This volume presents an annotated listing of research reports related to the teaching of college mathematics. Included in the listing are 513 journal articles, 771 dissertations, and 74 other documents which were produced during the period from 1900 through 1974. A brief annotation indicates the focus of each research document and a major finding reported in it. The type of research level of students and number of subjects are indicated for each study. The research reports are indexed by mathematical content area and by research focus (e.g., individual differences, attitudes, teaching approaches). (SD)
Compilation of Research
on
College Mathematics Education

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Science, Mathematics and Environmental Education
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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 subpopulations 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.
With this compilation, there is now available a basic list of research reports on mathematics education in the United States at all age levels (see the footnote on page 2 for previous listings on elementary-school and secondary-school mathematics). While the collection is not completely comprehensive, it does provide a base to which may be added missing information.

Of even more importance, however, is the time-saving role a compilation can play for those who are seeking information on a particular aspect of mathematics education. The ERIC Information Analysis Center for Science, Mathematics and Environmental Education is pleased to make this publication available, with the hope that it will be of help to many seekers.

Jon L. Higgins
Associate Director
for Mathematics Education

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Compilation of Research
on College Mathematics Education

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Compilation of Research on College Mathematics Education

This publication consists primarily of a listing of research reports on mathematics education in the United States at the college level. It also includes some studies which were conducted with samples from other post-secondary-school populations. And research conducted with teacher education samples is also included when the focus of the research was on mathematical background or courses. [Such studies were also included in Suydam and Riedesel (1969) and Suydam (1972).]

The reports listed include journal articles, dissertations, and ERIC documents which were located for the years 1900 through 1974. No claim of comprehensiveness is made: while the search for existing reports was careful, it is likely that some studies have been overlooked, especially those from the early years and those in sources not available in entirety.

Articles and dissertations for five recent years, 1970 through 1974, have been annotated to indicate at least one finding that reflects the focus of the research. Generally there are other findings reported, and certainly there is more specificity in the report. The annotation merely serves to direct attention toward a major focus, as one way to help readers in deciding whether to secure the full report. In brackets following the annotation, three additional pieces of information are noted: type of study, size of sample, and level.
To aid readers in locating studies on a particular topic, all
documents listed have been categorized by mathematical topic. The
index of topics appears on pages 239 through 284. Reports are listed
in alphabetical order by type -- journal articles, beginning on page 3;
dissertations, beginning on page 71; and ERIC documents, beginning on
page 230. In all, 513 articles, 771 dissertations, and 74 ERIC documents
are cited.

1 For previous listings of research on elementary-school and secondary-
school mathematics, see:

(a) An Evaluation of Journal-Published Reports on Elementary School
Unpublished doctoral dissertation, The Pennsylvania State Univer-
sity, 1967. (Order No. 68-3563)

(b) Interpretive Study of Research and Development on Elementary
School Mathematics, Phase I, by Marilyn N. Suydam and C. Alan
of Research Reports. (ERIC: ED 030 017)

(c) Annotated Compilation of Research on Secondary School Mathematics,
Volume I, Introduction; Compilation of Articles. (ERIC:
ED 062 165) Volume II, Compilation of Dissertations; Summary
and Conclusions. (ERIC: ED 062 166)

(d) A Categorized Listing of Research on Mathematics Education (K-12),
1964-1973, by Marilyn N. Suydam. Columbus, Ohio: ERIC/SMEAC,
August 1974. (ERIC: ED 097 225)

2 For "type of study", letters indicate: a, action research; c, case
study; d, descriptive; e, experimental; f, ex post facto; r, correla-
tional; and s, survey.
For "level", the numerals 13, 14, 15, and 16 refer to the freshman,
sophomore, junior, and senior levels, respectively (when reported).
1. LIST OF JOURNAL-PUBLISHED ARTICLES


No significant difference was found between initial and end-of-course attitudes, although some differences on specific items were found. [--; 65 students; college]


Empirical studies on attitudes, anxiety, interests, and other personal and social factors affecting achievement in mathematics are discussed, with 31 references cited. [d; 31 references; elementary - college]

Studies categorized by methods of measuring attitudes; distribution and stability of attitudes; the relationship of attitude to achievement and to personality and social factors; teacher characteristics, attitude, and behavior; instructional method and curriculum; and attitude development are discussed, with 109 references cited. [d; 109 references; elementary - college]


The relationship of mathematical ability to reading ability and general intelligence, reading instruction and mathematics learning, and student and teacher verbalizations were discussed. [d; 26 references; elementary - college]


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. [d; --; elementary - college]


Mathematics attitude was found to be related to a wide range of biodata variables; many correlations varied with age and sex. For college freshmen, but not for eighth graders or graduate students, significant differences in attitude were found between sexes. [r; 182 students, 225 college freshmen, 124 graduate students; 8, college]


Reading, intelligence, vocabulary, verbal interaction, and the language of mathematics are among the factors considered in this research review. [d; --; elementary - college]


Studies related to types and factors of mathematical ability, the meaning and measurement of creativity, heredity and development in mathematical abilities, psychosocial factors, and education for mathematical creativity are reviewed. [d; --; elementary - college]

The reliability of the "enjoyment" scale was found to be .95, while that of the "value" scale was .85. [n; 185 students; 13]


Scores on tests of temperament, programming aptitude, and critical thinking were found to be correlated with achievement in an introductory programming course. [n; 50 students; college]


High school students who had twice the number of hours of instruction learned FORTRAN as well as college students did. [n; 37 students; 11, 12, college]


Ameduri, Robert A. An Analysis of Student Grades in a University Physical Science Course for Pre-Nurses and Their High School Science and Mathematics Background. *School Science and Mathematics* 74: 251-254; March 1974.

Students with more high school mathematics background tended to receive higher grades in a physical science course. [n; 71 students; college]


Andrew, Dean C. Predicting College Success of Non-High-School Graduates. *School Review* 60: 151-156; March 1952.


Significant differences generally favored the group having a manipulative-pictorial or pictorial approach over a symbolic approach. [e; 71 students; college]


Barnes, Kenneth; Cruickshank, Raymond; and Foster, James. Selected Educational and Experience Factors and Arithmetic Teaching. *Arithmetic Teacher* 7: 418-420, 430; December 1960.


No significant differences between groups having immediate or delayed knowledge of results were found in means on one-hour tests; on the final examination, differences significantly favored immediate reinforcement. [e; 3 classes (75 students); junior high, college]

Male students had greater aptitude and interest in mathematics, but did not achieve better than female students. [e; 323 students; 13 (community college)]


Significant interactions were found between method of instruction and a figural factor on the time criterion; between method and three semantic factors on learning and retention criteria; and between method and another semantic factor on the time criterion. [e; 228 students; elementary pre-service]


Bergen, M. C. Achievement of Students in College Algebra Compared with the Number of Semesters of Preparation in High School. School Science and Mathematics 38: 763-765; October 1938.

Bergen, M. C. Engineering Students Versus Other Students in Freshman College Mathematics. *Mathematics Teacher* 36: 159-163; April 1943.


No significant differences were found between groups using or not using a unit on proof-writing. [e; 62 students; college]


Caution is expressed about comparing data from different tests, with mathematics as well as many other tests cited. [d; --; college]


Courses required in the various states were compiled; a program which would meet the requirements of all was not possible, but four- and five-year programs were suggested. [a; --; secondary preservice]

Students ranked themselves least favorably on ability in mathematics, compared with reading and creative thinking. [s; 93 students; college]


Regression equations, which included a quantitative score, were significantly different for regularly and specially admitted students. [r; 515 students; 13]


Normal learners scored higher at each mental age level than did retarded learners. [s; 231 pupils; ages 6-27 (MRs)]


Pre-service teachers were found to be influenced in making choices by the labels "mathematician" and "educator," although no significant differential influence between the two was found. [e; 61 students; secondary pre-service]


Attitudes toward the response system were favorable, and achievement showed some increase. [n; 75 students; college]


Students' evaluations of their instructors were correlated with amount learned. [r; 20 sections (582 students); college]


Burnett, Collins and MacMinn, Paul. A Comparison of Teacher Education Students and Non-Teacher Education Students on Measures of Academic Aptitude and Achievement. Journal of Teacher Education 17: 312-316; Fall 1966.


Advanced Placement Score had predictive validity for some mathematics courses. [r; --; college]


For a lesson on number theory, the use of television resulted in higher scores, but possibly was not more effective than audiotape presentation. [n; 54 teachers; secondary in-service (junior high)]


Chase, Sara E. Waste in Arithmetic. Teachers College Record 18: 360-370; September 1917.


Childs, G. B. Success in Initial University Mathematics Courses of Students with Correspondence and Non-Correspondence Background in High School Mathematics. Journal of Educational Research 49: 607-612; 1956.


20
Conjunctive concepts were easier than disjunctive concepts in a wide variety of measures. The performance of both cultural groups was strikingly similar. [f; --; ages 8-24]


Students who have completed the mathematics education program had more informal views of mathematics and mathematics instruction, and their beliefs were less ambivalent, than students beginning their programs. High and low achievers differed similarly. [s; 264 students; elementary pre-service]


Students in a field-based program gained significantly in knowledge of mathematics and teaching methods. Pupils they taught evidenced no significant difference in achievement or attitude. [a; ---; elementary pre-service]


Students' pre-course achievement in arithmetic computation was the best predictor of success and the third best predictor of completion of the course. [n: 113 students; community college]


Performance on the arithmetic test significantly decreased after students experienced failure on another test. [n: 90 students; college]


Significant differences between strategies were found on items measuring attainment at the Application and Analysis-Synthesis-Evaluation levels. Students performed better on exclusive concepts than on inclusive concepts, and attained geometric disjunctive concepts more easily than algebraic disjunctive concepts. [e; 320 students; elementary pre-service]


Use of a mathematics laboratory produced higher achievement and less attrition by poorer students. [e; --; 13]


Edwards, A. S. A Mathematics Vocabulary Test and Some Results of an Examination of University Freshmen. *Journal of Educational Psychology* 27: 694-697; December 1936.

Eells, Walter Crosby and Fox, Clement S. Sex Differences in Mathematical Achievement of Junior College Students. *Journal of Educational Psychology* 23: 381-386; May 1932.


Egan and Greeno acquired concepts of probability by discovery or rule versions of programmed instruction. Differences in needed skills and outcomes for each were all noted. [e; I: 57 students, II: 72 students; college].


The discrete-rules curriculum was cut from 303 lower-order rules to 169 rules plus five higher-order rules by a higher-order curriculum. [a; college].


Only on certain forms of questions did maturation appear to be a factor in logical reasoning ability. With some items in sentential logic, maturation seemed to hinder logical reasoning. [a; 154 students, 100 pupils; 2, 3, pre-service].


Percentages that mathematics and other SAT scores contributed to prediction estimates were computed. [r; --; college]


Freeman, Frank N. Grouped Objects as a Concrete Basis for the Number Idea. *Elementary School Teacher* 12: 306-314; 1912.


The developed strategy resulted in better predictive scores than other strategies. [r; 785 students; 13]

Mean achievement of the exemplification group was significantly greater than the average of the means of the characterization-followed-by-exemplification group and the characterization-preceded-and-followed-by-exemplification group. [r; 39 students; community college]


Few additional schools added calculus courses after teachers participated in an institute, but 12 per cent added calculus to existing courses. [s; 50 teachers; secondary in-service]


On a 65-item test (KR-21 reliability of .80), pre-service teachers scored significantly higher, with significant differences generally on subtests for "modern" topics. Significant differences were found in favor of pre-service teachers in grades 1-4, while for in-service teachers, the higher the grade level, the higher the mean score. [s; 887 pre-service, 177 in-service (1064); elementary pre- and in-service]

No significant differences among teachers grouped by size of community in which they desired to teach or were teaching were found. The mean score of those who preferred to teach mathematics was significantly greater than scores of those who preferred language arts, science, or social science; those who preferred mathematics least scored significantly lower. [s; 1077 teachers; elementary in-service]


As the amount of mathematics in high school, college, and on modern topics increased, scores increased. [f; 1050 teachers; elementary in-service]


No significant differences were found between a class allowed retesting on unit tests and a class which took the unit test only once. [e; 500 students (2 classes); junior college]


Achievement of students who had received mathematical credit during their last year in high school was significantly greater than students who had not attempted a mathematics course in grade 12. [f; 400 students; 13]


GPAs for mathematics and other students were computed to estimate how they would be graded in another subject field. [r; 902 students; college]


Grossnickle, Foster E. An Experiment with a One-Figure Divisor in Short and Long Division. I. *Elementary School Journal* 34: 496-506; March 1934. II. 34: 590-599; April 1934.

Grossnickle, Foster E. Reliability of Diagnosis of Certain Types of Errors in Long Division with a One-Figure Divisor. *Journal of Experimental Education* 4: 7-16; September 1935.


Gundlach, W. B. An Investigation of Mathematics Teachers in Minnesota. *Mathematics Teacher* 34: 258-265; October 1941.


Correlations with earned mathematics grades were .48 with SATV, .62 with SAT-M, and .63 with SAT-T. [r; 142 women; 13]

Habel, E. A. An Experiment in the Diagnosis and Remedy of Errors of College Freshmen in Arithmetic and Radicals. *School Science and Mathematics* 51: 105-113; February 1951.


Achievement improved when teachers used a mobile-laboratory CAI course on mathematics methods and content. [n; 342 teachers; elementary in-service]


Boys gifted in science scored significantly higher than girls on mathematics and science standardized tests. [n; 301 students; secondary (college)]


No significant differences were found between two types of mastery approach and a lecture approach. Students for whom the final exam score counted toward grades had significantly higher scores on the final. [e; 82 students; college]


Masculinity was related to the high mathematical-low verbal ability complex for females but not for males. \( r = 0.05 \) students; college


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 recommendations of 12 hours. [e; 211 teachers; teachers in grade 6]


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. [e; 148 teachers and classes; teachers in grade 6]


Attitudes toward mathematics were higher at the end of a method-content course than at the beginning, and were higher than for students who had no mathematics course. [f; 125 students; elementary pre-service]


Professional background factors of faculty were surveyed. [E; --; community college]

Kane, Robert B. Attitudes of Prospective Elementary School Teachers Toward Mathematics and Three Other Subject Areas. *Arithmetic Teacher* 15: 169-175; February 1968.


Responses to a logic puzzle were placed in six categories, with progress from "pre-logical" to "abstract logic" explanations evident as grade level increased; however, adults progressed little further. Only ten per cent of answers were correct at concrete levels; 60 per cent, at abstract levels. [n: 449 pupils; 5-12, adult]


Correlations of mathematics marks in grade 12 with predictors in grade 11 ranged from .22 to .49; in grade 13, correlations were from .09 to .37. [r; n; 11-13]


Keller, M. W.; Shreve, D. R.; and Remmers, H. H. A Mathematics Diagnostic Testing Program in Purdue University, II. Mathematics Teacher 35: 8-14; January 1942.


