Fischer, J.</td>
<td>C</td>
</tr>
<tr>
<td>Foshay</td>
<td>C</td>
</tr>
<tr>
<td>Fowler, E.</td>
<td>S</td>
</tr>
<tr>
<td>Giesbrecht</td>
<td>S</td>
</tr>
<tr>
<td>Gironda</td>
<td>S</td>
</tr>
<tr>
<td>Goodrum</td>
<td>S</td>
</tr>
<tr>
<td>Gordon</td>
<td>S</td>
</tr>
<tr>
<td>Hall</td>
<td>E/S</td>
</tr>
<tr>
<td>Huff</td>
<td>C</td>
</tr>
<tr>
<td>Jackson</td>
<td>C</td>
</tr>
<tr>
<td>Johns</td>
<td>E/S/C</td>
</tr>
<tr>
<td>Johnson, P.</td>
<td>S</td>
</tr>
<tr>
<td>Juarez</td>
<td>C</td>
</tr>
<tr>
<td>Kelly</td>
<td>C</td>
</tr>
<tr>
<td>Luan</td>
<td>S</td>
</tr>
<tr>
<td>Lyon</td>
<td>C</td>
</tr>
<tr>
<td>Malone</td>
<td>C</td>
</tr>
<tr>
<td>Mason</td>
<td>C</td>
</tr>
<tr>
<td>Medusky</td>
<td>C</td>
</tr>
<tr>
<td>Murry</td>
<td>S</td>
</tr>
<tr>
<td>O'Manony</td>
<td>C</td>
</tr>
</tbody>
</table>

### Analysis of Tests

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Behr and Eastman</td>
<td>E/C</td>
</tr>
<tr>
<td>Perkins</td>
<td>C</td>
</tr>
<tr>
<td>Peterson</td>
<td>C</td>
</tr>
<tr>
<td>Racette</td>
<td>C</td>
</tr>
<tr>
<td>Radloff</td>
<td>C</td>
</tr>
<tr>
<td>Reed</td>
<td>S</td>
</tr>
<tr>
<td>Richbart</td>
<td>S</td>
</tr>
<tr>
<td>Roecks</td>
<td>E</td>
</tr>
<tr>
<td>Simons</td>
<td>E</td>
</tr>
<tr>
<td>Smith, C.</td>
<td>C</td>
</tr>
<tr>
<td>Stewart, J.</td>
<td>E/S</td>
</tr>
</tbody>
</table>

