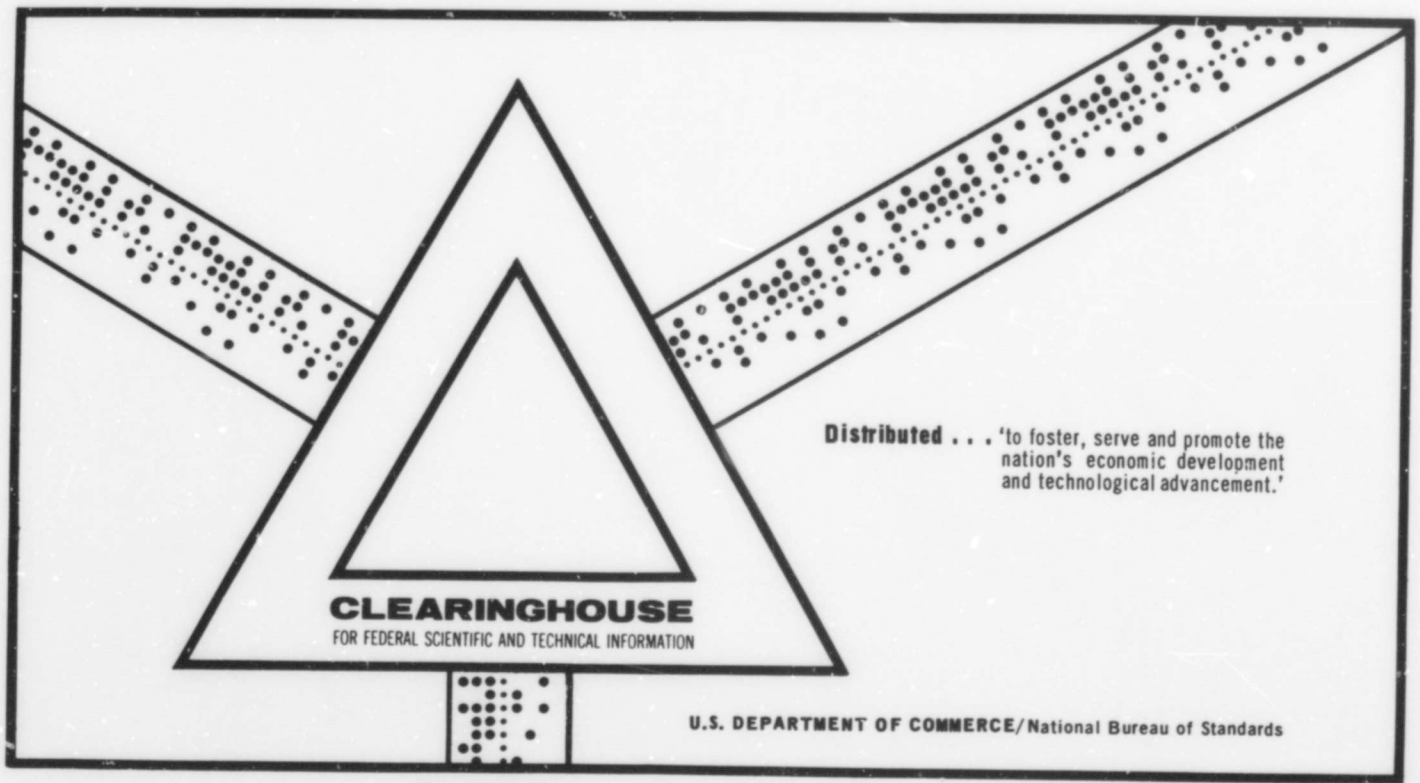
DEVELOPMENT AND EVALUATION OF AN EXPERIMENTAL COURSE IN APPLIED MATHEMATICS FOR GROUP IV PERSONNEL