Kirkpatrick, E. A. An Experiment in Memorizing Versus Incidental Learning. Journal of Educational Psychology 5: 405-412; September 1914.


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. [s; 316 teachers; pre- and in-service (grades 6-12)]


One hundred dissertations were classified as elementary: 48, junior high; 55, secondary; 84, college and adult; and 58, teacher education (some duplicate listing). [d; -*; elementary - college]


The proportion of freshmen with more than two years of high school mathematics increased significantly between 1958 and 1963, as well as an increase in those with at least one or two years of mathematics. [f; 3658 students; college freshmen]


Women earned seven per cent of the doctorates in mathematics from 1931-1970; for 1966-1970, they earned the same per cent at the doctoral, 25 per cent at the masters, and 36 per cent at the bachelors levels. [di --; college]


Of the students who took the advanced placement examination, 52 per cent were offered placement. There was little uniformity in the treatment of the 42 per cent who accepted it. [x; 182 students; college]


The course appeared to be useful in increasing achievement. [a; --; elementary in-service]


A mathematics course in which students worked in groups under group leaders resulted in better-than-expected achievement. [a; 109 students; elementary pre-service]


Attitudes of students who were given an enrichment problem each day became more positive, while students in regular classes showed no attitude change. [e; 145 students; elementary pre-service]


Skills needed by vocational students, skills lacking by students, and skills needing remedial attention were listed as they were ranked by teachers. [a; 260 teachers; secondary in-service]


Heuristic-oriented instruction appeared to be an effective mode of teaching problem solving. [a; 30 students (2 classes); college]


Groups using the self-paced approach achieved significantly better on algebra and trigonometry tests than the traditionally taught group did. [e; 99 students (4 sections); 13]


For July 1967 - June 1968, 55 dissertations pertaining to elementary school mathematics and 19 to teacher education are included. [d; --; elementary - college]


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. [d; --; elementary - adult]


Listed are 45 dissertations on elementary school mathematics, 23 for junior high school, 18 for secondary school, 38 for college and adults, and 26 for teacher education. [d; --; elementary - adult]


Both state and trait anxiety were significantly correlated with amount of study prior to a mathematics examination.  [--; 100 women; college]


Students taught with emphasis on calculating with a formula excelled on interpretive items while those taught the meanings of variables in the formula did better on near-transfer items.  [e; 225 students; college]


Correlation of the developed instrument with the Aiken-Dreger scale was .90.  [r; 68 students; college]


With male teachers, high teacher warmth resulted in higher mathematics achievement than did low teacher warmth.  [r; --; 13]

McKillop, William D. The Effects of High School Calculus on Students' First-Semester Calculus Grades at the University of Virginia. Mathematics Teacher 59: 470-472; May 1966.


...The program was found to be effective for underachievers. [...]


...The "modified" group scored significantly higher than the group using a "modern" textbook. [...]


...The contractive method was found to be effective. [...]


The equation using test score, years of and mean grade in high school mathematics, and age, was found to be 90 per cent accurate in its predictions. [r; 60 students; junior college]


No significant difference in achievement was found between students using an audio-tutorial or lecture-discussion method. [e; 4 classes; junior college]


Of students who had taken a calculus course in high school, 56 per cent were placed in pre-calculus or beginning calculus courses in college; advanced placement was granted to 35 per cent. (s; 293 students; college)


Inclusion and exclusion were understood by a majority of even the youngest children. Intersection was understood by a majority of all but the youngest children, while union was not understood by the majority except at the college level. (s; 513 students; 3-9, 13)


Students withdrawing or procrastinating were found to have initial feelings of anonymity in mathematics courses and less interest in doing mathematics problems. (--; 250 students; college)


50


Programmed instruction appeared effective for instruction in algebra. [c; --; junior college]


Latencies for addition increased linearly as a function of the minimum addend and also of the sum. For comparison, negative responses had longer latencies than did positive responses. [e; 6 students; college]


The average two-year college teacher was not adequately prepared by CUPM recommendations, but he believes these are more than is needed. [e; 311 faculty (in 57 colleges); college]


Simple addition and multiplication examples were solved more quickly than negative addition or subtraction examples. Number of operations and size of numbers were also related to solution time. [e; —; college]


Students acquired inductively the ability to count in non-decimal numeration systems, and subsequently were able to do novel tasks requiring manipulation of the system. [s; 24 students; college]


Preston, Ralph C. and Botel, Morton. The Relation of Reading Skill and Other Factors to the Academic Achievement of 2,048 College Students. *Journal of Experimental Education* 20: 363-371; June 1952.


No significant differences were found between the four instructional strategies, involving varied sequences of characterisation and exemplification moves. [n; 182 students; 13]

Read, H. B. Distributed Practice in Addition. *Journal of Educational Psychology* 15: 248-249; April 1924.

Errors and latency increased with size of numbers. Speed and accuracy increased with the difference between A and B, but were also high when A = B. [e; 38 students; college]


Significant differences were found in both number of errors and certainty of judgment for varied syllogistic figures. [e; 52 students; graduate students]


Students who had two semesters of calculus in high school achieved higher grades in college calculus than were predicted (using data from students who had completed only one semester of analytic geometry by the end of high school), even though they were repeating the courses. [f; 5 groups (226 students); college]


Rogers, Charles F. Arithmetic and Emotional Difficulties in Some University Students. Mathematics Teacher 30: 3-9; January 1937.


Students compared the subjective magnitude of weights with the integers 1-9; power functions were found. [n; 36 students; college]


Judged magnitudes of difference in area of paired circles and magnitude estimations of the circles making up the pairs were obtained; power functions were found. [n; 12 students; college]


Scandura, Joseph M. Prior Learning, Presentation Order, and Prerequisite Practice in Problem Solving. *Journal of Experimental Education* 34: 12-20; Summer 1966.


Scandura, Joseph M. and Behr, Marlyn. Prerequisite Practice and Criterion Form in Mathematics Learning. *Journal of Experimental Education* 35: 54-55; Fall 1966.


No significant differences in achievement were found between groups having an individualized module approach or group problem sessions. [n; 70 students; college]


Groups receiving feedback directed specifically to a student's incorrect response scored significantly higher on the retention test than groups receiving a general explanation of the correct answer. [n; 147 teachers; elementary pre-service]


Similar reaction times were found for naming, adding one, and subtracting one conditions for mapping tasks; other conditions did show consistent increases in reaction times. [n; 90 students; college]


The time required to decide whether arrows on a pattern would meet, if the pattern were folded into a cube, increased as the number of folds increased. (s; 10 students; college)

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. (s; 350 teachers; elementary in-service)


Teachers felt that pre-service programs should include two content and two methods courses. The amount of time a teacher spent in teaching mathematics seemed to reflect how she felt about her mathematics courses. (s; 313 teachers; elementary in-service)


Children were able to match handgrip force to their perceptions of length of lines and verbally-presented numbers as reliably as adults. The technique may be used to assess perceptual and cognitive skills. [s; 96 pupils, 16 adults; ages 6-13, adult]


For few students was there wide variability between grades on multiple-choice and objective tests. [x; 417 students; college]


No significant differences in retention were found among five verbalizing methods (speaking, reading, writing, listening, or no verbalizing), between oral and written modes, or between sources of verbalizing. [ri 50 students; secondary pre-service]


No significant differences in achievement were found between subgroups when they were taught half the time in subgroups, while differences were found between subgroups when they were taught only in a large group. [s; 88 students; —]


Near-zero correlations were found between class size and drop-out rate for mathematics classes in two suburban community colleges. [—; —; —]


The test was found to be reliable as a placement test. [r; 113 students; 13]


Terry, Paul W. The Reading Problem in Arithmetic. *Journal of Educational Psychology* 12: 365-377; October 1921.


All students gave correct responses to questions on conservation of mass; three answered incorrectly on conservation of weight questions; 27 (39 per cent) answered incorrectly on conservation of volume questions. [s; 71 students; college]


Prediction factors were ascertained. [r; --; community college]


Use flexible time scheduling and mastery learning strategies appeared effective. [e; —; junior college]


The correlation between student achievement and their evaluations of a calculus course was not significant. [r; 16 sections; college]


Geometric enrichment exercises did not significantly affect attitude toward mathematics or achievement. [e; 6 classes (111 students); elementary pre-service]


Student leaders scored lower in mathematics aptitude than did non-leaders. [f; 33 men; college]


The group receiving accurately drawn pictures performed better than groups having inaccurate or no pictures; having no pictures was better than having inaccurate pictures. [e; 80 students; elementary pre-service]


Whimbey, Arthur; Fischhof, Valerie; and Silikowits, Ron. Memory Span: A Forgotten Capacity. *Journal of Educational Psychology* 60: 56-58; Spring 1969.


Few differences were found between prospective teachers in England and the U.S. The English men were high in mathematics performance. [n: 839 students; secondary pre-service]


Students answered correctly a significantly higher proportion of arithmetic examples under a music condition than under the industrial noise condition, with no difference between quiet and speech conditions. [n: 15 students; college]

Wolfe, Jack. Mathematical Skill of College Freshmen in Topics Prerequisite to Trigonometry. *Mathematics Teacher* 34: 164-170; April 1941.


Prospective teachers were required to take at least one course in geometry in most institutions. Emphasizing transformations in college level geometry was generally favored. More coordinate geometry, a vector approach, and a transformations approach at the high school were favored by at least 40 per cent. [n; 155 institutions; secondary pre-service]


Woodby, Lauren G. The Content of a Junior College Course in Mathematics for the Purpose of General Education. *School Science and Mathematics* 53: 717-726; December 1953.


Students gained significantly in mathematical knowledge when new textbook material was used with small-group discussions and daily quizzes. [a; --; college]


Note: In this listing, several abbreviations are used:

(a) *Dis. Aber.* refers to *Dissertation Abstracts*.

(b) *Dis. Abst. Int.* refers to *Dissertation Abstracts International*.

(c) *COSC* refers to *Colorado State College* published listing.

(d) *PSU* refers to *The Pennsylvania State University* published listing.

Mathematics and science majors having individualized instruction had higher achievement scores and more favorable attitudes toward the course and toward mathematics than did students in traditionally instructed classes. [e; 118 students; 13]


Only one-third of the teachers had had a graduate mathematics content course and only one-fourth had had a graduate mathematics methods course. Other information on background and needs was cited. [s; 965 teachers; elementary in-service]


A formal programming language for writing and checking proofs is defined and its computer processing requirements are specified. Attempts at verifying some simple semantic inferences for a discourse on finite geometry are reported. [d; --; (college)]


Use of games, desensitization of fear, or discovery experiences each resulted in "numerical achievement" gains, but no significant differences in attitude, self-concept, or problem-solving scores were found. [e; 4 groups; college]

No significant difference in performance was found between high-risk students tutored or not tutored in mathematics. [e; 67 students (34 in mathematics, political science); 13]


No significant attitude changes resulted from a terminal mathematics concepts course, though grades and performance were (predictably) higher than for those in a college algebra course. High school GPA and percentile rank were correlated highest with success in the course. [f; 65 students; college]


The hypothesis that requiring a student to verbalize a newly discovered mathematical concept interferes with his ability to use that concept was not confirmed. [e; 118 students; elementary preschool]


Retrogressive sequencing appeared better than progressive sequencing for an ellipse construction task only when no overview was presented. [e; 48 students; college, adult]


A collection of 30 items of mathematical art was considered to have some potential for use as a teaching aid. [e; 226 viewers; secondary, college]

Most teachers indicated that they felt confident to teach junior high school mathematics, but wanted to take more work in mathematics or mathematics education. [e; 320 teachers; secondary in-service]


Written comments on tests did not appear to affect achievement or attitude scores. [e; 6 groups; college]


Students who used booklets specifying objectives, textbook references, and application problems achieved significantly higher in plane trigonometry than a group not using the booklets. [e; 537 students; college]


Achievement was significantly higher after a methods course, but did not increase significantly during student teaching. Students with more than six hours of mathematics credits scored significantly higher than those with less than six hours. [e; 72 students; elementary pre-service]

Anderson, John Robert. A Comparison of Student Performance in a One Year Freshman College Calculus Course Resulting From Two Different Methods of Instruction. (Purdue University, 1970.) Dis. Abst. Int. 31A: 3980; February 1971.

A techniques course using an intuitive approach to notation, followed by an advanced calculus course, resulted in significantly better performance than an integrated calculus and advanced calculus sequence in which notation was stressed. [e; 51 students (4 classes); 13]


No significant difference was found in the achievement of groups having counterexamples or only examples. [e; 60 students; 13]


Freshmen rated computation and symbol orientation topics significantly higher, while faculty rated topics associated with logic, structure, and proof significantly higher. Ratings of seniors were more like those of faculty than of freshmen. [e; 37 faculty, 51 seniors, 214 freshmen; 13, 16, college faculty]


Archer, Julian Andrew. Effect of Concrete, Semi-Concrete, and Abstract Teaching Methods on Mathematical Achievement, Transfer, and Retention at the College Level. (George Peabody College for Teachers, 1972.) Dis. Abst. Int. 33A: 1580; October 1972.

No significant difference in achievement was found between groups who used or did not use aids. However, there was some indication that use of concrete materials facilitated achievement, retention, and transfer. [e; 33 students; college]


No significant differences in achievement or attitude scores were found between groups using a team teaching or lecture method. [e; 40 students; college]


The mean score of the group using ten modules was significantly higher than scores of control groups. [e; 77 students; college]


No significant differences in achievement were found between groups using Dienes blocks and individualized assignments or having lectures. Attitudes were comparable in the groups having or not having a pedagogical sequence with the blocks; these groups had more positive attitudes than the lecture group did. [e; 70 students; elementary pre-service]


Techniques of exercise construction were determined, and a collection of good exercises presented. [d; --; college]

The group using the informal approach to proofs achieved better than the group writing formal proofs. [e; 2 groups; college]


Asal, Kareem S. A Comparative Study of Academic Achievement in Upper-Division Mathematics Courses of Mississippi Junior College Transfer Students and Native Students Who Graduated During the Years 1949 to 1968 From the University of Mississippi with a Major in Mathematics. (The University of Mississippi, 1970.) Dis. Abst. Int. 31A: 4480-4481; March 1971.

