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## Traditional vs. Individualized Fifth and Sixth Grade Arithmetic Program

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TRADITIONAL VS. INDIVIDUALIZED  
FIFTH AND SIXTH GRADE  
ARITHMETIC PROGRAM

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A Thesis  
Presented to  
the Graduate Faculty  
Central Washington State College

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In Partial Fulfillment  
of the Requirements for the Degree  
Master of Education

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by  
Donald Paul Giaudrone

August, 1972

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INDIVIDUALIZED VS. TRADITIONAL FIFTH  
AND SIXTH GRADE ARITHMETIC PROGRAM

by

Donald P. Giaudrone

August, 1972

This paper presents a comparative study involving two methods of arithmetic instruction for fifth and sixth grade students. Thirty pupils were taught arithmetic using a traditional approach and thirty pupils were taught arithmetic using an individualized approach. Each group was divided into high, average, and low ability students and between group achievements compared at the end of an eight month period with encouraging results.

Evaluation and statistical analysis followed. The findings were discussed and recommendations offered for further study.



## CHAPTER I

### THE PROBLEM AND DEFINITIONS OF TERMS USED

The traditional method of teaching elementary students has gradually been giving way to the individualization of instruction. Even the latter concept has undergone changes and innovations in the past few years. Most educators would agree that the ideal instruction has always been a one to one relationship between the student and the teacher. The idea that every learner should spend the same number of minutes in a mathematics class every day or that he should study the same textbooks is beginning to be abandoned. However, many educators continue to instruct using the latter method because of uncertainty or lack of class time.

From the beginning of formalized schooling, educators have sought ways of developing each individual to his fullest potential. Study after study have shown advantages and disadvantages in both the traditional method of teaching arithmetic and the individualized approach to arithmetic.

#### I. THE PROBLEM

Since the traditional and individualized methods of instruction appear to have different levels of effectiveness, it was the purpose of

this study to compare the two methods to determine which would enable the low, average, and high ability fifth and sixth grade students in a multi-age grouped school to become more proficient in arithmetic at the end of an eight month period.

### Importance of the Study

This writer has used the individualized approach to arithmetic for the past four years. The students appeared to be enthusiastic and relaxed during class time. It has also been felt that the students have gained a better understanding of the concepts and processes involved as well as gaining self-confidence and patience in learning. According to achievement test scores, the students have made satisfactory progress in the understanding of the fifth and sixth grade arithmetic subject matter.

However, there has been no valid evidence that this method was superior to other instructional methods. For this reason, the two methods were compared, simultaneously, and tested to check their levels of effectiveness.

### Implications of the Study

The implications of this study are extremely important. It is of utmost importance that educational research find new and more effective ways of instructing students so that they can reach their fullest potential. Arithmetic is an area which will be constantly used throughout adult life,

and a broad educational background is needed.

## II. DEFINITIONS OF TERMS USED

### Traditional Method

An instructional plan that is organized to meet the needs of the entire class as a whole is a traditional arithmetic program. In this study, the traditional approach took place within a fifth and sixth grade curriculum. Few materials were used above or below the intended grade levels. The students involved worked on arithmetic forty-five minutes a day, five days a week, for eight months. They used the same textbooks and worked on identical assignments which were corrected and discussed as a class.

### Individualized Method

An instructional plan that is organized to meet the needs of each individual student is an individualized arithmetic program. In this study, the individualized approach took place within a fifth and sixth grade curriculum. Many materials above and below the intended grade levels were used. The students involved worked on arithmetic forty-five minutes a day, five days a week, for eight months. Assignments were geared to each individual's level and were corrected by the students themselves and discussed with the teacher on a one to one basis.

### Heterogeneous Group

A group of students who are placed together on a random basis without regard for the differences which make them unique is defined as a heterogeneous group. For this study, the two groups consisted of students who were at the fifth and sixth grade levels as determined by the school district. Both heterogeneous groups contained an equal ratio of fifth and sixth grade students.

### Low Ability Students

Those students who scored on the first, second, or third stanine level in arithmetic on the Stanford Achievement Test, in the spring of 1971, are low ability students.