Ray E. Main

Naval Personnel and Training Research Laboratory
San Diego, California

September 1969



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NAVAL PERSONNEL AND TRAINING RESEARCH LABORATORY

SAN DIEGO, CALIFORNIA 92152

RESEARCH REPORT SRR 70-8

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DEVELOPMENT AND EVALUATION OF AN EXPERIMENTAL COURSE IN APPLIED MATHEMATICS FOR GROUP IV PERSONNEL

by

Ray E. Main

September 1969

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Research Report SRR 70-8

Submitted by

A. V. Anderson, Director, Training Methods Research Department

Approved by

E. I. Jones, Ph.D., Director, Navy Training Research Laboratory
E. E. Dudek, Ph.D., Technical Director
Karl E. Kuehner, Commander, USN
Commanding Officer

U. S. Navy Training Research Laboratory
U. S. Naval Personnel and Training Research Laboratory
San Diego, California 92152

SUMMARY AND CONCLUSIONS

Problem

A need has been recognized to establish effective methods for training Navy marginal personnel designated as Group IV. In order to accomplish method evaluations, experimental programs are required which will allow training methods to be compared under controlled conditions.

Background and Requirements

The Navy has initiated a policy of admitting certain marginal personnel who, because of low scores on military selection tests, would have previously been rejected. The subsequent influx of Mental Group IV recruits has caused greater attention to be focused on training requirements. Experimentation is being carried out to evaluate the effectiveness of different methods of instruction for appropriate subject matters.

Approach

An experimental course covering basic arithmetic operations was developed to provide a standard set of training conditions which could be systematically modified. The course was designed for critical evaluation of training methods by means of performance comparisons under standard and modified conditions.

Findings and Conclusions

Results indicated that, in general, Group IV personnel can benefit from instruction in all types of basic arithmetic operations. Whereas one might expect a group of trainees with similarly low achievement scores to display similar learning behaviors, sizable differences were found to exist among Group IV students in their ability to acquire computational skills. Attempts to train all students with the same materials and at the same rates were ineffective, suggesting the need for course work which would allow individuals to proceed at their own rate and level. A self-study mathematics course was subsequently developed and administered to three classes. Two classes used the materials effectively and made large and significant gains on posttests. The third class, however, did not produce consistently significant gains. It was felt that failure to improve indicated, in this case, a lack of motivation rather than of ability.

An initial study was carried out in order to utilize the course in an experimental evalution of training methods. The basic course was presented both with and without supplementary

flash card materials. Although instruction with flash cards did not produce significantly greater gains than instruction without flash cards, the effectiveness of flash cards was not clearly negated.

On the basis of the above findings, the following conclusions were drawn:

1. Group IV personnel are not a homogeneous group with identical training needs in mathematics.

2. Group IV students have the potential to use mathematics self-study materials effectively if class motivation is maintained at a high level.

3. The use of flash card instruction as a self-study method for training Group IV students in practical arithmetic operations should be evaluated further.

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DEVELOPMENT AND EVALUATION OF AN EXPERIMENTAL COURSE IN APPLIED MATHEMATICS FOR GROUP IV PERSONNEL

A. Introduction

1. Background

All individuals being considered for military service are required to take the Armed Forces Qualification Test (AFQT). Those whose percentile scores fall between 10 and 30 are classified as being in Mental Group IV. In the past, the Navy has been highly selective in its acceptance of Mental Group IV personnel. More recently, however, requirements have been made less stringent and personnel are being admitted who would have been rejected by previous standards.

The Navy has been concerned with a number of questions pertaining to the training of Mental Group IV servicemen. In what types of skills can they be trained effectively? Will special training procedures be necessary? What methods will optimize the efficiency of instruction? In order to investigate these and related questions, the Naval Personnel and Training Research Laboratory has initiated a program of research involving school training in a wide variety of subject matters (1). A description of the development of an experimental course in practical mathematics is contained in the present report.