July 1979 317
<table>
<thead>
<tr>
<th>Variables</th>
<th>Learning Theory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bates</td>
<td>S</td>
</tr>
<tr>
<td>Battista</td>
<td>C</td>
</tr>
<tr>
<td>Berman</td>
<td>E</td>
</tr>
<tr>
<td>Brockmann</td>
<td>E</td>
</tr>
<tr>
<td>Brook</td>
<td>E</td>
</tr>
<tr>
<td>Cavanaugh</td>
<td>E</td>
</tr>
<tr>
<td>Chang, U.</td>
<td>E</td>
</tr>
<tr>
<td>Charles</td>
<td>S</td>
</tr>
<tr>
<td>Clothiaux</td>
<td>E</td>
</tr>
<tr>
<td>Coppus</td>
<td>E</td>
</tr>
<tr>
<td>Cunningham</td>
<td>E</td>
</tr>
<tr>
<td>Davis, S.</td>
<td>S</td>
</tr>
<tr>
<td>Dejarnette-Ondrus</td>
<td>S</td>
</tr>
<tr>
<td>Elman</td>
<td>E</td>
</tr>
<tr>
<td>Endicott</td>
<td>S</td>
</tr>
<tr>
<td>Fitzgerald</td>
<td>S</td>
</tr>
<tr>
<td>Generes</td>
<td>E</td>
</tr>
<tr>
<td>Grossman</td>
<td>C</td>
</tr>
<tr>
<td>Guthne</td>
<td>E</td>
</tr>
<tr>
<td>Hamzeh</td>
<td>E</td>
</tr>
<tr>
<td>Hayatgeib</td>
<td>S</td>
</tr>
<tr>
<td>Hayden</td>
<td>E</td>
</tr>
<tr>
<td>Horak</td>
<td>C</td>
</tr>
<tr>
<td>Jemmot</td>
<td>E</td>
</tr>
<tr>
<td>Josephson</td>
<td>S</td>
</tr>
<tr>
<td>Lockwood</td>
<td>S</td>
</tr>
<tr>
<td>Marcy</td>
<td>C</td>
</tr>
<tr>
<td>McBride</td>
<td>S</td>
</tr>
<tr>
<td>Miller, B.</td>
<td>E</td>
</tr>
<tr>
<td>Monteiro</td>
<td>E</td>
</tr>
<tr>
<td>Morales</td>
<td>E</td>
</tr>
<tr>
<td>Moroz</td>
<td>S</td>
</tr>
<tr>
<td>Mueller</td>
<td>E</td>
</tr>
<tr>
<td>Oliyae-Zand</td>
<td>S</td>
</tr>
<tr>
<td>Pasquino</td>
<td>E</td>
</tr>
<tr>
<td>Radeloff</td>
<td>E</td>
</tr>
<tr>
<td>Rogerson</td>
<td>E</td>
</tr>
<tr>
<td>Rosenberger</td>
<td>E</td>
</tr>
<tr>
<td>Safran</td>
<td>S</td>
</tr>
<tr>
<td>Sanjivanurthy</td>
<td>C</td>
</tr>
<tr>
<td>Schmidt</td>
<td>E</td>
</tr>
<tr>
<td>Semmes</td>
<td>E</td>
</tr>
<tr>
<td>Silverman</td>
<td>C</td>
</tr>
<tr>
<td>Smith, H.</td>
<td>E</td>
</tr>
<tr>
<td>Smith, J.</td>
<td>E</td>
</tr>
<tr>
<td>Staszkiewicz</td>
<td>C</td>
</tr>
<tr>
<td>Stiff</td>
<td>E</td>
</tr>
<tr>
<td>Swatsenbarg</td>
<td>S</td>
</tr>
<tr>
<td>Werstein</td>
<td>E</td>
</tr>
<tr>
<td>Wiesner</td>
<td>E</td>
</tr>
<tr>
<td>Wyatt</td>
<td>C</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Measurement</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Allen</td>
<td>E</td>
</tr>
<tr>
<td>Battista</td>
<td>E</td>
</tr>
<tr>
<td>Connell</td>
<td>E</td>
</tr>
<tr>
<td>Corwin</td>
<td>E</td>
</tr>
<tr>
<td>Cossio</td>
<td>E</td>
</tr>
<tr>
<td>Crown</td>
<td>C</td>
</tr>
<tr>
<td>Gast</td>
<td>E</td>
</tr>
<tr>
<td>Generes</td>
<td>E</td>
</tr>
<tr>
<td>Gerling</td>
<td>E</td>
</tr>
<tr>
<td>Monteiro</td>
<td>E</td>
</tr>
<tr>
<td>Robinson</td>
<td>E</td>
</tr>
<tr>
<td>Sangviriakul</td>
<td>S</td>
</tr>
<tr>
<td>Semmes</td>
<td>S</td>
</tr>
<tr>
<td>Smith, W.</td>
<td>E</td>
</tr>
<tr>
<td>Tanguma</td>
<td>E</td>
</tr>
<tr>
<td>Thomas, O.</td>
<td>E</td>
</tr>
<tr>
<td>Tilson</td>
<td>C</td>
</tr>
<tr>
<td>Turner</td>
<td>S</td>
</tr>
<tr>
<td>Watkins</td>
<td>C</td>
</tr>
<tr>
<td>Webber</td>
<td>E</td>
</tr>
<tr>
<td>Weiland</td>
<td>E</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Materials</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Anderson and Maguire</td>
<td>E</td>
</tr>
<tr>
<td>Bana and Nelson</td>
<td>E</td>
</tr>
<tr>
<td>Barnett and Eastman</td>
<td>E</td>
</tr>
<tr>
<td>Boyce</td>
<td>E</td>
</tr>
<tr>
<td>Campbell</td>
<td>E</td>
</tr>
<tr>
<td>Claxton and Acres</td>
<td>E</td>
</tr>
<tr>
<td>Duby</td>
<td>E</td>
</tr>
<tr>
<td>Friedman</td>
<td>E/S</td>
</tr>
<tr>
<td>Greabell</td>
<td>E</td>
</tr>
<tr>
<td>Giunau</td>
<td>E</td>
</tr>
<tr>
<td>Hadar</td>
<td>S</td>
</tr>
<tr>
<td>Hornik</td>
<td>E</td>
</tr>
<tr>
<td>McLeod et al.</td>
<td>E</td>
</tr>
<tr>
<td>Moore and Parr</td>
<td>E</td>
</tr>
<tr>
<td>Prigge</td>
<td>E</td>
</tr>
<tr>
<td>Swain and Barik</td>
<td>E</td>
</tr>
<tr>
<td>Wollman and Lawson</td>
<td>S</td>
</tr>
<tr>
<td>Alderman</td>
<td>E</td>
</tr>
<tr>
<td>Anderson, B</td>
<td>C</td>
</tr>
<tr>
<td>Areougheti</td>
<td>S</td>
</tr>
<tr>
<td>Bachmann</td>
<td>S</td>
</tr>
<tr>
<td>Allen</td>
<td>S</td>
</tr>
<tr>
<td>Arougheti</td>
<td>S</td>
</tr>
<tr>
<td>Bachmann</td>
<td>E</td>
</tr>
<tr>
<td>Acosta</td>
<td>E</td>
</tr>
<tr>
<td>Anderson, B</td>
<td>C</td>
</tr>
<tr>
<td>Areougheti</td>
<td>S</td>
</tr>
<tr>
<td>Bachmann</td>
<td>S</td>
</tr>
<tr>
<td>Alderman</td>
<td>E</td>
</tr>
<tr>
<td>Anderson, B</td>
<td>C</td>
</tr>
<tr>
<td>Acosta</td>
<td>E</td>
</tr>
<tr>
<td>Areougheti</td>
<td>S</td>
</tr>
<tr>
<td>Bachmann</td>
<td>S</td>
</tr>
</tbody>
</table>

