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*Annotated Bibliographies; Bibliographies; College Mathematics; Elementary School Mathematics; Elementary Secondary Education; *Individualized Instruction; *Instruction; *Mathematics Education; *Research Reviews (Publications); Secondary School Mathematics

This bibliography provides information and brief annotations for 148 papers reporting research into the effectiveness of self-paced instruction in mathematics. The citations are organized into three major categories: research summaries (8 papers), studies comparing the effectiveness of self-paced programs with that of more traditional programs (101 papers), and studies designed to analyze or evaluate specific components of self-paced programs (39 papers). The papers annotated deal with mathematics instruction at all levels from the primary grades through college, and with a variety of cognitive and affective criteria for judging the effectiveness of instruction. Each annotation notes the grade levels at which the study was performed and summarizes the major findings. (SD)
An Annotated Bibliography of Research on Self-Paced Mathematics Instruction
(1965 - 1976)

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Abstract

This bibliography contains brief descriptions of studies done in the past 10 or 12 years in which the effectiveness of self-paced mathematics instruction was investigated. Included among the sources are summaries of this type of research, studies in which self-paced programs were compared to other instructional approaches, and studies in which the nature and role of various components of a self-paced instructional system were investigated. The self-paced programs examined in the studies include Individually Prescribed Instruction (IPI), Program for Learning in Accordance with Needs (PLAN), Individually Guided Education (IGE), Individualized Mathematics System (IMS) and many locally-developed programs which were based on a similar, self-paced instructional approach.
An Annotated Bibliography of Research

on Self-Paced Mathematics Instruction (1968-1976)

During the past decade, an increased emphasis has been placed on individualizing the instruction of America's school children. Many educational agencies have published materials to be used in self-paced or individualized instructional programs. They include Individually Prescribed Instruction (IPI), Program for Learning in Accordance with Needs (PLAN), and Individually Guided Education (IGE) among others. Teachers in local schools throughout the country have also been involved in writing packets for self-paced instruction. The aim of all these materials is to allow the student to proceed through the content presented at the pace best for him.

As with any educational innovation, many questions have been raised about various aspects of individualized instruction. As a result, much research has been done in the field, and publications of the past ten years abound with position papers which attempt to answer these questions. The bibliography which follows contains a fairly complete listing of the research studies which provide information about self-paced instruction in mathematics.

The entries were gathered from three main sources. First, the excellent annotated bibliographies by Suydam and Weaver found in the November issues of the Journal for Research in Mathematics Education from 1971 through 1975 were searched for entries related to self-paced instruction. Because it was felt that the annotations for these entries could not be improved upon, they appear in this bibliography also. Second, Dissertation Abstracts of the past
ten years were searched. In all, over 100 doctoral dissertations containing
to self-paced instruction were located. Third, a computer search of the ERIC
system files for the past ten years yielded many additional sources.

The entries have been divided into three broad categories. The first cate-
gory contains those articles which summarize research related to self-paced
mathematics instruction. In the second category are the studies which com-
pared students taught under a self-paced approach with students taught in a
more traditional program in which all students

access to the same work
at the same time. Cognitive as well as affective variables were used for
comparison. In the last category are studies in which specific components of
self-paced instructional programs were analyzed and evaluated.
Research Summaries


Ability grouping was used by eighty percent of the schools in New Jersey; about twenty percent reported individualized instruction programs. (grades 9 - 12)


The article describes many forms of individualized instruction throughout the United States and concludes with a list of features the programs seem to have in common. (all levels)


A conceptual framework having implications for future research on individualized mathematics instruction is given. (all levels)

Karmos, J. S. A study of four factors associated with the installation of the Individually Prescribed Instruction in mathematics program in ten
The main strengths cited were in student attitudes and in the individualized aspect while main weaknesses were in student arithmetic skills and in the lack of manipulative and audiovisual aids. (elementary)


The trend toward individualization is shown by a comparison of the numbers of articles devoted to that topic for the years 1930-1971; 36 individualized programs are described along with data on the costs of individualization; a taxonomy of terminology is also included. (all levels)

Schoen, H. L. Self-paced mathematics instruction: how effective has it been in the secondary and post secondary schools? The Mathematics Teacher (in press), 1976.

