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ABSTRACT

This annotated bibliography lists research related to mathematics teaching and learning published in the United States in 1971. Each annotation gives major results and appropriate level of the study. The first section (Research Summaries) lists research summaries which review groups of research studies or basic research techniques. The second section (Journal-Published Reports) contains research reports which appeared in major journals in 1971. The third and final section (Dissertation Abstracts) covers dissertations announced in DISSERTATION ABSTRACTS INTERNATIONAL. (Author/JM)

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MATHEMATICS EDUCATION REPORTS

RESEARCH ON MATHEMATICS EDUCATION (K-12)

REPORTED IN 1971

by

Marilyn N. Suydam

with the assistance of

J. Fred Weaver

ERIC Information Analysis Center for
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1460 West Lane Avenue
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Mathematics Education Reports

Mathematics Education Reports are being developed to disseminate information concerning mathematics education documents analyzed at the ERIC Information Analysis Center for Science, Mathematics, and Environmental Education. These reports fall into three broad categories. Research reviews summarize and analyze recent research in specific areas of mathematics education. Resource guides identify and analyze materials and references for use by mathematics teachers at all levels. Special bibliographies announce the availability of documents and review the literature in selected interest areas of mathematics education. Reports in each of these categories may also be targeted for specific sub-populations of the mathematics education community. Priorities for the development of future Mathematics Education Reports are established by the advisory board of the Center, in cooperation with the National Council of Teachers of Mathematics, the Special Interest Group for Research in Mathematics Education, the Conference Board of the Mathematical Sciences, and other professional groups in mathematics education. Individual comments on past Reports and suggestions for future Reports are always welcomed by the editor.

This annotated bibliography lists research related to mathematics teaching and learning which was published in the United States during 1971. The listing covers kindergarten through grade twelve levels and is divided into three major sections. The first section lists research summaries which review groups of research studies or basic research techniques. The second section contains research reports which appeared in major journals during 1971. The final section (Dissertation Abstracts) contains brief annotations of dissertations announced in Dissertation Abstracts International. (To conserve space, this reference is referred to as DAI in the listings.)

The ERIC Information Analysis Center for Science, Mathematics, and Environmental Education is pleased to make this annotated bibliography available as a Mathematics Education Report.

Jon L. Higgins
Editor

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RESEARCH ON MATHEMATICS EDUCATION (K-12)
REPORTED IN 1971

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I. Research Summaries

Aiken, Lewis R., Jr. Verbal Factors and Mathematics Learning: A Review of Research. Journal for Research in Mathematics Education 2: 304-313; November 1971.

The relationship of mathematical ability to reading ability and general intelligence, reading instruction and mathematics learning, and student and teacher verbalizations were discussed. (kindergarten-grade 12)

Aiken, Lewis R., Jr. Intellective Variables and Mathematics Achievement: Directions for Research. Journal of School Psychology 9: 201-212; 1971.

Research findings on general versus specific mathematical factors, age and sex differences, verbal and other abilities, and mathematical ability and method of instruction are discussed, with 60 references cited. (kindergarten-grade 12)

Earp, N. Wesley. Problems of Reading in Mathematics. School Science and Mathematics 71: 129-133; February 1971.

Findings from eight studies on vocabulary were discussed to support the contention that children must be helped to read mathematics materials. (grades 1-12)

Kieren, Thomas E. Manipulative Activity in Mathematics Learning. Journal for Research in Mathematics Education 2: 228-234; May 1971.

The place of manipulative activity in the instructional sequence and their value in promoting learning were discussed.

Mangrum, Charles T., II and Knight, Carlton W., II. Doctoral Dissertation Research in Science and Mathematics Reported for Volume 29 of Dissertation Abstracts. School Science and Mathematics 71: 203-225; March 71. (ERIC Document No. EJ 037 158)

Forty-four elementary school mathematics dissertations were listed, 32 on secondary school mathematics, 14 on teacher education, and 23 on college and adult mathematics education. (kindergarten-adult)

Metzner, Seymour. The Elementary Teacher and the Teaching of Arithmetic: A Study in Paradox. School Science and Mathematics 71: 479-482; June 1971.

That teachers like to teach arithmetic may be related to personality structure; it does not seem related to their liking for mathematics.

Riedesel, C. Alan. Research Suggestions: Use of Time in Teaching Elementary School Mathematics. Arithmetic Teacher 18: 177-179; March 1971. (ERIC Document No. EJ 035 214)

Research findings on length of class period, use of time, the role of homework, and retention were discussed. (kindergarten-grade 8)

Suydam, Marilyn N. and Weaver, J. Fred. Research on Mathematics Education (K-12) Reported in 1970. Journal for Research in Mathematics Education 2: 257-298; November 1971.

Fourteen summaries, 91 articles, and 223 dissertations were listed with annotations. (kindergarten-grade 12)

Vance, James H. and Kieren, Thomas E. Laboratory Settings in Mathematics: What Does Research Say to the Teacher? Arithmetic Teacher 18: 585-589; December 1971.

Research indicates that children can learn from and like mathematics laboratory approaches.

II. Journal-Published Reports

Allen, Ernest Edgar. Selected Characteristics of Junior High Level Mathematics Teachers in Colorado. Colorado Journal of Educational Research 10: 59; Spring 1971.

The need for pre-service programs and in-service courses designed especially for junior high teachers was presented. (secondary in-service)

Alspaugh, John W. The Relationship of Grade Placement to Programming Aptitude and FORTRAN Programming Achievement. Journal for Research in Mathematics Education 2: 44-48; January 1971.

High school students who had twice the number of hours of instruction learned FORTRAN as well as college students did. (grades 11, 12, college)

Anderson, Gary J. Effects of Course Content and Teacher Sex on the Social Climate of Learning. American Educational Research Journal 8: 649-663; November 1971.

The nine mathematics classes were characterized by high friction, favoritism, difficulty, cliqueness, and disorganization, and low formality and goal direction scores. They seemed to exemplify the student-centered activity approach to learning. (grades 10, 11)

Anderson, James G. and Johnson, William H. Stability and Change Among Three Generations of Mexican-Americans: Factors Affecting Achievement. American Educational Research Journal 8: 285-309; March 1971.

Self-concept of ability appeared to contribute the most to the prediction of success in mathematics and English. Parental stress on achievement and on attending college were also factors, and student desire to obtain high grades was significantly related to mathematics achievement. (grades 7-12)

Baker, Eva L. The Effects of Manipulated Item Writing Constraints on the Homogeneity of Test Items. Journal of Educational Measurement 8: 305-309; Winter 1971.

Subtraction test items written to meet behavioral objectives and under certain specifications were easier than those written under no specifications or for non-behavioral objectives. (grade 7, secondary pre-service)

Bassler, Otto C.; Curry, Dick; Hall, Wayne; and Mealy, Ed. An Investigation of Two Instructional Variables in Learning Nonmetric Geometry. School Science and Mathematics 71: 441-450; May 1971.

No significant differences were found for groups receiving one, three, or five exercises per learning set or for either an informal inductive or formal deductive mode. (grade 7)

Bassler, Otto C.; Hill, Warren H., Jr.; Ingle, Josephine A.; and Sparks, Billie Earl. Comparison of Two Levels of Guidance in Teaching Elementary School Mathematics. School Science and Mathematics 71: 303-312; April 1971.

No reliable differences were found between maximal and intermediate guidance on programmed mathematics units. (grades 4, 6, 8)

Bat-Haee, Mohammad Ali. Conservation of Mass, Weight, and Volume in Intermediate Grades. Psychological Reports 28: 163-168; February 1971.

Results confirmed Piaget's description of the sequential attainment of the three types of conservation. (grades 4-6)

Bennett, Lloyd M. and Walker, Reba K. Training Subordinate Processes Involved in Categorization. School Science and Mathematics 71: 703-706; November 1971.

Direct training of subordinate processes of categorization of size, form, number and other factors improved performance but did not generalize to higher level tasks. (nursery school)

Bidwell, James K. Some Consequences of Learning Theory Applied to Division of Fractions. School Science and Mathematics 71: 426-434; May 1971.

The inverse operation method was significantly better than the common denominator or complex fraction method. (elementary)

Bledsoe, Joseph C.; Brown, Iva D.; and Strickland, Arthur D. Factors Related to Pupil Observation Reports of Teachers and Attitudes Toward Their Teacher. Journal of Educational Research 65: 119-126; November 1971.

It was concluded that girls favored social studies teachers, while boys had more favorable perceptions of science and mathematics teachers. (secondary)

Bohrnstedt, George W.; Lambert, Philip; and Borgatta, Edgar F. The Reliability and Validity of Quick Tests with High School Seniors. Journal of Experimental Education 39: 22-23; Summer 1971.

The short number test was found to correlate about as well as longer tests with GPA. (grade 12)

Brumbaugh, Douglas K. Isolation of Factors That Influence the Ability of Young Children to Associate a Solid with a Representation of That Solid. Arithmetic Teacher 18: 49-52; January 1971. (ERIC Document No. EJ 032 208)

Correct classification of cubes and rectangular solids was most difficult; cylinders, spheres, and ellipsoids were relatively easy. They associated solids equally well with photographs and drawings. (ages 3, 4)

Byrkit, Donald R. Using Televised and Aural Materials for Mathematics Teachers. Mathematics Teacher 64: 519-524; October 1971.

For a lesson on number theory, the addition of television resulted in higher scores, but possibly not more effective than audiotape presentation. (secondary in-service)

Calhoun, L. G. Number Conservation in Very Young Children: The Effect of Age and Mode of Responding. Child Development 42: 561-572; June 1971.

Conservation responses increased with age. The eating and pointing responses were not significantly different, although performance with the pointing response decreased for age 3. (ages 2-4)

Callahan, Leroy G. and Passi, Sneh Lata. The Relationship Between the Ability to Conserve Length and Conceptual Tempo. Journal for Research in Mathematics Education 2: 36-43; January 1971. (ERIC Document No. EJ 033 810)

There was a tendency for reflective children to conserve more often than impulsive children, but differences were not statistically significant. (kindergarten, grade 1)

Callahan, Walter J. Adolescent Attitudes Toward Mathematics. Mathematics Teacher 64: 751-755; December 1971.

Twenty per cent of the students felt they disliked mathematics, 18 per cent were neutral, and 62 per cent liked it. These results were more positive than those obtained by using Dutton's scale. (grade 8)

Carey, Russell L. and Steffe, Leslie P. Before Children Can Measure. Elementary School Journal 71: 286-292; February 1971.

Pre-measurement activities were successful in improving ability to compare lengths using "longer than", "shorter than", and "the same length as". (ages 4, 5)

Cartwright, G. Phillip. The Relationship Between Sequences of Instruction and Mental Abilities of Retarded Children. American Educational Research Journal 8: 143-150; January 1971. (ERIC Document No. EJ 036 731)

No significant differences in achievement, retention, or transfer were found between groups using scrambled or ordered programs on fractions. (ages 15-20 [MR])

Cathcart, W. George. The Relationship Between Primary Students' Rationalization of Conservation and Their Mathematical Achievement. Child Development 42: 755-765; September 1971.

Arguments involving identity were the most common rationalizations for conservation, followed by arguments involving compensation and reversibility. Mode of rationalization was related to ability to conserve. (grades 2, 3)

Collis, K. F. A Technique for Studying Concept Formation in Mathematics. Journal for Research in Mathematics Education 2: 12-22; January 1971. (ERIC Document No. EJ 033 809)

A card-sorting task was found to be a plausible way to study students' categorization of certain principles, and thus to evaluate their conceptualization for a mathematics course. (grade 8)

Coppedge, Floyd L. and Hanna, Gerald S. Comparison of Teacher-Written and Empirically Derived Distractors to Multiple-Choice Test Questions. Journal for Research in Mathematics Education 2: 299-303; November 1971.

Teachers did not produce multiple-choice geometry item distractors that were very similar to the discriminating errors students made using completion format. It was suggested that multiple-choice tests be developed after analysis of completion tests. (grade 10)

Edwards, R. Philip; Alley, Gordon R.; and Snider, Bill. Academic Achievement and Minimal Brain Dysfunction in Mentally Retarded Children. Exceptional Children 37: 539-540; March 1971.

Arithmetic achievement of mentally retarded children was related to visual-motor impairment but not to impaired soft neurological signs. (MA 5-11)

Engle, Carol D. and Lerch, Harold H. A Comparison of First-Grade Children's Abilities on Two Types of Arithmetical Practice Exercises. School Science and Mathematics 71: 327-334; April 1971. (ERIC Document No. EJ 037 870)

Pupils who had not studied closed sentences were able to state whether they were true or false almost as well as they could complete open sentences. Girls scored higher than boys. (grade 1)

Feigenbaum, Kenneth D. A Pilot Investigation of the Effects of Training Techniques Designed to Accelerate Children's Acquisition of Conservation of Discontinuous Quantity. Journal of Genetic Psychology 119: 13-23; September 1971.

The reversibility-reciprocity training was most effective in improving conservation scores and social role-taking ability. (pre-school, ages 4-5)

Feldhusen, John F.; Treffinger, Donald J.; Van Mondfrans, Adrain P.; and Ferris, Donald R. The Relationship Between Academic Grades and Divergent Thinking Scores Derived from Four Different Methods of Testing. Journal of Experimental Education 40: 35-40; Fall 1971.

For mathematics achievement, correlations obtained under a game-like method of testing were lower than under standard, prior practice for creativity, or take-home procedures. (grades 5, 8, 11)

Flynn, John T. and Mauser, August J. Contribution of a Non-Cognitive Variable to Achievement of Gifted Students Using Programmed Instruction. Contemporary Education 42: 134-138; January 1971.

No significant differences were found between gifted students at any anxiety level taught a unit on vector geometry by programmed or regular instruction. (grades 10-12)

Gavurin, Lester L. Two NSF-Supported Projects for Teachers of Advanced Placement Calculus. Mathematics Teacher 64: 361-366; April 1971.

Few additional schools added calculus courses after teachers participated in an institute, but 12 per cent added calculus to existing courses. (secondary in-service)

Gipson, Joella. Use of the Environment and Discovery in Teaching Decimals to Second Grade Children. School Science and Mathematics 71: 737-741; November 1971.

Use of familiar situations and manipulative materials resulted in a mean score of 14.75 on a 20-item test on decimals. (grade 2)

Glavin, John P.; Quay, Herbert C.; Annesley, Frederick R.; and Werry, John S. An Experimental Resource Room for Behavior Problem Children. Exceptional Children 38: 131-137; October 1971.

The group of behavior problem children given a remedial program with response-reinforcement made significantly greater gain scores in arithmetic fundamentals. (grades 2-6)

Goodstein, H. A.; Cawley, J. F.; Gordon, S.; and Helfgott, J. Verbal Problem Solving Among Educable Mentally Retarded Children. American Journal of Mental Deficiency 76: 238-241; September 1971.

The use of introductory sentences (existential quantification) and different names for subsets (superordinate set identification) did not significantly affect problem solving scores, but extraneous information did affect performance. (age 12)

Goolsby, Thomas M., Jr. Appropriateness of Subtests in Achievement Tests Selection. Educational and Psychological Measurement 31: 969-972; Winter 1971.

Correlations between mathematics subtests of the MAT and SAT ranged from .45 to .53. (grade 7)

Gray, Roland F. and Allison, Donald E. An Experimental Study of the Relationship of Homework to Pupil Success in Computation with Fractions. School Science and Mathematics 71: 339-346; April 1971.

No significant differences were found when students were given three or no homework assignments per week. (grade 6)

Hall, Lucien T., Jr. The Prediction of Success in Each of Six Four-Year Selections of Secondary Mathematics Courses. School Science and Mathematics 71: 693-696; November 1971.

Previous achievement was a prime predictor in equations for use at the end of grades 7, 8, or 9. (grade 11)

Hanna, Gerald S. Testing Students' Ability to do Geometric Proofs: A Comparison of Three Objective Item Types. Journal for Research in Mathematics Education 2: 213-217; May 1971.

Multiple-choice items in which students selected what was given and what was proved or selected the "reason" were recommended over items which merely required the student to note whether a statement could be proved. (grade 10)

Hendrickson, Gerry F. The Effect of Differential Option Weighting on Multiple-Choice Objective Tests. Journal of Educational Measurement 8: 291-296; Winter 1971.

The correlation of two mathematics subtests on the SAT decreased when Guttman weights were used to correct for guessing. (grade 12)

Hoemann, Harry W. and Ross, Bruce M. Children's Understanding of Probability Concepts. Child Development 42: 221-236; March 1971.

Successfully choosing the more favorable odds did not necessarily give an index of probability knowledge. (ages 4-13)

Holt, Gary L. Effect of Reinforcement Contingencies in Increasing Programmed Reading and Mathematics Behaviors in First-Grade Children. Journal of Experimental Child Psychology 12: 362-369; December 1971.

Reinforcement with liked activities after completion of a specified portion of programmed materials resulted in increased response rate. (grade 1)

Hunkler, Richard. A New Look at the Implementation of the CUPM Level I Recommendations. School Science and Mathematics 71: 423-425; May 1971.

Only nine per cent of the teachers had less than two years of college preparatory mathematics, but 90 per cent had less than six hours of college mathematics and 60 per cent had no hours. Only one teacher had met CUPM minimum recommendation of 12 hours. (teachers in grade 6)

Hunkler, Richard. An Evaluation of a Short-Term In-Service Mathematics Program for Elementary School Teachers. School Science and Mathematics 71: 650-654; October 1971.

Completing in-service programs had a positive effect on the concept scores of pupils who had one year of instruction in modern textbooks, but a negative effect on those with two or three years of modern instruction. There was no effect on problem solving scores. (teachers in grade 6)

Ingersoll, Gary M. An Experimental Study of Two Methods of Presenting the Inversion Algorithm in Division of Fractions. California Journal of Educational Research 22: 17-25; January 1971. (ERIC Document No. EJ 033 863)

The complex fraction method appeared to be more effective than a procedure using the associative property. (grade 6)

Jacobs, Paul I. and Vandeventer, Mary. The Learning and Transfer of Double-Classification Skills: A Replication and Extension. Journal of Experimental Child Psychology 12: 240-257; October 1971.