### Average Ability Students

Those students who scored on the fourth, fifth, or sixth stanine level in arithmetic on the Stanford Achievement Test, in the spring of 1971, are average ability students.

### High Ability Students

Those students who scored on the seventh, eighth, or ninth stanine level in arithmetic on the Stanford Achievement Test, in the spring of 1971, are high ability students.

## CHAPTER II

### REVIEW OF RELATED LITERATURE AND RESEARCH

The purpose of this chapter is to briefly review the present and past philosophies of the American school system. Within the context of this chapter, a resume of the attitudes and beliefs concerning the graded school as well as a resume of the claims made for individualizing instruction will be discussed. The last portion of the chapter will deal more specifically with individualization of instruction in arithmetic and what research has to say about it.

#### I. HISTORY OF THE AMERICAN SCHOOL SYSTEM

The traditional public school in the United States is the graded school. At the time of its design it conformed to the then prevalent conceptions of child development and education as a schooling process. Though the citizenry of the new nation believed education essential to the preservation and extension of a democratic form of government, resistance to tax support for schools was strong, educational theory and practice were based on philosophical foundations, educational research was unknown and competent teachers were difficult to obtain. (13:179)

From 1800 until 1850, there was a rapid expansion in the demands for elementary education. Facing the need for creating an effective school system to deal with the increasing number of students to be taught and the lack of teachers available, the tutorial system was replaced by the graded school. (13:179)

"By 1870 nearly all the elementary schools had been graded and the lock-step system of educating the masses was initiated." (13:183) It followed naturally that a policy of acceleration or retention would be used to ensure that a student at a particular grade level would be ready for the specified material which was to be presented. "Many students failed to meet the strict subjective standards for promotion and the 'laggards' in our schools became an educational problem." (13:183)

The advance of the American public school in the twentieth century does not present a picture comparable to that of the more or less progressive school.

Democratic living, with its stress on individual development, cooperative planning and working, and real functional activities, though on the increase, is still rare. The concept of education in most of the 'contemporary' American public schools is to a large extent 'schooling' in the traditional sense. (18:100)

Most public schools are subject to much more pressure than are the progressive schools. The conservative nature and political complexion of public schools, operated under local initiative and control, usually preclude the sweeping innovations possible in the

independent experimental school. Most reforms in the public school have been slow and piecemeal. (18:100)

The old, traditional school tended to put stress on knowledge. From the beginning of any formalized schooling, schools have emphasized the acquisition of facts. Schoolmasters, assuming that education is knowledge, concluded that the more you know the better educated you are. Thus, their main task was to present to the learner an array of facts and to make sure that they were remembered. Drill, review, and frequent tests were inevitably necessary. In the end, "subject matter assumed the unimaginative guise of a well-built outline, a skeleton of labeled and classified parts." (18:102)

Fact accumulation, however, was not the only blemish of the traditional school. There were, indeed, many other faults:

1. Since instruction put a premium on knowledge, inadequate consideration was given to other phases of personality.
2. The fact that the normal child is an active rather than an intellectual animal, found little application in practice.
3. Instruction was built mainly around the senses of sight and hearing, and gave little consideration to the educational value of self-activity.
4. The teacher organized and presented his subject. He questioned and expected answers. He drilled, tested, and gave marks. Under this regime, discussions, socialized recitations and projects could not flourish.
5. Questions, suggestions, or criticisms emanating from the learners were not welcome.

6. The usual relationship between teacher and pupil was that of ruler and subject.

7. Children were expected to accept authority. Individual thought was not fostered.

8. The schools were not sufficiently socialized. Talking, unhampered locomotion, and mutual help on the part of pupils were forbidden.

9. Inadequate attention was given to individual ability.

10. Education was looked upon mainly as preparation for adult life. (18:102-103)

Despite its numerous faults, the old-time school was not quite so bad as some of its modern adversaries would have us believe:

1. It stressed development of a moral personality in its pupils.

2. Instruction in the traditional school on the whole was thorough, though often tyrannical. Those obtaining diplomas were usually proficient.