Results of studies from the past ten years which compared self-paced instruction with other instructional approaches in the secondary and post secondary schools are summarized. (grades 9 - 16)

Schoen, H. L. Self-paced mathematics instruction: how effective has it been?
Recent research dealing with the overall effectiveness of self-paced instruction as well as various program components with elementary school students is reviewed. (grades K - 8)


A review of some research on individualized instruction prior to 1970 is given. (all levels)

Comparative Studies


In grades 1 - 3, but not in grade 4, pupils using the PLAN system achieved as well on a mathematics test as did students in a non-PLAN school. (grades 1 - 4)

Amendola, A. A. Changes in attitude and achievement effected by a continuous
The continuous progress program was as effective as a traditional program for increasing arithmetic-concepts knowledge but not computational skills.


Mean gain scores on an arithmetic test were significantly higher for EMR pupils when they used the developed IPI program. (Primary EMR)


No significant differences were found in attitudes or mathematical skills between groups of ninth-grade general mathematics students who contracted for their achievement grades and those who did not. (grade 9)

Bartel, E. V. A study of the feasibility of an individualized instructional

Mean concept test scores, but not achievement scores, were significantly higher for fourth graders in an individualized math program than for those in a more traditional one. (grade 4)


No significant differences were found between students who used self-paced materials with explicit objectives and a smaller group having traditional instruction. (elementary preservice)


A significant difference in achievement favored the group having the individualized program over the traditionally-taught group. (grade 7)

Seventh-grade students when grouped into very flexible groups each using materials at an appropriate level showed significant improvement in attitudes over both experimental and control groups of previous studies but showed no significant difference in achievement. (grade 7)


The mathematics program tended to be more successful than the reading program. A cost analysis showed per pupil expenditure does not necessarily determine performance. (elementary)


Gains in mathematics scores were significantly greater in the schools using

Eighty percent mastery was not achieved at the end of the unit.


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


Classes not using Project PLAN scored significantly higher in computation.
while there were no differences between PLAN and non-PLAN classes in concepts and applications. (grade 5)


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


Pupils in self-contained classrooms achieved significantly better in mathematics in grade 4; no achievement differences were found in grade 3 or 5. (grades 3 - 5)

Chatterley, L. J. A comparison of selected modes of individualized instruction in mathematics for effectiveness and efficiency (Doctoral dissertation,
Use of multimedia materials with correct-answer feedback was found to be more effective than either alone, especially with medium and low achievers, for a unit on integers using IPI materials. (grade 7)

Clough, R. A. An analysis of student achievement in mathematics when individually prescribed instruction (IPI) is compared to the current instructional program. (Doctoral dissertation, The University of Nebraska, 1971). Dissertation Abstracts International, 1971, 32, 2849B. (University Microfilm No. 71-28, 604)

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


Continuous Progress Mathematics Program (CPMP) produced a favorable attitude change and growth in achievement of 1.9 years as compared to 1.3 years in the control schools. (grades 6 - 12)


Of the four treatments compared, T.V. by itself was the least effective and teacher demonstration followed by the students' manipulation of objects was rated as the best overall. (grade 1)


No significant differences in achievement or attitude were found between groups taught by individualized or traditional approaches. (grades 7, 8)


Freshmen in conventional remedial mathematics classes did slightly better on several measures than those in both a modularized approach and a programmed instruction approach. (undergraduate)

Crandall, L. D. The effects of peer tutors and individual skill kits on arithmetic achievement and attitude in grade seven (Doctoral dissertation,
For computation, little difference was found between groups using skill kits or in-class tutoring; no differences were found for applications or attitude. For concepts, highly significant results favored the tutoring group. (grade 7)


Students taught by traditional instruction achieved significantly more than those taught by individualized instruction. (grade 8)


Individualized instruction did not improve or adversely affect student achievement or intelligence over the baseline data of 1969. (grades 1 - 8)

Deep, D. The effect of an individually prescribed instruction program in arithmetic on pupils at different ability levels (Doctoral dissertation,
Although IPI higher ability students tended to do more work than lower ability students, IPI did not operate differentially on high, average, and low ability groups, but the conventional program did. (grades 4, 5, 6)


Pupils in the open education program did not score as well as pupils in a regular program on standardized tests of mathematics and reading. (grade 2)