Training on shape and color and extended training including shading and addition also were found to result in significant learning and transfer to various types of classification tasks. (grade 1)

Jones, W. Paul and DeBlassie, Richard R. Social Class Contrasts in Short Term Predictability of Grade 7 Achievement. Journal of Educational Research 65: 11-14; September 1971.

Only correlations on arithmetic concepts subtests for the two lower social classes were significantly different. (grade 7)

Jose, Jean and Cody, John J. Teacher-Pupil Interaction As It Relates to Attempted Changes in Teacher Expectancy of Academic Ability and Achievement. American Educational Research Journal 8: 39-49; January 1971.

No significant differences in IQ, achievement, students' grades or behavior, or teacher behavior were found when teachers were told these students were capable of greater intellectual growth. It was found that teacher expectancy had frequently not been modified. (grades 1, 2)

Kauffman, James M.; Payne, James S.; and Ensminger, E. Eugene. Quantitative Judgments of Culturally Advantaged and Disadvantaged Preschool Children. Psychological Reports 28: 939-944; June 1971.

Conservation-like cognitive operations may be affected by difficulty of the discrimination task, cultural disadvantage, and age. (ages 2-4)

King, William L. A Nonarbitrary Behavioral Criterion for Conservation of Illusion-Distorted Length in Five-Year-Olds. Journal of Experimental Child Psychology 11: 171-181; April 1971.

Choice of correct stick provided a behavioral criterion for conservation, which was achieved by the majority of the children. (ages 4-6)

Klein, Stephen P. and Neidermeyer, Fred C. Direction Sports: A Tutorial Program for Elementary-School Pupils. Elementary School Journal 72: 53-61; November 1971.

A program involving chalk talks on whole number and decimal computation resulted in significant gains in achievement and self-concept. (ages 11, 12)

Kneitz, Margaret H. A Study of Secondary Mathematics Teachers: What Influences Them to Leave the Profession? American Mathematical Monthly 78: 1012-1016; November 1971.

Eighty-five per cent of the sample felt that their mathematics courses had prepared them adequately or better; 72 per cent felt that a methods course had been adequate. Almost half of the graduates were not teaching. (elementary and secondary pre- and in-service)

Lackner, Lois M. A Pilot Study on Teaching the Derivative Concept in Beginning Calculus by Inductive and Deductive Approaches. School Science and Mathematics 71: 563-567; June 1971.

The inductive approach appeared to be more satisfactory than the deductive approach. (grade 12)

Lee, Seong-Soo. The Effects of Visually Represented Cues on Learning of Linear Function Rules. Journal of Experimental Child Psychology 12: 129-145; August 1971.

Graphic and pictorial context combined with a weight cue resulted in faster acquisition of the coefficient rule. Weight and context cues each facilitated learning of the intercept rule. Effects decreased when applied to a complex linear function rule task. (grade 4)

Lenke, Joanne M.; Bligh, Harold F.; and Kane, Bernard H. Cross-Validation of the Orleans-Hanna Algebra Prognosis Test and the Orleans-Hanna Geometry Prognosis Test. Educational and Psychological Measurement 31: 521-523; Summer 1971.

Correlations for the algebra test ranged from .70 to .77, and from .60 to .78 for the geometry test. (grades 8-10)

Lloyd, Barbara B. Studies of Conservation with Yoruba Children of Differing Ages and Experience. Child Development 42: 415-428; June 1971.

Pupils evidenced conservation of number and continuous quantity at the same age as American and other African children. Performance was similar with familiar and alien materials. (ages 3-8)

Marjoribanks, Kevin. Environmental Correlates of Diverse Mental Abilities. Journal of Experimental Education 39: 64-68; Summer 1971.

The environment was found to account for a large percentage of the variance in both number and verbal ability, and some in reasoning ability, but less in spatial ability. (age 11)

Meeker, Mary and Meyers, C. E. Memory Factors and School Success of Average and Special Groups of Ninth-Grade Boys. Genetic Psychological Monographs 83: 275-308; May 1971.

The auditory-backward recall of digits was related to arithmetic achievement. (grade 9)

Minde, K.; Lewin, D.; Weiss, Gabrielle; Lavigueur, H.; Douglas, Virginia; and Sykes, Elizabeth. The Hyperactive Child in Elementary School: A 5 Year, Controlled, Followup. Exceptional Children 38: 215-221; November 1971.

Hyperactive children did not score significantly lower than other children on arithmetic tests. (age 12)

Moody, William B.; Abell, Roberta; and Bausell, R. Barker. The Effect of Activity-Oriented Instruction Upon Original Learning, Transfer, and Retention. Journal for Research in Mathematics Education 2: 207-212; May 1971.

No advantages for activity-oriented instruction were observed on learning, transfer, or retention when compared to rote procedures. (grade 3)

O'Bryan, Kenneth G. and Boersma, Frederic J. Eye Movements, Perceptual Activity, and Conservation Development. Journal of Experimental Child Psychology 12: 157-169; October 1971.

Eye movement patterns of conservers and non-conservers were substantially different. (ages 6-10)

Ohuche, R. Ogbonna. Piaget and the Mende of Sierra Leone. Journal of Experimental Education 39: 75-77; Summer 1971.

Pupils aged 7 to 8 scored significantly higher on conservation of quantity tasks than those younger than 7. (ages 5-7)

Olander, Herbert T. and Ehmer, Charles L. What Pupils Know About Vocabulary in Mathematics--1930 and 1968. Elementary School Journal 71: 361-367; April 1971. (ERIC Document No. EJ 035 466)

On the Buswell-John Vocabulary Test, 1968 pupils achieved higher scores on 74 of 100 items in grade 4, 59 items in grade 5, and only 48 items in grade 6. On a test of contemporary terms, mean scores were 49.34 for grade 4, 57.87 for grade 5, and 64.02 for grade 6. Girls achieved higher scores than boys did. (grades 4-6)

Papalia, Diane E. and Hooper, Frank H. A Developmental Comparison of Identity and Equivalence Conservations. Journal of Experimental Child Psychology 12: 347-361; December 1971.

The order of acquisition of quantity was: qualitative identity, quantitative identity, and equivalence conservation. No significant difference was found for justification and no justification conditions. (ages 4-6)

Postlethwaite, T. N. International Association for the Evaluation of Educational Achievement (IEA)--The Mathematics Study. Journal for Research in Mathematics Education 2: 69-103; March 1971.

Procedures used in the IEA and data on tests and scales were presented. Among the many findings were: (1) age of entry in school was not an important variable in mathematics achievement; (2) type of school affected the achievement of 13-year-olds; (3) correlations between achievement and attitude were small. (grades 8, 12)

Proger, Barton B.; Mann, Lester; Taylor, Raymond G., Jr.; and Morrell, James E. Test Anxiety and Defensiveness Experimentally Induced by Four Conditions of Testing Arousal. Journal of Experimental Education 39: 78-83; Summer 1971.

Students who had daily tests achieved the highest arithmetic scores, followed by daily practice, alternate-day test, and weekly test groups. All four induced comparable degrees of anxiety and defensiveness, as well as comparable decreases in manipulatable anxiety during the study. (grade 6)

Rea, Robert E. and Reys, Robert E. Mathematical Competencies of Negro and Non-Negro Children Entering School. Journal of Negro Education 40: 12-16; Winter 1971. (ERIC Document No. EJ 036 917)

No significant differences on the inventory were found between non-Negro and Negro children entering integrated schools, but both groups scored significantly higher than Negro children entering all-Negro schools. (kindergarten)

Rea, Robert E. and Reys, Robert E. Competencies of Entering Kindergarteners in Geometry, Number, Money, and Measurement. School Science and Mathematics 71: 389-402; May 1971.

Specific data on knowledge of children in each of the four areas were presented. Use of an informal but planned sequence of experiences was recommended. (kindergarten)

Renzulli, Joseph S. and Shaw, Robert A. The Reliability and Validity of the Contemporary Mathematics Test. Educational and Psychological Measurement 31: 973-976; Winter 1971.

Test reliability was found to range from .78 to .88. (grades 7-9)

Rhodes, Fen. Team Teaching Compared with Traditional Instruction in Grades Kindergarten Through Six. Journal of Educational Psychology 62: 110-116; April 1971.

No significant differences in arithmetic scores were found for students having team teaching or traditional instruction. (kindergarten-grade 6)

Rosenfeld, Michael and Hilton, Thomas L. Negro-White Differences in Adolescent Educational Growth. American Educational Research Journal 8: 267-283; March 1971.

Fifth grade Negro students were roughly one year behind white students in mathematics achievement, and the gap widened significantly as the students advanced in grade. By grade 11, the Negro students were two to four years behind. (grades 5-11)

Saxe, Richard W. What's A School For? Elementary School Journal 71: 7-11; October 1971.

Mathematics was the second most cited answer to the question in the title, after "to learn" and followed closely by "to read". (grades 1-6)

Scharf, Eugenia S. The Use of the Semantic Differential in Measuring Attitudes of Elementary School Children Toward Mathematics. School Science and Mathematics 71: 641-649; October 1971.

Students using IPI materials were more positive toward mathematics than non-IPI students. (grades 4-6)

Shepps, Florence P. and Shepps, R. Ronald. Relationship of Study Habits and School Attitudes to Achievement in Mathematics and Reading. Journal of Educational Research 65: 71-73; October 1971.

Attitude subtest scores were found to predict mathematics achievement only for girls. (grade 6)

Sherrill, James M. In-Service Mathematics Education as Viewed by Elementary School Teachers. School Science and Mathematics 71: 615-618; October 1971.

Teachers preferred (1) in-service programs to summer school, (2) equal presentation of methods and content, and (3) involvement of both university and school personnel. (elementary in-service)

Shumway, Richard J. Negative Instances and Mathematical Concept Formation: A Preliminary Study. Journal for Research in Mathematics Education 2: 218-227; May 1971.

The use of negative instances with content in geometry, exponents, and operations resulted in higher achievement than the use of only positive instances. (grade 8)

Singhal, Sushila and Crago, Priscilla H. Sex Differences in the School Gains of Migrant Children. Journal of Educational Research 64: 417-419; May/June 1971.

Girls had higher scores for both reading and arithmetic than boys, as a total group and at most grade levels. Boys made significantly greater gains than girls did in grades 3, 4, and 9. (ages 5-16)

Smith, Frank. The Readability of Sixth Grade Word Problems. School Science and Mathematics 71: 559-562; June 1971.

The composite readability scores for sixth grade textbooks ranged from 5.0 to 5.8. Analysis of selections indicated a range of below grade 4 to grade 8. Tests ranged from below grade 4 to grade 6. (grade 6)

Sowder, Larry. Performance on Some Discovery Tasks, Grades 4-7. Journal for Research in Mathematics Education 2: 5-11; January 1971.

Pupils needed about three to six instances to form generalizations of the sort tested. Only rarely were generalizations formed after six unsuccessful instances. (grades 4-7)

Stafford, Don G. and Renner, John W. SCIS Helps the First Graders to Use Logic in Problem Solving. School Science and Mathematics 71: 159-164; February 1971.

The group using the SCIS program achieved significantly higher scores on conservation tasks than the group using a textbook series. (grade 1)

Steffe, Leslie P. and Johnson, David C. Problem-Solving Performances of First-Grade Children. Journal for Research in Mathematics Education 2: 50-64; January 1971. (ERIC Document No. EJ 033 811)

Described action did not differentially affect problem solving performance on the four basic problem structures studied. Mean scores for problems of the type a + b = □ were higher than for other problem types. (grade 1)

Suppes, Patrick and Feldman, Shirley. Young Children's Comprehension of Logical Connectives. Journal of Experimental Child Psychology 12: 304-317; December 1971.

Age and SES affected pupils' responses to conjunction, disjunction and negation commands. Conjunction was easiest, followed closely by "exclusive-or"; disjunction was most difficult. Negation substantially increased the difficulty of commands. (nursery school, kindergarten)

Taylor, Alton L. Teacher and Student Evaluations of an Enriched Science and Mathematics Summer Program for Elementary and Secondary School Students. School Science and Mathematics 71: 283-294; April 1971. (ERIC Document No. EJ 037 869)

Student reactions to the six-week program were highly favorable. (grades 5-12)

Thomas, Elizabeth C. and Yamamoto, Kaoru. Minority Children and Their School-Related Perceptions. Journal of Experimental Education 40: 89-96; Fall 1971.

Mathematics ranked third of four curricular areas rated by Negro, Mexican-American, and Indian pupils. (grades 6-8)

Ulrich, Roger E.; Louisell, Stephen E.; and Wolfe, Marshall. The Learning Village: A Behavioral Approach to Early Education. Educational Technology 11: 32-45; February 1971.

Children who had been in the "village" did better on later achievement tests than children who had been in other nursery school programs. (pre-school, kindergarten)

Weaver, J. Fred. Some Factors Associated with Pupils' Performance Levels on Simple Open Addition and Subtraction Sentences. Arithmetic Teacher 18: 513-519; November 1971.

On an inventory involving 20 open-sentence types, achievement increased from grade to grade. At each grade level, differential achievement effects were observed for particular combinations of open-sentence types. (grades 1-3)

Wei, Tam T. D.; Lavatelli, Celia B.; and Jones, R. Stewart. Piaget's Concept of Classification: A Comparative Study of Socially Disadvantaged and Middle-Class Young Children. Child Development 42: 919-927; September 1971.

Culturally deprived groups scored lower on classification tasks than middle-class groups. (kindergarten, grade 2)

Weinstein, Laura. The Zoomer Class: Initial Results. Exceptional Children 38: 58-65; September 1971.

Disturbed children made good arithmetic achievement gains in a special class. (grades 4-6)

Weisman, Lorraine I. and Safford, Philip L. Piagetian Tasks as Classroom Evaluative Tools. Elementary School Journal 71: 329-338; March 1971.

Piagetian tasks were found to be helpful in evaluating the ability of nine children. (ages 6, 7)

Williams, Robert. Testing for Number Readiness: Application of the Piagetian Theory of the Child's Development of the Concept of Number. Journal of Educational Research 64: 394-396; May/June 1971. (ERIC Document No. EJ 041 226)

Most of the children (86) formed an equivalent set by perceptual one-to-one correspondence; eight maintained equivalence after perceptual correspondence was destroyed. Implications for mathematics education were stated. (kindergarten)

Willmon, Betty. Reading in the Content Area: A "New Math" Terminology List for the Primary Grades. Elementary English 48: 463-471; May 1971.

A total of 473 technical words was found in 24 textbooks, with frequency ranging from 1 to 5,995. Seventeen words were repeated more than 1,000 times, but most were used less than 25 times. (grades 1-3)

Worthen, Blaine R. and Collins, James R. Reanalysis of Data from Worthen's Study of Sequencing in Task Presentation. Journal of Educational Psychology 62: 15-16; February 1971.

When the data from an earlier study were reanalyzed with the unit of analysis changed from pupil scores to class means, no significant differences were found between expository and discovery strategies. (grades 5, 6)

Yawkey, Thomas D. Alternative Response Measures for Mathematical Behaviors on Numerical Tasks in Preschool Subjects. Journal of Experimental Education 40: 88-96; Winter 1971.

With the "symptom" response to inequality tasks, age groups 5-7 differed significantly from age groups 3-4. Using the verbal response, differences were found between age groups 6-7 and 3-5. (ages 3-7)

III. Dissertation Abstracts

Adams, Leah Dutenhaver. The Effect of Training on the Linear Ordering Ability of Prekindergarten Disadvantaged Children. (The University of Michigan, 1970.) DAI 31A: 6391; June 1971.

Linear ordering ability was found to follow sequential stages of development, and was slightly increased through training. (age 5)

Adams, Lillian Josephine Hunter. Developing and Testing a Procedure for Presenting Selected Instructional Materials for Utilization in Programs for Learning Handicapped Children. (University of Pittsburgh, 1970.) DAI 31A: 5227; April 1971.

No significant difference in achievement resulted from use of special instructional materials for arithmetic, but teachers indicated a preference for the developed materials over a non-systematic approach. (elementary)

Aims, Bernard Douglas. A Study of Selected Relationships Between Solution Time and Five Characteristics of Arithmetic Drill Problems. (Memphis State University, 1970.) DAI 31A: 4373; March 1971.

The number of frames to the left of the equals sign and the arrangement of operators affected time needed to solve problems, but number of possible solutions did not significantly affect time. (grades 4-8)

Albert, Sylvio Hilaire. The Educational Attainment of Indian Pupils in Integrated and Segregated Elementary Schools in New York State. (Lehigh University, 1971.) DAI 32A: 2292; November 1971.

Indiana attending segregated reservation schools scored significantly higher in arithmetic achievement than those attending integrated schools in grade 3, but not in grade 6. No significant achievement differences were found between boys and girls. (grades 3, 6)

Alberti, Jean Mae C. Self-Perception-in-School: Validation of an Instrument and a Study of the Structure of Children's Self-Perception-in-School and Its Relationship to School Achievement, Behavior, and Popularity. (State University of New York at Buffalo, 1970.) DAI 31A: 4535-4536; March 1971.

The self-perception inventory scores were found to be significantly related to arithmetic achievement. (grades 1-3)

Alford, Roy W., Jr. Teaching Mathematical Concepts to Rural Preschool Children Through a Home-Oriented Program. (University of Virginia, 1970.) DAI 31A: 4373-4374; March 1971.

A program involving television and home visits was significantly more effective than use of television alone in teaching mathematics to preschool Appalachian children. (ages 3-5)

Allen, Ernest Edgar. Selected Characteristics of Junior High Level Mathematics Teachers in Colorado. (University of Northern Colorado, 1970.) DAI 31B: 7412; June 1971.

Most teachers indicated that they felt confident to teach junior high school mathematics, but wanted to take more work in mathematics or mathematics education. (secondary in-service)

Anderson, Doloris Gerkewicz. An Analysis of the Effect of Mathematics Readiness Education at the Kindergarten Level on the Growth of Conceptual Ability of Number as Measured by Piaget's Stages of the Development of Number. (Oregon State University, 1971.) DAI 32A: 2292-2293; November 1971.