2. Goals

An experimental school was initiated in order to provide a controlled learning situation where training content and training methods could be evaluated. There are a number of different approaches one could take in accomplishing evaluative comparisons of training methods. The decision was made to carry out experimentation under conditions approximating typical classroom training. It was planned that a standard set of training conditions would be established in order to provide a basis against which the effectiveness of modified presentations could be compared.

Mathematics was felt to be an appropriate area for study since the development of new training approaches for mathematical instruction could have widespread application. Arithmetic skills are required by a number of Navy ratings, both during training and on the job.

What was required, then, was a course covering basic arithmetic operations which could be used to provide base line data and which might be readily modified in order to allow experimental comparison of different conditions of presentation. The present report deals with the development of such an experimental course including: the selection of content, the development and evaluation of course materials, and the preliminary implementation of the course in an experimental evaluation of training methods.

B. Establishment of Training Needs

1. Background Data

The data in Table 1 provide background information on five classes of Group IV students who attended school in 1968. These data were obtained from trainees' service records. Included are test scores from the Armed Forces Qualification Test (AFQT) and from two Navy Basic Test Battery measures, the General Classification Test (GCT) and the Arithmetic Test (ARI).

In age and years of schooling completed, classes were closely matched. For Classes 4 and 5 it was requested that all personnel assigned for training have ARI scores no higher than 45.[1] The purpose of this limitation was to eliminate trainees whose level of skill acquisition was inappropriate for the level of training being considered. Although average performance on the GCT and ARI varied somewhat from class to class, the establishment of maximum cut-off scores did not result in uniformly lower class means.

2. Diagnostic Testing

A diagnostic mathematics test, the Basic Mathematical Skills Test (BMST), was constructed and administered to Classes 1 and 2. The BMST consisted of 28 computational problems of varying type and difficulty. Table 2 displays the percentage of problems missed for each of the types of arithmetic operations presented. From an analysis of these data it was concluded that a comprehensive training program covering all areas of basic arithmetic skills would be required.

It was anticipated that Group IV personnel would be deficient in verbal skills and would, therefore, experience particular difficulty with mathematical operations set in the form of word problems. In order to provide relevant data, two revisions of the Navy ARI were constructed. Both revisions matched the content of the ARI with regard to the nature of the problems and the choice of answers. Actual values were, of course, changed. A Verbal Revision (VR) contained word problems similar to those of the ARI but with simplified wording. A Non-verbal Revision (NR) consisted of computational problems formed by translating the ARI problems into pure symbolic notation.

The NR and the VR were administered to Class 1 and, later, to Class 4. Class 1 took both tests without receiving training and Class 4 took the tests following training. In order to compensate for sequence effects, testing was ordered as

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[1] A maximum cut-off score of 50 was established for GCT scores for purposes of other courses.

TABLE 1

Background Data on Five Classes of Mental Group IV Trainees*

Class Number	N	Age	Years of Schooling	Aptitude Test Scores**		
				GCT	ARI	AFQT
1	12	19.0	11.9	41.7	43.0	21.0
2	12	19.0	11.3	36.6	40.3	19.7
3	16	19.4	11.4	38.1	42.5	19.2
4	16	19.1	11.6	36.6	41.0	19.5
5	16	18.9	11.6	36.9	38.0	19.4

Notes.--

*Values represent arithmetic means.

**The GCT and ARI are standard scores; the AFQT is a percentile score.

TABLE 2

Percentages of Items Missed for Each Problem Type
on the Basic Mathematical Skills Test

Type of Problem	Mean Percentage Missed	Range	Number of Items
Addition, Subtraction, Multiplication and Division with:			
Whole Numbers	13%	50%-0%	8
Fractions	48%	100%-0%	2
Decimals	29%	50%-0%	4
Multiplication of Fractions by Decimals	67%	100%-0%	2
Linear Equations (One unknown)	44%	100%-0%	6
Computation of Areas and volumes	80%	100%-0%	4
Averages (Arithmetic Means)	48%	100%-0%	2

follows: half of the students in each class received the VR first followed by the NR while the other students received the NR first.