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

Englert, T. J. A comparative study of the effects on achievement and changes

No significant differences in achievement or attitude were found between classes taught by an individualized approach and a group oriented approach. (grade 9)

Ewing, P. M. A study of the effects of individualizing the pacing and instruction of elementary algebra at the college level (Doctoral dissertation, The Ohio State University, 1973). Dissertation Abstracts International, 1974, 35, 212A. (University Microfilm No. 74-14, 509)

The individual pacing method did not produce higher achievement, but it did greatly reduce the drop-out and attrition rates. (undergraduate)


When traditional scheduling was compared with flexible scheduling, findings on attitude and achievement measures were mixed. (grades 9, 11)

Fernandez, P. P. A presentation and evaluation of an individualized

First year algebra students using researcher-prepared materials for individualized instruction showed satisfactory achievement and a more positive attitude toward mathematics than students at a neighboring school. (secondary)


The group not using PLAN achieved significantly higher on arithmetic reasoning than the group using PLAN. Girls using PLAN achieved higher scores than did boys, and thus PLAN may be more related to the learning styles of girls. (grade 5)


The non-IPI group generally achieved better than the IPI group. (grades 3-6)

No significant differences in mathematics achievement were found among groups taught by IPI, programmed instruction and traditional instruction. (grades 3-5)


No significant differences in achievement were found between students using the computer managed units or having the traditional geometry program. (grade 11)


Neither progressing independently nor evaluating their own work seemed to
contribute significantly to students' achievement in mathematics. (grade 6)


An individualized program resulted in significantly higher achievement than a non-individualized program. (grade 1)


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

Fremont, H. I. Individualized instruction in plane geometry: a comparison of the relative effectiveness of learning plane geometry by an individualized approach as contrasted with the traditional approach of group instruction (Doctoral dissertation, New York University, 1963). Dissertation Abstracts, 1964, 24, 3227. (University Microfilm No. 64-245)
No significant differences were found in achievement, attitude toward mathematics, or social acceptance between students taught by a conventional approach compared to an individualized approach. (secondary)


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


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

No significant differences in mathematics achievement were found, but attitudes and adjustment scores were higher for pupils in the individual program. (kindergarten, grade 1)


The differences found suggested a trend in achievement favoring pupils in the individualized program. (grades 4, 5, 6)


No significant difference in achievement was found between groups using activity packages or conventional instruction. (grade 10)


The IPI program appeared superior to the teacher-developed and textbook
programs, (grades 4, 5)


Students in the individualized instruction-contract grading program achieved as well as the students in the traditional program. (undergraduate)


The overall achievement of third graders appeared to be adversely affected by the IPI program, whereas sixth graders appeared to benefit from IPI. (grades 3, 6)


The guided discovery group had significantly higher achievement and transfer
than either of the two individualized instruction groups. (grade 11)

Isenberg, R. L. A comparison of achievement scores in reading, arithmetic, and motor skill development among three instructional programs with different levels of supportive services for elementary school compensatory education students (Doctoral dissertation, Brigham Young University, 1972). Dissertation Abstracts International, 1972, 33, 2765A. (University Microfilm No. 72-32, 649)

In an ESEA Title I Compensatory Education Program, mathematics skills improved more than reading skills in an individualized approach. (grades 1 - 5)


The mean gain of the experimental group over the control group was significant on the complete test battery which included reading, arithmetic, and spelling. (grades 1 - 3)

In 1972, achievement test percentile ranks for grades 3 and 4 were higher than those for grades 5 and 6 but showed a decline over the previous year. (grades 3, 4)


The majority of students made substantial gains in computation in the project year, but the overall scores were not higher than comparable students made the preceding year. (grades 7, 8)


No significant differences were found between pupils using self-instruction (following a model), guided learning, or a regular approach. (grade 2)

Kontogianes, J. T. The effects on achievement, retention, and attitude of an individualized instructional program in mathematics for prospective elementary school teachers (Doctoral dissertation, The University of Oklahoma,
Students using the individualized program achieved and retained significantly higher scores than those having the regular program. (Elementary preservice)


The individual method favored the high achievement pupils and disfavored the low achievers who were thought to become more dependent on the teacher. (grades 7, 8, 9)


Students with learning problems who were in an IGE school achieved as well in mathematics as the average norm-group students. (grades K-4)