Increased readiness instruction did not result in a significant change in level of understanding of conservation or in arithmetic achievement. No significant correlation was found between ability to conserve and IQ, age, family constellation, or nursery school experience. (kindergarten)

Andrews, Henry B., Jr. The Effects of Group Contingent Reinforcement on Student Behavior. (The University of Tennessee, 1970.) DAI 32A: 227-228; July 1971.

Group contingent reinforcement procedures were effective in significantly raising the level of task-relevant behavior for students in a remedial summer program. (junior high)

Atwood, Marjie Henrietta. Teacher Effectiveness in Writing Terminal Objectives as Measured Through Student Participation in a Preschool Readiness Program. (United States International University, 1971.) DAI 32A: 1835; October 1971.

Pupils of teachers who wrote terminal objectives tended to change more on measures of mathematical concepts (as well as other factors) than pupils of other teachers. (pre-kindergarten, in-service)

Bailey, Joan Hauser. On the Concept of Transitivity in Children. (University of California, Los Angeles, 1970.) DAI 31B: 7618; June 1971

A markedly greater proportion of five-year-olds than four-year-olds met criterion on all transitivity of length tasks. Neither replicas nor symbols aided many children in making transitive inferences. (ages 4, 5)

Bailey, William Thomas. A Study of Group Reaction to and Productivity on a Mathematical Task Involving Productive Thinking. (New York University, 1971.) DAI 32A: 2474-2475; November 1971.

Small group activity using productive-thinking materials on calculus was found to be feasible. (grade 12, college)

Baker, Betty Louise. A Study of the Effects of Student Choice of Learning Activities on Achievement in Ninth Grade Pre-Algebra Mathematics. (Northwestern University, 1971.) DAI 32A: 2895; December 1971.

No significant differences in achievement, confidence, or interest were found between groups who selected their own activities and those who could select problems or had no choice. The low-achievers most frequently chose teacher-made assignments. (grade 9)

Baker, Eugene Austin. Conservation and Two Related Cognitive Functions. (University of Missouri - Columbia, 1970.) DAI 31B: 4965; February 1971.

Scores on "operative", "figurative", and "traditional" tasks all increased linearly with age. "Traditional" Piagetian tasks appeared to be the most effective for assessing conservation. (kindergarten-grade 2)

Barnes, Ospy Dennis. The Effect of Learner Controlled Computer Assisted Instruction on Performance in Multiplication Skills. (University of Southern California, 1970.) DAI 31A: 4538; March 1971.

No significant differences in achievement were found whether pupils or computer selected the problem type, with varied types of feedback. (grades 4-8, ages 8-13)

Barrish, Bernard. Inductive Versus Deductive Teaching Strategies with High and Low Divergent Thinkers. (Stanford University, 1970.) DAI 31A: 4029; February 1971.

For the learning of "low-cognitive" mathematical material, a deductive-reception strategy was found to be more effective than an inductive-guided-discovery strategy; no differences were found for "high-cognitive" material. (grades 4-6)

Bass, Helen Genetos. The Topological Understandings of Children in Kindergarten, First, and Second Grades. (Columbia University, 1970.) DAI 31A: 3946; February 1971.

Understanding of the concepts of enclosure and order, but not equivalence, increased significantly with age and was related to SES. (kindergarten-grade 2)

Baur, Gregory Ralph. A Study of the Effects of a Creative Classroom, Creative Problems, and Mathematics Educators on the Creative Ability in Mathematics of Prospective Elementary Teachers. (Indiana University, 1970.) DAI 31A: 5895; May 1971.

A creative classroom, use of creative problems, and a teacher who was a mathematics educator rather than a pre-mathematician each appeared to effect mean change in creativity ability. (elementary pre-service)

Beamer, James Edward. A Model for the Evaluation of Educational Projects. (The University of Nebraska, 1971.) DAI 32A: 2295; November 1971.

The model was successfully applied to a workshop on mathematics education. (elementary in-service)

Bell, James A. Trends in Secondary Mathematics in Relation to Psychological Theories: 1893-1970. (The University of Oklahoma, 1971.) DAI 32A: 1890-1891; October 1971.

The influence of faculty psychology, connectionism, Gestalt psychology, and developmental psychology were traced. SMSG and SSMCIS textbooks were analyzed to ascertain psychological orientation. (secondary)

Benner, Carl Virgil. Applying Paired Comparison Techniques to Determine the Relative Importance Assigned to Selected Mathematical Behaviors. (The Ohio State University, 1970.) DAI 31A: 4614-4615; March 1971.

A relationship was found between the rankings of 25 mathematical objectives for elementary pupils and teachers, but not for those at the secondary level. Consistency was significantly high. (grades 5, 8, pre-service)

Bennett, Gene Wiley. The Role of Topology in the Preparation of Secondary Mathematics Teachers. (Indiana University, 1971.) DAI 32A: 1372; September 1971.

Most colleges offered a course in topology, usually at the undergraduate level, but the course was not required for pre-service programs. (secondary pre-service)

Berrios, Jorge Efrain. The Effects of Departmentalization on Achievement in Reading and Arithmetic on Fourth Grade Pupils in Public Schools of Puerto Rico. (Lehigh University, 1970.) DAI 31A: 5023-5024; April 1971.

No significant differences in arithmetic achievement between classes having departmentalized or self-contained patterns, in either rural or urban areas. (grade 4)

Bertram, Charles John. Selected Characteristics of Mathematics Teachers in Indiana Public Secondary Schools. (Indiana University, 1971.) DAI 32A: 3132; December 1971.

In general, the teachers surveyed felt that too much attention in preparation programs had been directed toward content and too little toward classroom management. (secondary in-service)

Biancoviso, Anthony Nicholas. A Multiple Training Approach to Facilitate the Acquisition of Number Conservation in Children. (University of Kansas, 1971.) DAI 32A: 1911; October 1971.

Training with candy or buttons each facilitated the acquisition of conservation. No transfer from conservation of number to conservation of discontinuous quantity was found. (ages 5-7)

Bishop, Thomas David. A Study of the Computer-Related Mathematics Programs of Secondary Schools and Teacher Education Institutions in Missouri and Adjoining States. (University of Missouri - Columbia, 1970.) DAI 31A: 3997-3998; February 1971.

Thirty per cent of the schools offered technically-oriented computer-related courses; 20 per cent used computer time for enrichment and supplementary activities; only one school used the computer for tutorial instruction. Two-thirds of the colleges had a recommended computer-related mathematics course, but only one-fourth included computer-related topics. (secondary)

Bisio, Robert Mario. Effect of Manipulative Materials on Understanding Operations with Fractions in Grade V. (University of California, Berkeley, 1970.) DAI 32A: 833; August 1971.

The passive use of manipulative materials appeared to be as effective as active use and better than non-use. (grade 5)

Blazek, Ronald David. Teacher Utilization of Nonrequired Library Materials in Mathematics and the Effect on Pupil Use. (University of Illinois at Urbana - Champaign, 1971.) DAI 32A: 994; August 1971.

Students used library materials to a greater extent when the teacher referred to them more in his teaching. (grade 8)

Bobbe, Carol Norwalk. Sex-Role Preference and Academic Achievement. (Yeshiva University, 1971.) DAI 32B: 1818-1819; September 1971.

Girls judged arithmetic to be "feminine", while boys judged it to be for both sexes. A relationship was found between sex-typing and arithmetic achievement. (grades 4-6)

Bohan, Harry Joseph. A Study of the Effectiveness of Three Learning Sequences for Equivalent Fractions. (The University of Michigan, 1970.) DAI 31A: 6270; June 1971.

No significant differences between groups were found on tests of addition, subtraction, or multiplication with fractions. On post-tests on equivalent fractions, the groups using diagrams or paper folding scored significantly higher than those using the "property of one" procedure, while the paper-folding group scored significantly higher on this retention test and on an attitude measure. (grade 5)

Boozer, Robert Foster. An Investigation of Selected Procedures for the Development and Evaluation of Hierarchical Curriculum Structures. (University of Pittsburgh, 1970.) DAI 31A: 4616; March 1971.

The usefulness of simplex and scalogram analysis for determining hierarchical relationships in (IPI) mathematics materials was demonstrated. (elementary)

Borgen, Jerome Stanley. The Effect of Two Modes of Instruction on Creativity, Dogmatism, and Arithmetic Achievement in the Elementary School. (The University of North Dakota, 1970.) DAI 31A: 6446-6447; June 1971.

Creativity was found to be related to arithmetic achievement, while pupils classified as close-minded scored lower than other pupils, in both "New School" and other classes. (grades 4-6)

Bostic, Doyle Leroy. A Developmental Approach for Introducing the Concept of Proof Utilizing Informal Logic. (The Florida State University, 1970.) DAI 31B: 5468-5469; March 1971.

A unit on logic was judged to be appropriate, and trial use resulted in satisfactory scores. (grade 10)

Bradley, Banks Thurston. An Assessment of Objectives for Special Methods Courses for the Subject Areas of English, Mathematics, Science, and Social Studies. (Indiana University, 1970.) DAI 31A: 5897; May 1971.

There was some agreement by instructors and supervisors that methods courses were less than adequate, but that specified objectives were appropriate. (secondary pre-service)

Brainerd, Charles Jon. The Construction of the Formal Operations of Implication-Reasoning and Proportionality in Children and Adolescents. (Michigan State University, 1970.) DAI 31B: 6919-6920; May 1971.

Implication-reasoning abilities were found to increase with age, and were affected by propositional semantics and syntax. Conservation improved with age, with differences in attainment of different types of conservation noted. (ages 8-9, 11-12, 14-15)

Branca, Nicholas Anthony. Strategies in Learning Mathematical Structures. (Columbia University, 1970.) DAI 31A: 3160; January 1971.

For three games, the distribution of strategy evaluations was ordered in decreasing frequency of occurrence as Pattern, Memory, Operator, and in decreasing efficiency as Operator, Pattern, Memory. **(secondary)**

Brantley, Betty Conrad. Effect of a Sibling Tutorial Program on the Language and Number Concept Development of Head Start Children. (The Florida State University, 1970.) DAI 32A: 300; July 1971.

Those tutored had a slightly higher mean mathematics score than those not tutored in mathematics, but the difference was not significant. (pre-school, ages 9-12)

Brantly, Brythel Henry. An Analysis of the Effects of Absenteeism Upon Academic Achievement Related to Algebra II and English III in Certain Public High Schools of Louisiana. (Northeast Louisiana University, 1971.) DAI 32A: 113; July 1971.

Absenteeism was significantly related to teachers' marks but not to standardized achievement test scores. (grade 11)

Broussard, Vernon. The Effect of an Individualized Instructional Approach on the Academic Achievement in Mathematics of Inner-City Children. (Michigan State University, 1971.) DAI 32A: 2999-3000; December 1971.

Students given individually prescribed work through independent study, small-group discussions, large-group activities, and teacher-led discussions achieved significantly higher in skills and concepts than those taught by a traditional, textbook, class-group method. (grade 4)

Browning, Carole Livingston. An Investigation of Selected Mathematical Terminology Found in Five Series of Modern Mathematics Texts Used in Grades Four, Five, and Six. (The Florida State University, 1970.) DAI 32A: 2899-2900; December 1971.

A total of 743 terms were tabulated; only 10 were common to all 15 textbooks. (grades 4-6)

Bryne, Mary Ann. The Development of a Measure of the Familiarity of Mathematical Terms and Symbols. (Purdue University, 1970.) DAI 31A: 5222-5223; April 1971.

A measure of the familiarity of 1,165 terms and 153 symbols was developed. (grades 7, 8)

Buckner, Sam Levi. First-Year Algebra in Selected Junior High Schools and High Schools. (Auburn University, 1970.) DAI 31A: 3999-4000; February 1971.

Ten of eleven major algebraic concepts received average or above average emphasis by the teachers surveyed. (teachers of grade 9)

Bull, Scott Spragg. A Comparison of the Achievement of Geometry Students Taught by Individualized Instruction and Traditional Instruction. (Arizona State University, 1971.) DAI 31A: 4616-4617; March 1971.

The mean score of classes taught by the individualized method was significantly higher than that of classes taught by the traditional method. Classes taught in the seventh period scored significantly higher than those taught in the first period, but there was no interaction effect between method and time of day. (grade 10)

Burns, James Alden. The Teaching of Applications in Secondary School Mathematics. (Indiana University, 1970.) DAI 31A: 5870; May 1971.

Teachers and teacher educators considered applications a necessary part of secondary school mathematics, and indicated that a mathematical model could be used in teaching applications. (secondary in-service)

Byars, Jackson Abbott. The Relationship Between Teacher Conformity to a Model of Teaching Behavior and Student Achievement and Student Attitude in a First Course in Algebra. (The University of Nebraska, 1970.) DAI 31A: 5264; April 1971.

Student attitude and achievement were not significantly different among teachers who rated high or low on the developed instrument; it was therefore revised. (grade 9)

Cahoon, Owen William. Group Training on Conservation Tasks in a Preschool Setting. (The Pennsylvania State University, 1970.) DAI 32A: 780; August 1971.

Significant gains on three of six conservation tasks were made, although differences between trained and untrained groups were not significant. (ages 3-5)

Cain, Mary Alexander. A Study of Relationships Between Selected Factors and the School Achievement of Mexican-American Migrant Children. (Michigan State University, 1970.) DAI 31A: 3947; February 1971.

Arithmetic achievement equaled or excelled reading achievement at each age level; a linear relationship between scores and age was significant. Arithmetic achievement was positively related to fathers' love, while lower achievement was related to mothers' rejection, neglect, and casualness. (ages 7-13)

Calloway, Elwayne. Required Mathematical Topics for Prospective Junior High School Mathematics Teachers at the University of Arkansas. (University of Arkansas, 1971.) DAI 32A: 2521; November 1971.

There was general consistency between the content of textbooks and college course content, except for too-extensive inclusion of calculus in the courses. (secondary pre-service)

Camp, Martha Gwendolyn. Determination of the Correlation Between Conservation Task Levels and Memory Drawings and the Prediction of Conservation Task Levels of Children Through the Use of Memory Drawings. (The Florida State University, 1971.) DAI 32A: 1912; October 1971.

Conservation of number levels was found to be significantly related to memory drawings, but conservation of length was not. (kindergarten-grade 2)

Campbell, William Lester. A Study of the Effectiveness of Supplementing a Mathematics Course for Prospective Elementary School Mathematics Series. (The University of Michigan, 1970.) DAI 31A: 6448; June 1971.

No significant differences in achievement or attitude were found between classes where content from elementary school textbooks was or was not included. (elementary pre-service)

Carmody, Lenora Marie. A Theoretical and Experimental Investigation Into the Role of Concrete and Semi-Concrete Materials in the Teaching of Elementary School Mathematics. (The Ohio State University, 1970.) DAI 31A: 3407; January 1971.

The group using semi-concrete materials scored significantly higher than the symbolic group on a numeration test; no significant differences were found between groups using concrete or semi-concrete materials. The groups using materials scored higher on tests of transfer. (grade 6)

Carr, Donna Humpherys. The Development of Number Concept as Defined by Piaget in Advantaged Children Exposed to the Bereiter-Engelmann Preschool Materials and Training. (University of Utah, 1970.) DAI 31A: 3947-3948; February 1971.

No significant differences on four Piaget-type tests were found between kindergarten groups who used Bereiter-Engelmann materials for two, one, or no years. The program was more effective for kindergarten children than for pre-kindergarten children. (pre-kindergarten, kindergarten)

Carrico, Mark Andrew. An Assessment of the Children's Television Program "Sesame Street" in Relation to the Attainment of the Program's Goals by Kindergarten Children in the Sioux Falls, South Dakota Public Schools. (University of South Dakota, 1971.) DAI 32A: 2297; November 1971.

"Sesame Street" viewing had a measurable achievement effect on the two mathematical goals tested. Parental and teacher reactions were favorable. (kindergarten)

Carroll, Constance Anne. Low Achievers' Understanding of Four Logical Inference Forms: An Analysis of Difficulties and of the Effect of Instruction. (Columbia University, 1970.) DAI 31A: 4377; March 1971.

No significant differences in total scores were found between students who had or had not had the logic instruction, but those taught improved significantly on the converse argument and on the "misleading" content dimension. (grade 9)

Carruth, Edwin Ronald. A Multiple Linear Regression Analysis of Computer-Assisted Elementary Arithmetic Achievement. (University of Southern Mississippi, 1970.) DAI 31A: 5691; May 1971.

Previous level of arithmetic achievement, intelligence, and reading ability had the greatest effect on success in the CAI drill-and-practice program. (Specific correlations for many variables were cited.) (grades 4-6)

Carter, Irvin Lee. In-Service Education and Innovation in Oklahoma Public Schools. (The University of Oklahoma, 1971.) DAI 32A: 2333-2334; November 1971.

Mathematics, reading, language arts, and social studies led in the number of innovations reported. (in-service in kindergarten-grade 12)

Case, David Aree. A Comparative Study of Fifth Graders in a New Middle School with Fifth Graders in Elementary Self Contained Classrooms. (The University of Florida, 1970.) DAI 32A: 86; July 1971.

Students in both organizational patterns made achievement gains, with those in the middle school showing more gain, particularly in arithmetic. (grade 5)

Chapman, Judith Ellen. Mirror-image Discrimination in Pre-School Children. (University of Minnesota, 1970.) DAI 31B: 6279; April 1971.

Significantly more errors were made on mirror-image problems than on others. Spatial distance did not affect the number of orientation errors. (pre-school)

Chew, Harold Raymond. Using Operant Conditioning and Contingency Management in Teaching Arithmetic. (University of Pittsburgh, 1970.) DAI 31A: 4583-4584; March 1971.

No significant differences in achievement were found between groups of disturbed children who were given operant (mini-reward), contingency (school activities), or no special reinforcement. (elementary)

Choe, Sae-Hyun. Family and Social Relationships as Factors Related to Academic Achievement of Korean Secondary School Students. (Fordham University, 1971.) DAI 32A: 781; August 1971.