A difference score was found for each trainee by subtracting his score on the VR from his score on the NR and mean difference scores were computed for each class. An analysis of the data revealed that scores on the NR and VR were not significantly different for either class.[2] Computational problems and word problems were apparently equally difficult for students to solve.

[2]For Class 1 the mean difference score was -0.58, SD = 4.19, $p > .05$. For Class 4 the mean difference score was -0.06, SD = 3.86, $p > .05$.

For Class 1, performance levels on the VR and the ARI were also compared. ARI scores (obtained from students' service records) were subtracted from scores achieved on the VR. A mean difference score was computed and found significant (mean = 4.54, SD = 4.42, $p < .01$). The fact that Group IV students performed better on the VR than the ARI may indicate that the ARI's level of verbal expression is confounding the test's usefulness as an index of mathematical ability for personnel with limited verbal skills.

C. Development of an Experimental Course

1. Preliminary Instruction

Having established that Group IV students experience some degree of difficulty with all types of basic arithmetic operations, the next step was to prepare a course of instruction with a suitably comprehensive content.

Before any attempt was made to select a training approach, some effort was directed toward discovering how Group IV students function under different instructional procedures. Accordingly, Class 2 received approximately three weeks of training in a variety of arithmetic skills. Training was accomplished with a combination of techniques including lectures and self-study instruction. The latter consisted of both conventional programmed texts and specially developed self-study materials. The course work was developed specifically for the purpose of training Group IV students.

a. Lectures. Under classroom training, Group IV students were found to differ greatly in their individual training needs and learning rates. Typical lecture methods were not productive since the more able students became restless listening to material they already understood while their classmates were unable to follow the explanations. Under these conditions students did not maintain attention and disruptive behavious were frequent.

b. Programmed course work. The use of programmed self-study materials promoted a more satisfactory training environment than did lectures.[3] The students, as they worked with the programmed texts, appeared to be involved with what they were doing. The instructor was available to offer assistance and was frequently called upon by students for this purpose. Although programmed training alleviated those difficulties associated with lectures, other problems were encountered. Some portions of the course

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[3]The programmed texts utilized were developed for the Navy by Naval Air Technical Training Command and combined linear and branching techniques.

provided answers on the margin of each page. It was possible for students to copy answers directly without working the problems and, unfortunately, several students did this.

c. A different type of self-study course. A third method of instruction was developed specifically for the purpose of training Group IV personnel. A sample of this instructional material appears in the Appendix. Representing an alternative approach to conventional programmed instruction, this self-study course work makes greater use of explanations and demonstrations of mathematical processes. As with conventional programmed materials, the course requires frequent written responses from the student in order to maintain his attention and assure his comprehension. In contrast to conventional programmed materials, responses are not required for each frame or item of information presented.

Answer keys are provided so students can refer to them while working the course and can check the accuracy of their responses upon completion of a course section. However, students are not allowed to maintain constant possession of the keys and simply transfer answers into their workbooks. The terminology of the course is kept as simple as possible. Mathematical jargon is avoided wherever more common words can convey the same information.

Students' reactions to this course work were relatively positive. Materials were used efficiently, attention was maintained and disruptive behaviors were infrequent. Instructor-student interactions occurred even more frequently than with the conventionally programmed course and the instructor's time was fully utilized.

2. Selection of a Training Approach

Since lectures were found to be an unsatisfactory method of instruction and since Group IV trainees appeared to be capable of working with self-study materials, it was decided that a self-study course would be selected as a training medium. Linear programmed course work had not been found satisfactory and no branching programmed texts were found which covered an acceptable range of mathematical operations. Since the self-study materials, developed specifically for use with Group IV trainees, had been used successfully, the decision was made to utilize this form of instruction. Accordingly, a comprehensive mathematics course, titled Self-study Course in Practical Mathematics, was constructed. This course was designed to cover a variety of basic mathematical operations: carrying out multiplication and division with whole numbers; working fraction and decimal problems; computing squares and square roots, averages, percentages and measurement problems (finding perimeters, areas, and volumes and making unit conversions); and solving linear equations (with one unknown), formulas and ratio problems.