July 1979  319
Number and Numeration

J
Barr
Flexer
Gullen
Hook
Russak
Shannon

D
Allardice
Boelke
Brockmann
Clothiaux
Cohen, P.
Crown
Gullen
Montero
Montgomery
Thomas, P.

Operations with Whole Numbers and Fractions

J
Alderman
Babad and Bashi
Bell and Nelson
Barnett and Eastman
Broughton and Lahey
Brown and Burton
Brush
Campbell
Eichelberg-Laursen
Grunau
Herbert and
Tonnesen
Howell
Kieren and Nelson
Lafron
Vest
Wheatley and
Wheatley

D
Alderman
Allardice
Allen
Berger
Bird
Boylan
Campbell
Crown
Daugherty
Davis, S.
Gabbard
Genaes
Gerling
Graham
Grossman
Hebbeler
Johnston
Marcy
McBride
Smith, R.
Travis
Turner
Weland
Woodward

Organizing and Grouping

J
Becker and Young
Behr and Eastman
Breuning
Claxton and Acres
Duby
Eastman and Salhab
Eshel and Klein
Fitzgerald
Flexer
Forman and McKinney
Hassett and Thompson
Hundert and Batsone
Irwin et al.
James and Kniief
Johnson et al.
Lukasevich and Gray
Mayer
McLeod et al.
Meyers et al.
Miller and Sabatino
Moers and Harris
Moore and Parr
Packer and Bain
Pascarella
Ritter
Sagotsky et al.
Sawada and Jarman
Schunke
Seidner et al.
Strang et al.
Swain and Bank
Town

Other Individual
Factors

J
Abel
Adair
Azz
Barr
Ballain
Beohmer
Boslin
Briggs, J.
Cusner
Chang, P.
Cohen, C.
Crockett
Daughdrill
Dejarnette-Odums
Dianna
Fitzgerald
Flowers
Geimer
Greenwood
Grimshaw
Hartley
Herman
Hoek
Huff
Johnson, W.
Jolly
Jones
Keating
Koons
London
Matty
McCabe
McDermott
McFarland
Miller, L.
Nicholson
Olson
Pribnow
Price, D.
Randle
Romine
Salviani
Savage
Scrofani
Sears
Stewart, J.
Swan
Tanguma
Tapp
Tate
Thomas, O.
Thomas, P.
Tilson
Vincent
Welsh, N M
Weeks
White
Zucker