3. The old school sought to develop some valuable attitudes, habits, and ideals such as: effort, industry, tidiness, and punctuality. (18:103)

## II. CHARACTERISTICS OF THE MODERN SCHOOL

The twentieth century school began primarily as a protest against the old school. As such, many of its principles have been shaped by educational reformers rather than by the rank and file of practical schoolmasters. Certain general characteristics still show themselves in virtually all the schools influenced by the movement.



1. The new schools favored freedom. Behind this emphasis on pupil freedom lies the theory that liberty generates self-discipline and stimulates a sense of responsibility.
2. Activity was accepted. What was important was the use and application of facts by active participation or doing.
3. The schools' fundamental curriculum was based on experiences which are typical of the community's living; meeting the daily needs of the children.
4. The new school was looked upon as a living society, wherein typical life situations are reproduced.
5. Creative activities were stressed to help make education as rich and rounded as possible.
6. Each child is regarded as a unique person requiring special individual consideration. Courses and methods are elastic.
7. Education in the new school is "child centered."
8. All-around growth of the child is stressed.
9. Children are allowed to progress as rapidly or as slowly as needed.
10. The child's progress is judged by the comparison of his own work and achievements.
11. Teachers participate outside of the classroom. They are expected to take part in social, economic, and political movements.
12. Teachers seek active interest and cooperation of parents in the education of their children. (18:104-107)

Present day education involves continued research and innovations.

Individualization of instruction is a major issue confronting educators today and much has been written on the subject.

### III. INDIVIDUALIZATION OF INSTRUCTION

'We hold these truths to be self-evident': that children differ; that they differ markedly in many ways and as a result of many causes; that no uniform instructional program, the same for all children, can provide learning experiences which are equally beneficial for each child; and that effective provision for individual differences is dependent in large measure upon appropriate differentiated instruction. (23:300)

A crucial concept which separates individual from group instruction is the rejection of the idea that all learners must move through a predetermined, sequence curriculum. Essentially, individualization of instruction requires the teacher to encourage individual interests, allow for individual styles, and respond to individual needs. (25:31-40)

Two basic facts support the need to individualize instruction. First, students vary tremendously in size, shape, energy level, rate of development, temperament, motivation, previous experience and style of learning. Secondly, a human being is an active seeking organism that does more than merely react to his environment; he also explores and changes it. (25:32)

The individualization of learning is perhaps the most difficult, single problem of instruction facing the teacher today. Because so many variables are involved, no single formula or plan has evolved that can offer an acceptable solution.

### IV. INDIVIDUALIZING ARITHMETIC

Before considering the various means and methods that may be used to adapt instruction in arithmetic to individual differences, it is

important to list some of the functions of arithmetic instruction.

The major purpose of arithmetic in the elementary school is to assist boys and girls in developing power to deal with mathematical ideas. The teacher helps learners develop several dimensions of thought: comprehension, recall, production and evaluation. (14:1)

Another goal is:

. . . to teach the nature and use of the number system in the affairs of life and to help the learner to utilize quantitative procedures effectively in the achievement of his purposes and those of the social order of which he is apart. (3:1)

There are various methods of instruction that strive to fulfill the above goals. It is this writer's contention that we cannot provide fully for individual differences in arithmetic in any one way by any one method or technique. Many are necessary and must be integrated.

For most arithmetic topics, through differentiated instruction we can provide variations in the depth of understanding emphasized, in the complexity of skills to be mastered, and in the type of social application stressed.

The slow learner will have experiences which lead to a less penetrating understanding of a topic to the mastery of the simpler skills, and to an awareness of the more immediate social applications. (8:124)

He will rely more heavily on the use of concrete materials and will have need for larger amounts of practice. He "will profit from shorter units of work and from more specific assignments."(8:124)

The superior child on the other hand will be challenged by experiences which "develop a greater depth of understanding, a mastery of more complex skills, and an awareness of a wider variety of social applications." (8:124) He will rely less heavily on the use of concrete materials, and will need smaller amounts of practice. He "will profit from larger units of work and from broader assignments." (8:124)

A completely individualized program of instruction was initiated by Frederic L. Burke and its use in public schools was begun in Winnetka, Illinois, in 1919. Under the Winnetka plan stress is placed on the pupils' readiness for the phase of work to be undertaken. "It is maintained that if arithmetic is to be learned effectively the pupil must sense its social significance and have some appreciation of its meaning." (3:21) This end was achieved by providing numerous experiences in which the student comes in direct contact with number, or particular phases of number, in social setting. (3:21)