Students from junior colleges performed at least as well in upper-division mathematics courses as students enrolled in the four-year university program. [f; --; junior college, college]


No significant differences were found in the achievement of groups using or not using flowcharts. [e: 96 students; adults]


Students having a pictorial or a manipulative-plus-pictorial approach achieved better than students having a symbolic presentation. No attitude differences were found. [e; 71 students; college]
Avenoso, Frank J. An Experimental Study of Student Achievement and Attitude in a First-Year Community College Mathematics Course for Liberal Arts Students in Relation to Class Size and Follow-Up Conferences. (New York University, 1971.) Diss. Abstr. Int. 32B: 2843-2844; November 1971.

No significant differences in attitude or achievement were found between groups having or not having follow-up conferences in either large or small classes. [e: 432 students; 13 (community college)]

Babcock, James Gray. An Experimental Study to Determine the Effects That Creative Problem-Solving Situations Have Upon Creative Thinking Ability and Visual Thinking Ability of Selected Students Enrolled in College Descriptive Geometry Classes. (Utah State University, 1969.) Dis. Abst. Int. 30B: 3659-3660; February 1970.

A course in descriptive geometry including instruction on creative problem-solving did not improve visual thinking ability or achievement in the course, but did improve creative thinking ability. [e; --; 15, 16]


No significant differences in achievement were found between groups taught by television or conventionally; attitudes were more favorable toward conventional instruction. [e; 160 students; 13]


Teachers answered correctly approximately 45 per cent of the items on geometry and teaching geometry tests. Attitudes toward geometry were slightly favorable. [e; 65 teachers; elementary in-service]


A 23-module branching core curriculum was developed. [--; --; junior college]

Seventy per cent of the students scored 70 per cent or less on a geometry test based on content from children's texts. Those who had a high school geometry course or a specific mathematics content course scored higher than those who did not have such a course. [—; 183 students; elementary pre-service]


Small group activity using productive-thinking materials on calculus was found to be feasible. [a; 4 classes (72 students); 12, 13]


Pre-calculus courses accounted for about 80 per cent of the mathematics offerings, and were generally traditionally-oriented. [a; 91 teachers (59 colleges); community college]


No significant differences in achievement were found between remedial instruction by teacher, teacher assistant, or tape cassette; the second was reported to be least expensive, however. [a; 2 classes; college]


Seven attitudinal factors were identified in analyzing scale to assess attitudes. [a; 938 students; college]

A third geometry course following the regular sequence significantly increased scores on a test on geometry concepts used in elementary school textbooks. [f; --; elementary pre-service]


Students having a property approach to integer addition appeared to have better understanding immediately after instruction, while students having a theorem approach surpassed them after a retention period. [e; 4 classes; elementary pre-service]


An historical-practical-involvement approach appeared to be more effective than a set-theoretic approach. [e; 22 classes; 13]


No significant differences in achievement or attitude were found between groups using computer programs or desk calculators. [e; 2 groups; college]

Differences in response to the "set" effect were identified, particularly between males and females. [e; 379 students; college]

Bass, Chester Franklin. An Experimental Study of the Effectiveness of Two Methods of Teaching Certain Topics in Plane Trigonometry at the College Level. (Columbia University, 1970.) Dis. Abst. Int. 31B: 4823-4824; February 1971.

The experimenter-taught group using an algebraic approach gained significantly more in understanding of trigonometric concepts than groups using the unit-circle approach. [e; 40 students (2 classes); 13]


Slide-tape materials appeared to teach some concepts better than the textbook did. Use of both text and materials had a favorable effect on highly prepared students, but had adverse effects on low-preparation students. [e; 57 students; elementary pre-service]


Students who worked cooperatively to solve problems achieved significantly higher daily grades, but not weekly or final grades, than students who worked alone. [e; 391 students; college]


A creative classroom, use of creative problems, and a teacher who was a mathematics educator rather than a pre-mathematician each appeared to affect mean change in creativity ability. [e; 161 students; elementary pre-service]

No significant differences were found between students who used self-paced materials with explicit objectives and a smaller group having traditional instruction. [e; 35 students; elementary pre-service]


The model was successfully applied to a workshop on mathematics education. [a; 1 class; elementary in-service]


Both successful and marginally successful students achieved significant gains on one standardized mathematics test but not another. [f; 844 students; 13]


Those who studied six programmed units supplementing a methods course achieved significantly higher scores than those who took only the course. Attitudes improved significantly for both groups, but were not significantly different between the groups. [e; 128 students; elementary pre-service]


Achievement was higher for students having a lecture-discussion or multi-method approach than for those using programmed instruction. Failure and withdrawal rates were lowest for the latter group, however. [e; 188 students; junior college]


Beers, George S. Some Effects of the Use of Supervised Study with Off-Campus In-Service Classes in Mathematics for Teachers. (The University of Florida, 1967.) Dis. Abst. 29A: 827; September 1968.


No significant differences were found for ten tests given with immediate or delayed knowledge of results, but immediate knowledge was significantly better for the final test. Test anxiety, attitude, and aspiration contributed most to prediction of test performance. [e; 3 groups; 8, college]


The class which wrote and executed computer programs achieved significantly more on tests of understanding of calculus concepts, but were not different from the non-computer-use group on tests of ability to exhibit techniques of calculus. [e; 95 students (2 classes); college]

Mathematics achievement was less highly related to economics achievement than was social science achievement. [r; --; college]


Most colleges offered a course in topology, usually at the undergraduate level, but the course was not required for pre-service programs. [n; 300 colleges; secondary pre-service]

Bents, Ralph P. Critical Mathematical Requirements for the Program of the Community College. (George Peabody College for Teachers, 1952.)


Students using the programmed text improved more in achievement and attitude than students using a regular text. [n; 150 students (6 classes); 13]


Geometric errors on the block designs did not appear to influence students' performance on spatial ability tests. [s, r; 160 students; college]

In general, the teachers surveyed felt that too much attention in preparation programs had been directed toward content and too little toward classroom management. [s; 493 teachers; secondary in-service]


Comparisons were made between the University's courses and those recommended by CUPM and/or offered by other colleges. [d; s; --; college]

Bingham, Ralph Lee. An Investigation Into the Relationship Between Advanced Placement in Mathematics and Performance in First Semester Calculus at the University of Texas at Austin. (The University of Texas at Austin, 1972.) Dis. Abst. Int. 33A: 4865; March 1973.

The mean course grade in calculus for students enrolling in pre-calculus first was lower than for students enrolling only in calculus. [r; --; 13]


No significant differences in attitudes toward mathematics or toward teaching mathematics were found, but the group having methods and student teaching concurrently received more pleasure from teaching while the sequential group was more confident. [e; 151 students; elementary pre-service]


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. [s; 20 schools, 100 colleges; secondary, college]

Students who used computer homework assignments achieved significantly higher than those who did not use the computer. [e; 6 classes; college]


Bjork, Clarence Milford. A Survey of State, College, and Municipal Requirements for High School Teachers of Mathematics (Grades Nine to Twelve). (Columbia University, 1950.)


Characteristics of students nominated as potentially creative were determined in terms of those who were "high creative" and those who were "low creative." [u, c; 34 students (5 secondary, 29 college); secondary, college]


Some facets of cognitive style which may be related to achievement in mathematics were determined. [r; 50 students, 2 teachers; community college]

No significant difference in achievement was found between groups using a laboratory or a traditional method. Attitudes of the laboratory group were more favorable. [e; 4 classes; 13 (community college)]


Topics appropriate for a course for capable but poorly prepared students were determined. The concepts of set and function were thought to be most important. [s; 112 faculty; 13]


Algorithms and models appropriate to operations research were determined; that there are implications for mathematics educators was suggested. [d; --; adult]


Mathematicians preferred objectives closely related to traditional algebra and geometry courses, while teachers had stronger preferences for objectives related to teaching computational skills and social arithmetic. [s; --; teachers in grades 9, 10, mathematicians]


Bompart, Billy Earl. The Development of an Undergraduate Program for Prospective Secondary School Mathematics Teachers Based on an Analysis of State Certification Requirements. (The University of Texas, 1967.) Dis. Abst. 28A: 4020; April 1968.

Significant differences on some scales of an attitude instrument were found between groups using or not using booklets illustrating uses of mathematics. [n; 106 students; community college]


Bradberry, Reim Styles. A Study of the Participants in the 1959-60 and 1960-61 Academic Year Institutes Sponsored by the National Science Foundation at Six Southeastern Universities. (University of Georgia, 1967.) Dis. Abstr. 28A: 2114; December 1967.


The SAT-mathematics score and high school rank were found to be most useful in a prediction equation. [r; 50 students; 13]


Entry level and achievement in mathematics were related only for females. Entry level appeared to be a good predictor of achievement on the High School Equivalency Examination. [r; --; adults]


It was concluded that the secondary school mathematics teacher preparation program is in keeping with recommendations of study groups, and the teacher is being adequately prepared. [d; --; secondary pre-service]

No significant difference in achievement was found for students using audio-taped or discussion methods. [e; 118 students; college]


No significant differences in achievement were found between marginal students in the self-paced CRIMEL program and those in the traditional two-course sequence. Other pacing options were also studied. [f; 173 students; 13]


Students using the Spitz System did not achieve better, have lower anxiety scores, or have better attitudes than those using a lecture-recitation approach. [e; 73 students; 13]


Four of six high school variables were found to correlate with achievement in a college mathematics course. Differences in instructor level were found to affect grades. [r; --; 13]

The test, including topology and algebra, was found to have satisfactory reliability. [s; 589 students; 7 - graduate student]


Buckeye, Donald Andrew. The Effects of a Creative Classroom Environment on the Creative Ability of Prospective Elementary Mathematics Teachers. (Indiana University, 1968.) Dis. Abst. 29A: 1801; December 1968.

Buckland, Golden T. Development of a Plan for Mathematics Education at the Appalachian State Teachers College: (Five Years Leading to M.S. in Mathematics Education). PSU 17: 255-259; 1954.


Instruction on the cloze procedure resulted in improved reading ability, but did not affect mathematical facility. [e; 8 classes; college]

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. [s; --; secondary in-service]


Overall high school GPA was the best single predictor of success in college mathematics; other factors were noted. [r; 197 students; college]


The developed program appeared to be effective. [a; --; community college]


Quantitative test scores were not affected by item difficulty sequence, anxiety, or sex, but were affected by some interactions among the three factors. [r; 156 students; 14]


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


Achievement in mathematics of regular program graduates was significantly higher than that of adult graduates; no significant difference was found when aptitude was considered. [f; 300 students; 12; adult]


No significant differences in achievement or attitude were found between classes where content from elementary school textbooks was or was not included. [e; 119 students (6 classes); elementary pre-service]


For three of four geometry topics, students using a laboratory approach achieved better than those having a lecture-discussion approach. [e; —; college]

No significant differences in achievement were found for groups using an advanced organizer or an introductory overview, but some interaction effects were noted. [e; 91 students; college]


Tests constructed for mathematics and English were found to be useful as predictors of GED scores. [r; 60 students; adult]


Students who had a unit on logic achieved on tests of proof only slightly better than those not having the unit. [e; 72 students; 13]

Carlson, Stanley Lloyd. Differences in Aptitude, Previous Achievement, and Nonintellectual Traits (Personality, Values, Interest, and Attitude Toward Mathematics) of Freshmen Mathematics Majors and Transfers from the Mathematics Major at the University of Northern Colorado. (University of Northern Colorado, 1970.) Dis. Abst. Int. 31A: 3768; February 1971.

High school mathematics achievement, attitude toward mathematics, and a preference score were significantly different for students continuing as mathematics majors or switching majors. [r; 78 students; 13]


No significant differences in achievement or attitude were found between students whose teachers had an in-service program and those whose teachers did not have in-service work. [f; 646 students, 16 teachers; secondary in-service]


Carson, James Edward. The Effects of Programmed Instruction as a Supplementary Teaching Aid in Adult Basic Education at the Ohio State Reformatory, Mansfield, Ohio. (The Ohio State University, 1970.) Dis. Abst. Int. 31A: 4441-4442; March 1971.

No significant differences were found in arithmetic achievement between students using or not using supplementary programmed materials. [f; 62 students; adult]


Significant achievement differences led to the conclusion that the course should be modified. [s; --; junior college]


No significant differences in achievement were found between students who used or did not use calculators. [e; 90 students; college]


Chase, Dayton Keith. A Study to Identify the Basic Skills Needed with Adding and Calculating Machines for Office Positions with Implications for Improvement of Instruction in Office Machines. (The University of North Dakota, 1965.) Dis. Abst. 26: 5906-5907; April 1966.


While no significant differences in mathematics achievement were found, interaction effects favored the audio-tutorial method. [N: 186 students; community college]

Christofferson, Harold W. Geometry Professionalized for Teachers. (Teachers College, Columbia University, 1933.)


Teachers achieved a mean score of 29 on the 65-item test. Intermediate-level teachers scored significantly higher than primary-level teachers. [N: 12 districts; elementary in-service]


Students appeared to achieve successfully using the developed program. [a: 66 students; 13]


Reviews were found to enhance learning and retention. The testing-with-explanation review appeared to be the most effective. [e: 201 students (9 classes); 6, 8, 10, 11, 13]


Students taught by large-group instruction made significantly more gain in content and attitude scores than those working in small groups. No significant differences were found in methods scores. [e; 2 classes (70 students); elementary pre-service]
Cline, Russell Walter. Constructing and Evaluating Practice Exercises in Mathematics for Students of Vocational Agriculture in Arizona. (Ohio State University, 1940.)


Achievement scores were significantly higher for students using programmed instruction rather than an audio-tutorial or conventional approach; however, the dropout rate was also higher. [n=473 students; community college]


No significant interaction effects were found between two sequences and type of student style; however, achievement was low, with little possibility for variance. [n=116 students; junior college]

Coleman, Ralph H. An Analysis of Certain Components of Mathematical Ability, and an Attempt to Predict Mathematical Achievement in a Specific Situation. (Indiana University, 1956.) Dis. Abst. 16: 2062; November 1956.


Younger women were not consistently functioning at the formal operations stage on conservation tasks; aging women were at the concrete level, with some regression toward the pre-operational stage. [n=100 women; ages 20-94]


After 1-3 courses, high achievers had a more informal view of mathematics than did low achievers, with some variation. Students planning to teach grades K-2 had more formal views of mathematics instruction than those planning to teach grades 3-8. 


Congdon, Allan Ray. Training in High School Mathematics Essential for Success in Certain College Subjects. (Teachers College, Columbia University, 1930.)