D. Evaluation of the Course

Having established the need for individual instruction of Mental Group IV students and their ability to work with self-study materials, the next step was to determine how effectively a complete course could be utilized to improve students' mathematical skills. Accordingly, three classe of Group IV students were administered the Self-study Course in Practical Mathematics and tested to determine performance gains.

1. Method

a. Subjects. The Mental Group IV trainees from Classes 3, 4, and 5 received training with the materials. Each class consisted of 16 students. An examination of service record data reveals that mean values for age, schooling, and aptitude test performance were quite similar for the three classes (see Table 1).

b. Materials. The Self-study Course in Practical Mathematics formed the basic curriculum.[4] Course materials included a workbook of instruction and sets of quiz sheets. For Classes 4 and 5, basic materials were supplemented with decks of flashcards. Although each class was given the same basic course, materials were revised and improved between classes.

Two tests were utilized for performance evaluation, the USAFI III Arithmetic Computation Test and the Arithmetic Operations Quiz (AOQ). The USAFI test was selected for the following reasons:

(1) It covers a wide range of mathematical skills.

(2) Scores can be readily converted into school grade levels.

(3) The test has been used extensively by the Navy to determine grade level achievement of Navy personnel.

The AOQ was constructed to supplement the USAFI. This 60-item test covers the same general types of problems as the USAFI but provides examples of operations which were included in the Self-study Course in Practical Mathematics but not specifically tested by the USAFI. Since the AOQ was developed following Class 3, it was administered only to Classes 4 and 5.

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[4]For Class 3 McGraw-Hill programmed texts on multiplication and division supplemented the Self-study Course in Practical Mathematics. For Classes 4 and 5, the self-study course was expanded to replace this programmed course work.

c. Procedure. Classes 3, 4, and 5 each received about 14 hours of training, 1 hour per day. Class 3 was taught as one unit. In order to provide more individual attention, Classes 4 and 5, were each divided into two groups and each group was taught separately.

Prior to training, each student was administered the USAFI III Arithmetic Computation Test and the AOQ in order to discover what types of problems gave him difficulty. Following testing, the student worked independently with materials covering those types of problems on which he made errors. The instructor circulated among the students clarifying procedures, checking answers and offering assistance as needed.

The study procedure recommended to students was as follows: (1) Work through a section answering all questions, (2) check answers against answer sheets, and (3) take a short quiz to demonstrate mastery of the operations. Although students were encouraged to follow this recommended procedure, conformity was not insisted upon. For example, if a student felt he understood a given section of instruction, he might challenge the quiz before completing the appropriate course work.

Testing was carried out in the following manner. Classes 3, 4, and 5 were administered the USAFI III Arithmetic Computation Test and the AOQ both before and after training. Two forms of the USAFI were presented. It was intended that Class 3 be pretested on Form A and retested on Form B. Due to a shortage of materials, however, two students were both tested and retested on Form A. For Classes 4 and 5, half of the students were pretested on Form A and half on Form B. They then received the opposite form on the posttest.

2. Results

Improvement scores were computed for each trainee by subtracting the number of problems he answered correctly on the pretest from the number right on the posttest. Table 3 presents mean improvement scores for the three classes which used the Self-study Course in Practical Mathematics and also includes Class 2's data for comparison.

The large significant gains made by Classes 3 and 4 on both the USAFI and AOQ tests prove Group IV personnel capable of using self-study methods effectively. Results were not, however, unequivocal since Class 5 did not improve significantly on the USAFI.