Eighth-grade girls who had better family relationships performed better in mathematics achievement than those who were less well adjusted at home. No differences were found for eighth grade boys or twelfth graders. (grades 8, 12)

Clark, Newton Cecil. Test Anxiety, Locus of Control, and Feedback in Self-Instruction. (George Peabody College for Teachers, 1971.) DAI 32A: 1912; October 1971.

No interaction effects were found between level of anxiety and level of feedback on achievement tests. (grade 11)

Clough, Roger Anthony. An Analysis of Student Achievement in Mathematics When Individually Prescribed Instruction (IPI) is Compared to the Current Instructional Program. (The University of Nebraska, 1971.) DAI 32B: 2849; November 1971.

Students using IPI appear to make greater mean gains than those using a traditional program. (grades 1-3)

Coblentz, Dwight Oliver. An Analysis of the Practices Carried Out by Cooperating Teachers in Supervising Student Teachers in Mathematics as Perceived by Student Teachers. (Northwestern University, 1971.) DAI 32A: 3133-3134; December 1971.

Activities of supervising teachers were rated satisfactorily, though a list of inadequate practices was presented. (secondary pre- and in-service)

Cochran, Corydon Eugene. An Experimental Study of Achievement of Intermediate Educable Mentally Retarded Students. (Oklahoma State University, 1969.) DAI 31A: 4031; February 1971.

There did not seem to be a measurable difference in arithmetic achievement when instruction in arithmetic computation was omitted for six weeks. (intermediate EMR's)

Coffia, William J. The Effects of an Inquiry-Oriented Curriculum in Science on a Child's Achievement in Selected Academic Areas. (The University of Oklahoma, 1971.) DAI 32A: 2398; November 1971.

Students who used the SCIS science program for five years scored higher on mathematics applications, but not on concepts or reasoning, than those having a regular program. (grade 5)

Cohen, Martin Seymour. A Comparison of Effects of Laboratory and Conventional Mathematics Teaching Upon Underachieving Middle School Boys. (Temple University, 1970.) DAI 31A: 5026-5027; April 1971.

Students taught conventionally achieved significantly more than those taught with laboratory activities. A few changes in attitude were noted. (grades 7, 8)

Cole, Samuel Eugene. An Assessment of Mathematical Abilities of Secondary Students in Selected Schools of Puerto Rico. (The University of Nebraska, 1970.) DAI 31A: 4032; February 1971.

Areas of relative strength and weakness were cited. Few correlations were predictive. (grades 7-11)

Cole, William L. The Evaluation of a One-Semester Senior High School Mathematics Course Designed for Acquiring Basic Mathematics Skills Using Computer-Assisted Instruction. (Wayne State University, 1971.) DAI 32A: 2399; November 1971.

CAI was effective in improving computational skills in whole numbers, fractions, decimals, and per cent. (grade 9)

Collins, Kenneth Michael. An Investigation of the Variables of Bloom's Mastery Learning Model for Teaching Junior High School Mathematics. (Purdue University, 1971.) DAI 32A: 3149; December 1971.

Either a list of specific objectives or diagnostic-progress tests was found to be sufficient for a significant increase in mastery of objectives with seventh graders; eighth graders also profited from alternate resources. Type of grading did not affect scores. (grades 7, 8)

Confer, Ronald William. The Effect of One Style of Computer Assisted Instruction on the Achievement of Students Who Are Repeating General Mathematics. (University of Pittsburgh, 1971.) DAI 32A: 1741; October 1971.

No significant differences on standardized tests were found for students taught by CAI or conventional instruction. The groups each scored higher on certain content areas. (grade 9)

Cooke, Gary Edward. Conceptual Learning in Young Children: A Comparison of the Effects of Rote, Principle, and Guided Discovery Strategies on Conceptualization in First Grade Children. (University of Oregon, 1971.) DAI 32A: 2904; December 1971.

Students only questioned about the attributes and design scored significantly better than those told the organizing principle or given attribute cues. (grade 1)

Copley, Walter Patrick. The Construction and Validation of an Instrument to Measure the Attainment of Certain Mathematical Concepts Recommended by the Committee on the Undergraduate Program in Mathematics. (Boston University School of Education, 1971.) DAI 32A: 1954-1955; October 1971.

The reliability of the test (composite score) was found to be .85. (secondary pre-service)

Crangle, Eva Abbie. An Evaluative Study of the Northwest Junior High School Individualized Mathematics Program. (University of Utah, 1971.) DAI 32A: 1774-1775; October 1971.

Students taught by traditional instruction achieved significantly more than those taught by individualized instruction. No difference was found in work study skills nor for ability level, but individualized instruction took more time. (grade 8)

Crittenden, William Bryan. A Study of Attitudes of Elementary and Secondary Teachers of Mathematics Toward Selected Deterrents to Pupil Progress. (University of Houston, 1970.) DAI 32A: 280; July 1971

Attitudes supportive to the development of 14 "deterrents to pupil progress" were found to exist at both teaching levels. (in-service in elementary and secondary)

Cromer, Fred Eugene. Structural Models for Predicting the Difficulty of Multiplication Problems. (George Peabody College for Teachers, 1971.) DAI 32A: 1974; October 1971.

It was found that difficulty of multiplication problems could be predicted by problem characteristics such as order, digital, or process variables. (grade 5)

Curry, Richard Dean. Arithmetic Achievement as a Function of Concrete, Semi-Concrete, and Abstract Teaching Methods. (George Peabody College for Teachers, 1970.) DAI 31A: 4032-4033; February 1971.

Methods providing concrete materials or pictures resulted in greater computational achievement and understanding of properties than did a verbal method. (ages 8-10)

Deatsman, Gary Allen. Efficiency of Time Use by Above Average Pre-Service Elementary School Teachers Learning Mathematics in Independent Study Sessions. (Arizona State University, 1971.) DAI 32A: 3113; December 1971.

No significant difference in time to complete a unit was found between students having independent study or lecture-discussion instruction. (elementary pre-service)

Deighan, William Patrick. An Examination of the Relationship Between Teachers' Attitudes Toward Arithmetic and the Attitudes of Their Students Toward Arithmetic. (Case Western Reserve University, 1970.) DAI 31A: 3333; January 1971.

Attitude toward arithmetic was not found to be significantly related to achievement, nor was there a significant relationship between teachers' and students' attitudes. A significant decrease in students' attitudes across grades 3, 5, and 6 was found. (grades 3, 5, and 6)

Del Gaudio, Jerome. A Study of the Academic Achievement of Pupils Exposed to Departmentalized and Non-Departmentalized Instruction in Grades Seven and Eight in Selected Inner City Elementary Schools in St. Louis, Missouri. (St. Louis University, 1970.) DAI 32A: 696; August 1971.

No significant difference was found in the arithmetic achievement of students taught in departmentalized or non-departmentalized classes. (grades 7, 8)

Denoyer, Richard Armand. A Study of the Effect of Age and Sex on School Achievement in Grades Three, Six, Seven and Nine. (Southern Illinois University, 1970.) DAI 31A: 3950; February 1971.

The sex of a student was found to have a definite effect on arithmetic achievement in grades 6 and 9. Factors such as race, IQ, and SES also had an effect on achievement in general, but age did not. (grade 9)

DePasarell, Claudine Luiggi. A Study to Determine the Effect of Kindergarten Experience on the Achievement of Students in Mathematics and Spanish in the First, Second, and Third Grades in a Selected Public School in Puerto Rico. (New York University, 1970.) DAI 31A: 3409; January 1971.

Pupils with kindergarten experience achieved significantly more on mathematics tests in grades 1 and 3. (grades 1-3)

DeRenzis, Joseph John. An Investigation Into the Attitude Patterns and Their Relationship to Prescription Writing Procedures of Teachers Using the IPI Instructional System in Elementary Mathematics. (Temple University, 1970.) DAI 31A: 6398; June 1971.

Characteristics of teachers who are more successful at writing prescriptions were identified. (elementary in-service)

Dilts, Robert Guy. Development and Application of a Cognitive Verb List to Facilitate Analysis of Mathematics Textbooks. (University of Pittsburgh, 1970.) DAI 31A: 4617-4618; March 1971.

Teachers were able to use the verb list in analyzing textbooks. (grades 5, 6)

Dockweiler, Clarence J. A Study of the Impact of a CUPM Inspired Mathematics Course on the Level of Mathematical Understanding of Lutheran Elementary School Teachers. (Northwestern University, 1970.) DAI 31A: 4001; February 1971.

Teachers who had a course in Mathematical Analysis had a better understanding of elementary school mathematics than those who had taken Intermediate Algebra. (elementary in-service)

Dodson, Joseph Wesley. Characteristics of Successful Insightful Problem Solvers. (University of Georgia, 1970.) DAI 31A: 5928; May 1971.

Among the characteristics of successful problem solvers were high scores on reasoning tests, good spatial relations ability, ability to discriminate critical elements, divergent thinking, low test anxiety, and a positive attitude toward mathematics. (grade 10)

Dunlap, William Phillip. A Comparison of the Effects of Diagnostics and Remedial Arithmetic Programs Upon the Achievement and Attitude Development of Fourth Grade Children. (University of Oregon, 1971.) DAI 32A: 2905-2906; December 1971.

No significant differences in achievement were found on the standardized test, between students who were given diagnostic activities or textbook materials. The activities group scored higher on the concept section of the experimenter's test, while the textbook group scored higher on computation. (grade 4)

Earle, Richard Allen. The Use of Vocabulary as a Structured Overview in Seventh Grade Mathematics. (Syracuse University, 1970.) DAI 31A: 5929; May 1971.

Students who used a structured overview learned more about vocabulary relationships, but mathematical achievement and retention were not affected. (grade 7)

Eberle, Betty Jobes. Mathematics Program for Gifted High School Students. A Participant Follow-Up, Summers 1964 Through 1969 at The Ohio State University. (The Ohio State University, 1970.) DAI 31A: 4378-4379; March 1971.

Students felt that of greatest importance in the program were the faculty, the intellectual challenge, and stimulating contacts with leaders and peers. (secondary)

Eddleman, Virginia Kincaid. A Comparison of the Effectiveness of Two Methods of Class Organization for Arithmetic Instruction in Grade Five. (Northeast Louisiana University, 1971.) DAI 32A: 1744; October 1971.

No significant difference in achievement was found between pupils grouped homogeneously or heterogeneously. SES affected achievement, but there was no interaction effect with method. (grade 5)

Eisenberg, Theodore Allen. The Integration of Modified Learner-Generated Sequences Into the Development of a Behaviorally Stated Learning Hierarchy, as Applied in Mathematics Curricula Construction. (University of Maryland, 1970.) DAI 31A: 4033-4034; February 1971.

A learning hierarchy developed by students was found to be successful with other high-achieving students but not with low-achieving students. (elementary pre-service)

Elliott, Robert Brown. The Relationship Between Training, Experience, and Characteristics of Secondary Teachers of the Educable Mentally Retarded and the Teaching of Arithmetic. (The University of Michigan, 1970.) DAI 31A: 6438; June 1971.

The special class teachers were found to rate arithmetic skills and problem difficulty less accurately than did regular teachers of low ability pupils. (secondary in-service)

Ellis, Dale Huband. An Analysis of Achievement Gains in Mathematics Classes Which Result from the Use of Student Tutors. (University of Utah, 1971.) DAI 32A: 1976-1977; October 1971.

The classes in which tutoring was used made greater achievement gains than those in which it was not used, with tutees gaining more than tutors. (grades 9-11)

Emanuel, Jane McIntosh. The Intelligence, Achievement, and Progress Scores of Children Who Attended Summer Head Start Programs in 1967, 1968, and 1969. (University of Alabama, 1970.) DAI 31A: 5031-5032; April 1971.

Significant differences were found between children who attended or did not attend Head Start classes on arithmetic achievement in grade 2, and marks in grades 2 and 3. (pre-school, grades 1-3)

Emery, Harriett Elenor. Mathematics for Prospective Elementary Teachers in a Community College: A Comparison of Audio-Tutorial and Conventional Teaching Materials and Modes. (Michigan State University, 1970.) DAI 31A: 5930; May 1971.

The group using audio-tutorial materials achieved more than the conventionally-taught group. A significant correlation between attitude and achievement was found only for the conventionally taught group. (elementary pre-service)

Estes, Robert Abbott. The Effect of Translation Practice and Group Participation in Solving Verbal Problems for Prospective Elementary Teachers. (The University of Michigan, 1970.) DAI 31A: 6274-6275; June 1971.

Students working in small groups to solve problems made greater individual gains in problem solving than did students who worked alone. (elementary pre-service)

Esty, Edward Tuckerman, II. An Investigation of Children's Concepts of Certain Aspects of Topology. (Harvard University, 1970.) DAI 31A: 3773; February 1971.

The youngest children preferred the topologically most accurate copies of model figures, while the oldest children preferred those geometrically most accurate. No other evidence was found that children aged 4 to 6 understood topological ideas well enough to complete simple topological tasks successfully. (ages 4-8)

Evans, Robert Franklin. A Study of the Reliabilities of Four Arithmetic Attitude Scales and an Investigation of Component Mathematics Attitudes. (Case Western Reserve University, 1971.) DAI 32A: 3086; December 1971.

The four scales had intercorrelations ranging from .59 to .83, indicating that a common construct was sampled. Grade and concept effects were found to be significant. (grades 4, 6)

Farris, Dan Curry. Toward a Theory of Sequencing: Study 1-2: An Exploration of Selected Relationships Among the Enactive Iconic and Symbolic Modes of Representation. (The Pennsylvania State University, 1970.) DAI 31A: 4618; March 1971.

The mastery of antecedent objectives apparently did not induce mastery of consequent objectives for which no explicit instruction was provided. The order of acquisition of antecedent objectives did not significantly affect the implicit mastery of consequent objectives. (grade 5)

Fleischmann, Ray Wendell. A Comparison of Two Methods of Instruction in Mathematics for Elementary Teachers. (Oklahoma State University, 1970.) DAI 31A: 5246; April 1971.

The group having short quizzes had greater achievement than those having longer tests on more material. (elementary pre-service)

Flynn, Richard Bernard. The Effect of Varied Intensities of Exertion and Levels of Aerobic Capacity on the Performance of Numerical Task. (Columbia University, 1970.) DAI 31A: 3318-3319; January 1971.

Numerical task performance (adding and/or subtracting three numbers) was not significantly affected by five intensities of physical exertion. Speed scores were significantly lower following the two highest levels of exertion. (ages 9-11)

Foisy, Hector B. The Mathematics Specialist in the Elementary School. (George Peabody College for Teachers, 1971.) DAI 32B: 2281-2282; October 1971.

Desirable characteristics and training needs of mathematics specialists were ascertained from a survey of teachers, supervisors, and principals. (elementary in-service)

Forhetz, John Elbert. An Investigation of Test Anxiety as Measured by the TASC in Content Areas Ranked Difficult and Easy with Fourth and Sixth Grade Students. (Southern Illinois University, 1970.) DAI 31A: 5124; April 1971.

Pupils who ranked mathematics as difficult showed more test anxiety before a mathematics test than before a test in easy-ranked spelling. (grades 4, 6)

Foster, Kenneth Roger. The Implementation of the CUPM Recommendations for Elementary School Mathematics Teachers Into the Curricula of Certain NCATE-Approved and Non-NCATE-Approved Institutions in the United States. (The University of Tennessee, 1970.) DAI 31A: 4596-4597; March 1971.

There were no apparent relationships between the NCATE and non-NCATE institutions in regard to the degree of inclusion of 31 CUPM-recommended topics. More of the number system topics were included, but few of the algebra and geometry topics. (elementary pre-service)

Francies, Hallie Davis. Arithmetic Attitudes and Arithmetic Achievement of Fourth and Sixth Grade Students in Urban Poverty-Area Elementary Schools. (Case Western Reserve University, 1971.) DAI 32A: 1333; September 1971.

Attitudes of medium-achievers were significantly more positive than the attitudes of low-achievers. Significant differences were also found between grade levels, but not sexes. (grades 4, 6)

Frank, Alan Raymond. A Study of Selected Variables in the Preparation of Seatwork for the Mentally Retarded. (The University of Iowa, 1970.) DAI 31A: 4585; March 1971.

No significant differences in achievement were found between groups who used worksheets for subtraction which varied in type of feedback, number of problems and color of paper, although some interaction effects were significant. (ages 9-16, MR's)

Frase, Larry Eugene. A Comparison of Two Individualized Mathematics Programs on Student Independence, Achievement, Time, and Attitude Criterion Measures. (Arizona State University, 1971.) DAI 32A: 1978; October 1971.

Students using guided discovery units completed their objectives more quickly and with greater independence than those using individualized booklets, but achievement and attitude were not significantly different. (intermediate)

Gallick, Mary Catherine. Achievement of Fifth, Sixth, Ninth and Tenth Graders in Coordinate Geometry. (Michigan State University, 1970.) DAI 31A: 4035; February 1971.

Pupils in grades 5 and 6 scored as high as tenth graders on the coordinate geometry test, but lower than ninth graders. (grades 5, 6, 9, 10)

Gargiulo, Raymond J. A Field Study to Effect Changes in Academic Achievement Levels of Underachieving Seventh-Grade Students. (The University of New Mexico, 1970.) DAI 31A: 5931-5932; May 1971.

The group taught in an open classroom reading program made expected growth in arithmetic concepts, but not in arithmetic reasoning. (grade 7)

Gaskill, Edgar Allen. An Evaluation of Individually Prescribed Instruction in the Primary Grades of the Urbana Schools. (Illinois State University, 1970.) DAI 31A: 4416; March 1971.

There was little difference in mathematics achievement between IPI and non-IPI groups. (grades 1-3)

Gaudia, Gil. Race, Social Class, and Age of Achievement of Conservation on Piaget's Tasks. (State University of New York at Buffalo, 1970.) DAI 31A: 5843-5844; May 1971.

Significant differences were found between Negro and Indian/white groups in the age of attaining conservation, with Negro and/or the entire low SES group at least a year below "norm" groups. (grades 1-3)

Gawronski, Jane Donnelly. An Investigation of the Effect of Selected Learning Styles on Achievement in Eighth Grade Mathematics. (University of Minnesota, 1971.) DAI 32A: 3151-3152; December 1971.