Burke's ideas were carried further by Carleton W. Washburne, who had once been on the staff of Burke's school. Concurrently with Washburne, Helen Parkhurst developed the Dalton Laboratory Plan. Other plans following the same general direction also emerged. The best known of these was the Morrison Plan designed for use in the secondary schools. These plans are usually classified under the heading "Laboratory methods." (12:854). Usual features of this approach are:

A. The student is freed from recitation and other class routines of the ordinary type.

B. The classroom becomes a laboratory for work.

C. The curriculum is divided into minimum essentials and social activities.

D. The minimum essentials are then sub-divided into their component parts for instruction.

E. Elaborate materials are used, including diagnostic tests, achievement tests, study guides, etc.

F. Each child is allowed to proceed through the work as rapidly or as slowly as his abilities enable him to.

G. The role of the teacher is that of giving help and guidance to the students in their study. (12:854)

One of the most interesting studies dealing with individualizing instruction was done by Daisy Jones. She sought to find out whether children would make greater progress in learning the common elementary school skills when they were taught at their own level of achievement rather than when they were taught under usual mass-education procedures.

On the average, the experimental group showed development 2.5 months ahead of the control group. Individualization appeared to be more beneficial to those students who were slow or who were just average in ability than to the superior students. Since the subjects were numerous, and the study carefully conducted, the evidence can weigh heavily in favor of the growth of individualizing instruction in the classroom. (12:854)

Regardless of the interest in adopting and promoting of instruction to individual needs, a relatively small number of valid researches dealing with the techniques and effects of such instruction have been reported

to date. Fred Weaver, in 1954, used a successful method for individualizing instruction. As each new concept was presented, the students were encouraged to experiment with and follow their own methods of attack. Then the teacher observed the levels of response and followed through with the necessary instruction to ensure each student's understanding of the subject matter. (23:304)

Frank Spanga, in 1960, used a refresher course in arithmetic as the basis for an individualized instructional program. Since the course covered a wide range of concepts at varying levels of difficulty, it was possible to alter assignments to the needs of individual students. (22:52)

Maria Morrison made an attempt to determine whether multiplication was more effectively taught by the mass method of instruction or by the individual method. Test results indicated that the permanent gain of the individual group was higher than the class group. (19:345-346)

A kindergarten through grade six program, in 1967, was set up in arithmetic to allow each child to progress at his own rate and reach objectives by means of tasks assigned on the basis of his unique abilities. Several implications were observed. First, the greater the variability of student achievement in the classroom or school, the greater the potential of an individualized system. Secondly, a system of continuous revision of curricular materials, based on student performance, is a highly desirable way to arrive at effective working materials. In

addition, several motivational factors were observed. First, behavior problem students in a regular classroom often are not as disruptive in an individualized setting where each works on his own assignment.

Secondly, slowly progressing students who performed well in the traditional classroom seemed to be missing something in a program in which they spend much of their time working alone. (17:78-79)

Two additional researchers have concluded that for the talented student, there will be greater opportunities for enrichment, for independent study, and for advanced placement when involved in an individualized program. They also conclude that slower students tend to be further behind in a traditional classroom than in an individualized program. (15:379-380)

Frances Flournoy and Fred Weaver, who have done pilot studies on individualized arithmetic, consider the following essential:

- A. Variation in instructional time.
- B. Variation in the kind and level of mathematical content.
- C. Variation in the methods and materials of instruction. (24:75)

Banks D. Wilburn cites studies of cases carried out through self-instruction in an arithmetic program of grades one, two, and three.

A. There is much evidence to indicate that pupils in each grade in the elementary school can teach themselves a particular selection of content of arithmetic largely by their own efforts.

B. It seems evident that, beginning in grade one and moving progressively forward through grades two and three, pupils can learn

by methods of self-instruction the arithmetic appropriate for the year.