As age increased, achievement with either type of instruction decreased. No significant differences were noted for sex. [ages: 17-53]


Most of the teachers felt adequately prepared to teach mathematics. A sequence of courses was recommended, including courses in statistics and computer science. [63 teachers; secondary in-service]

Students in a mathematics course who were informed of the behavioral objectives and/or learning hierarchy did not achieve significantly better than an uninform group on an immediate achievement test, but those who were given statements of objectives showed a positive gain in performance after two weeks. [e; 80 teachers; elementary pre-service]

Coon, Dorothy Trautman. The Intuitive Concept of Limit Possessed by Pre-Calculus College Students and Its Relationship with Their Later Achievement in Calculus. (The Ohio State University, 1972.) Dis. Abst. Int. 33A: 1537; October 1972.

Less than half of the students could demonstrate that they clearly understood the concept of limit. [s; 39 students; college]

Coon, Lawrence Allen. Long Term Effects of Acceleration on Undergraduate Calculus Students in the CRIMEL Program at the Ohio State University. (The Ohio State University, 1973.) Dis. Abst. Int. 34B: 3911; February 1974.

Students using the CRIMEL program at an accelerated pace achieved less than non-CRIMEL or non-accelerated-CRIMEL students, but had a higher "survival" level. [f; --; college]


Cooper, Matthew Nathaniel. To Determine the Nature and Significance, If Any, of Certain Differences in the Social and Personal Adjustment of Fifty-One Successful and Fifty-One Non-Successful College Students at Texas Southern University. (New York University, 1955.) Dis. Abst. 16: 497; March 1956.


The reliability of the test (composite score) was found to be .85, [s; 5505 students; secondary pre-service]

No significant differences in achievement were found between groups having varied combinations of tests and homework. [e; 4 classes (116 students); college]


Counts, Sarah. Achievement in College Mathematics as a Function of Instructors' and Students' Patterns of Primary Mental Abilities. (University of Chicago, 1952.)


While a positive relationship was found between hours in methods courses and "competence level" of teachers, pupil achievement was not found to be affected by teacher's knowledge of mathematics. [r; 1034 pupils, 24 teachers; 3, 6, teachers]


1. 7

The PRIMES information system was found to be reliable and useful. Teachers did not gain in mathematical knowledge from applying PRIMES to curriculum decision-making. [n: 31 teachers; elementary in-service]


Croaswhite, F. Joe. Procedures for Admission with Advanced Standing in Mathematics at The Ohio State University. (The Ohio State University, 1964.) Dis. Abst. 25: 6427; May 1965.


Findings on the use and achievement of 23 mathematics items, rated by high school mathematics teachers and college science teachers, were reported. [n: 347 teachers; secondary, college teachers]


Use of systematic desensitization procedures or group counseling did not result in greater achievement or lessened anxiety. [n: 275 students; college]


A statistics problem-solving unit was developed. [d; --; college]

No significant differences were found between students who verbalized or did not verbalize generalizations for arithmetic and geometric tasks. [s; 157 students (86 secondary, 71 college); 10, college]


No significant difference in achievement was found between students having an audio-tutorial or conventional program. Costs for the former were lower. [s; 4 classes; community, junior college]


Attitudes toward the course were favorable. Achievement-related factors were also considered. [s; 113 students; community college]

Dalrymple, Charles O. Fractions in Business and Life. (Boston University, 1934.)


Training in interaction analysis had a significant effect on the indirectness and flexibility of teaching assistants. There was a significant difference in the achievement of students taught by mathematics education assistants and those taught by mathematics assistants. [s; 8 teachers, 211 students; 13]


Procedures used in the course were described. [s; 12 students; 13]


Achievement and attitudes were higher for students using the developed unit. [s; 73 students; 13]

The educational and psychological foundations of Moore's method are discussed. [d; —; college]


Objectives and content for the course were structured. [d; —; junior college]


Increases in professional and personal status, teaching qualities, leadership activities, and knowledge of and confidence in teaching of mathematics were reported. [s; 119 teachers; secondary in-service]


A set of 265 test items was judged for importance by 20 mathematics educators. [s; 20 educators; elementary pre-service]


No significant difference in time to complete a unit was found between students having independent study or lecture-discussion instruction. [s; 31 students; elementary pre-service]


No significant effects on achievement or attitude were found for students using computers. [s; 2 classes (44 students); college]

Programming achievement and attitude toward mathematics significantly increased following lessons requiring computer use. [e; 1 class; elementary and secondary pre- and in-service]


Below-average students achieved significantly better when having supervised study; no differences were found for other students. [e; 3 classes; college]


There were no significant differences on a logic test between the group taught logic with continuing reinforcement and one taught logic alone, but both scored significantly higher than a group not taught logic. On general mathematics achievement, no difference was found. [e; --; elementary pre-service]


The developed test was found to have a reliability of .87. [e; 291 students; college]


Teachers who had a course in Mathematical Analysis had a better understanding of elementary school mathematics than those who had taken Intermediate Algebra. (s; 176 teachers; elementary in-service)


Dolney, Edwin Leo. The Effects of the Use of a Unit on Mathematical Logic in Freshman College Analysis. (University of Illinois at Urbana-Champaign, 1971.) Dis. Abst. Int. 32A: 5531; April 1972.

A 12-day logic sequence appeared to aid achievement in formal aspects of mathematics. (s; 2 classes; 13)


Student teachers had more favorable attitudes toward mathematics than toward teaching mathematics; no significant differences were noted for teachers. (s; 184 teachers; elementary in-service, pre-service)

Donovan, Sister Mary Matthew. A Study of Selected Data Relative to the Education of Texas Teachers of Secondary School Mathematics in Order to Suggest a Program for Their Future Education. (University of Houston, 1956.) Dis. Abst. 16: 1228-1229; July 1956.


The CEC (Characterisation-Exemplification-Characterisation) strategy was more effective than the ECE strategy. The example approach appeared better than the non-example approach. [e; 320 students; college]


Use of a laboratory appeared to be effective. [e; 206 students; 13]


The assessment system identified several personality patterns of mathematics students. [s; 52 students; 16]


Some advantages in using performance objectives were reported. [e; 120 students; junior college]


Student materials for the course were developed and discussed. [d; 1 class; college]

No significant differences in achievement or attitude were found between groups using programmed instruction or having only the traditional lecture-discussion course. [e; 64 students; elementary pre-service]

Drushel, J. A. Arithmetical Knowledges and Skills of Prospective Teachers. (New York University, 1927.)


The text materials developed for the course were described. [d; 1 class; 14]


Effects of three units on aspects of attitude were reported. [--; 771 students; college]

Dunigan, Nancy Casey. Factors Related to Success and Failure of Transfer and Native Students in Mathematics Courses in the University of Southern Mississippi. (Northwestern University, 1974.) Dis. Abst. Int. 35A: 3454; December 1974.

Significant differences were found between transfer students from junior college and students in the four-year college. [s; 1996 students; junior college, college]


The presence of date-chart and one other clue type facilitated problem-solving achievement, as did the presence of all three clue types. [s; 248 students; college]
Either collecting homework or giving quizzes appeared better than giving no homework or quizzes. [6 classes; college]


Intuitive students performed better than analytical students on an inconsistent task, while analytic students performed better on a consistent task. [e; --; college]


Easton, Stanley Evan. The Relation Between Certain High School Course Patterns and Achievement in First Freshman Courses in English, Social Science, Mathematics, and Natural Science at Louisiana State University. (The Louisiana State University and Agricultural and Mechanical College, 1970.) *Dig. Abst. Int.* 31A: 4378; March 1971.

High school course patterns were significantly related to achievement in mathematics (and the other three areas). [r; 2191 students; 13]


Five factors were used in the prediction equation. [r; 359 students; junior college]


Scandura's algorithmic approach was found to be feasible as a basis for constructing a curriculum. Making rules explicit facilitated learning, and use of higher-order rules aided transfer. [e; --; college]

A learning hierarchy developed by students was found to be successful with other high-achieving students but not with low-achieving students. [a; 16 students; elementary pre-service]


Effects of varying the sequence were noted; using polynomial-rational, exponential-logarithmic, and then trigonometric functions was recommended. [e; --; college]


A course for pre-service teachers in which APL was used to clarify selected topics in mathematics is described and evaluated. [a; --; elementary pre-service]


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. [e; 77 students; elementary pre-service]


No significant differences were found between programmed instruction, lecture-discussion, or lecture methods. [e; 3 classes (70 students); junior college]

Students' achievement and attitude toward mathematics changed significantly during a two-quarter mathematics sequence. [a; 117 students; elementary pre-service]

Ernst, Charles Irven. Affective Behavior of High-Ability University Freshmen Whose Achievement in Mathematics is Low. (The Ohio State University, 1968.) Diss. Abstr. 29A: 3037-3038; March 1969.


Significant differences favored the "revised discovery" strategy only on the retention test. [e; 66 students; 13]


Students working in small groups to solve problems made greater individual gains in problem solving than did students who worked alone. [e; 120 students; elementary pre-service]


Evans, Joe S. An Experimental Study of the Readability of Textbooks as a Factor in Achievement in College Algebra. (George Peabody College for Teachers, 1971.) Diss. Abstr. Int. 32B: 2279-2280; October 1971.

No significant differences in achievement or attitude were found between groups using materials at three readability levels. [a; 3 classes; 13]


Use of the circular function or complex-valued function appeared equally effective. [e; 2 groups; college]

Use of the individualized procedure resulted in a lower attrition rate; no achievement differences were found. [f; 2380 students; college]


The booklet was found to be effective in teaching the metric system. [a; 6 classes (306 students); college]

A hierarchy of competencies was verified, and the use of proportional rods was found to facilitate the attainment of four competencies. [n; 60 adults; adults (MRs)]


Use of equations involving multiple predictors was reported to be more effective than use of a single predictor. [r; ---; college]


Use of diagnostic progress tests with or without tutorial help produced consistently higher achievement and attitude scores than when diagnostic tests were not used. [n; 127 students (77, plus 50 in replication); elementary pre-service]


Predictor variables for various courses were determined. [r; 196 students; 13]


Activities considered important by department chairmen were determined. [a; --; community, junior college]


Activities considered important by department chairmen were determined. [a; --; community, junior college]


Students who had a high school or college geometry course, a mathematics content course, or a methods course achieved better on a developed geometry test. [a; 189 students; elementary pre-service]


About two-thirds of the teachers had attended NSF institutes. While vectors and calculus had been added to some curricula, the correlation between changes and institute attendance was only .28. [a; 833 teachers, 152 department chairmen; secondary in-service]

Finco, Arthur Anthony. Mathematics Majors and Transfers from the Mathematics Major at Purdue University: Temperament, Interest, Value, and Student Questionnaire Differences at the Exploratory Stage. (Purdue University, 1966.) Dis. Abst. 27A: 327-328; August 1966.


Support was not found for Bloom's comprehension, application, or analysis levels. [d; --; 13]

Students in the coordinated sequence achieved significantly higher in mathematics content, but not on teaching of mathematics tests, than did those who had either a methods or a content course. Attitudes improved for those in the methods course and in the coordinated sequence. [e; 135 students; elementary pre-service]


Students who received one-half or one-third of their instruction using mathematics laboratory procedures did not achieve differently nor have different attitudes from those in a lecture-discussion group. [e; 73 students; elementary pre-service]


"Conjunction" required the fewest number of card choices, while "conditional" required the most. Pretraining and presentation mode affected concept attainment. [e; 80 students; college]


The group having short quizzes had greater achievement than those having longer tests on more material. [e; 361 students; elementary pre-service]

No significant differences in achievement or attitude were found between groups taught by laboratory or lecture approaches. [e: 8 groups: elementary pre-service]


Data suggested the existence of relationships between economic production and mathematics education levels in the countries studied. [r; --; adult]


Moore's method is described and discussed. [d; --; college]


It was concluded that the formal approach to teaching complex numbers may result in greater achievement than the traditional approach. [e: 3 groups; college]

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. [s; 70 colleges; elementary pre-service]


The "completely explicit" method was found to be more effective than the "implicit" or combination method. [e; 55 students; 13]


Advanced placement students were found to achieve at least as well as regular students. [r; --; college]


The computer-assisted testing procedure was found to be a better predictor of success than standardized testing procedures. [e; 312 students; community college]

125
Fuller, Joseph. Basic College Mathematics for Prospective Elementary School Teachers. (University of Pennsylvania, 1945.)


The unit on topology appeared to result in satisfactory achievement and attitude scores. [n: 2 classes (57 students); elementary preservice]


Some arithmetic factors were found to affect achievement in the program. [n: 77 students; community college]


High school mathematics grades were the best single predictor of achievement, but use of multiple variables was more effective. [r; 99 students; 13]


Giving unannounced examinations resulted in better achievement, less anxiety, and positive attitudes. [e; 164 students (8 classes); junior college]

Gasaway, Sadie Catherine. The Effectiveness of Continued Testing in Mathematics of Freshmen of Varying Proficiencies at Tennessee Agricultural and Industrial State University. (Cornell University, 1961.) Dis. Abst. 22: 2808; February 1962.


Length of feedback delay or absence of feedback had no effect on the learning of meaningful material. [e; 92 students; college]

Gee, Burton Cleon. Attitudes Toward Mathematics and Basic Mathematical Understanding of Prospective Elementary School Teachers at Brigham Young University. (Oregon State University, 1966.) Dis. Abst. 26: 6528; May 1965.

Geiselmann, Harrison Adam. The Effectiveness of a Mathematics Review Course for Freshmen in the College of Agriculture at Cornell University. (Cornell University, 1955.) Dis. Abst. 16: 1371-1372; August 1956.


Students who had instruction in logical inferences were better able to write proofs. [e; 101 students; college]

Gibb, Allan A. Visual Materials for Teaching the Calculus. (Stanford University, 1951.)


Objectives, content, and pedagogical procedures for a high school calculus course were determined by questioning college calculus students. [s; 6 colleges; 13]


Mathematics was involved as a characteristic in predicting success for junior college students. [r; 234 students; junior college]

Significant differences in discriminability were found as stimulus length varied; there were marked order effects. [e; —; college]

Ginnings, Gerald Keith. The Determination of Major Factors Which Contributed to Success or Failure of First Quarter Freshmen Students in Mathematics, Science, and English at Berry College, Mount Berry, Georgia. (Auburn University, 1966.) Diss. Abstr. 28A: 467; August 1967.

Glennon, Vincent J. A Study of the Growth and Mastery of Certain Basic Mathematical Understandings on Several Educational Levels. (Harvard University, 1948.)