No significant difference in achievement was found between students identified as having inductive or deductive learning styles on programs developed inductively or deductively. (grade 8)

Gay, Lorraine Rumbel. Temporal Position of Reviews and Its Effect on the Retention of Mathematical Rules. (The Florida State University, 1970.) DAI 32A: 237; July 1971.

All review groups retained significantly more than the no-review group on a rule-learning task. No differences were found for review after one day of review at various intervals, but an early and a delayed review was found to be effective. (grades 7, 8)

Genkins, Elaine Frances. A Comparison of Two Methods of Teaching the Concept of Bilateral Symmetry to Young Children. (Columbia University, 1971.) DAI 32A: 1355-1356; September 1971.

The paper-folding method was more effective than the mirror method for kindergarten children, but the mirror method was effective in helping second graders to discriminate more types of figures. (kindergarten, grade 2)

Geoghagan, James Landon. An Action Approach to Group Counseling: An Experimental Study. (The University of Tennessee, 1970.) DAI 4458; March 1971.

A reality-based counseling approach resulted in more arithmetic homework being turned in. (grade 5)

Gerstein, Shayle Jay. Returnees at an Inner-City High School: A Comparison of Nonreturning Dropouts, Unsuccessful Returnees, Successful Returnees, and Stayins. (Illinois State University, 1971.) DAI 32A: 2342; November 1971.

It appeared that students two or more years overage and/or at the low remedial level in both English and mathematics have little chance for success in a standard high school program. (secondary)

Gibish, Patricia Ann. A Description and Evaluation of the Second Year Implementation of a Systems Approach to Improving Mathematics Instruction. (University of Pittsburgh, 1970.) DAI 31A: 4619-4620; March 1971.

The SAM films were found to have instructional value, but SAM pupils did not achieve higher than non-SAM pupils. (grade 4)

Goldberg, Robert. An Evaluation of Selected Aspects of a Tri-Semester Algebra Program. (New York University, 1971.) DAI 32A: 2400; November 1971.

Increased time for the study of algebra did not increase students' success. (grade 9)

Gould, Dean Lyle. A Comparative Study of Two Plans for Utilization of Class Time in the Teaching of First-Year Algebra. (Northwestern University, 1970.) DAI 31A: 3164-3165; January 1971.

Achievement gain for students taught under the supervised study plan was significantly more than that of students taught under the daily recitation plan. No significant difference in change in attitude between the two groups was found. (grade 9)

Grant, Eugene Edward. An Experimental Study of the Effects of Compulsory Arithmetic Homework Assignments on the Arithmetic Achievement of Fifth-Grade Pupils. (University of the Pacific, 1971.) DAI 32A: 2401; November 1971.

No significant differences in achievement were found between groups given differentiated, textbook, or no homework. (grade 5)

Gray, Carol Ann. Factors in Students' Decisions to Attempt Academic Tasks. (University of Washington, 1971.) DAI 32B: 3031; November 1971.

Students' "subjective expected value" predictions accounted for their choice of arithmetic problems to work. (elementary)

Gray, James Harold. A Follow-Up Study of the National Science Foundation Summer Institutes for Secondary Teachers of Science and Mathematics Held at the University of Mississippi, 1957-1969. (The University of Mississippi, 1970.) DAI 31A: 4597; March 1971.

The NSF Institutes were considered worthwhile in increasing knowledge and status of participants. (secondary in-service)

Gridley, John David, Jr. An Empirical Investigation of the Construct of Mathematics Achievement in the Elementary Grades Based on the Method of Homogeneous Keying. (Fordham University, 1971.) DAI 32A: 1914; October 1971.

Mathematics achievement as measured by a standardized test was found to consist of several empirically defined clusters of items, which varied from grade to grade. The meaningfulness of the total score was questioned. (grades 2-5)

Griffiths, Robert H., Jr. The Effect of Irrelevant Redundancy and Information Regarding the Rule for Solution on Oddity Problem Learning in Young Children. (University of Cincinnati, 1970.) DAI 31B: 6289-6290; April 1971.

Children performed better when given the rule about the relationship among geometric figures than when not given the rule. Kindergarteners and second graders performed similarly, and better than nursery school children. (ages 4, 6, 8)

Grimes, Bill Ray. A Modern Geometric Development for Elementary School Mathematics Teachers. (Oklahoma State University, 1969.) DAI 31A: 4004; February 1971.

More than 100 geometric topics were identified in elementary school textbooks. Teachers need to know language as well as concepts. (elementary pre- and in-service)

Grumbling, Betty Lou Nowlin. An Experimental Study of the Effectiveness of Instruction in Mental Computation in Grade IV. (University of Northern Colorado, 1970.) DAI 31A: 3775-3776; February 1971.

The group having mental computation lessons made a significant increase in arithmetic achievement and was better able to solve problems mentally than was the group in which mental computation was not stressed. (grade 4)

Cryde, Stanley Kermit. A Paradigm for the Application of the Audio-Tutorial System in Construction to the Secondary School. (University of Southern California, 1971.) DAI 32A: 3136; December 1971.

Algebra was taught successfully with an audio-tutorial system. (grade 9)

Gubrud, Allan Roy. The Effect of an Advance Organizer and a Concrete Experience on Learning the Concept of Vectors in Junior and Senior High School. (Cornell University, 1970.) DAI 31A: 6468-6469; June 1971.

High-ability ninth graders and all in grade 10 were able to learn the vector concepts. Advance organizers had some facilitating effect. Use of pictures was as effective as were concrete materials. (grades 8-10)

Gumm, Robert Duane. An Analysis and Development of a Computer Science Program for Use in Secondary School Mathematics. (Oklahoma State University, 1969.) DAI 31A: 3899; February 1971.

Ways of using computers for instruction were studied, and a course of study recommended. (secondary)

Gururaja, Sreelakshmi. The Development of Number Concepts in Children. (University of Saskatchewan, 1969.) DAI 31B: 5023; February 1971.

Training with special play materials was found to be effective in improving understanding of number concepts. Transfer to tests involving logical class relationships was limited. (primary)

Gussett, James Clayton. The Employment of Non-Standard English in the Development of a Mathematics Course for Seventh-Grade Disadvantaged Students. (University of Cincinnati, 1971.) DAI 32A: 275; July 1971.

The materials using non-standard English were as effective as regular text materials. (grade 7)

Haggard, Charles Harmon. A Study of the Mathematical Understanding of Pre-Service Elementary School Teachers in Selected Kentucky Teacher Education Institutions. (University of Kentucky, 1971.) DAI 32A: 1957-1958; October 1971.

Students in colleges and universities had a better mathematics background than those in junior colleges. Methods courses in universities appeared to be better than those in colleges. (elementary pre-service)

Hall, Cynthia Tuttle. Determining Some Validities of the Test of Quantitative Judgment (Form T). (University of Massachusetts, 1970.) DAI 31A: 4382; March 1971.

The test on judging quantitative real-world situations was found to have a reliability of .78. (grades 4-6)

Hall, Wayne Hawkins. The Effect on Performance of Number of Exercises, Feedback, and Amount of Detail. (George Peabody College for Teachers, 1970.) DAI 31B: 4839-4840; February 1971.

Five exercises were found to be not as beneficial as 15 or 30 exercises. When 30 exercises were used, feedback on all appeared helpful. (grade 6)

Hamm, Anna Lois Sackett. An Investigation of Piagetian Conservation Abilities in Young Children. (Northeast Louisiana University, 1971.) DAI 32A: 1915-1916; October 1971.

Mean scores of white pupils aged 5 to 7 were found to be significantly higher than mean scores of black children on tests of conservation; no difference was found at age 8. Much variability was noted. (ages 5-8)

Hamner, Brent. A Study of Strategies Used in Teaching Geometry in the Public Secondary Schools of Alabama. (University of Alabama, 1970.) DAI 31A: 5267-5268; April 1971.

"Leadership" and "teacher" factors appeared to have the greatest influences on the teaching of geometry. (secondary in-service)

Hampton, Charles Edgar. The Relationship of Religious Attitudes to Certain Aspects of Mathematics Learning. (The University of Texas at Austin, 1970.) DAI 31B: 4197-4198; January 1971.

Religious attitude did not appear to be strongly related to mathematics aptitude or achievement. (grade 10)

Haney, Joanne Deloris Hager. A Comparison of Socioeconomic Status, Verbal Ability and Grade Level in the Performance of Piagetian Tasks. (West Virginia University, 1970.) DAI 31A: 3955; February 1971.

Verbal ability was found to be a stronger variable in discriminating conservation than was SES, but had less effect as age increased. (kindergarten-grade 4)

Hankins, Ben Albert. The Effect of a Controlled Classroom Environment on Student Performance. (The University of Tennessee, 1971.) DAI 32A: 2343-2344; November 1971.

No significant differences in arithmetic computation scores were found between students in rooms in which heating and lighting were controlled or marginal. (secondary)

Haven, Elizabeth Wright. Selected Community, School, Teacher, and Personal Factors Associated with Girls Electing to Take Advanced Academic Mathematics Courses in High School. (University of Pennsylvania, 1971.) DAI 32A: 1747; October 1971.

Liking and finding mathematics interesting, together with its usefulness in future study or job, were the main reasons girls took advanced mathematics courses. (grade 12)

Heiman, Marcia Bernice. Individualized Instruction in the Classroom. (The University of Michigan, 1970.) DAI 31A: 3956; February 1971.

Student performance rates increased more when teachers had feedback on pupils' success in an individualized instruction program. (elementary)

Heintz, Ruth Euller. Goals in the Cognitive and Affective Domains and a System of Instruction for the Pre-Service Training of Teachers of Elementary School Mathematics. (State University of New York at Buffalo, 1971.) DAI 32A: 819-820; August 1971.

A guide for teaching a one-year sequence of mathematics for elementary teachers was developed; utilizing objectives at various taxonomy-levels. (elementary pre-service)

Hershberger, Lotus Dean. A Comparison of Two Methods of Teaching Selected Topics in Plane and Solid Analytic Geometry. (The Florida State University, 1970.) DAI 31A: 4622-4623; March 1971.

No significant difference in immediate achievement or retention was found between groups using vector or non-vector approaches, but the vector-group scored significantly higher on a transfer test. (grade 12)

Hiatt, Arthur Allen. Assessing Mathematical Thinking Abilities of Sixth, Ninth, and Twelfth Grade Students. (University of California, Berkeley, 1970.) DAI 31B: 7427-7428; June 1971.

The developed test was found to measure certain mathematical thinking abilities not measured by standardized tests. Ninth graders did as well as twelfth graders on non-routine problems. The divergent thinking ability of sixth graders did not differ significantly from that of ninth graders. (grades 6, 9, 12)

Hill, Warren Henry. The Effect of Set Theory Instruction Upon the Ability of Children to Recognize Conclusive and Inconclusive Inferences in Sequential Logic. (George Peabody College for Teachers, 1970.) DAI 31B: 5024-5025; February 1971.

Training on classification skills and the meaning of conditional statements was more effective than training only on classification skills for increasing performance on sentential logic tests. (grade 3)

Hillerby, Robert Webster. Teaching First Grade Math to Spanish-Speaking Students. (University of California, Los Angeles, 1970.) DAI 31A: 3167; January 1971.

No significant differences in achievement on printed tests were found between groups of Spanish-speaking pupils taught in both English and Spanish or English only. When test items were presented orally, those taught in Spanish scored significantly higher. (grade 1)

Hirschi, Melvin Edward. A Study of Mathematical Achievement in an Intermediate Grade of the Lewiston School District. (University of Idaho, 1971.) DAI 32A: 2953; December 1971.

The group using the drill-and-practice materials improved in computational skills more than a group not using them. (grade 6)

Hoban, Michael James. Transformation Geometry in the Junior High School: An Evaluation of a Curricular Unit in the Seventh Grade. (Columbia University, 1970.) DAI 31B: 5482-5483; March 1971.

Six of the nine classes mastered each of the cognitive objectives set in a chapter for talented students. (grade 7)

Hoffman, Irwin J. Effect of Computer Application on Generalization Skills and Achievement in a Second Year Algebra Course. (University of Denver, 1971.) DAI 32B: 2856-2857; November 1971.

No evidence was found that use of the computer significantly affected generalization skills or achievement, except for certain simple analysis skills. (grade 11)

Holly, Keith Allen. Structure-of-Intellect Factor Abilities and a Self-Concept Measure in Mathematics Relative to Performance in High School Modern Algebra. (University of Southern California, 1971.) DAI 32A: 2484; November 1971.

Certain structure-of-intellect factors were found to be useful in predicting algebra success, especially when used with eighth grade marks. (grade 9)

Hooper, Frank H. Piaget's Conservation Tasks: The Logical and Developmental Priority of Identity Conservation. (Wayne State University, 1967.) DAI 31B: 6936-6937: May 1971.

Equivalence conservation was found to be more difficult than identity conservation. Age, but not the degree of physical transformation, was significant. (kindergarten-grade 2)

Hostetler, Robert Paul. Toward a Theory of Sequencing: Study 2-1: An Exploration of the Effect of Selected Sequence Variables Upon Student Choice in the Use of Algorithms. (The Pennsylvania State University, 1970.) DAI 31A: 4623; March 1971.

Evidence was obtained that the algorithm (for determining equivalent fractions) learned last was the one preferred. Scope of applicability did not affect preference. (grade 5)

Hubert, Lawrence James. A Formal Model for the Perceptual Processing of Geometric Configurations. (Stanford University, 1971.) DAI 32A: 788-789; August 1971.

Basic elements which appeared important in perceptual encoding of geometric figures were the parallel sides of the square, the "corners", and the diagonals. (elementary)

Hynes, Michael C. An Analysis of the Instructional Time Necessary for a Network of Behavioral Objectives for K-9 Mathematics Utilizing Program Evaluation and Review Technique. (Kent State University, 1971.) DAI 32A: 2305; November 1971.

A PERT-analysis indicated that there is sufficient time in the curriculum to complete the network of K-9 mathematics objectives. (teachers in kindergarten-grade 9)

Jansson, Lars Crispin. The Development of an Instrument to Assess Critical Thinking Ability in Mathematics. (Temple University, 1970.) DAI 32A: 1383; September 1971.

The 50-item test was found to have "satisfactory" reliability and validity. (elementary and secondary pre-service, college, grade 12)

Jennings, Thomas Edward. Self-Correctable Errors in the Educational Diagnosis of the Skills--A Multiple Regression Analysis. (University of North Carolina at Chapel Hill, 1971.) DAI 32A: 2350; November 1971.

Habitual errors in arithmetic computation were related to IQ and mathematical understanding. Errors due to problem difficulty and fatigue were more related to carelessness and lack of persistence than to mathematical background. (elementary)

Johnson, Herbert Norman. The Relationship of a Supplemental Unit in Logic to Certain Aspects of the Mathematics Education of Sixth Grade Students. (University of Oregon, 1971.) DAI 32A: 3005; December 1971.

A unit in logic was found to be successful, with pupils able to detect mathematical inconsistencies in a problem solving situation better than those who did not have such a unit. (grade 6)

Johnson, Randall Erland. The Effect of Activity Oriented Lessons on the Achievement and Attitudes of Seventh Grade Students in Mathematics. (University of Minnesota, 1970.) DAI 32A: 305; July 1971.

Activity-oriented instruction did not appear to be more effective than instruction with little or no emphasis on activities for units in number theory, geometry and measurement, and rational numbers. (grade 7)

Johnson, Robert Lee. The Effect of Teaching Algebra on the Maintenance and Development of Arithmetic Skills. (Lehigh University, 1970.) DAI 31A: 5079-5080; April 1971.

The students taking arithmetic scored greater mean gains on an arithmetic achievement test than did those taking algebra, but scores of those taking algebra were higher. (grade 8)

Johnson, Robert Leo. Effects of Varying Concrete Activities on Achievement of Objectives in Perimeter, Area, and Volume by Students of Grades Four, Five, and Six. (University of Colorado, 1970.) DAI 31A: 4624; March 1971.

A high degree of concreteness resulted in higher mean achievement and retention scores. (grades 4-6)

Johnson, Theola Gae. Influence of Selected Factors on the Ability of Fourth, Fifth, and Sixth Graders to Read Graphs. (University of Southern California, 1971.) DAI 32A: 726; August 1971.

The best single predictor of success in graph reading was a pretest on graphs. (grades 4-6)

Johnston, Hiram Drexel. Suggested Mathematics Enrichment Topics for High School Seniors. (Oklahoma State University, 1970.) DAI 31B: 6750-6751; May 1971.

Topics were selected to emphasize fundamental concepts. The axiomatic method was stressed. (grade 12)

Jones, Robert Sommerville. The Influence of Tactile-Kinesthetic Experience on Perceptual-Motor Behavior in Disadvantaged Preschool Children. (University of South Carolina, 1971.) DAI 32A: 671-672; August 1971.

Matching skills but not copying skills improved when children had plastic numerals available for free-play use. (ages 4-6)

Jordan, Ralph James. Effects of Sequence of Presentation of Square Root Extraction Methods. (The University of Rochester, 1970.) DAI 31A: 3416; January 1971.

The square root algorithm appeared to be the most preferred method, and the divide-and-average method the least preferred. (grade 8)

Kamins, Martin P. An Exploratory Study of the Effect of Familiar Language on the Ability of Black Children to Achieve Success with the Solving of Word Problems. (Wayne State University, 1971.) DAI 32A: 2402; November 1971.

No significant difference in achievement was found between use of problems written by children and textbook problems. (grade 5)

Kaminsky, Mildred. A Study of the Status of Conservation Ability in Relationship to Arithmetic Achievement. (Wayne State University, 1970.) DAI 31A: 3341; January 1971.

Correlations between the conservation concept test and standardized tests were significant. The highest correlation, .81, was with arithmetic concept scores. (grades 2, 3)

Kamps, Kenneth George. An Investigation of Portions of a Model for Acquisition of Conservation and Measurement of Length Based on Performance of Selected Second Grade Children on Six Piaget-Type Tasks. (The University of Iowa, 1970.) DAI 31A: 4550; March 1971.