C. The outcomes of the experiments possibly offer teachers reasonable justification for having pupils begin in the first of the year and attempt to teach themselves the arithmetic of the elementary school. (10:58)

The preceding report clearly indicates a need for continued research in the area of learning. Today's problem of meeting individual needs and providing for individual differences in our mass education system is extremely important and difficult to resolve. Although educators may agree on the need to effect changes in this direction, we badly need to work out some philosophically consistent practices which will develop and support individuality.

## V. SUMMARY

This chapter briefly summarized the growth of the American school as to its present and past philosophies. Basic beliefs and assumptions were discussed and researcher's findings reported. Individualized instruction as opposed to mass education were discussed and compared. Finally, research in the area of individualizing arithmetic instruction was shared. It is the belief of this writer that much more needs to be done in the area of individualizing arithmetic instruction. We still must strive to allow each student to reach his fullest potential in the easiest and most rewarding manner. Inconclusive research indicates that many avenues of exploration remain open.



## CHAPTER III

### STRUCTURE AND PROCEDURES OF THE STUDY

The writer's purpose in this study was to evaluate the effectiveness of the individualized arithmetic program as opposed to the traditional arithmetic program. For several years the Bellevue school district, in which the writer is a teacher, has sought to strengthen the basic skills of elementary students. Many personnel believe that this can best be accomplished in a completely individualized arithmetic program while others believe it is physically impossible, creates more work for the teacher than he can possibly handle, and is completely unjustified. There are those educators in Bellevue that believe academic freedom cannot be handled by the students and that the only feasible way to teach arithmetic is in large or small group situations.

Hence, this writer set up a plan by which he would use both methods for the 1971-1972 school year.

#### I. STRUCTURE

It was decided to use two separate classrooms in the experiment. Both contained thirty fifth and sixth grade students assigned to the respective classes at random. The study was conducted in one elementary school under the direction and teaching of the writer. Each group used the Addison, Wesley math series as the basic text.

During the month of September, 1971, the writer looked over all the pupils test scores which were derived from a Stanford Achievement test given the preceding spring. In addition, the writer sought written information regarding previous teacher's appraisal of the students arithmetic ability.

Based on this information, each class was divided into low, average, and high ability students. This was done only to enable the writer to compare the low, average, and high ability students in one class with the low, average, and high ability students in the other class. Comparison was based on test scores derived from the Stanford Achievement test given in May of 1972.

Low ability students were those who scored on the first, second, or third stanine level in arithmetic on the Stanford Achievement test. Average ability students were those who scored on the fourth, fifth, or sixth stanine level in arithmetic on the Stanford Achievement test. High ability students were those who scored on the seventh, eighth, or ninth stanine level on the Stanford Achievement test. All groupings were derived from the test given in the Spring of 1971. Table II, Appendix A, shows the scores of that test.

## II. STRUCTURE OF GROUPS

The traditional class, hereafter referred to as the control group, worked on arithmetic forty-five minutes a day, five days a week from

September, 1971, through May, 1972. Each class member used the Addison, Wesley arithmetic series for fifth and sixth grade. All students worked in the text designed for their grade level. Assignments were given to the class as a whole as were explanations and directions. Daily work was corrected verbally and common errors discussed with the entire class. Students were not allowed to move ahead of the class or remain behind them. All class members progressed together. Few materials were used above or below the intended grade level.

The individualized class, hereafter referred to as the experimental group, worked on arithmetic for forty-five minutes a day, five days a week from September, 1971, through May, 1972. Each class member received the Addison, Wesley arithmetic series for fifth and sixth grade. In addition, job cards, worksheets, workbooks, and any other supplemental materials that could be found were used. Each student was given individual assignments based on his own ability and understanding in arithmetic. Directions were given in written form to individual class members. Each student corrected his own paper, presented it to the teacher, discussed any errors, and was given the next appropriate assignment for him. Short conference periods were scheduled for those students having additional difficulty. At the end of each week, a test was given to each student to evaluate his computational accuracy and understanding of the weeks' work.

### Control of Variables

The study was scheduled in such a way as to ensure that each group worked on arithmetic the same number of total hours and at the same time of day. For example, the control group worked on arithmetic from 10:00 a. m. until 10:45 a. m. one week while the experimental group worked on arithmetic from 11:00 a. m. until 11:45 a. m. On alternate weeks, the hours of study for each class were reversed.