Students who had mathematics courses during the senior year in high school scored significantly better on achievement, grade, and aptitude measures than those who had a comparable amount of mathematics but none during the senior year. [f; 400 students; 13]


A logic unit resulted in no loss of achievement in the course. [e; 8 classes; 13]


Cognitive style appeared to be correlated with aptitude and achievement. [r; 162 students; community college]


Level of education and race had little effect on conservation attainment. Scores were 78 per cent for mass, 67 per cent for weight, and 24 per cent for volume conservation. [r; 120 adults; adult]


The NSF institutes were considered worthwhile in increasing knowledge and status of participants. [n; 326 teachers; secondary in-service]


Scores in all groups were higher than those reported in other studies, but no meaningful differences were found between groups. [r; r; elementary pre- and in-service]

Green, George F., Jr. The Effectiveness of a Correspondence-Study Method for Teaching Mathematics to In-Service Elementary School Teachers Using Programed Instruction and Television. (The Florida State University, 1967.) Diss. Abst. 28A: 2580-2581; January 1968.


Positive relationships were found between attitudes and problem-solving performance, and between field dependence-independence and both mathematics and problem solving. Training accounted for more variance than attitude, while attitude was more important than perceptual style. [r; 472 students; college]


Three hypotheses about verbal chaining were verified. [n; 160 students; college]

Griffin, James Franklin. Relationship of Selected High School Courses Taken by Industrial Arts Majors to Their College Success. (University of Missouri - Columbia, 1970.) Dis. Abst. Int. 31A: 5165-5166; April 1971.

Correlations of mathematics courses with various industrial arts courses were reported. [r; 273 students; college]


More than half of the students had had some calculus instruction in high school, but no strong relationship was found with mathematical ability or calculus achievement. [r; 813 students; 13]

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


No significant differences in achievement were found between regular or experimental students enrolled in mathematics courses. [s; 200 students; 13, 14]


Large group and small group instruction was equally effective, even for students in the large group given varying forms of help-sessions. Attitudes were not changed, though teaching of arithmetic was viewed with less trepidation after the course. [e; 247 students (2 classes); elementary pre-service]


Significant differences were found in the number of prompts used, but no consistent patterns were observed. [c; 20 students; college (students), mathematics education and psychology (jurors)]


Mathematics, science, and engineering students did not perceive a significant difference in the academic environment of the two types of colleges, while social science and education students did. [s; 61 students; junior college, college]

Participants generally achieved satisfactorily and responded well in the developed course. [s; 22 teachers; secondary in-service]


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. [s; 616 students; elementary pre-service]


Nine percent of the teachers had fewer than 12 hours of mathematics courses; weaknesses in geometry, probability and statistics were noted, while strength was indicated in algebra and analysis. [s; 274 teachers; secondary in-service]


Certain relationships between variables and hierarchies proposed by Gagne were not found in the developed materials. [--; 22 students; college]


Some mathematical variables which correlated with achievement in statistics were reported. [r; --; college]

No significant relationship was found between achievement and strength of students' objectives. [r; 309 students; community college]


Hamilton, Elbert W. The Notational System as an Aid to Understanding Arithmetic. (State University of Iowa, 1956.) DIS. ABST. 16: 1849-1850; October 1956.


Hamrock, Josephine Stephanie. A Comparison of Two Methods of Teaching FORTRAN Programming in an Undergraduate Mathematics Class. (Purdue University, 1974.) DIS. ABST. INT. 35A: 3297; December 1974.

Teaching programming by writing programs to solve mathematical problems appeared more effective than a structured approach. [e; 134 students; college]


Significant differences favored the verbal mode of presentation over the figural mode; no significant interaction effects were found. [e; 176 students; college]


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Hannely, R. J. Mathematics in the Junior College. (University of Colorado, 1939.)


No significant differences were found between homework and no-homework groups on standardized tests, but differences on some instructor-developed tests favored the homework group in trigonometry. [e; 3 classes; community college]


Achievement was greatest for teachers using the televised series on mathematics than for teachers not in the institute. Teachers in grades 7-9 achieved higher scores than teachers in grades 1-3. [f; 1054 teachers (35 classes); in-service (grades 1-9)]


Hanson, Robert Alfred. The Relationship Between Different Levels of Preparation in High School Vocational Agriculture, Science, and Mathematics and First Year Achievement in a College of Agriculture. (University of Minnesota, 1958.) Diss. Abst. 19: 1246; December 1958.


Significant differences in scores on a mathematics test were found between teachers with specified professional interests. [s; 350 teachers; secondary in-service]

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The developed program appeared to meet curricular goals. Attitudes were favorable, although self-perception of ability did not differ. (e; 7 groups; college)


Self-supervision with "innovative methods" was reported to be effective. (e; 3 groups; college)


Attitude toward mathematics was more highly correlated with achievement than was general scholastic aptitude for students taught by a guided-discovery method. (r; 43 students; elementary pre-service)


The personalized homework approach appeared to be preferred by students and resulted in higher achievement than for students receiving a list of assigned problems for the entire course. [a; 4 classes; college]


Applications and techniques of mathematics for economics, psychology, sociology, and management science were formulated. [d; —; college]


Mathematics scores were higher for accelerated students. [r; 1061 students; college]


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


No significant differences in achievement were found between groups using a mathematics laboratory, enrichment problems, or a conventional approach, though all gained. Attitude also improved. [--; 90 students; elementary pre-service]


Individual use of programmed materials appeared better than group use of them. [a; 105 students; college]


Hicks, Randall Clarke. A Program of Study in Mathematics for Elementary School Teachers Based Upon Exhibited and Derived Needs. (University of Georgia, 1966.) Dis. Abst. 27A: 3341-3342; April 1967.


While attitudes and achievement of pre- and in-service teachers were significantly related, experienced teachers scored higher on applications and attitude measures. [r; 724 pre-service, 284 in-service; elementary pre- and in-service]


No interaction effects between performance or attitude and needs were found. [n; 2 classes; college]


Significant increase in achievement was made during the professional sequence, with 69.4 per cent evidencing an increase in mathematical knowledge. Significant positive change in attitudes also occurred, expressed by 75 per cent. Correlations between attitude and achievement were positive. [n; 72 students; elementary pre-service]


14J
Mathematics-science scores were correlated with MAT scores and successful completion of the program. [r; 200 students; graduate students]


Audio-tutorial instruction was found to be more effective than conventional instruction in teaching slide rule use to engineering students. [-; --; college]


The computer seemed helpful in learning calculus, especially for lower-ability students. [e; 59 students; college]


Predictive factors accounting for only 53 per cent of the variance were determined. [r; 96 students; 15, 16]


Hoshauer, John C. The Effect of the Number and Type of Mathematics Courses Pursued in High School Upon Adequate Mastery of or Competence in the Fundamental Mathematical Processes. FBU 10: 171-178; 1947.


Howlett, John L. A Study of Predicting Achievement in Analytic Geometry and Calculus. (Austin Peay State College, 1966.)


Characteristics on which calculus students were superior to algebra-trigonometry or elementary functions students were reported. [r; 183 students; college]


Hurst, Doyle. The Relationship Between Certain Teacher Related Variables and Student Achievement in Third Grade Arithmetic. (Oklahoma State University, 1967.) Dis. Abst. 28A: 4935-4936; June 1968.


No significant differences were found between students having lectures with programs, discussion, textbook, or quizzes. [r; 290 students; elementary pre-service]

Students who were taught partially by computer-assisted instruction achieved significantly more than non-CAI students on an immediate test, but were not significantly different on a retention test. Attitudes toward CAI were generally favorable. [e; 80 students; 13]


Functional analysis appeared to be more feasible than use of rigorous proofs. [d; --; college]

Irby, Bobby Newell. A Follow-Up Study of the Participants of the National Science Foundation Academic Year Institutes for High School Teachers of Science and Mathematics Held at the University of Mississippi, 1961-66. (The University of Mississippi, 1967.) Diss. Abst. 28A: 2120; December 1967.


A significant positive correlation was found between the attitudes of disadvantaged students and achievement in a basic mathematics course. \( r; --; 13 \)


The 50-item test was found to have "satisfactory" reliability and validity. \( r; 258 \) students; elementary and secondary pre-service, college, 12


The intersection mistake was found to occur most frequently; other mistakes were identified and suggestions made for correcting them. \( s; --; \) college


Competencies for medical technicians were determined and a mathematics curriculum suggested. \( s; 63 \) adults; adult

Graduates reported that they had most of the mathematics competencies on a developed list. [s; —; junior college]


Students tended to like those who had attitudes toward mathematics similar to their own, and dislike those with dissimilar attitudes. [e; —; college]

Johnson, Wendell Gilbert. A Relation Between High-School and College Mathematics Grades. (Syracuse University, 1956.) Diss. Abst. 16: 1913-1914; October 1956.


Ability to read mathematical materials improved during the institute. [f; 15 teachers; secondary in-service]

Jones, Franklin McGehee. A Controlled Comparison of the Academic Performance of Native and Transfer Students at the University of Georgia. (University of Georgia, 1966.) Diss. Abst. 27A: 3227; April 1967.


No significant difference was found between groups spending six or ten weeks in the course, but entering achievement level did have an effect. [e; 2 groups; college]


Use of both positive and negative instances appeared to be as effective as only positive instances. [e; 76 students; community college]


No significant differences in mathematical achievement or attitude were found between groups using an elementary-school textbook, exercises from that textbook, or regular instruction. [e; 76 students; elementary pre-service]


The developed approach was as effective as the traditional approach. [a; 53 students; elementary pre-service]
The course blending modern algebra and geometry was developed for sophomores; it was very effective in a trial with graduate students.

From textbooks used in courses and from journal articles, prerequisite courses were determined: advanced calculus, linear algebra, probability and statistics, and differential equations. [d; --; college]


Student proofs were analyzed; it was found that significant variability depends on the number and type of rules available to the student. [s; 23 students; college]


Homework appeared to affect calculus achievement; characteristics of learners were identified. [e; 2 classes; college]

Karnes, H. T. Professional Preparation of Teachers of Secondary Mathematics. (George Peabody College for Teachers, 1940.)


No significant differences were found between programs using three types of feedback. A significant difference in the proportion of errors was found between the response-insensitive and the no-correctional feedback groups. [e; 63 students; elementary preservice]

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. [s; 199 teachers; elementary in-service]


No evidence was found of a "deep-end effect" (in which learning is greater than when "shallow-end" tasks are presented). Performance was better when free-choice format tasks were compared with state-operator-state format tasks. [s; 144 students; college, graduate students]


Kersh, B. Y. Variations in Number Symbols and Instruction Procedures in Learning Numerical Concepts. (University of California, 1955.)


The developed in-service materials appeared to be effective in preparing teachers to teach a new geometry course. [s; 39 teachers; secondary in-service]

Students who completed the course had significantly higher IQ and self-concept scores, and were older than non-completing students. [s; 185 students; college]


Teachers gained in content achievement and implemented materials, concepts, and techniques from the in-service program. [s; 403 teachers; elementary in-service]


A predictive equation, student characteristics, and a course based on mastery learning were determined. Learning rate was predicted by quantitative aptitude. [r, s; 1 class; 13]

King, Calvin Elijah. A Comparative Study of the Effectiveness of Teaching a Course in Remedial Mathematics to College Students by Television and by the Conventional Method. (The Ohio State University, 1959.) Dis. Abst. 20: 2177; December 1959.


The open learning approach was found to be at least as effective as the lecture approach. [s; 92 students (4 classes); college]


Non-algebraic aspects of functions were understood better than algebraic ones, and were readily identified and used. [s; 132 students; college]


No significant differences were found between visual and audiovisual modes or between three types of reinforcement, for five mathematics lessons. [s; 36 students; adult]


Achievement differences favored the distributed-practice group over the massed-practice group. [s; 40 classes (809 students); college]


The course in which methods and content were integrated was found to be more effective than separate courses. [s; 65 students; elementary pre-service]


A significant relationship was found between student self-concept and achievement. No significant effect of teacher self-concept level on student achievement was found, and teacher content-competence had little effect on student achievement. [s; 602 pupils, 26 teachers; 6; teachers]


Attitude toward CAI improved in the computer-assisted group, but no differences in achievement or attitude toward mathematics were found between the CAI and lecture-only groups. [s; 66 students; college]


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. [s; 153 teachers, 325 college students, 147 secondary teachers; elementary pre- and in-service]


Differences in achievement and needs were analysed. [s; 68 graduates; community college]


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Students using the individualized program achieved and retained significantly higher scores than those having the regular program. [e; —; elementary pre-service]


Different variables predicted creativity in mathematics and three other fields. [r; 146 students (21 in mathematics); college]

Koren, Charles. A Program for the Preparation of Teachers of Mathematics in Community Colleges. (Teachers College, Columbia University, 1952.)


Characteristics, work load, and preparation of junior college teachers were determined, and compared with other junior college data. [a; —; junior college]


Interspersing skill-type questions was found to have no effect on achievement. [e; 60 students; college]

LaGrone, Cyrus Wilson. A Syllabus of Mathematics 370, the Teaching of Arithmetic, Grades 4 to 7 Inclusive: A Course in East Texas State Teachers College, Designed to Prepare Teachers of Elementary Education. (New York University, 1937.)


Lane, Bennie Ray. An Experiment with Programmed Instruction as a Supplement to Teaching College Mathematics by Closed-Circuit Television. (George Peabody College for Teachers, 1962.) Dis. Abst. 23: 3817-3818; April 1963.


The computer group achieved higher scores on a concepts test than the non-computer group; no difference was found on a general test. [e; 8 classes; college]


No significant differences in achievement were found between groups having spaced or integrated repetition with or without variety. [e; 9 classes; college]


The preference test was found to make overall distinctions between groups. [r; 254 students; elementary and secondary pre-service]


The linear constructed-response program was as effective as the lecture method, and affected higher achievement than the reading-response program. [e; 285 students; college]


No significant differences in achievement or attrition were found between audio-tutorial and lecture-discussion approaches. [e; 225 students; community college]


155
The developed 35-item test was found to be reliable and valid. [a; 170 students; secondary pre-service]


Use of a diagnostic test and remedial instruction was reported to be successful. [a; 10 students; community college]


 Goals of instructors and cognitive needs of learners were analyzed. [s; --; college]


No significant differences in retention were found for any ordering of algorithmic sequences. [e; 60 students; elementary pre-service]


Significant relationships were found between change in interest and class, course, text, instructor, and college. Elementary education majors showed a gain in interest, not found in other major areas of study. [a; 929 students; college]


Higher mean scores were achieved when a non-computational approach was used. [e; --; college]


A course allowing self-pacing was developed. [a; --; college]


An inventory of validated mathematical skills needed by electricity-electronic technicians was developed. [a; 60 adults; adult]


Use of the problem-solving heuristics approach resulted in higher achievement and attitude scores. [a; 70 students (4 groups); 13 (junior college)]


The activity-oriented approach resulted in significantly greater achievement and a more positive attitude toward mathematics than the lecture-discussion method did. [a; 57 students; elementary pre-service]

Achievement on the developed unit was satisfactory and attitudes were positive. [a; 36 students; elementary pre-service]


Work-study programs did not affect arithmetic skills. Employed men had better arithmetic skills than unemployed men did. [f; 40 men; adults (Mks)]


Mathematical "confidence" and competence of participants in the in-service institute significantly increased. [a; 53 teachers; secondary in-service]


No significant difference in achievement was found between groups using personalized or regular procedures. [e; 4 sections; college]

Lindsay, Charles McCown. An Experimental Investigation of Two Methods Used in the In-Service Education of Teachers of Arithmetic. (George Peabody College for Teachers, 1965.) Dis. Abst. 26: 5219-5220; March 1966.