Fewer than one-third of the pupils achieved any of the conservation or measurement tasks. No significant differences were found between groups having AAAS, Cuisenaire, or "limited" experiences. (grade 2)

Kanes, Lelage G. A Comparison of Two Teaching Strategies Used to Present a Unit in Elementary Mathematics Using Computer-Assisted Instruction. (University of Pennsylvania, 1971.) DAI 32A: 1981; October 1971.

No significant differences in achievement were found between pupils using guided discovery or expository programs. (ages 6-10)

Katz, Saul M. A Comparison of the Effects of Two Computer Augmented Methods of Instruction with Traditional Methods Upon Achievement of Algebra Two Students in a Comprehensive High School. (Temple University, 1971.) DAI 32A: 1188-1189; September 1971.

The more effective method of computer utilization appeared to be program-writing with no direct computer-access. (grade 11)

Keith, Virgie Irene. Elementary Teachers' Knowledge of the Geometry Appearing in Elementary School Mathematics Textbooks. (University of Virginia, 1970.) DAI 31A: 5037; April 1971.

Virginia teachers were found to have a better knowledge of the geometry in elementary school textbooks than with the geometry recommended by CUPM, SMSG, and CEEB, but they are weak in at least ten areas. (elementary in-service)

Kepner, Henry Sieber, Jr. An Empirical Investigation of Retroactive Effects on the Retention of Meaningful Mathematical Material. (The University of Iowa, 1970.) DAI 31A: 4550-4551; March 1971.

No significant differences in retention of concepts of vectors were found, whether interpolated content was on related or unrelated material. (grade 11)

Kessinger, Peter Remington. The Use of Student Generated Descriptions in the Identification of Mathematical Talent. (University of Arizona, 1971.) DAI 31A: 6280; June 1971.

Significant correlations were found between scores on the test developed to elicit mathematical statements and both marks and standardized test scores. (grades 4-9)

Khan, Masarrat Ali. A Comparison of Some Aspects of Mathematical Achievement of Sixth Grade Pupils at Lahore, Pakistan and Berkeley, California, U.S.A. (University of California, Berkeley, 1970.) DAI 32A: 672; August 1971.

Students in Berkeley (studying modern mathematics) scored higher than those in Lahore (studying traditional mathematics) on reasoning, understanding, and application subtests, but not on computation. (grade 6)

Kilman, Darrell Clark. The Effect of a Micro-Teaching Technique on the Attitudes of Prospective Elementary Teachers Toward Mathematics. (Oklahoma State University, 1969.) DAI 31A: 3783; February 1971.

No significant difference in attitude or achievement were found between groups taught with micro-teaching or lecture methods. (elementary pre-service)

Kirkpatrick, Joan Elizabeth. The Use of Finite Mathematical Systems to Achieve Selected Mathematics Objectives in Grade Six. (University of Minnesota. 1970.) DAI 32A: 306-307; July 1971.

Students studying the infinite systems scored significantly higher on understanding and appreciation objectives, while those studying finite systems scored significantly higher on the search-for-patterns objective. No differences were found on two other objectives. (grade 6)

Kissel, Mary Ann. A Comparative Investigation of the Efficiency of Two Classroom Observational Methods. (University of Pittsburgh, 1970.) DAI 31A: 4385-4386; March 1971.

The method in which randomly selected individuals were observed, rather than the whole class, was found to be more efficient for observing activity-type behaviors in an individualized classroom. (grade 5)

Klein, Paul Alfred. Toward a Theory of Sequencing: Study 1-1: An Exploration of Selected Relationships Among the Enactive, Iconic and Symbolic Modes of Representation. (The Pennsylvania State University, 1970.) DAI 31A: 4624-4625; March 1971.

A procedure was developed to prepare and classify objectives. Hypotheses were tested and conclusions reached, but the abstract does not indicate whether this was theoretical or empirical. (?)

Knaupp, Jonathan Elmer. A Study of Achievement and Attitude of Second Grade Students Using Two Modes of Instruction and Two Manipulative Models for the Numeration System. (University of Illinois at Urbana - Champaign, 1970.) DAI 31A: 6471; June 1971.

Both teacher-demonstration and student-activity modes with either blocks or sticks resulted in significant gains in achievement, but not changes in attitude. (grade 2)

Knight, Genevieve Madeline. The Effect of a Sub-Culturally Appropriate Language Upon Achievement in Mathematical Content. (University of Maryland, 1970.) DAI 31B: 7433-7434; June 1971.

Pupils taught and assessed using a sub-culturally appropriate language in a unit on non-metric geometry performed more successfully than those taught and assessed using standard language. (primary)

Knodel, Raymond Willard. A Comparative Study of Two Approaches to Teaching Mathematics and Arithmetic Methods to Prospective Elementary School Teachers. (University of Northern Colorado, 1970.) DAI 31A: 4010-4011; February 1971.

The course in which methods and content were integrated was found to be more effective than separate courses. (elementary pre-service)

Koch, Richard Roy. A Study of the Effectiveness of a Unit in Geometry Utilizing ETV for Third and Fourth Graders. (Rutgers University, The State University of New Jersey, 1970.) DAI 31B: 4202; January 1971.

Students who were instructed via ETV learned geometric concepts and had higher scores than those not having such instruction. (grades 3, 4)

Koeckeritz, William Albert. An Analysis of Mathematical and Professional Knowledge of Present and Future Elementary Teachers. (Utah State University, 1970.) DAI 31A: 3172; January 1971.

Professional knowledge of in-service teachers and college seniors was significantly higher than that of college freshmen. Mathematical concepts were not significantly different among these groups and high school sophomores. (elementary pre- and in-service)

Kort, Anthone Paul. Transformation vs. Non-Transformation Tenth-Grade Geometry: Effects on Retention of Geometry and on Transfer in Eleventh-Grade Mathematics. (Northwestern University, 1971.) DAI 32A: 3157-3158; December 1971.

Transformation geometry resulted in greater retention of congruence, similarity, and symmetry, but no greater overall retention or transfer than with non-transformation geometry. (grade 11)

Krenzel, Ken. Development of Equivalence of Amount in the Visual and Haptic Modalities. (Yeshiva University, 1970.) DAI 31A: 4552; March 1971.

Visual judgment of equivalence of amount was found to develop independently, antededing haptic judgment. Arithmetic achievement and counting ability had virtually no correlation with the capacity to judge amount. (ages 7-11)

Kulm, Gerald. The Readability of Elementary Algebra Textual Material. (Columbia University, 1971.) DAI 32A: 2913; December 1971.

When ten variables were considered, three were good predictors of readability regardless of the purpose of the material. Mathematical symbols accounted for 20 per cent of the variance in both illustrative and explanatory material. (grade 9)

Lackey, Kenneth Elbert. A Comparison of the Effects of Information Feedback Variation on Arithmetic Achievement. (University of Missouri - Columbia, 1970.) DAI 31A: 5037-5038; April 1971.

No significant differences were found among groups given immediate, delayed, or non-systematic feedback. (grade 7)

Laing, Robert Andrew. Relative Effects of Masses and Distributed Scheduling of Topics on Homework Assignments of Eighth Grade Mathematics Students. (The Ohio State University, 1970.) DAI 31A: 4625; March 1971.

No significant differences in achievement and retention were found between groups in which practice on a topic was massed in one homework assignment or distributed over several. There was a consistent trend favoring distributed practice. (grade 8)

Laliberte, Richard Arsene. Multivariate Statistical Prediction/Classification of Students Within Instructional Levels in Selected Ninth Grade Subjects: A Comparison of the Relative Effectiveness of the Multiple Regression and Discriminant Models. (Oklahoma State University, 1969.) DAI 31B: 4970-4971; February 1971.

Models for predicting achievement were developed, and used to classify mathematics and English students. (grade 9)

Lash, Stark William Edward. A Comparison of Three Types of Homework Assistance for High School Geometry. (Temple University, 1971.) DAI 32A: 1984; October 1971.

The Solutions group achieved lower scores than the groups having Hints, Answers, or no assistance. (grade 10)

Lasswell, Edmund Clarence. Incremental Programing: Exploration of a Technique for Meeting Individual Needs of High School Mathematics Students Through Hierarchical Task Analysis and Materials to Support Behavioral Assignments. (Southern Illinois University, 1970.) DAI 31A: 5272; April 1971.

Practice materials for subordinate skills were developed. No difference in means was found between groups using card or mimeographed forms. (grade 9)

Lawrence, Otis O'Neal. The Effect of the Utilization of Selected Mathematics Concepts and Skills on Achievement in High School Chemistry by Students from Two Different Populations. (The University of Oklahoma, 1971.) DAI 32A: 2404; November 1971.

Using mathematics concepts to teach certain chemistry concepts did not significantly affect chemistry achievement, but a significant correlation was found between mathematics achievement and chemistry achievement. (grade 12)

Lawton, Peter Andrew. Peer Relationships and Mathematical Achievement; A Study of the Relationship of Peer Acceptance and Peer Acceptability to Achievement in Mathematics. (New York University, 1970.) DAI 31A: 6281; June 1971.

Peer acceptance and acceptability were each significantly related to mathematics achievement. (grades 5, 7, 9, 11)

Leach, John Nathaniel. Cultural Factors Affecting the Adjustment of Puerto Rican Children to Schooling in Hartford, Connecticut. (The University of Connecticut, 1971.) DAI 32A: 2308; November 1971.

No significant difference was found in the mathematical achievement of students who had come from hill or coastal regions of Puerto Rico. (secondary)

Lesher, Ronald Eugene. A Study of Logical Thinking in Grades Four Through Seven. (Lehigh University, 1971.) DAI 32A: 2487; November 1971.

Significant grade level differences favoring seventh graders were found on both Proverbs and Logic Tests. (grades 4-7)

Levine, Maita Faye. A Study of Mathematical Confidence Relative to the Attainment of Certain Objectives of the In-Service Institute in Mathematics for Secondary School Teachers, University of Cincinnati, 1969-1970. (The Ohio State University, 1970.) DAI 32A: 287-288; July 1971.

Mathematical "confidence" and competence of participants in the in-service institute significantly increased. (secondary in-service)

Libeskind, Shlomo. A Development of a Unit on Number Theory for Use in High School, Based on a Heuristic Approach. (The University of Wisconsin, 1971.) DAI 32B: 3504; December 1971.

A unit on number theory including a sequence of ten theorems taught students to reproduce the proofs, understand the meaning of the theorems, and apply the method to new problems. (grades 9-11)

Lockley, Jeanette Elaine. A Comparative Study of Some Cluster Analytic Techniques with Application to the Mathematics Achievement in Junior High Schools. (Stanford University, 1970.) DAI 31A: 3982-3983; February 1971.

Students' mathematical achievement (from NLSMA data) across clusters was not the same after adjustments were made for differences in aptitude and initial understanding of mathematical concepts. (grades 7-9)

Lockwood, James Riley. An Analysis of Teacher-Questioning in Mathematics Classrooms. (University of Illinois at Urbana - Champaign, 1970.) DAI 31A: 6472-6473; June 1971.

Sixteen cues and 17 factors were identified in an analysis of questioning strategies, and relationships among them conceptualized. (teachers in grades 7-11)

Loftus, Elizabeth Jane Fishman. An Analysis of the Structural Variables That Determine Problem-Solving Difficulty on a Computer-Based Teletype. (Stanford University, 1970.) DAI 31A: 5853; May 1971.

Four variables were identified which significantly affected the difficulty of problems: number of operations, sequence of problems, complexity, and conversions. Verbal clues, order of operations, and number of steps had little effect on difficulty. (grade 6)

Lorentz, Jerome Stephen. An Experimental Study of the Effects of Varying the Amount and Sequencing of Explanatory Materials in the Teaching of Formal Mathematical Definitions. (University of Georgia, 1970.) DAI 32A: 5853; November 1971.

The material in which explanation followed definition was not as effective as explanation-definition, explanation preceding definition, or definition alone. (grade 10)

Luttrell, Homer Dale. The Effect of Supplementary Audio Tapes on the Performance of Seventh-Grade Students Who Read Below Grade Level and Were Enrolled in an Individualized Science Program - ISCS. (The Florida State University, 1971.) DAI 32A: 1366; September 1971.

No significant differences in mathematics or science achievement were found between groups studying the ISCS program with or without audio tapes. (grade 7)

Lutz, Paul Norman. Hardboard Slates as a Feedback Device in Fifth Grade Mathematics. (University of Oregon, 1970.) DAI 31A: 5273; April 1971.

No significant differences in achievement were found between groups holding up slates and those using paper-and-pencil, but the group using slates without holding them up achieved significantly higher than the paper-and-pencil group. (grade 5)

Mahan, Elizabeth Anne. A Study of the Verbal Behavior of Four Student Teachers Teaching Selected Geometric Concepts to Kindergarten Children. (Columbia University, 1970.) DAI 31A: 3392-3393; January 1971.

Descriptive language accounted for 45 per cent of the interactions, "instance moves" for 41 per cent, and comparative actions for 11 per cent. (elementary pre-service)

Mahoney, Vincent David. A Branch Analysis of Graphing Behavior in Two Learning Hierarchies Within Piagetian Stages. (University of California, Berkeley, 1970.) DAI 31A: 5204-5205; April 1971.

Sequences for drawing and interpreting line graphs (for science) were determined. Most of the tasks were associated with concrete and formal thinking levels. (ages 9-14)

Malcolm, Susan Vanderwal. A Longitudinal Study of Attitudes Toward Arithmetic in Grades Four, Six and Seven. (Case Western Reserve University, 1971.) DAI 32A: 1194; September 1971.

Attitudes toward arithmetic decreased with grade level. (grades 3-7)

Marchi, Jack Ugo. Comparison of Selected Piagetian Tasks with the Wechsler Intelligence Scale for Children as Measures of Mental Retardation. (University of California, Berkeley, 1970.) DAI 31A: 6442; June 1971.

Retardates followed a similar sequence in the acquisition of mass, weight, and volume as postulated for normal children. The ability to conserve was not affected by sex, race, SES, or language, but was related to IQ. (ages 7-16)

Martin, Joanna May. The Effects of Rote and Discovery Teaching Methods of Fifth, Seventh, and Ninth Grade Students of a Low and Middle Socio-Economic Background. (Oklahoma State University, 1970.) DAI 31A: 5941; May 1971.

No significant differences were found for pupils taught a mathematics concept by rote or discovery at either middle or low SES level. (grades 5, 7, 9)

Martin, Ralph Clyde. A Study of Methods of Structuring a Proof as an Aid to the Development of Critical Thinking Skills in High School Geometry. (University of Kansas, 1970.) DAI 31A: 5875-5876; May 1971.

No significant difference was found in the critical thinking skills of students using ledger or flow proof methods of structuring proofs. (grade 10)

Mastantuono, Albert Kenneth. An Examination of Four Arithmetic Attitude Scales. (Case Western Reserve University, 1970.) DAI 32A: 248; July 1971.

The correlations of four attitude scales with grade and sex were analyzed. Scores on two scales correlated significantly with achievement. (grades 3, 5)

Masterson, Sister Hannah Marie. Learning Through Teaching. The Effects of Arithmetic Tutoring on High School Tutors and Their First-Grade Pupils. (New York University, 1970.) DAI 31A: 6473; June 1971.

Tutors were not found to differ from non-tutors in achievement or attitude, but tutoring did significantly affect the arithmetic skills of first graders. (grades 1, 12)

McBride, Ralph Book. Flexible Grouping and Differentiated Instruction Based on Achievement of Behavioral Objectives in a Mathematics Course for Prospective Elementary Teachers. (The University of Michigan, 1970.) DAI 31A: 4040-4041; February 1971.

The differentiated instruction plan appeared to be effective for achievement gains, anxiety reduction, and positive attitudes. (elementary pre-service)

McClure, Sherman Le Jeal. The Application of Cognitive Dissonance Theory to the Acquisition of a Piagetian Conservation Task by Selected Elementary School Children. (Oregon State University, 1971.) DAI 31B: 6948; May 1971.

There was some evidence that "cognitive dissonance" and verbal training were effective in developing conservation of length on tests of equivalency. (ages 6-9)

McClure, Wesley Cornelious. A Multivariate Inventory of Attitudes Toward Selected Components of Elementary School Mathematics. (University of Virginia, 1970.) DAI 31A: 5941-5942; May 1971.

The inventory appeared to be a valid measure of attitude toward mathematics. Mathematics aptitude was found to be a strong predictor of attitude. (elementary pre- and in-service, grades 9, 12)

McCullouch, James Victor. The Effect of Using a Behavioral Objectives Curriculum in Mathematics on the Achievement of Ninth-Grade Pupils in the Meridan Separate School District. (University of Alabama, 1970.) DAI 31A: 5114; April 1971.

There were no significant differences between groups, but the behavioral objectives groups made greater progress than the groups using the standard textbook approach. (grade 9)

McCune, James Herbert. A Study of the Effects of a Sequence of Skill-Building Activities on a Group of Pre-School Children. (Wayne State University, 1970.) DAI 32A: 96; July 1971.

Disadvantaged children using the activities (which included number concept development) made significantly greater gains than a comparable group not using the activities. (age 4)

McDonald, Norma Lee Hale. A Study of Creativity in Educable Mentally Retarded Children. (University of Denver, 1970.) DAI 31A: 4587; March 1971.

Significant positive relationships were found between creativity and IQ, and creativity and arithmetic scores. (ages 9-14, MR's)

McGannon, Thomas Herbert. A Comparison of Two Methods of Teaching Calculus with Special Inquiry Into Creativity. (Northwestern University, 1970.) DAI 31A: 3785; February 1971.

There was no difference in achievement of groups using rigorous or intuitive calculus textbooks. Creative students achieved better with the intuitive textbook. (secondary)

McHenry, Hugh Lansden. An Analysis of the Relative Effectiveness of Two Embodiments of Rigor in a First Course in College Mathematics for Prospective Elementary School Teachers. (George Peabody College for Teachers, 1970.) DAI 31A: 4014; February 1971.

No significant difference was found between classes taught with low-rigor or high-rigor approaches. (elementary pre-service)

McKeen, Ronald Louis. A Model for Curriculum Construction Through Observations of Students Solving Problems in Small Instructional Groups. (University of Maryland, 1970.) DAI 31A: 5223-5224; April 1971.