Having concluded that Group IV personnel can improve their mathematical skills through the utilization of a brief self-study course, one might then ask, "What effect has this training had on grade level achievement?" Since USAFI III test scores can

TABLE 3

Mean Improvement Scores from the USAFI III Arithmetic Computation Test and the AOQ

Test	Classes	N	Mean Improvement	Range of Improvement	SD	Significance Level	Total Hours of Instruction
USAFI	Mixed Methods of Instruction						
	Class 2	12	2.58	-3 to 7	2.66	<.01	12
	Self-study Instruction						
	Class 3	16	4.94	-5 to 13	4.51	<.001	14
	Class 4	16	6.00	1 to 14	3.72	<.001	14
	Class 5	16	2.38	-8 to 12	6.10	>.05	14
AOQ	Class 4	16	5.19	-7 to 18	6.5	<.01	14
	Class 5	16	3.06	-8 to 11	5.5	<.05	14

be translated into school grade levels, such information is readily obtainable. Distributions of mathematical grade level achievement for Classes 2 through 5 are recorded in Table 4.

TABLE 4

Distributions of School Grade Level Achievement
Before and After Training *

School** Grade Level	Mixed Instruction Class 2 (N=12) Pre	Post	Self-study Instruction Class 3 (N=16) Pre	Post	Class 4 (N=16) Pre	Post	Class 5 (N=16) Pre	Post
< 6th	3	1	4	3	6	1	5	6
6th	1	4	5	2	2	3	2	2
7th	5	2	2	1	3	4	4	0
8th	1	3	2	3	2	0	2	2
9th	2	2	3	7	3	8	3	6

Notes.--

*Grade levels were computed from performance scores on the USAFI III Arithmetic Computation Test.

**The 9th grade level was the highest obtainable.

It is apparent that even before training is given, students display a wide range of ability. Although students made gains in all classes there was no class in which all students manifested higher performance levels following training. Ceiling performance on the USAFI is set at the ninth grade and slightly less than half of the Group IV population in our sample achieved this level of performance. If the ninth grade level is a reasonable criterion, then most Group IV personnel will require a more extensive training program unless training effectiveness can be improved.

3. Discussion

It appears that Group IV personnel are capable of using self-study materials effectively. However, not all classes did. It is not at all clear why Class 5 did not accomplish test gains on the USAFI similar to Classes 3 and 4. There is some evidence to indicate Class 5's level of motivation was not as high as other classes. Written responses to questionnaires showed Class 5 to be less enthusiastic about the self-study methods employed for the mathematics course than had other classes and less satisfied with their situation in general. Unfortunately, the reason for their dissatisfaction is no more apparent than is the reason for their low scores.

Class 5's relatively poor achievement was not peculiar to the mathematics course; performance for other courses in which they participated was also low. Unexpected changes in performance levels are somewhat disquieting. A high degree of control over the trainees' environment may be necessary if such variations are to be avoided.

E. Utilization of the Course in an Investigation of Flash Card Instruction

Flash cards are commonly used as arithmetic training aids. Among their advantages are immediacy of feedback and simplicity of usage, characteristics which might make them effective training aids for Group IV students. In order to provide relevant data, a set of flash cards was designed to supplement the Self-study Course in Practical Mathematics. Standard course materials were administered both with and without this additional flash card instruction and subsequent changes in test performance were compared.

1. Method

a. Subjects. The two sections of trainees from Class 5 served as subjects for the experiment. There were eight students in each section. The two sections were closely matched on their Basic Test Battery ARI and GCT scores.

b. Materials. Flash cards were prepared to supplement certain portions of the Self-study Course in Practical Mathematics. The cards were divided into two sets. Set 1 included problems in multiplication, decimals, and measurement (making unit conversions and finding perimeters, areas and volumes). Set 2 included problems in division, fractions and percentages. Those items on the AOQ and USAFI III which corresponded to the six types of problems covered by flash cards were used as a performance measure.

c. Procedure. For ten days, starting with the second week of training, subjects worked with flash cards for the last 10 to 15 minutes of the class hour. Both sections were exposed to

all six parts of the course but only to one of the two sets of flash cards. One section worked only with set 1, the other section worked with set 2.