Students in the experimental algebra class did as well as the students in the control group although the experimental group had had fewer weeks of instruction than the control. Differences for the basic mathematics classes were not significant. (grade 9)


Significant differences in achievement and attitude favoring students using a teacher-developed program over a traditional program were found in grades 7 and 9 but not grade 8. (grades 7 - 9)

Matthews, F. F. An investigation of the feasibility of the use of student's perceived needs to control the rate of instruction. Paper presented at the AERA annual meeting, 1974. (ERIC Document Reproduction Service No. ED 091 227)

Experimental students did as well or better on achievement than students in the regular Curriculum Revision and Instruction in Mathematics at the Elementary Level (CRIMEL) project classes, and they made more use of the equipment. (undergraduate)

Mayfield, I. R. A comparative study: two methods of teaching mathematics--conventional and individualized (Doctoral dissertation, Mississippi State

No significant difference in achievement was found for groups taught by an individualized or a conventional program, but the individualized group was significantly higher on some self-concept scales. (grade 4)


There were no differences in achievement as measured by standardized tests between IPI and non-IPI pupils. However, IPI pupils liked school and mathematics better than non-IPI pupils. (grades 1 - 6)


Results of a teacher-made test given to students who had been taught in groups of size 1, 2, 5, and 23 favored group sizes 1, 2, and 5 over size 23, and size 1 over sizes 2 and 5. (grade 4)

Morman, S. J. An audio-tutorial method of instruction vs. the traditional

No significant differences were found in pretest scores, posttest scores or attrition rates when classes taught remedial college algebra by the audio-tutorial method were compared to classes taught by the traditional lecture-discussion method. (undergraduate)


Very few differences were found in attitude toward education or in educational progress when a conventional program was compared to an individualized program over a five-year period. (secondary)


Low-achieving and average-achieving students did significantly better under Individualized Mathematics System (IMS) than corresponding groups did under trititional instruction, but the high achievers did significantly better under the traditional; no significant differences were found in self-concept
between the two treatment groups. (grade 7)


Students with low IQ, those with average mathematics ability, and boys achieved significantly more under individualized instruction than under group-oriented instruction. (grade 8)


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


In a modularized, self-paced course in college algebra, there was a slight increase in success rate of modularized over unmodularized. (undergraduate)

No significant difference in achievement was found between students using an individual progress or a traditional approach. (grade 11)


No significant differences in achievement were found for students using the CAI or regular version of IPI. (grades 5, 6)


The teacher-demonstration method was just as effective as the activities-based method in both immediate and residual learning and more economical in
both teacher time and operational costs. (elementary preservice)


Greater progress in achievement was shown by the experimental students than by students at three similar schools; no significant differences were found in attitude toward mathematics or toward school. (grades 5, 6)


Significant differences favored the individualized and the diagnostic programs over the regular program on mathematics concepts; no differences in problem solving were found. (intermediate)


No significant differences were found among classes taught by whole-group,
multi-group, or individualized patterns. (grade 4)


No significant differences in achievement were found between students who had or had not been in a laboratory school, open education program, but students in the program had lower mathematics marks. (grade 7)


Self-esteem did not appear to be affected by the individualized or traditional approaches used. In grade 7, one class taught traditionally achieved significantly better. (grades 7, 8)


No significant difference in achievement was found between groups using learning packages compared to TI and between classes taught by teachers who had prepared the packages and the classes taught by other teachers. (grades 9 - 10).

Neither Project Success nor the traditional program brought the group with an average IQ of 92 up to grade level whereas the traditional program brought the group with an average IQ of 90 above grade level. (grade 6)


No significant differences in mathematics achievement, study habits, or study attitudes were found between students who had an IPI or a non-IPI program in elementary school. (grade 7)


No differences were found between students taught by teacher demonstration or with a self-paced module. Flexibility of closure was not useful as a
predictor of achievement. (elementary preservice)


The expository approach was found to be superior to the unimodal and multimodal approaches on most topics studied. (grade 7)


There was no significant difference in achievement between the group in which the students selected their own topics from a wide variety of sources and the group which had the content set by the teacher but had three levels of assignments from which to choose. (grades 7, 8)