The students who were taught by a hierarchy developed by other students did not achieve better than a group taught by an instructor-developed hierarchy. (elementary pre-service)

McLeod, Gordon Keith. An Experiment in the Teaching of Selected Concepts of Probability to Elementary School Children. (Stanford University, 1971.) DAI 32A: 1359; September 1971.

Most pupils in both grades were able to apply the concepts on the "likely" to "unlikely" continuum before instruction. No clear treatment effect was found for groups having laboratory participation, teacher demonstration, or no instruction. (grades 2, 4)

McMillan, William B. The Effect of Monetary Reinforcement Upon Mathematics Performance with Sixth Grade Ghetto Children in a Naturalistic Classroom Setting. (Southern Illinois University, 1970.) DAI 31A: 5206; April 1971.

Monetary reinforcement resulted in significant achievement gains. (grade 6)

Mealy, Edward Clark. An Evaluation of the Use of Films as an Aid to Changing Students' Attitudes Toward Mathematics. (George Peabody College for Teachers, 1970.) DAI 31B: 4852; February 1971.

The films had no benefit for students having a pretest, but induced more positive attitudes in non-pretested students. (grade 7)

Miller, Edward Jeremiah, III. The Current Status of High School Mathematics Programs in North Central Texas as Related to Selected Factors. (North Texas State University, 1970.) DAI 31A: 3177; January 1971.

Mathematics teachers in large schools had a more extensive preparation in mathematics than did those in medium and small schools. Students from large schools scored significantly higher on an aptitude test. (grades 9-12)

Miller, Patricia Ann Hackney. Attention to Stimulus Dimensions in the Conservation of Liquid Quantity. (University of Minnesota, 1970.) DAI 31B: 6297; April 1971.

Kindergarten non-conservers based conservation beliefs more on height than width, while conservers attended to both. Third grade conservers preferred quantity responses. (kindergarten, grade 3)

Montemerlo, Melvin David. The Effects of Training and Ability on Conservation of Number. (The Pennsylvania State University, 1970.) DAI 31A: 4555; March 1971.

Relevant-concept training was found to effect more transfer to number conservation than irrelevant-concept training and was generalized to liquid conservation. (kindergarten)

Montemuro, Michael Paul. A Comparative Analysis of Three Modes of Instruction Programmed Text - Audio-Projected Program and Lecture-Demonstration. (Temple University, 1968.) DAI 31A: 6312-6313; June 1971.

The programmed text and the audio-projected program were as effective as the lecture-demonstration mode. (elementary in-service)

Moorhouse, John Nelson. Student-Appointed Goals Applied to the Evaluation of Student Teacher Mathematics Instruction. (The Pennsylvania State University, 1970.) DAI 32A: 823-824; August 1971.

Students who had aided in the development of an observation instrument did not score differently on the instrument than students who had not used it. (elementary pre-service)

Mowbray, John Smart. An Investigation of a Coder Training System for Mathematics Textbook Analysis. (University of Pittsburgh, 1970.) DAI 31A: 6475; June 1971.

It was possible to train coders to use the Method of Response List to analyze textbooks. (kindergarten-grade 6 textbooks)

Muckey, Roy William. Using Decimal and Non-Decimal Numeration Systems to Effect Change in the Ability of Beginning Second Grade Students to Add and Subtract in Different Bases. (University of Minnesota, 1971.) DAI 32B: 3510; December 1971.

No significant differences were found between groups studying base-ten only, non-ten bases, or many bases including base ten, in ability to add base ten numbers, but study of non-ten bases increased ability to add non-ten bases. There was little transfer from addition to subtraction. (grade 2)

Mullen, Whitney Paul. An Evaluation of Quantitative Physical Science: An Equipment-Based Ninth-Grade Course in Physical Science. (Duke University, 1970.) DAI 31A: 5224; April 1971.

Students who took the quantitative science course took more science and mathematics courses and achieved better than students in a non-quantitative course. (grade 9)

Napier, Toy Lee. A Comparison of a Team and a Non-Team Method of Teaching Algebra I to Ninth Grade Students Who Were Low Achievers in Eighth Grade Mathematics. (University of Arkansas, 1970.) DAI 31B: 4206-4207; January 1971.

No significant differences in achievement and attitude were found between groups who were instructed with team-teaching or conventional methods. (grade 9)

Nelson, Norman Neibuhr. A Survey of the Status of Probability and Statistics in the Public Secondary Schools of Colorado. (University of Northern Colorado, 1970.) DAI 31A: 4041; February 1971.

Most teachers felt that more probability and statistics should be taught. No relationship was found between the extent to which these topics are taught and such factors as size of school. (secondary)

Neujahr, James Lloyd. An Analysis of Teacher-Pupil Interactions When Instruction is Individualized. (Columbia University, 1970.) DAI 31A: 4041; February 1971.

Analysis of lessons in mathematics, social studies, and science revealed that interaction patterns differ in individualized and lecture-discussion classes. (grade 6)

Nickel, Anton Peter. A Multi-Experience Approach to Conceptualization for the Purpose of Improvement of Verbal Problem Solving in Arithmetic. (University of Oregon, 1971.) DAI 32A: 2917-2918; December 1971.

The multi-experience approach to problem solving was more effective than the verbal approach. (grade 4)

Niederkorn, Robert Henry. Assessing Relative Effectiveness of Standardized and Experimental Tests in Measuring Mathematics Achievement in Selected Fifth Grades. (University of Montana, 1971.) DAI 32A: 2314-2315; November 1971.

Classrooms identified as traditional tended to produce higher mean scores on the traditional test, while classrooms identified as modern tended to produce higher mean scores on the modern test. (grade 5)

Nixon, Betty Lou Knapp. An Evaluation of the Educational Program as Implemented in a Transitional School in the Northern Section of New Jersey. (West Virginia University, 1970.) DAI 31A: 6285; June 1971.

The traditional school was significantly better than the transitional school on arithmetic subtests. (grades 5-9)

Norland, Charles R. Mathematics Achievement: Changes in Achievement Scores for Grades Six and Eight After Instruction in Modern Mathematics Programs for Four Years or More, 1969. (Northern Illinois University, 1971.) DAI 32A: 2363; November 1971.

In general, students who had a traditional program scored higher than those who had a modern program. (grades 6, 8)

Nowak, Arlene Theresa. The Use of Time-Lapse Photography to Record Teacher-Pupil Contacts, Teacher Supervisory Behavior, and Teacher Travel in the Classroom. (Wayne State University, 1970.) DAI 32A: 310; July 1971.

During arithmetic instruction, teachers spent the greatest amount of time contacting pupils as a whole class. More time was devoted to supervisory behavior in arithmetic than in reading. (teachers in grade 4)

Nuhfer, Thomas Harry. Individual Enrichment in Mathematics Utilizing Three Modes of Instruction: A Comparison Involving Advanced High School and Lower Division College Students. (State University of New York at Buffalo, 1971.) DAI 32A: 2554; November 1971.

Both the linear-programmed-text group and the audio-taped program group achieved higher scores than the enrichment-textbook group. The use of audio tape also resulted in better retention. (grades 10, 12, college)

Offir, Joseph. Some Mathematical Models of Individualized Differences in Learning and Performance. (Stanford University, 1971.) DAI 32A: 795; August 1971.

A model was developed and tested; it was found adequate to describe the difficulties in column addition. (elementary)

O'Flaherty, Helen T. The Developmental Significance of Pictorial Representation in Problem Solving. (Fordham University, 1971.) DAI 32B: 2382; October 1971.

The presence of black-and-white pictures did not affect problem-solving performance. When colored pictures were used, seventh graders solved more problems correctly than did fourth graders. (grades 4, 7)

Oliveira, Arnulfo Luis. A Comparison of the Verbal Teaching Behaviors of Junior High School Mexican American and Anglo American Teachers of Social Studies and Mathematics with Classes of Predominantly Spanish-Speaking Children. (The University of Texas at Austin, 1970.) DAI 31A: 3396; January 1971.

Students used more non-substantive statements and asked more substantive questions in mathematics classes than in social studies classes. Mathematics teachers asked more elaborating and procedural-positive questions, but fewer divergent questions than did social studies teachers. (teachers in grade 8)

Olson, Alton Thorpe. High School Plane Geometry Through Transformations: An Exploratory Study. (The University of Wisconsin, 1970.) DAI 31A: 5944; May 1971.

The unit on geometry with transformations appeared to be more successful for high-ability students. (grade 10)

Olson, Franklin Carl. The Effects of Pair Study on Student Attitude and Achievement in Plane Geometry. (The University of Nebraska, 1971.) DAI 32A: 840-841; August 1971.

Achievement and attitude were not significantly different in classes in which students studied in pairs or alone. (grade 10)

O'Neill, Jane Anne. An Analysis on Selected Variables of the Effect of a Systems Approach to Teaching Specific Mathematical Skills to Fifth Grade Students from a Disadvantaged Area. (The University of Connecticut, 1970.) DAI 31A: 6286; June 1971.

The teacher-text approach was found to be more effective than a machine-presented approach to materials on fractions. (grade 5)

Onorevole, Richard Emil. A Study of the Effectiveness of Having Middle-Grade Arithmetic Students Rewrite Programed Questions in Their Own Words Prior to Making a Response. (Columbia University, 1970.) DAI 31A: 3366; January 1971.

Students who rewrote the question prior to answering it achieved more than those who answered it without rewriting it. (grade 7)

Ordonez, Joselina Maniago. School-Related Attitudes of Title I Children in the District of Columbia Public Schools. (The George Washington University, 1971.) DAI 32A: 1196; September 1971.

Significant differences between Title I and non-Title I pupils were found in attitudes toward arithmetic, with disadvantaged pupils having less positive attitudes. (grades 4, 6)

Ostheller, Karl Olney. The Feasibility of Using Computer-Assisted Instruction to Teach Mathematics in the Senior High School. (Washington State University, 1970.) DAI 31A: 4042; February 1971.

A significant difference in achievement favored the group taught a unit on probability and statistics with CAI. Attitudes were not different, but students preferred teacher-pupil interaction. (grade 12)

Otaala, Barnabas. The Development of Operational Thinking in Primary School Children: An Examination of Some Aspects of Piaget's Theory Among the ITESO Children of Uganda. (Columbia University, 1971.) DAI 32A: 796; August 1971.

Piaget's theory was supported in regard to the sequence of development; the parallel development of conservation, seriation, and classification was only partially supported. (ages 6-14)

Pack, Elbert Chandler. The Effect of Mode of Computer-Operation on Learning a Computer Language and on Problem Solving Efficiency of College Bound High School Students. (University of California, Los Angeles, 1970.) DAI 31A: 6477; June 1971.

No significant differences were found on the language test or in number of mathematics problems solved, but students preferred the time-sharing mode to quick-batch and slow-batch modes. (secondary)

Page, Robert Leroy. An Experiment to Compare the Effectiveness of Instruction Versus Discovery in Generalizing the Strategy of a Simple Game. (The Florida State University, 1970.) DAI 31A: 4628-4629; March 1971.

The group which was told the counting-game strategy played significantly more perfect games than the group which had to discover the strategy. Ability to generalize was not significantly different. (secondary)

Paris, John August. The Relation of a Personality Trait and Game Conditions to Participant Learning. (Syracuse University, 1970.) DAI 32A: 102; July 1971.

Certain characteristics of students in cooperative and competitive arithmetic game situations were identified. (grade 5)

Peck, Lawrence Keith. The Effect of Two Geometric Instructional Paradigms in Grades Four, Six, and Eight. (University of Missouri - Columbia, 1970.) DAI 31A: 3787-3788; February 1971.

Groups using conventional or imaginative terminology did not differ significantly in achievement, but ability to transfer certain concepts was significantly different. (grades 4, 6, 8)

Peper, John Benjamin. A Predictive Study of the Relationship Between Status and Achievement in Elementary Units of Urban, Suburban, Rural Farm and Rural Non-Farm School Districts. (Temple University, 1970.) DAI 31A: 5092; April 1971.

Differences in arithmetic achievement favored pupils in suburban and rural-farm communities over those in center-city or rural-non-farm communities, but there were no significant differences between communities in predicting achievement. (grade 5)

Pettis, Rufus Grier. An Analysis of the Methods Being Used to Make Provisions for Outstanding High School Mathematics Students in North Carolina. (Oklahoma State University, 1970.) DAI 31A: 5798-5799; May 1971.

Nine enrichment procedures used regularly were ascertained. (secondary)

Postman, Robert Derek. The Effects of Mathematics Laboratory Experiences on the Teaching Behavior of Preservice Elementary School Teachers. (Columbia University, 1971.) DAI 32A: 3142; December 1971.

Involvement in laboratory experiences was not sufficient to cause students to use the laboratory approach when teaching. On the average, nine-tenths or the time was devoted to teachers talking to the whole class. (elementary pre-service)

Poteet, James Allen. Identification Classification and Characteristics of First Grade Students with Learning Disabilities in Reading, Writing and Mathematics. (Purdue University, 1970.) DAI 31A: 3994; February 1971.

Learning disabilities were found in 5.5 per cent of the pupils, with five factors identified as predictors. (grade 1)

Prather, Frank Peck. An Experimental Briefing-Teacher Aide Program with Professional Laboratory Experiences for Sophomore-Junior Level Pre-Service Mathematics Teacher Trainees. (The University of Nebraska, 1971.) DAI 32A: 825; August 1971.

No significant differences were found on most measures for students who served as teacher-aides with or without briefing sessions. (secondary pre-service)

Prock, Don. Algebra for Elementary Teachers Based on Current Elementary Mathematics Textbooks. (Oklahoma State University, 1969.) DAI 31A: 4019; February 1971.

Algebraic materials were developed following analysis of children's textbooks. (elementary pre- and in-service)

Puglisi, Donald Francis. The Differential Effects of Supplemental Self-Instruction on Student Achievement in Mathematics. (Lehigh University, 1970.) DAI 31A: 5043; April 1971.

No significant differences were found between groups who used pupil- or teacher-directed programmed materials or teacher-directed drill materials for mathematics. (grade 6)

Raines, Bob Gene. Personal, Situational and Behavioral Predisposition Factors Related to the Elementary Teacher's Attitude Toward Teaching Mathematics. (University of Virginia, 1970.) DAI 31A: 4631; March 1971

Virginia teachers had a very favorable attitude toward the teaching of mathematics. Teachers trained specifically for elementary teaching and those with a strong mathematics background were likely to have favorable attitudes. (teachers in grades 3-6)

Ratzlaff, Harold Cornie. The Relative Effectiveness of Advance Organizers in the Acquisition, Retention, and Lateral Transfer of Seventh Grade, Base Five Mathematics. (University of Oregon, 1970.) DAI 31A: 5277-5278; April 1971.

No significant differences in achievement, retention, or transfer were found between groups having advanced organizers, rote, or meaningful instruction. (grade 7)

Reed, Jerry Franklin. The Relative Effectiveness of Programmed and Conventional Textbooks as Supplements to Classroom Lecture in the Teaching of Elementary Modern Mathematics. (Mississippi State University, 1971.) DAI 32A: 1989; October 1971.

No significant differences were found between groups using programmed or conventional textbooks. (elementary pre-service)

Reichert, Conrad Alfred. The Effects of Learner, Task and Criterion Test Characteristics on Learning in Scrambled Item Sequences. (Cornell University, 1971.) DAI 32A: 253-254; July 1971.

Scrambling learning sequences (on computing line slopes) appeared detrimental to learning, especially when sequences are long. Grade level, mathematics achievement, and test complexity did not interact with type of sequence. (grades 6-8)

Remacle, Leo Felix. A Comparative Study of the Differences in Attitudes, Self-Concept, and Achievement of Children in Graded and Nongraded Elementary Schools. (University of South Dakota, 1970.) DAI 31A: 5948; May 1971.

Non-graded students achieved higher scores in mathematics and other subjects than did graded students. (grades 5, 6)

Richard, Tommy Harold. The Development and Appraisal of a Unit on Diophantine Equations for Prospective Elementary School Teachers. (University of Northern Colorado, 1971.) DAI 32A: 1966; October 1971.

Achievement and attitude toward the developed unit were satisfactory. (elementary pre-service)

Richards, Kenvyn Barrett. A Comparison of the Effects of Verbal-Manipulative Forms of Programed Instruction in Teaching Measurement Skills to Sixth Grade Pupils. (University of Maryland, 1970.) DAI 31A: 5818; May 1971.

No significant differences in achievement or retention were found between groups using verbal or verbal-manipulative programs on reading a ruler. (grade 6)

Riley, James Edward. A Comparison of the Abilities of Late Elementary School Children to Learn Tasks on the Operations of Signed Numbers. (Michigan State University, 1970.) DAI 31A: 5878; May 1971.

Students in the didactic-instruction group generally had higher scores than those in discovery-oriented groups. (grades 4-6)

Ritter, Myron Wayne. A Comparison of the Traditional Approach and of Independent Study by Video-Tape Dial Access in Trigonometry Classes. (The Pennsylvania State University, 1970.) DAI 32A: 254; July 1971.

No significant differences in achievement or attitude were found between groups using dial-access equipment and those taught traditionally. The dial-access group completed the course in one-sixth the time, however. (grade 11)

Rivera, Hugo H. Ascertaining Language and Computational Curriculum Needs for Economically Disadvantaged Mexican-American Elementary Students. (Arizona State University, 1971.) DAI 32A: 2516; November 1971.

Significant positive relationships were found between English language abilities, reading, and arithmetic. (grades 2, 5)

Roberts, William Joseph. Measuring Aspects of Quantitative Judgment of Upper Elementary and Junior High School Students. (University of Massachusetts, 1970.) DAI 31B: 4860-4861; February 1971.

Boys scored significantly higher than girls on the test; scores were related to IQ and standardized achievement test scores. (grades 6-9)

Robertson, Howard Charles. The Effects of the Discovery and Expository Approach of Presenting and Teaching Selected Mathematical Principles and Relationships to Fourth Grade Pupils. (University of Pittsburgh, 1970.) DAI 31A: 5278-5279; April 1971.