Three approaches to functions were determined and discussed. [d: —; college]


Instruction on heuristics had some effect on problem-solving scores, and appeared to result in more use of heuristics in teaching. [s: 43 students; secondary pre-service]


Four of six levels of the hierarchy on Bloom's Taxonomy were supported by the test. [r: 62 students; elementary pre-service]


The problem-solving theory was analyzed, and specific recommendations and behaviors determined. [d; --; college]


Lomax, P. S. A Comparative Study of Commercial English, Mathematics, and Science Teachers in the State of New Jersey. (New York University, 1927.)


The best single predictor of college chemistry achievement was secondary-school mathematics preparation. [r; 120 students; college]


No significant differences in achievement were found between teachers who studied informal geometry before or after traditional geometry. [d, e; 26 teachers; secondary in-service]


No significant differences were found between students who used a CAI program alone or in pairs. [c; 54 students; college]


Heuristic strategies used by students were determined. Instruction using heuristic strategies was effective in changing some aspects of performance. [e; 40 students; 13]


Those in the accelerated program generally achieved significantly higher than those in the standard program, with either IQ or content level accounting for score differences. Grades in calculus were also higher for those in the accelerated program. [f; --; 12]


No significant differences were found between groups taught limits with or without instruction in logic. [s; 27 students; college]


The strategy which emphasized student choice of pacing plus test scores yielded the highest percentage of correct decisions. [r; 600 students; college]

Mahaffey, Michael Lee. An Experimental Comparison of Students and Teachers in Culturally Deprived and Non-Culturally Deprived Schools in a Mathematics In-Service Training Program. (Southern Illinois University, 1968.) Dis. Abst. 29A: 2589-2590; February 1969.


Grouping of variables facilitated problem solving. Models indicated that students used at least three alternative strategies. [s; —; college]


The computer-oriented techniques resulted in increased achievement. [a; 20 students; college]


Materials appropriate for teaching technical mathematics for electronics were developed. [d; --; technical school]


Among the findings was the indication that chemistry students had difficulty with problems involving several kinds of manipulations, and those involving logarithms, graphs, units, and algebraic equations. [e; 3 sections; college]


The experimental program involving in-depth study of mathematical relationships and understandings as they pertain to the algorithms of the fundamental operations was generally successful, especially for high ability students. During the senior high school and two years of college, the experimental group pursued more mathematics courses and achieved as well as the conventionally-taught group. [e; --; 7-14]


Many students earned higher entry course levels when using a procedure permitting them to select test items ordered by difficulty, rather than completing the entire test. [e; 195 students; 13 (community college)]

Use of the instructional module resulted in achievement gains and changes in attitude. [e; 2 classes; elementary pre- and in-service]


The experimental course materials appeared to be effective for students with low SAT scores, and no more effective than regular materials for those with high SAT scores. [e; 4 classes (127 students); elementary pre-service]


No significant differences in achievement were found between free-choice or no-choice conditions for four instructional procedures: class participation, semi-automatic audio-visual, written program, and standard textbook. Attitude was highest for those using the audio-visual mode. [e; 96 students; elementary pre-service]

Mason, Cathryn Thomas. The Effects of Counseling on Self-Concept and Academic Achievement of Disadvantaged Drop-Outs. (St. Louis University, 1972.) Dis. Abst. Int. 33A: 2718; December 1972.

Self-concept improved, but no significant differences in mathematics or other achievement scores were found between groups counseled or not counseled. [e; 40 students; adult education]

Massie, Ronald Owen. The Construction and Use of a Test to Evaluate Teacher Preparation in Modern Mathematics. (The University of Nebraska Teachers College, 1967.) Diss. Abst. 28A: 4027-4028; April 1968.

Matthews, Frank F. Measures of Creativity as These Relate to Placement in Honors Calculus. (The Ohio State University, 1974.) Diss. Abst. Int. 35A: 2543; November 1974.

Creativity measures appeared to be useful predictors for placement in advanced sections. [r; 3 groups; college]


No differences in achievement were found between groups having the regular 15-week or an intensive three-week College Algebra course. For Intermediate Algebra, a six-week course was better than a 15-week course. [e; -; community, junior college]


Use of history vignettes resulted in significantly favorable changes in attitudes. [e; 4 classes (67 students); college]


The differentiated instruction plan appeared to be effective for achievement gains, anxiety reduction, and positive attitudes. [e; 88 students; elementary pre-service]

A mastery learning strategy was found to be effective. [e; 50 students; college]


Use of slides and models was more effective than a lecture-demonstration method. [e; 362 students; college]


A CAI program on probability for statistics students was described. [d; 17 students; college]


Students using the computer-aided course achieved as well in calculus as students having a regular course, and also learned programming. [e; 65 students; community college]


No significant difference was found between classes taught with low-rigor or high-rigor approaches. [e; 252 students (12 classes); elementary pre-service]

McKillop, William David. The Effects of Secondary School Analytic Geometry and Calculus on Students' First Semester Calculus Grades at the University of Virginia. (University of Virginia, 1965.) Diss. Abst. 26: 5920-5921; April 1966.


The best predictors of student teaching grades were block course grades and content test scores. [r; 1; elementary pre-service]


Females stated significantly lower expectancies than males on the addition task. Success confirming an expectancy was called ability, while performance against expectation was referred to in terms of luck and effort. [s; 349 students; 6, 10, college]


The course in which slides of children's texts were used to relate content to the classroom produced a greater positive effect on attitude and achievement than did a course taught by lectures only. [s; 430 students (2 classes); elementary pre-service]


The course in which slides of children's texts were used to relate content to the classroom produced a greater positive effect on attitude and achievement than did a course taught by lectures only. [s; 430 students (2 classes); elementary pre-service]


The course in which slides of children's texts were used to relate content to the classroom produced a greater positive effect on attitude and achievement than did a course taught by lectures only. [s; 430 students (2 classes); elementary pre-service]

Mendirrad, Charles. Mathematics in General Education. (The Ohio State University, 1939.)

Menderrad, Charles. Mathematics in General Education. (The Ohio State University, 1939.)


High school GPA, ACT mathematics scores, and parents' annual income were the best predictors of college GPA. [r; 143 students; community college]

A two-test final unit evaluation procedure appeared to be most effective. A whole-group approach seemed better for low-achieving students, while a grouping approach seemed better for high-achievers. [n; 161 students; community college]


The group using pamphlets did significantly better in solving inequalities than did film or added-CAI groups. [n; 3 classes (75 students); college]


Students in college algebra and general mathematics did not differ significantly in achievement when taught by directed or non-directed homework procedures, though some differences on unit tests were noted under different instructors. [n; 304 students; college]


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. [n; 210 teachers (50 schools); 9-12, teachers]


No significant differences were found between groups having or not having questions seeking verbalization of principles. [e; 16 sections; college]


A survey revealed diversity in small college mathematics departments; a model to aid in developing a cohesive program was suggested. [s; 82 colleges; college]


Students who had a traditional course scored higher on achievement and opinion measures than those having a modern course. [e; 58 students; 13]


Significant relationships were found between various factors of Negro faculty members' backgrounds. [e; 181 teachers (57 colleges); college]

Responses for 203 logic problems were analyzed; seven structural variables were found to be significant in predicting problem difficulty (but they accounted for only one-third of the variance). [r; 27 students; college]


No significant differences were found between groups having audiovisual, written, or no advanced organizers. [e; 51 students; college]


The programmed text and the audio-projected program were as effective as the lecture-demonstration mode. [e; —; elementary in-service]


Geometric intuition was found to be positively correlated with mathematics achievement. [--; 4 classes; college]


The groups using television had significantly better achievement and attitude than those using programmed instruction. [e; 1630 students; college]


No significant differences were found between groups having three types of assignments on polynomials and rational expressions. [e; 106 students; college]


Institute participants tended to use behavioral objectives more frequently and to choose "modern" courses more than non-participants did. [s; 365 teachers; secondary in-service]


Grades-point averages were the most powerful predictors of achievement on the developed taxonomy-type instrument. Not all cognitive descriptors correlated significantly with the instrument. [r; 126 students; elementary pre-service]


Significant differences on the logic test were found favoring students from large colleges with more than 30 quarter hours of mathematics. [n; 90 students; college]


Employed and unemployed retardates differed significantly in mathematics achievement. [n; 100 adults; ages 16-47]


No significant differences in achievement or attitude were found between groups using audio-tutorial or lecture-discussion approaches. [n; 3 groups; junior college]


Students taught by an inductive procedure achieved as well as students taught deductively. On an applications test, the deductively taught group was significantly better. [n; 2 classes; elementary pre-service]

Among the findings was that only one-third of the colleges surveyed had even one section of calculus where the computer was used.

Mulligan, Sister Rose Marian, O.S.F. The Effect of Student Constructed Assignments on Certain Factors in Mathematical Achievement and Retention. (New York University, 1959.) Dis. Abst. 20: 4402; May 1960.


Suggestions for improving the program, such as emphasizing evaluation, diagnosis, and remediation, are noted. [s: 610 teachers; elementary in-service]


Many objectives in calculus were found to be related to the Mean Value Theorem. [d; --; college]


Self-concept, intelligence, and age were found to be effective predictors of net gain in arithmetic computation. [r; 100 adults; adults (age 18+)]


No significant differences in attitude toward mathematics were found between groups given desensitization, insight-oriented, or no counseling. [n; 45 students; college]


Students using the developed unit achieved significantly higher scores than those using a textbook. [e; 16 students; college]


A film introduction was not as effective as either a positively or a negatively oriented lecture or no introduction for a programmed lesson on binary arithmetic. [e; 128 students; college]


No significant differences were found between groups having advance organizers or reviews. [e; 360 students; 13]

The Rasch model was found to be better than either the two- or three-parameter logistic model for estimating distributions. [e; 1200 students; college]


No significant difference was found between programmed instruction or lecture-text groups unless time was considered. [e; 12 classes; junior college]


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. [e; 108 students; 10, 12, college]


Nuthall, G. A. An Experimental Comparison of Instructional Strategies in the Teaching of Concepts. (University of Illinois, 1966.)


Achievement was higher when students used application problems. [a; 2 classes (40 students); college]


Students who used an interactive graphics program achieved significantly more than a group not using the computer. [e; 2 groups; college]


No significant differences were found between groups taught by individualized or lecture-textbook programs at either of two class times. [e; 4 groups; community college]


Teachers' perceptions of mastery levels, importance of specific content, and time were "strikingly" similar. They placed a greater degree of importance on traditional content than on new content. [e; --; teachers in grade 6]


A stress condition affected high-stress students more than low-stress students; under both stress and non-stress conditions, high-stress students made more errors. [e; --; college]


Predictors of achievement on the developed materials were found. The unit was considered satisfactory. [e; 4 classes (122 students); elementary pre-service]


Use of a CAI course resulted in higher achievement in less time than a conventionally taught group attained. [e; 46 adults; adult]


No significant differences in achievement or attitude scores were found between groups who had or did not have the limit unit. [e; 57 students; college]


No significant differences in achievement were found, but achievement was more readily predictable for students having a student-centered tutorial approach than for those having a lecture-discussion approach. [e; 64 students; 13]


On formal operations tasks, conservation ability increased throughout childhood, but some differences were found among older adult groups. [e; 96 persons; ages 6 through 65+]


The programmed text appeared to help students achieve objectives. [e; 22 classes; community junior college]


Systematic reaction-time effects were found for the addition and multiplication algorithms studied. [s; n; adults]


No significant differences were found between groups having or not having student verbalization of generalizations, but some interaction effects with English aptitude were found. [s; 8 classes; college]


Prediction equations were not the same for the three mathematics courses studied in two colleges; per cent of correct predictions ranged from 60 to 92. [r; 219 students; junior college]


Significant differences in means favored groups which had high school calculus over groups not having high school calculus. [f; 526 students; 13]


A typical college was found to offer eight of 15 CUPM-recommended courses. Journal subscriptions and faculty background were also surveyed. [s; 20 colleges; junior college]

Perry, Robert D. Prediction Equations for Success in College Mathematics. (George Peabody College, 1934.)


Subjects with specific performance goals achieved better than those without such goals. [s; --; adults]


A core of common topics, with a common set of mathematics operations involved, was found in nearly all beginning research statistics courses. [s; 40 colleges; college]


Although students reacted positively to CAI, they did not use CAI when they had a free choice. [e; 3 groups; college]


No significant difference in achievement was found between group having or not having mathematics laboratory instruction for one course. [e; 2 groups; college]

Phillips, Orval Lewis. A Proposed Program for the Training of Mathematics Teachers for the Public Secondary Schools of Mississippi. (Columbia University, 1950.)

Picard, Anthony John. An Analysis of the Objectives of a First Year Calculus Sequence, A Test for the Achievement of These Objectives, and an Analysis of Results. (The Ohio State University, 1967.) Dis. Abstr. 28A: 3379-3380; March 1968.