Seventh graders experienced greater academic growth in the self-paced approach while the eighth graders experienced greater growth in the traditional approach, but neither difference was significant. (grades 7, 8)


Significant differences found were in favor of the control group. The poor showing by the experimental students was attributed in part to the heavy demands placed on the teachers by the manipulation of the experimental materials. (grade 7)


No significant difference was found on mathematics subtests between groups using programmed material's developed for a performance contract or the regular textbook. (grades 2 - 4)

In a 3-year study, it was found that in most cases students using IPI fell progressively further below the grade level norms. (grades 1 - 6)


A lecture-discussion class did not achieve significantly more than an independent-study class. (grade 9)


The IPI method did not produce significant achievement gains over the conventional method. In grade 6, attitude was more favorable toward IPI. (grades 5, 6)

Thomas, B. G. Continuous progress advanced algebra in the Lincoln public
Achievement and attitude were not significantly different in continuous progress or traditional algebra II classes. (grade 11)


No significant differences in achievement between groups using individualized materials and groups taught by the teacher were found. (grade 1 - 6)


Pupils having conventional textbook instruction achieved higher than those using IPI. (grade 6)

No significant differences in mathematics were found between students having modular or traditional scheduling. (grades 10, 12, undergraduate)


In general, students in traditional schools scored higher on tests of arithmetic skills than did students in individualized schools. (elementary)

Waters, G. H. The effects of an individualized laboratory approach on the teaching of mathematics to third grade students achieving below level (Doctoral dissertation, Virginia Polytechnic Institute and State University, 1974). Dissertation Abstracts International, 1975, 35, 7629A. (University Microfilm No. 75-11, 952)

Individualized instruction in the mathematics laboratory significantly improved general mathematics achievement in concept development and problem solving and mastery of specified mathematical skills, but did not significantly improve computation skills. (grade 3)

Students taught by individualized methods did not differ significantly in mathematics achievement from those taught by traditional methods, but the latter gained significantly more in arithmetic applications. (secondary)


Students who used a laboratory approach with manipulative materials scored higher than students using individualized instruction units. (grade 8)


The continuous progress group achieved significantly better in mathematics than the graded group. (grades 4 - 6)

Students using audio tapes in self-pacing had better attitudes than students in traditional classes. (undergraduate)


No achievement differences were found between IPI and non-IPI groups of EMR's on norm-referenced tests; differences favored the IPI group on 4 of 12 criterion-referenced tests. (grades 7 - 9, EMR's)


Differences in achievement favoring the children in the traditional school were found but there were no differences with respect to measures of personality or cognition. (grade 5)

Yomtoob, Y. A study of the effect of an individualized instructional program

The modified IGE program was not found to be superior to traditional instruction as regards achievement, attitudes, or self-concepts (grades 4, 5)

Analysis of Program Components


The use of learning packages on fractions and decimals with manipulative materials produced greater gain on posttests and retention tests than packages with only paper-and-pencil exercises. (grade 7)


No significant differences in achievement or attitude were found between groups using an individualized-team or conventional program. (grade 7)

The modular approach shows promise for providing a program superior to the conventional classroom instruction program. (undergraduate)

Colvin, O. Improved learning practices through diagnosis of individual pupil needs, prescription and implementation for fulfilling those needs. (COLAMDA project.) Denver: Regional Center for Pre-Coll. Mathematics, 1973. (ERIC Document Reproduction Service No. ED 086 743)

The Committee of Low Achievers in Mathematics, Denver Area (COLAMDA) made use of the mathematics laboratory and individualized instruction in small groups. (grades 7 - 12)


On the Iowa Test of Basic Skills, only two grades out of six attained the level set as a goal. (grades 2 - 7)

Dahlke, R. M. Determining the best predictors of success and of time of completion or dropout in an individualized course in arithmetic at a community

The best predictors for all three criteria were reasons for enrolling and prior achievement in mathematics. (undergraduate)

Dahlke, R. M. Studying the individual in an individualized course in arithmetic at a community college: a report on four case studies. The Mathematics Teacher, 1975, 68, 181-188.