Pupils in the expository group achieved significantly higher on computation tests, while those in the discovery group scored significantly higher on the retention test on applications. Attitudes were significantly higher for the discovery group. (grade 4)

Ronan, Franklin Delano. Study of the Effectiveness of a Computer When Used as a Teaching and Learning Tool in High School Mathematics. (The University of Michigan, 1971.) DAI 32A: 1264-1265; September 1971.

Students who used a computer scored significantly higher on some (but not all) measures of achievement than those not using the computer. (grade 11)

Rose, Susan Ann. A Study of Children's Understanding of Cardinal Number. (New York University, 1969. DAI 32B: 2383-2384; October 1971.

Training on "more" or "same" concepts, designed to disassociate length and density from number, had little effect on children who could construct a one-to-one correspondence. The concept "more" was easier than the concept "same". Children who could not construct were able to discriminate one-to-one correspondence. (ages 3-8)

Rosenbaum, Sema Joy Marks. A Course in Computer Simulation for High School Students. (Harvard University, 1970.) DAI 31A: 5676; May 1971.

The course was developed for college-bound seniors with an interest and aptitude in mathematics. (grade 12)

Roy, Gregory Raymond. The Effect of the Study of Mathematical Logic on Student Performance in Proving Theorems by Mathematical Induction. (State University of New York at Buffalo, 1970.) DAI 31A: 4045; February 1971.

The study of logic had little or no effect on students' ability to determine the validity of arguments or to prove theorems using inductive principles. (grade 12)

Sanders, Frank Jarman. A Study of the Impact of the Chattanooga Public Schools' Head Start Follow-Through Program 1967-1970. (The University of Tennessee, 1970.) DAI 32A: 142-143; July 1971.

Pupils in the Follow-Through Program achieved significantly more than those not in the program on some arithmetic tests. Significant differences were also found favoring those who had had Head Start programs, although this was also evident when the effect of Head Start was held constant. (grades 1-3)

Savells, Jerald Owens. A Sociological Analysis of the Relationship Between the Home Environment and Achievement in Mathematics Among a Select Sample of Culturally Disadvantaged Students. (The Louisiana State University and Agricultural and Mechanical College, 1971.) DAI 32A: 1098; August 1971.

No significant differences in achievement were found between groups using materials developed for disadvantaged pupils or "regular" materials when factors related to mothers' background and attitude were considered. (grades 2, 4, 7)

Scott, Dorothy Marie. A Modern Mathematics Test to Evaluate Pre-Set Goals in a City School. (St. Louis University, 1970.) DAI 31A: 3791; February 1971.

Scores on the developed test correlated significantly with teachers' ratings of student achievement, and were significantly different from correlations of standardized test scores and teacher ratings. (grades 4-8)

Scott, Joseph Augustine. The Effects on Short- and Long-Term Retention and on Transfer of Two Methods of Presenting Selected Geometry Concepts. (The University of Wisconsin, 1970.) DAI 31A: 6413; June 1971.

Scores of students who were taught with a discovery method increased over time, while scores of students taught with an expository method decreased. (grade 6)

Sension, Donald Bruce. A Comparison of Two Conceptual Frameworks for Teaching the Basic Concepts of Rational Numbers. (University of Minnesota, 1971.) DAI 32A: 2408; November 1971.

Area, set-subset, and combination representations of introducing rational number concepts appeared to be equally effective on tests using two types of pictorial models. (grade 2)

Sharlow, John Francis. Retroactive and Proactive Effects of Learning Certain Aspects of Symbolic Logic on Ninth and Tenth Grade Students' Understanding of Mathematical Topics. (State University of New York at Albany, 1971.) DAI 32A: 1841; October 1971.

The logic program increased geometry students' understanding of previously learned concepts; algebra students also needed teacher encouragement. The logic program also facilitated the following work in geometry. (grades 9, 10)

Sheofee, Jim Bartley. A Comparative Study of the Effectiveness of Two Methods of Teaching Mathematics to Prospective Elementary School Teachers. (The University of Mississippi, 1970.) DAI 31A: 4606-4607; March 1971.

The expository approach resulted in a more positive change in attitude than the guided-discovery approach; no achievement difference was found. (elementary pre-service)

Sherrill, James Malcolm. The Effects of Differing Presentations of Mathematical Word Problems Upon the Achievement of Tenth Grade Students. (The University of Texas at Austin, 1970.) DAI 31A: 3427; January 1971.

Achievement with problems was affected by the presence of a pictorial representation of the problem situation, as well as by IQ, reading ability, and previous achievement. (grade 10)

Silverblank, Francine. Sense of Responsibility, Level of Anxiety, and Sociability in Suburban Male High School Seniors Who Are Talented in Mathematics and Those Talented in English. (New York University, 1970.) DAI 31A: 6414; June 1971.

Students talented in mathematics were not significantly different from those talented in English in sense of responsibility or anxiety level, but were less sociable. (grade 12)

Simpson, Robert Edward. The Effects of Cognitive Styles and Chronological Age in Achieving Conservation Concepts of Substance, Weight, and Volume. (University of Alabama, 1970.) DAI 31A: 3353; January 1971.

Age was a greater factor in conservation than reflexive or impulsive cognitive style. (ages 6-12)

Smith, Calvin Matthew, Jr. An Exploratory Study of the Effects of Compensatory Education on the Reading and Mathematics Achievement of Intermediate Grade Pupils. (The Ohio State University, 1971.) DAI 32A: 2509-2510; November 1971.

The mathematics compensatory education component was significantly associated with success in computation for fourth and fifth grade low IQ underachievers. (grades 4-6)

Smith, Charles William. The Effect of Group Appointed Goals on Mathematics Teaching Behaviors of Elementary Student Teachers. (The Pennsylvania State University, 1970.) DAI 32A: 827-828; August 1971.

A course in which observational techniques were discussed resulted in different behaviors during student teaching from those used by students in a regular course. (elementary pre-service)

Smith, Dan Faye. A Study of the Relationship of Teacher Sex to Fifth Grade Boys' Sex Role Preference, General Self Concept, and Scholastic Achievement in Science and Mathematics. (University of Miami, 1970.) DAI 31A: 4563; March 1971.

Boys with male teachers scored higher on mathematical problem solving than boys with female teachers, but not differently on computation. (grade 5)

Smith, Edwin Malcolm Ramsey. The Preparation of Elementary School Teachers in Indiana for the Emerging School Mathematics Curriculum. (Ball State University, 1971.) DAI 32A: 1388-1389; September 1971.

Most teachers reported favorable attitudes toward mathematics. Their college courses had included much of the geometry recommended by CUPM, but little of the algebra. (elementary in-service)

Smith, George Wilson. The Development of an Instrument to Record the Interaction Between Teacher and Pupil in the Classroom and the Correlation of Certain Factors with Achievement. (University of Maryland, 1971.) DAI 32A: 1991-1992; October 1971.

The degree of task-attendance was found to vary from one achievement level to another according to the type of classroom organization. (grades 2, 4)

Sobelman, Marilyn. The Relationship of Secondary School Teachers' Subject Specialization, Teaching Level, and Reaction to Selected Teaching Situations. (New York University, 1971.) DAI 32A: 1389; September 1971.

Teachers of mathematics and science reacted significantly differently from teachers of English and social studies to non-subject-oriented teaching situations. (secondary in-service)

Solheim, Jerome Harold. The Effect of the Study of Transformations of the Plane on the Attitudes of Secondary School Geometry Students. (Indiana University, 1971.) DAI 32A: 3165; December 1971.

Attitudes of groups studying transformations became more negative, while that of the groups studying traditional topics were unchanged. Attitude toward geometry was found to be significantly correlated to achievement in geometry. (grade 10)

Spitler, Gail Jean. An Investigation of Various Cognitive Styles and the Implications for Mathematics Education. (Wayne State University, 1970.) DAI 32A: 105; July 1971.

Five conceptual styles were identified and related research summarized. (kindergarten-grade 12)

Stacy, Bobby Fant. A Comparison of Academic Achievement and Mental Maturity Test Scores of Negro High School Seniors in Predominantly White Schools with Academic Achievement and Mental Maturity Test Scores of Negro Seniors in Predominantly Negro Schools. (Mississippi State University, 1971.) DAI 32A: 1815; October 1971.

Negro students who transferred to predominantly white high schools achieved significantly more on mathematics and certain other tests than Negro students who remained in Negro schools. (grade 12)

Starkey, Kathryn Towns. The Effect of Teacher Comments on Attitude Toward and Achievement in Secondary Mathematics Classes: An Experimental Study. (The Pennsylvania State University, 1970.) DAI 32A: 259-260; July 1971.

No significant differences in achievement were found for groups receiving no, specified, or "free" comments. Girls scored significantly higher than boys. Mean attitude level increased for all groups. (grades 8-12)

Stevenson, Erwin Francis. An Analysis of the Technical and Semi-Technical Vocabulary Contained in Third Grade Mathematics Textbooks and First and Second Grade Readers. (Indiana University, 1971.) DAI 32A: 3012; December 1971.

Of 396 words identified, only 51 were used in both the reading and mathematics textbooks studied and only 161 were common to all four mathematics textbooks. (grades 1-3)

Stokes, Charles Alphonso. Some Effects of Schooling, Age, Race and Socio-Economic Status on the Cognitive Development of Primary School Boys. (The University of Michigan, 1970.) DAI 31A: 3793; February 1971.

Significant differences in conservation, seriation, and classification abilities were found for different races, ages, and SES levels. (ages 5-8)

Strickmeier, Henry Bernard, Jr. An Analysis of Verbal Teaching Behaviors in Seventh Grade Mathematics Classes Grouped by Ability. (The University of Texas at Austin, 1970.) DAI 31A: 3428; January 1971.

Teachers were found to have different perceptions and expectations for low- and high-ability classes, but differences in behavior were not observed. (teachers in grade 7)

Szetela, Walter Frank. The Effects of Test Anxiety and Success-Failure on Mathematics Performance in Grade Eight. (University of Georgia, 1970.) DAI 31A: 5949; May 1971.

Neither success nor failure experience affected mathematics achievement or anxiety. Test anxiety did appear to interfere with mathematics learning even at high IQ levels, however, and correlations for both test anxiety and mathematics anxiety were highly significant for boys. (grade 8)

Taylor, Robert Paul. Two Yes: A Study of Language and Mathematics Instruction in Selected Uganda Primary School Classrooms. (Columbia University, 1970.) DAI 31A: 4048; February 1971.

A computer program was developed to analyze teacher-pupil language use in mathematics lessons. The instructional emphasis was almost exclusively on calculation, with teachers dominating all verbal activity. (grades 6, 7)

Taylor, Washington Theophilus. A Cross Sectional Study of the Modification of Attitudes of Selected Prospective Elementary School Teachers Toward Mathematics. (Oklahoma State University, 1969.) DAI 31A. 4024; February 1971.

Courses and the amount of use of mathematics had a significant effect on students' attitudes. (elementary pre-service)

Thees, Sister Alice Matthew. Positions in the Philosophy of Mathematics That Form a Basis for a Modern Mathematics Program. (Columbia University, 1971.) DAI 32A: 680; August 1971.

The SSMCIS was found to reflect three philosophic orientations in both planning and execution. (secondary)

Thoyre, Henry Howard. A Pilot Study on the Use of Small-Group Discussion in a Mathematics Course for Preservice Elementary School Teachers. (The University of Wisconsin, 1970.) DAI 31A: 5258-5259; April 1971.

The course in which small-group work was substituted for part of the lecture discussion did not result in significantly different scores, although they tended to be higher. (elementary pre-service)

Trafton, Paul Ross. The Effects of Two Initial Instructional Sequences on the Learning of the Subtraction Algorithm in Grade Three. (The University of Michigan, 1970.) DAI 31A: 4049-4050; February 1971.

More extensive development of the decomposition algorithm was found to be more effective than a procedure which included work with concepts and use of the number line before the algorithm was taught. (grade 3)

Tucker, Ruth C. A Study of the Logical Abilities of Children as a Function of Mental and Chronological Age. (St. Louis University, 1970.) DAI 32A: 1369-1370; September 1971.

A significant difference was found in the ability of mentally retarded and normal children to recognize logical conclusions. (ages 6-11, MR's)

Tychsen, Alfred Balmer. An Experimental Comparison of Teacher-Paced Instruction and Student-Paced Instruction in the Teaching of Mathematics in the Public Elementary Schools in Greenwich, Connecticut. (The University of Connecticut, 1971.) DAI 32A: 2382-2383; November 1971.

No significant differences between groups using individualized materials and groups taught by the teacher were found in achievement, and attitudes differed only in grade 2. (grades 1-6)

Urwiller, Stanley LaVerne. A Comparative Study of Achievement, Retention, and Attitude Toward Mathematics Between Students Using Spiral Homework Assignments and Students Using Traditional Homework Assignments in Second Year Algebra. (The University of Nebraska, 1971.) DAI 32A: 845; August 1971.

No significant differences were found between groups who used spiral or traditional homework assignments. (grade 11)

Vakil, Rama. Classroom Climate, Pupil Achievement and Attitude. (Case Western Reserve University, 1970.) DAI 32A: 1351; September 1971.

Pupils with non-rejective teachers learned arithmetic computation "more" than did pupils of non-integrative teachers. (grade 6)

Victor, Laurence Joseph. On Understanding Laws of Invariance. (University of Minnesota, 1970.) DAI 32B: 599; July 1971.

A philosophical analysis of the laws of invariance resulted in the conclusion that "conservation" is neither "logically necessary" nor does it necessarily involve the concept of "quantity". "Conserving behavior" is shown to be basically a perceptual process, not involving "logical thought". (elementary)

Vinskey, Mildred Louise. A Follow-Up Study on the Implementation of the Recommendations of the Committee on the Undergraduate Program in Mathematics and Other Mathematics Study Groups Within Selected Massachusetts Elementary School Classrooms. (University of Massachusetts, 1970.) DAI 31A: 5259; April 1971.

The CUPM recommendation on the real number system was being implemented. Teachers had the conceptual background but lacked sound pedagogical preparation. (elementary in-service)

Wasden, Francis DelMar. A Comparative Analysis of the Difference in Achievement Between Students Educated in Traditional and Individualized Schools. (Brigham Young University, 1971.) DAI 32A: 1247; September 1971.

In general, students in traditional schools scored higher on tests of arithmetic skills than did students in individualized schools. (elementary)

Weeks, Gerald Malcolm. The Effect of Attribute Block Training on Second and Third Graders Logical and Perceptual Reasoning Abilities. (University of Georgia, 1970.) DAI 31A: 5681-5682; May 1971.

Attribute block training was found to have a strong positive effect at both grade levels on logical and perceptual reasoning ability. (grades 2, 3)

Weinstein, Howard Gilbert. Special Classes and Group Therapy: An Evaluation of Their Effects on Achievement and Behavior in a Public School Setting. (University of Maryland, 1971.) DAI 32A: 1930; October 1971.

Certain therapy groups had a significant effect on arithmetic test scores. (elementary)

White, Josie Nance. The Effectiveness of Purposive Teaching of Certain Reading Readiness Skills and Quantitative Concepts to Pre-School Children. (University of North Carolina, 1963.) DAI 31A: 4051-4052; February 1971.

Both younger and older pupils achieved significantly on tests of quantitative relationships following purposive instruction. (nursery school)

Wieters, Wade Cooper Heins. Denotative Meanings Assigned Indefinite Number Terms by Children Varying in Intelligence and Age. (University of Georgia, 1970.) DAI 31A: 5893-5894; May 1971.

Children at different age and IQ levels responded similarly to terms such as "few", "many", and "lot". They assigned "some" and "few" equivalent meanings. (ages 7, 9, 11)

Wilkinson, Gerald Glendel. The Effect of Supplementary Materials Upon Academic Achievement in and Attitude Toward Mathematics Among Eighth Grade Students. (North Texas State University, 1971.) DAI 32A: 1994; October 1971.

Students using supplementary materials did not show a significant gain in attitude over those using a traditional method, but achievement increased in heterogeneously-grouped classes using supplementary materials. (grade 8)

Wilkinson, Jack Dale. A Laboratory Method to Teach Geometry in Selected Sixth Grade Mathematics Classes. (Iowa State University, 1970.) DAI 31A: 4637; March 1971.

No significant differences in achievement or attitude were found between groups using conventional instruction or either of two types of laboratory materials. (grade 6)

Williams, Peter Henry. The Effect of More Than One Teacher During a School Year on the Attitude and Achievement of Junior High Mathematics Students. (Indiana University, 1970.) DAI 31A: 5683; May 1971.

Average and above-average students gained significantly more than expected when they had four mathematics teachers during the year. In general, however, having four teachers did not significantly affect achievement or attitude. (grade 8)

Williford, Harold Johnson. A Study of Transformational Geometry Instruction in the Primary Grades. (University of Georgia, 1970.) DAI 31A: 6462; June 1971.

The unit on transformational geometry resulted in significantly better achievement on geometry skills but not spatial ability. (grades 2, 3)

Wiviott, Suzanne Pasch. Bases of Classification of Geometric Concepts Used by Children of Varying Characteristics. (The University of Wisconsin, 1970.) DAI 31A: 5865; May 1971.

The development of classificatory behavior was found to proceed with age and experience from reliance on perceptual cues toward the use of intrinsic properties. The use of word-cues appeared to affect responses. (grades 5, 8, 11)

Woods, Margaret Christine. A Study of Expectations Held By Supervisors Relative to Teacher Aspirations Toward the Objectives in the Cognitive and Affective Domains in Selected Subject Areas. (The University of Wisconsin, 1970.) DAI 31A: 5261-5262; April 1971.

Supervisors preferred that teachers emphasize the cognitive over the affective domain in mathematics. (elementary in-service)

Yawkey, Thomas Daniel. A Test of Piaget's Notions of Conservation of Number on Tasks of Inequality. (University of Illinois at Urbana - Champaign, 1970.) DAI 31A: 4566; March 1971.

Children generally evidenced conservation by age 6 when responses were verbal, and by age 5 with "symptom" or pointing responses. (ages 3-7)