The control group was not this writers own class, but arrangements were made with another teacher. He agreed never to discuss or teach arithmetic to his class. All questions and concerns of his students were directed to this writer.

Cooperation of the students was achieved in not discussing anything about arithmetic with the group of which they were not a member. Parents were notified prior to the study and complete cooperation was received in regard to not helping their children with arithmetic assignments that may have been taken home. It is to be noted here that no homework was given. All work was done under the supervision of this writer.

Every possible precaution was taken to keep all personal bias out of the teaching situation. Preplanned lessons helped accomplish that task.

## Hypotheses

A. The high ability students in an individualized arithmetic program will gain significantly greater proficiency than those in a traditional arithmetic program.

B. The average ability students in an individualized arithmetic program will gain significantly greater proficiency than those in a traditional arithmetic program.

C. The low ability students in an individualized arithmetic program will gain significantly greater proficiency than those in a traditional program.

This study began in September of 1971. It was concluded in May of 1972. Chapter IV will present the findings of the May test and this study. The hypotheses will be rejected or retained on the basis of the statistical evidence.

## CHAPTER IV

### RESULTS OF THE STUDY

#### Statistical Analysis of Achievement

The achievement test battery that was administered at the conclusion of the treatment condition provided the evidence necessary for evaluation. Table I gives a summary of achievement score means for both the experimental (individualized) class and subgroups and the control (traditional) class and subgroups.

For the entire classes there was a significant difference in means which yielded an obtained "t" of 2.595 which was above the required "t" of 2.000. On the basis of this evidence, a significant difference between the two classes after the treatment condition did exist.

In looking at the ability groups, those who were designated as high ability students showed only a small difference in their mean scores. The obtained "t" of 1.540 was below the required "t" of 2.365. Hence, it was concluded that there was no significant difference between the groups. Based on the statistical evidence, hypothesis A was rejected.

TABLE I

MEAN DIFFERENCES OF INDIVIDUALIZED ARITHMETIC  
ACHIEVEMENT SCORES AND TRADITIONAL  
ARITHMETIC ACHIEVEMENT SCORES  
FOR ENTIRE CLASSES AND SUBGROUPS  
(BASED ON STANINES)

Group	Number of cases	Obtained means	Obtained "t"	Required "t"
Individualized class	30	4.68	2.595*	.05 > 2.000
Traditional class	30	3.57		
Individualized high ability students	5	6.60	1.540	.05 > 2.365
Traditional high ability students	4	5.25		
Individualized average ability students	17	4.76	1.843	.05 > 2.042
Traditional average ability students	17	3.94		

TABLE I (Cont.)

Group	Number of cases	Obtained means	Obtained "t"	Required "t"
Individualized low ability students	8	3.25	2.582*	.05 > 2.131
Traditional low ability students	9	2.11		

\*Significant at .05 level

The average ability students showed some difference in their mean scores, but the obtained "t" of 1.843 was less than the required "t" of 2.042. Therefore, it was concluded that there was no significant difference between the groups. Based on the statistical evidence, hypothesis B was rejected.

The low ability students showed a substantial difference in their mean scores. The obtained "t" of 2.582 was more than the required "t" of 2.131. Therefore, it was concluded that a significant difference between the groups did exist. Based on the statistical evidence, hypothesis C was retained.



## CHAPTER V

### SUMMARY, CONCLUSIONS, DISCUSSION, RECOMMENDATIONS

#### I. SUMMARY

The purpose of this study was to determine whether fifth and sixth grade students in an individualized arithmetic program would gain greater proficiency than those fifth and sixth grade students in a traditional arithmetic program. An experimental class of thirty students used the individualized approach and their progress was compared with the control class of thirty students who used the traditional approach. Criteria used for evaluation were measurements of achievement test results. The classes were divided into three subgroups of comparable size, based on a standardized test which was administered prior to the study. The subgroups were designated high ability students, average ability students, and low ability students.

#### II. CONCLUSIONS

Based on the statistical evidence, the following conclusions can be made:

1. Achievement of the individualized class was significantly greater than that of the traditional class.

2. Achievement of the individualized low ability students was significantly greater than that of the traditional class.

3. There was no significant differences between the individualized and traditional average ability students and high ability students.