Individualized courses in community colleges are not meeting the needs of adults who never grasped the fundamentals of arithmetic. (undergraduate)


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


A description of IPI is given including some information on costs. (elementary)

The case studies involve two sixth-grade students who had been in IPI since second grade and were at the top of the class. (grade 6)


The text-only and objective-equipment categories were used most often, accounting for 64 percent of the assignments of pupils. (grades 4, 5)


A description of Program for Learning in Accordance with Needs (PLAN) is given. (elementary)


A report of the 1970-71 evaluation of Individualized Mathematics System (IMS) is given. (grades 1 - 6)

In one of the two schools, students who individually manipulated the instructional materials achieved significantly more than those who worked in groups and those who watched the teacher handle the materials; in the other school, achievement was lowest for the students who handled the instructional materials themselves. (grade 3)


There was no significant difference in posttest performance between the diagnostic-test-based group and control groups. (grades 3 - 6)


The fifth graders, working alone or in small groups on skills according to their needs, scored 1.2 years higher on the May ITBS than on the November. (grades 5, 6)

Attempts at individualized instruction in the early part of this century are described. (all levels)


Scores for students using a modified IPI program were better than for students using the regular program. (grade 2)


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

The type of prescription affected achievement. (primary)


Under the laboratory program, student attitudes improved, the rate of mastery was better than before and tasks were learned more rapidly. (emotionally disturbed ages 7-11)


Students from closed-space elementary schools achieved more in both open- and closed-space ninth-grade mathematics programs than did students from open-space elementary schools. (grade 9)

Kulm, G. The effects of the two summative evaluation methods on achievement and attitudes in individualized seventh-grade mathematics. Lafayette, Ind.: Purdue University, 1973. (ERIC Document Reproduction Service No. ED 090 279)
No significant differences in achievement were found between those tested after each unit and those tested after each objective. (grade 7)


The individualized units were not cost effective, although the use of them was more effective on some achievement measures. (grade 8)


A rationale is given for procedures in formative evaluation of an individualized mathematics curriculum in an elementary classroom. (elementary)


In a three-year study it was found that the manipulative materials of IM could be managed by the students on their own and that IM produced mastery rates and achievement scores equivalent to those produced by IPI. (grades K - 3)

Actual criterion levels differed from levels indicated by the program developers. (elementary)


The hypothesis that there was no significant difference in the personality characteristics among pupils of different levels of mathematical achievement gain was accepted for six personality variables and rejected for six others. (grades 4, 5, 6)


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


On an attitude test given before treatment, students who withdrew from the course exhibited low interest in doing mathematics problems while both those who withdrew and those who procrastinated showed feelings of anonymity in traditionally-taught mathematics courses. (undergraduate)


Fifth-grade students often "cheated" when self-scoring by not marking the item wrong or by changing their answer without reworking the problem. (grade 5)


In an individualized system using teacher-made learning packets, geometry students were unable to function alone, and lectures had to be added. (secondary)

A program of individualized instruction for elementary education students had a positive effect on students' attitudes toward individualized instruction. (elementary preservice)


Significant changes in arithmetic and language arts scores were noted during five years of individualizing the first grade program, including the use of materials on quantification, classification, and perceptual skills. (grade 1)

Schoen, H. L. A plan to combine individualized instruction with the lecture method. The Mathematics Teacher, 1974, 67, 647-651.

Use of modules for self-pacing in the problem session of a mathematics course for elementary teachers produced no significant differences in achievement. (elementary preservice)

Sowell, E. Elementary teachers learn to sequence mathematics instruction.
Teachers who used the self-instructional materials achieved significantly higher scores on a test of ability to select and sequence prerequisite objectives than did teachers who did not use the materials. (elementary pre-service and in-service)


No significant relationship was found between teachers' judgment of student needs and mode of instruction received by the student in an individually diagnosed and prescribed mathematics program, nor was there any significant difference in achievement of pupils who were matched or mismatched in terms of judged personality with instructional mode. (grade 8)


No significant correlation between aptitude and rate of learning was demonstrated when data from students using IPI were used. (grades 2 - 6)

PEP seemed to show promise in helping to overcome the "cumulative deficit" in mathematics and reading achievement often found in culturally- and economically-deprived children. (pre-school, grade 1)


The potential of a systems approach for planning and scheduling an individualized secondary mathematics and science program was explored. (secondary)


No differences were found in teachers' concepts of individualization, how individualization was done, and students' test score variability when nongraded schools were compared to graded schools. (grade 3)