Low-predictor-level students made more achievement gain under the printed program method, but this method produced less attitude gain. The conventional method was found to be best for producing achievement at the knowledge level, while the programs were equally effective at understanding and applications level. [--; 43 students; college]

No significant differences were found between students using time-sharing or batch processing. [e; --; college]


High-school mathematics average was one of three factors in an equation for predicted success in the business administration curriculum. [r; --; community college]


Recommendations of two national groups (CUPM and Cambridge Conference) have not been implemented by the majority of colleges. [e; 445 colleges; elementary pre-service]


It was concluded that a teacher-directed mathematics laboratory approach was more effective than a student-directed laboratory approach. [e; --; college]

Differences between Advanced Placement Credit and Non-Credit students were analyzed. [a; 2 colleges; 14-15]


The history, general structure, models for development, and analysis of trigonometry were presented, for use in teacher education programs. [d; --; secondary pre-service]


No significant correlations were found between the teacher-background variables studied and pupil achievement. [r; 61 classes (61 teachers); teachers in grades 4-6]


Students achieved best on problems related to their interests, and tried to characterize new problems in terms of types with which they were familiar. [e; 3 classes (97 students); post-secondary]


No significant differences in achievement were found between groups taught by a mastery learning or a traditional approach. With time, mastery learning appeared increasingly effective. [e; 118 students; 13]


In 82 per cent of the colleges surveyed, the computer was used in one or more mathematics courses; 73 per cent of the institutions gave students direct access to the computer. [a; 134 colleges; college]


The treatment in which teachers were given cues appeared more effective than merely taking a second form of the test, but not more effective than review and giving correct answers. No differences among treatments were apparent for students. [e; 54 teachers, 54 pupils; teachers, grades 1-6]


The feasibility of a combined course was indicated by arithmetic scores. [e; 349 students; college]

Fifth grade teachers who exhibited knowledge of properties had students who achieved more. [n: 2014 pupils; 48 teachers; teachers, grade 5]


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. [n: 329 teachers; teachers in grades 3-6]


The group given programmed materials scored significantly better than groups informed of deficiencies only or given references. [n: --; 13]

Ramstad, William Kvindlog. A Study of Staff Utilization Experimentation in Selected Public Junior Colleges. (Stanford University, 1963.)


A self-instruction approach was not as effective as the lecture approach. [n: 4 classes (77 students); 13]

Students felt that remedial arithmetic courses were effective; lecture-discussion course resulted in better attitudes than courses using programmed materials. [n; 884 students; community college]


No significant differences were found between groups using programmed or conventional textbooks. [n; 196 students; elementary pre-service]


In secondary school textbooks, function was generally developed as a set of ordered pairs, in very abstract form. Agreement was found on 16 points regarding functions in over one-half of the college texts analyzed. [d; --; secondary, college]


Teachers with the most favorable view of mathematics were those with the highest GPA in mathematics and the largest number of credits in mathematics and mathematics education. [n; 253 teachers; secondary in-service]


Rhoads, Margaret V. Recent Trends in Mathematical Requirements in the Education of Elementary Teachers. (Columbia University, 1950.)


The approach using CAI, programmed packet, and lectures appeared effective. [n; 55 students; 13]


No significant differences were found between adults who used the computer and those who did not. [n; 60 students; adults]

Achievement and attitude toward the developed unit were satisfactory. (n; 51 students; elementary pre-service)


None of the twelfth-grade courses considered was significantly better than the others in preparing students for analytic geometry and calculus in college. (n; 4 colleges; college)

Richmeyer, Cleon C. Functional Mathematical Needs of Teachers. (Colorado State College of Education, 1937.)


Aspects of existentialism appeared to affect achievement. Use of the existentialist approach was found feasible. (n; --; college)


Predictor equations were reported. Females attained significantly higher GPAs than did males. (n; --; college)


No differences on mathematics examples were found between women classified as avoiding or not avoiding success, under "competition" or "encouragement" conditions. Both types of women performed better on female format than male format problems. (n; 86 women; college)

Elementary education majors scored relatively high on mathematics attitude but lacked clearly defined vocational interests. [p; 191 students; elementary pre-service]

Robinson, William Baker. The Effects of Two Semesters of Secondary School Calculus on Students' First and Second Quarter Calculus Grade at the University of Utah. (University of Utah, 1968.) Dis. Abst. 29B: 2990-2991; February 1969.


The textbooks were examined in terms of 43 variables. [d; 30 textbooks; college]

Rodney, Cecil T. An Evaluation of Pre-Service Preparation for Teaching the Mathematics of the Elementary School. (University of Buffalo, 1952.)


A summary of the major mathematics concepts in the symbolic logic materials is included. [d; --; community college]


Some sex differences were reported when individualized or traditional GED programs were used. [f; --; adults]

No significant differences were found between groups taught with an applications approach or "traditionally". The role of applications in secondary school mathematics is discussed. [e; 43 students; secondary pre-service]


Size of high school attended and sex did not significantly affect achievement in college mathematics. How well a student does is more related to success than is the type of course (traditional or modern). [r; --; 13]


Procedures used in developing the course are described. [d; --; college]


The mathematical sections in the SAT independently accounted for one per cent of the variance, while verbal sections accounted for four per cent. [r: --; 13]


Two hierarchies were found to be valid for teaching ideas about one- and two-dimensional figures. [a: 124 students; elementary preservice]


Mean grades in a first-year college mathematics course were not significantly different for those who had the SMSG course in grade 12 and those in traditional courses. [f: 39 students; 13]

No significant difference on objectives was found between participants and non-participants. Participants favored a guided discovery approach and "modern" courses. [s; 193 teachers; secondary in-service]


Significant gains in achievement were found for students using the programmed text. [a; 43 students; college]


The geometric and algebraic treatments were equally effective in producing learning and transfer. Prediction of achievement was possible using general reasoning and spatial visualization scores. [r; 45 students; secondary pre-service]


Different patterns of courses in high school mathematics were not equally effective in influencing achievement in college courses. [f; 110 students; college]


Students made significant gains on mathematics and other tests during two years in college. [s; —; college]


Pupils whose teachers attended three in-service seminars learned the geometric ideas studied. [4; 12 teachers, 293 pupils; teachers in grades 5, 6]


Significant gains in attitude toward mathematics and toward specified instructional techniques, including television, were found. Attitude toward radio instruction decreased. [8; 213 teachers; elementary in-service]

No significant differences in achievement were found between students in large lectures or smaller classes, or having homework with or without quizzes. [e; 269 students; college]

Schoen, Harold Leo. A Comparison of Four Types of Feedback to Student Responses in a CAI Unit Designed to Teach the Concept of Function to Pre-Calculus College Students. (The Ohio State University, 1971.) Dis. Abst. Int. 32A: 2508; November 1971.

Individualized feedback resulted in higher achievement than did generalized feedback. [e; 60 students; college]

Schowengerdt, George C. The Relationship of Student and Instructor Personality Type to Student Achievement in Calculus. (University of Missouri, Columbia, 1969.) Dis. Abst. Int. 30B: 5228; May 1970.

No significant relationships were found between personality pattern and calculus achievement. [r; 96 students; 13]


Schroeder, James Carl. A Study of the Relationship Between Remediation and Reduced Credit Hour Load and the Success of Open Admissions Students at the University of Toledo. (The University of Toledo, 1972.) Dis. Abst. Int. 33A: 4761-4762; March 1973.

Remediation in mathematics tended to be correlated with success. [r; 195 students; college]


Eight approaches were compared; no significant differences in achievement could be attributed to lecture, recitation, or interaction effects. Some differences between groups were specified. [a; --; elementary pre-service]


Schumert, Jim R. The Association of Mathematical Achievement with Certain Factors Resident in the Teacher, in the Teaching, in the Pupil, and in the School. (University of Minnesota, 1951.)


After taking the course, students achieved better on tests of computation, historical problems, and other problems. [a; --; college]


A model was judged and tested with students; it appeared to include the components necessary and sufficient for explaining the problem-solving process. [a; --; 7 - graduate student]


Scott, Ralph Lincoln. The Relationship Between Achievement in High School and Success in College with Reference to Science and Mathematics. (University of Arkansas, 1966.) Dis. Abst. 27A: 639; September 1966.


Following a survey about mathematics needed by business employees, a business mathematics topical outline was developed which included 20 of 25 needed applications. [8; 200 adults; community, junior college]


Memory, length, and other variables were found to be of importance in determining problem difficulty. [8; 44 students; junior college]


The activity-oriented integrated content-methods course concurrent with clinical experience had a significant positive effect on achievement and attitudes. [8; 38 students; elementary pre-service]


All mathematics instructors had a master's degree. About 25 courses, varying in content, were offered. [s; 15 colleges; community college]


The expository approach resulted in a more positive change in attitude than the guided-discovery approach; no achievement difference was found. [a; 2 classes (82 students); elementary pre-service]


Reading comprehension did not show improvement on an immediate post-test after use of a unit on logic, although some students showed gain on a retention test. [a; 12 sections; community college]


Students were able to give correct validity judgments of verbal simple conditional arguments as a result of explicit instruction on judging validity of simple arguments in symbolic form followed by practice on translating from verbal to symbolic form without explicit instruction. [e; 115 students; elementary pre-service]


The history of mathematics course was infrequently offered and required, though it was considered valuable by both mathematicians and mathematics educators. [s; secondary pre- and in-service]


Shuert, Keith L. A Study to Determine Whether a Selected Type of Cognitive Style Predisposes One To Do Well in Mathematics. (Wayne State University, 1970.) Dis. Abst. Int. 31A: 3352-3353; January 1971.

Elements of cognitive style held by successful and unsuccessful mathematics students were listed. [r; college]
Shuler, Caroline Eucebia. The Professional Treatment of Freshman Mathematics in Teachers Colleges. (George Peabody College for Teachers, 1933.)


Remedial courses in community colleges were essentially the same courses taught at the secondary-school level. Appropriate topics and sequences were determined. [e; --; community college]


The in-service program was effective in improving teachers' understanding of and attitude toward mathematics. Pupils gained in achievement of arithmetic concepts more after teachers had the in-service program. [e; 2006 pupils, 92 teachers; teachers in grades 1-8]


Emphasis on reading techniques improved mathematical achievement in college algebra but not basic algebra or calculus. [e; 6 classes; college]


Students taught by the lecture method scored as well or better on tests of understanding, computation, and transfer as did students taught through material-oriented units. Those taught with two embodiments scored as well or better than those taught with one embodiment. [e; 145 students; elementary pre-service]

No significant differences were found between classes in which homework was not integrated or was discussed in class by teacher or students. [n; 86 students (3 classes); college]


Learning in pairs was found to be effective. [n; 12 classes; college]


Most teachers reported favorable attitudes toward mathematics. Their college courses had included much of the geometry recommended by CUPM, but little of the algebra. [n; 820 teachers; elementary in-service]


Attitudes toward including manipulation of materials in courses were positive. [n; 69 students; college]


Students who received heuristic instruction did not solve more transfer problems or work faster than students who received task-specific instruction. [e; 176 students; college]


Laboratory experience facilitated learning and retention of concepts. [e; 48 students; college]


Students informed of the structure and objectives of a learning sequence did not complete the sequence more rapidly than uninformed students. Time and retention were related. [e; 73 students; college]


The developed unit appeared to be effective. [a; 53 students; 13]

Smith, Quentin Clark. A Comparison of a Heuristic and a Traditional Method of Teaching a Preparatory Course in Mathematics to College Freshmen and Sophomores. (University of Missouri at Kansas City, 1967.) Diss. Abst. 28A: 3573; March 1968.
Smith, Roland Frederick. An Experimental Comparison of Two Liberal Arts Courses in General Mathematics at Syracuse University. (Syracuse University, 1955.) Diss. Abst. 15: 2538-2539; December 1955.


No significant differences in achievement or attitude were found between groups having a laboratory or a lecture approach. [e; 2 classes (39 students); elementary pre-service]


Students achieved more when taught by mathematics teachers with more than two years of experience, a high GPA, and above average knowledge. [r; 34 teachers, 1930 students; 9, teachers]

High school GPA in mathematics was the best single predictor of success in calculus, accounting for 39 per cent of the variance. \( r; \) 133 students; 13


The graduates surveyed were "reasonably happy" with the mathematical level of their programs. \( s; \) 315 graduates; college


Sparks, Jack Norman. A Comparison of Iowa High Schools Ranking High and Low in Mathematical Achievement. (State University of Iowa, 1960.) Dis. Abst. 21: 1481-1482; December 1960.


Presentation order had little effect on the learning of a principle, whether negative or positive examples were used. \( s; \) 362 students; college


Students rewarded by teacher or self achieved significantly more than non-rewarded students only on number of addition examples completed. \( s; \) 45 students; college


In general, analyzed factors had little relation to success; the pre-math test was the best predictor. [r; —; post-secondary]

Stannard, William Albert. The Effect on Final Achievement in a Beginning Calculus Course Resulting From the Use of Programmed Materials Written to Supplement Regular Classroom Instruction. (Montana State University, 1966.) Diss. Abst. 27A: 1723-1724; December 1966.


Teachers in community junior colleges were found to be "exceptionally homogeneous": most have a master's degree from a geographically near college and have considerable teaching experience and interest. University teachers were "very heterogeneous": all three degrees were held, from a variety of institutions; teaching experience was limited, and background was in graduate mathematics rather than education. [n; 34 colleges; college faculty]


Five models and a hierarchy of mathematical skills and concepts needed in working with these models were determined. [d; --; college]


Teaching students in subgroups by academic major appeared effective. [n; 88 students; college]


No significant difference in time-telling scores was found between groups given or not given money and verbal reinforcement. [e; 61 adults; adult EMRs]


Materials were developed for a mathematics course based on the philosophy of realism. [d; --; college]


Arguments for the use of a Socratic approach rather than the current (lecture) approach are presented. [d; --; elementary and secondary pre-service]


No significant differences were found between groups taught by a deductive or inductive approach. [e; 10 classes (256 students); 13]

Students in the NSF program scored higher than a norm group. [s; 98 students; college]


The lecture-discussion method was found to be significantly better than the lecture method, but no significant differences were found with an individualized method. [s; 60 students; college]


Equations were determined which classified students into appropriate mathematics sequences. [r; 510 students; 13]


Stone, William C. The Preparation of College Instructors of Mathematics. (University of Chicago, 1952.)


Stuessy, Eugene L. An Experiment to Evaluate the Relative Effectiveness of Two Approaches to Teaching College Algebra in Achieving Selected Objectives of College Algebra in Industrial Technology Curricula. (Texas A & M University, 1969.) Dis. Abst. Int. 30A: 4698; May 1970.
The traditional approach was more effective in developing ability with proofs, while an approach emphasizing applications was better on work with derivations. [s; 66 students; 13]


Sueltz, Ben A. The Status of Teachers of Secondary Mathematics in the United States. (Columbia University; 1934.)