### III. DISCUSSION

This study suggested that the individualized arithmetic program was of value to the pupils who used it. The success of the low ability students could be accounted for in the removal of some of the barriers to learning. These students received more individual guidance, were taken out of a competitive situation, and were allowed to progress at their own rate. Furthermore, these students did not need to face assignment deadlines. Not only did they receive help and guidance from the teacher, but they also received assistance from other students.

The failure of the average and high ability students to do better could possibly be due to lack of self-motivation. Perhaps some students were already working to their fullest potential. It must also be considered that some highly intelligent students perform on a lower level if not challenged and pushed.

### IV. RECOMMENDATIONS

If the writer were to engage in identical research again, he

would conduct the study over a two year period. This would allow the students more time to be involved with the particular method. It would also permit more powerful generalizations as to the effectiveness of an individualized arithmetic program. The writer also recommends a larger sampling distribution as well as identical number of subjects in the subgroups. Furthermore, it would be advantageous to conduct a survey of the students' attitudes.

The effects of the individualized arithmetic program need further study. Although more educators are seeing its value, it continues to seek a greater place as an instructional technique.

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## APPENDIX

APPENDIX A

TABLE II

SUMMARY OF STANINE SCORES ON STANFORD  
ACHIEVEMENT TESTS ADMINISTERED TO  
BOTH CLASSES PRIOR TO THE STUDY

<u>Ability group classification</u>	<u>Individualized class</u>		<u>Traditional class</u>	
	<u>student</u>	<u>score</u>	<u>student</u>	<u>score</u>
High	1	7	1	8
High	2	7	2	7
High	3	7	3	7
High	4	7	4	7
High	5	7	-	-
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Average	1	6	1	6
Average	2	6	2	6
Average	3	6	3	6
Average	4	6	4	5
Average	5	6	5	5
Average	6	5	6	5
Average	7	5	7	5
Average	8	5	8	5
Average	9	5	9	5
Average	10	4	10	5
Average	11	4	11	5
Average	12	4	12	5
Average	13	4	13	5
Average	14	4	14	4
Average	15	4	15	4
Average	16	4	16	4
Average	17	4	17	4



TABLE II (Cont.)

<u>Ability group Classification</u>	<u>Individualized class</u>		<u>Traditional class</u>	
	<u>student</u>	<u>score</u>	<u>student</u>	<u>score</u>
Low	1	3	1	3
Low	2	3	2	3
Low	3	3	3	3
Low	4	3	4	3
Low	5	2	5	2
Low	6	2	6	2
Low	7	2	7	2
Low	8	1	8	1
Low	-	-	9	1

TABLE III

SUMMARY OF STANINE SCORES ON STANFORD  
ACHIEVEMENT TESTS ADMINISTERED TO  
BOTH CLASSES AT THE CONCLUSION OF THE STUDY

<u>Ability group classification</u>	<u>Individualized class</u>		<u>Traditional class</u>	
	<u>student</u>	<u>score</u>	<u>student</u>	<u>score</u>
High	1	6	1	7
High	2	7	2	5
High	3	6	3	6
High	4	8	4	3
High	5	6	-	-
<hr/>				
Average	1	3	1	4
Average	2	5	2	7
Average	3	6	3	4
Average	4	6	4	3
Average	5	6	5	6
Average	6	6	6	4
Average	7	6	7	4
Average	8	5	8	4
Average	9	4	9	4
Average	10	7	10	4
Average	11	4	11	4
Average	12	3	12	5
Average	13	4	13	3
Average	14	6	14	2
Average	15	4	15	3
Average	16	3	16	2
Average	17	3	17	4

TABLE III (Cont.)

<u>Ability group classification</u>	<u>Individualized class</u>		<u>Traditional class</u>	
	<u>student</u>	<u>score</u>	<u>student</u>	<u>score</u>
Low	1	4	1	2
Low	2	4	2	1
Low	3	3	3	3
Low	4	4	4	2
Low	5	3	5	4
Low	6	2	6	2
Low	7	2	7	2
Low	8	4	8	2
Low	-	-	9	1