No major background differences in remedial and non-remedial students were identified; remedial students had inadequate high-school preparation. Remedial courses were insufficiently individualized. [s; 90 students; junior college]


Pre-1963 participants had a higher regard for lectures and discussion leaders and were more involved than previously in leadership activities than were later participants. Participants were less mobile within and across schools than mathematics teachers in general. Fewer than one-fifth completed four sessions. [f; --; secondary in-service]

No significant differences in achievement were found when pacing was controlled by student or teacher, but an average pacing rate on tests was found to be more effective than other paces. [s; 3 groups; 13]


Students who scored similarly on reading and mathematics measures appeared to be paradigmatic responders. [s; 90 students; 13 (junior college)]

Courses and the amount of use of mathematics had a significant effect on students' attitudes. [f; 279 students; elementary pre-service]


The Dutton and the Aiken-Dreger attitude scales were both found to be significant predictors of achievement; the semantic differential instrument was not found to be a good predictor. [r; 93 students; elementary pre-service]


No significant differences in achievement were found between the two procedures. [e; 82 students (9 classes); junior college]


The structure of the mathematical ideas was discussed, as well as trial use of the materials. [d; --; college]


No significant difference in achievement was found between groups where the computer was or was not used. [e; 1 class; college]


Teachers who scored higher on a test of high school mathematics had 45 or more quarter hours of mathematics courses and/or graduated from private institutions. [r, s; --; secondary in-service]


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. [e; 2 classes (50 students); elementary pre-service]


Students with a scanning learning style achieved significantly below those with a focusing style in mathematics. Mathematics teachers tended to have a focusing style. [r; 204 students; 11, teachers]


Equations to predict success in the first mathematics course were developed. [r; 3 colleges; 13 (community college)]

Todd, Robert Marion. A Course in Mathematics for In-Service Teachers: Its Effect on Teachers' Understandings and Attitudes. (University of Virginia, 1965.) Diss. Abst. 26: 5898-5899; April 1966.


Townsend, Neal Russell. The Relationship of Frequency of Tests and Delay of Feedback of Test Results to Achievement in First Quarter Analytic Geometry and Calculus. (Purdue University, 1972.) Diss. Abst. Int. 33A: 2826-2827; December 1972.
Classes receiving daily quizzes achieved significantly higher scores on the final test than classes having only a midterm test. Three-day delay of feedback was better than one-day delay. [e; 442 students; college]


About the same proportion of students could demonstrate mastery of the principles of conversion and inversion even though they had no instruction on inversion. Familiar and suggestive content appeared equally difficult for contraposition and conversion, though transitive suggestive items were easier. [e; --; elementary pre-service]


ACT Mathematics score was the least accurate predictor of success following delay in entering college after high school. [r; 441 students; college]


A rehearsal strategy that did not involve grouping of the algorithm (for finding the area of a triangle) was superior to strategies in which rehearsal steps were grouped. [e; 126 students; elementary pre-service]


The single most important predictor was mathematics ability. [r; 111 students; (community, junior) college]

Arithmetic accuracy was generally higher when individuals, rather than the group, received reinforcement. [e; 6 adults; adult]


The classes in which the computer was used to score and provide immediate feedback on weekly exercises scored significantly higher than classes in which scoring time took a week. [e; 6 classes; college]


Students having the individualized approach had significantly higher achievement than those having lecture or lecture-discussion approaches. [e; 135 students; 13]


No significant differences in achievement were found between groups using lecture-discussion or a student-centered approach, with or without the option of attendance. [e; --; junior college]


Van Dam, Robert Harold. Programmed Lecturer as a Means of Increasing Student Achievement and Involvement in Large Classes in Liberal Education Mathematics Courses. (The Florida State University, 1967.) Dis. Abst. 29A: 522-523; August 1968.


At third grade level, teachers' informal perceptions of mathematics and positive attitudes were associated with student comprehension; informal perceptions and negative attitudes were associated with student computation ability. No significant differences were found in grade 6. [s; 122 teachers, 113 classes (3100 pupils); teachers in grades 3, 6]


Equations which predicted about 40 per cent of calculus grades were determined. [r; secondary in-service]

Vanmatta, Glen David. Background, Choices, and Opinions of Superior Mathematics Students as a Basis for an Attack of the Scientific Manpower Shortage. (Indiana University, 1957.) Dis. Abst. 17: 2189-2190; October 1957.


Mathematics teachers in Idaho were found to be not well trained when compared with standards set by professional groups. They taught more classes than is recommended. [s; secondary in-service]

No significant differences in instructor effectiveness were found on measures of students' manipulative skills, but some significant differences were found on measures of concepts. (r; students of 73 instructors; college)


The CUPM recommendation on the real number system was being implemented. Teachers had the conceptual background but lacked sound pedagogical preparation. (s; 200 teachers; elementary and secondary in-service)


Attitudes of students in the student-directed course were more positive than attitudes of those in a regular course. (f; —; college)


Less than half of the Montana teachers surveyed felt highly prepared to teach content skills; less than one-third felt highly prepared to teach applications. Many felt inadequately prepared on other professional tasks. (s; 159 teachers; secondary pre- and in-service)

Von Rosenberg, Mary Edna. The Status of Teachers and Teaching of Secondary School Mathematics in Texas for the Academic Year 1942-1943. (University of Texas, 1943.)
Waggoner, Wilbur. The Relationship of High-School Mathematics to Success in College. (University of Wyoming, 1956.)


Use of Venn diagrams facilitated the learning of a new rule in a transfer task. [e; 72 students; college]


Students in large lecture groups achieved higher scores than students having televised instruction. [e; 971 students; 13]


Conventional homework was as effective as programmed homework on an immediate posttest; on a retention test, scores of the conventional group exceeded those of the programmed group. [e; --; 13 (community college)]


Students taught in terms of logic appeared to achieve better on induction than students not having logic. [a; --; college]

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No significant differences in mathematics were found between students having modular or traditional scheduling. [f; 2 groups; 10, 12, college]


Twelfth graders achieved as well on the developed unit on functions as did college students. [e; 41 secondary, 22 college students (3 classes); 12, college]


Neither attitude nor achievement was significantly affected by the inclusion of enrichment exercises in the geometry course, regardless of scholastic aptitude. [e; 111 students; elementary pre-service]


Lower-level jobs required the use of basic mathematics; high-level jobs required calculus. The majority of tasks required use of algebraic and trigonometric concepts. [e; 170 adults; adult]

The writing, execution, and correction of computer programs (using CUPL) was found to strengthen understanding of mathematical concepts and result in a strong positive attitude at each of the grade levels studied. Although high-IQ students tended to derive greater benefit, average and low-IQ students also benefited. [e; 10 classes; 7, 8, 12, 13]


The predictive test was apparently effective. [e; 333 students; 13]


No single course or groupings of courses were significant predictors of student achievement, but the number of semester hours of mathematics taken by a teacher and the number of students in grade 12 of his school were significant predictors. [r; 900 students, 138 teachers (28 schools); 9-12, in-service]

Weaver, James Fred. Skill in Subtraction: The Effect of Changing From the Method of Decomposition to the Method of Equal Additions. (Johns Hopkins University, 1952.)


The hierarchy on limits had a high degree of validity for five of seven units. [a; 206 students; college]


No significant differences in achievement were found between groups using lecture-discussion or a programmed materials approach. [e; 99 students; college]
Weddle, Edith George. An Appraisal of Selected Aspects of the Teacher Education Program at East Texas State University Based on a Follow-Up Study of Beginning Elementary Teachers. (East Texas State University, 1971.) Dis. Abst. Int. 32k: 5097; March 1972.

One mathematics course was considered adequate. [a; 135 teachers; elementary in-service]


Attitudes became more positive in the group taught by activity learning, but no significant differences in achievement were found between that group and one taught traditionally. [a; 45 students; pre-service]


No significant differences in mathematics scores were found between the three types of students. [f; 303 students; 15]

The computer-administered test (r = .93) was found to have a correlation of .59 with S.A.T. Math scores and GPA. Diagnosis, instant scoring and reporting of results, and ease of administration and of revision were cited as advantages. [r; 580 students (4 secondary schools, 2 colleges); 12, college]


Activities reported to be of significant value were meetings sponsored by mathematical organizations, summer workshops, professional reading, and curriculum experimentation and research. [s; --; secondary in-service]


No significant difference was found between groups given a diagnosis or given only scores. Use of a diagnostic program appeared effective. [s; 96 students; college]


Wetzler, Henry George, Jr. Predicting Student Achievement and Satisfaction with the Teacher in College Mathematics in Terms of Previous Students' Satisfaction with the Same Teacher. (The Ohio State University, 1972.) Dis. Abst. Int. 33A: 3977; February 1973.

In about half the cases, satisfaction with instructor could be predicted, but achievement was not predicted by the instrument used. [r; students of 12 instructors; college]

Whelan, James Francis. Correlation of the Professional and Subject Matter Training in the Preparation of Teachers of High School Mathematics. (Ohio State University, 1938.)

A small but important relationship between mathematical attitude and achievement was indicated. [r; 175 students; elementary pre-service]

Whitaker, Mack L. A Study of Participants in Summer Mathematics Institutes Sponsored by the National Science Foundation. (The Florida State University, 1961.) Dis. Abst. 22: 2712; February 1962.


ACT Mathematics scores were found to be related to persistence. [r; 508 students; 13 (community college)]


The effect of Model, Statement Generality, Vocabulary, and Text Orientation on the learning of the identity and inverse axioms was studied. It was concluded that the learning of mathematical concepts must take into account differentiated levels of the learner’s cognitive structure, though specific effects were not evident from the study. [e; 170 teachers; elementary pre-service]


Taking high school calculus was found to be the best predictor of success for first quarter calculus, but one of the worst predictors for success in second and third quarter calculus. [r; —; college]


No significant difference in critical thinking scores was found between groups given or not given a logic unit. [e; 74 students; 13]


An instrument to assess cognitive preferences was developed and tested. [e; 200 students (in mathematics); college]


Williams, Vernon. A Multi-Predictive Measure to Predict Success at Two Levels in Freshman College Mathematics. (Oklahoma State University, 1969.) Dis. Abst. Int. 31A: 4026-4027; February 1971.

A standardized test appeared to be an effective predictor for elementary but not advanced courses. [r; 365 students; 13]


Wilson, G. M. A Survey of the Social and Business Usages of Arithmetic. (Columbia University, 1918.)


A significant positive relationship was found between "postmathematical" attitudes and both general and modern mathematics skills and achievement, as well as with prior mathematics attitudes. [r; 206 students; elementary pre-service]

Students who had three or more years of mathematics achieved significantly better in statistics than students having less than three years of mathematics. [f; --; college]


For two of three algorithms (presented in varying order), the last algorithm presented was the one best recalled. [e; 75 students; community college]


Some techniques to be used in determining the essential behavior of solutions of a differential equation are described. [d; --; college]


Nearly two-thirds of the teachers taught only mathematics. Algebra was more frequently the full-time assignment than any other mathematics course. [s; 465 teachers; secondary in-service]


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Characteristics of teachers and programs were cited. [n; 1517 teachers; secondary in-service]

Woods, Velma E. An Analysis of Errors in Arithmetic Made by Teachers in Training. (University of California, Berkeley, 1936.)


Adequacy in college courses appeared related to the mathematics courses taken in high school. [n; 219 students, 225 faculty; 13]


In general, the developed text was found to be appropriate in teaching topological concepts. [a; 16 students; secondary in-service]


The unit, involving use of desk calculators, was found to be effective. [e; --; community, junior college]


The developed unit was found to be successful. Attitudes toward geometry were significantly changed by the unit. [a; 1 class; secondary pre-service]


Young, Ralph W. Programs for the Mathematical Education of Prospective Elementary School Teachers in Southern States. (University of Florida, 1951.)

No significant differences were found between use of a slide/tape program or a flow-charting presentation. [e; 102 students; college]


The tutorial method was found to be better than use of a lecture-discussion method. [e; 148 students; 13]


Zeddies, Melvin Louis. The Effectiveness of a National Science Foundation Institute in Mathematics as Reflected in Teacher and Student Attitudes and Student Achievement. (United States International University, 1972.) Dis. Abst. Int. 33A: 1067-1068; September 1972.

No significant difference was found in the attitudes toward mathematics of teachers who had or had not attended an NSF institute. Attitudes of students of participating teachers were not significantly different, but achievement increased significantly. [e; 20 teachers; secondary in-service]

Zimmerman, Carl L. An Experimental Study of the Effects on Learning and Forgetting When Students Are Informed of Behavior Objectives Before or After a Unit of Study. (University of Maryland, 1972.) Dis. Abst. Int. 33A: 562; August 1972.

No significant difference was found between groups given or not given behavioral objectives before or after brief programmed units. [e; 150 students; college]

Addendum: Pertinent Dissertations on Mathematics


3. LIST OF ERIC DOCUMENTS


Begle, Edward G. Teacher Knowledge and Student Achievement in Algebra. (SMSG reports number 9.) 1972. ERIC: ED 064 175.


Block, A. Narvey. A Test of the Use of a Program of Instruction in Basic Mathematics Requiring Only Minimal Reading Skills for Use as a Remedial Tool for College Freshmen. (Final report.) October 1968. ERIC: ED 026 969.


Hively, Wells, II. *Programmed Correspondence Courses in Algebra and Geometry for Inservice Teacher Training: Field Studies.* (Final report.) August 1968. ERIC: ED 023 430.


Judd, Wilson A. *Program Vs. Learner Control of Selection of Instruction and Amount of Practice in Computer-Assisted Instruction.* April 1972. ERIC: ED 064 399.


Kohen, Eileen. A Validity Study for the CLEP Introductory Calculus Subject Examination at the University of Illinois. (Research report number 349.) February 1974. ERIC: ED 087 295.


Lind, Donald J. The Identification of Those College Students for Which Programmed College Basic Algebra is Most Effective. (Final report.) May 1970. ERIC: ED 043 507.


Matthews, Frank F. An Investigation of the Feasibility of the Use of Students' Perceived Needs to Control the Rate of Instruction. (AREA paper.) April 1974. ERIC: ED 091 227.


Schoen, Harold L. A Comparison of Four Types of Feedback to Student Responses on a CAI Unit Designed to Teach the Concept of Function. (NCTM paper.) April 1972. ERIC: ED 061 081.


INDEX: MATHEMATICAL TOPIC

This index is designed to help the user in locating references to designated mathematical topics. It should be noted that the cross-referencing is not exhaustive; there may be other references which could be pertinent, but which have been omitted due to oversight.

On the next four pages, a summary of the categories is given, followed by the categorization. The references have been grouped by article (art.), dissertation (dis.), and ERIC document (ERIC).
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   b. Diagnostic procedures  
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   b. Slow learner  
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   d. Tutoring  
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   a. Overachiever  
   b. Acceleration  
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|           | (Grinstein, 1965) |
|           | Hamilton, E. W., 1956 |
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|           | Smith, R. F., 1955 |
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College linear algebra

art. Bittinger and Rudolph, 1974

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Occupational, vocational-technical mathematics

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Business mathematics

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  - Conroy, 1972

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- Carr and Russell, 1968
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- Davis, W. R., 1969
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- Cammarata, 1974
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- art. Abe, 1966
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### Effect of Parental Knowledge

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**Note:** The text continues with various references and paragraphs discussing related topics, but the provided excerpt focuses on prediction and includes a table listing authors and years, as well as key findings related to parental knowledge and teacher background characteristics.
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