Instructions advised students to go through the cards quickly but carefully, checking the correctness of their answers. Then, at the end of the allotted time, they were instructed to count the number of cards they had answered correctly. Subjects were encouraged to record their own progress from day to day and see how much they could improve.

2. Results

Two improvement scores were computed for each subject. One score represented performance on flash-card-supplemented portions of the course, the other score represented performance on the portions presented to the subject without cards. Each improvement score was formed by subtracting the number of items correctly answered on the pretest from the number of items correctly answered on the posttest.

Average improvement scores were not significantly higher when course work was supplemented with flash card instruction. Mean improvement for flash-card-supplemented instruction was 3.1 problems (SD = 4.9). Mean improvement for work done without flash cards was 0.4 problems (SD = 3.7). The difference between these two mean improvement scores is not statistically significant at the .05 level using a two-tailed t-test.

3. Discussion

While Group IV students appear quite capable of working with flash card instruction, the present results do not allow one to state conclusively whether or not such instruction has a beneficial effect on performance. Before levels of improvement can be meaningfully compared, it is mandatory that a significant degree of improvement occur. Class 5 did not, in fact, improve significantly on the USAFI test. Further experimentation is needed to determine the usefulness of flash cards.

F. Summary Discussion

Present findings indicate that Group IV personnel can make effective use of self-study materials. It was also found, however, that such materials did not assure high performance levels. One class did not produce significant gains. The class which did not improve significantly also displayed considerably less enthusiasm during training than had other classes. Maintenance of high class motivation may be a prerequisite to any meaningful comparison of

training methods. (It is interesting to note, however, that the performance of individual students was not observed to be closely related to their expressed attitudes.)

An investigation into the effectiveness of flash card instruction found that performance gains on selected arithmetic operations did not increase significantly when standard course work was supplemented by flash card materials. Further investigation into the advisability of using flash cards and similar self-study materials for training Group IV personnel is planned.

The Self-study Course in Practical Mathematics provided a training situation which was found quite suitable for carrying out experimental evaluations. Since each student worked independently, treatments could be easily varied within a given class. The importance of this feature was highlighted by the fact that classes did not produce uniformly significant performance gains. Unless treatments are compared within a class, effects may be hopelessly obscured by such uncontrolled variations.

It is felt that the Self-study Course in Practical Mathematics has been developed to the point where it can serve adequately for experimental purposes. Future efforts will, therefore, concentrate on the experimental evaluation of potential training methods. The need for further experimentation with flash card instruction has already been discussed (see page 12). As a result of training experiences encountered with Group IV personnel, a number of other methods for optimizing training effectiveness have come under consideration. These include:

1. Presenting auditory instruction either in conjunction with or in place of written instruction.

2. Providing information to students with regard to:

   a. What operations they will be expected to perform upon completion of training.

   b. The correctness of training responses through the use of self-scoring punch card devices.

3. Presenting course content in the form of:

   a. Practical operations, such as taking measurements with rulers.

   b. Mathematical games.

4. Determining optimal sequences and amounts of:

   a. Theoretical instruction (dealing with why one performs an operation in a given manner) and operational instruction (dealing with how one performs a given operation).

   b. Instruction and practice.

5. Grouping of trainees with similar ARI scores on the Navy Basic Test Battery in order to increase class homogeneity.

Investigations of the effectiveness of these approaches are planned.

APPENDIX

A SAMPLE PORTION FROM THE SELF-STUDY COURSE IN PRACTICAL MATHEMATICS

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PERCENTAGE

What do you save with a 25% discount?

How much is 5% of 86?

What is the cost of a 10% tax if your taxable income is $5,000?

Above are several examples of percentage problems. You will run into percentage problems when you:

1. Do your income tax.
2. Find out how much interest you get on your savings.
3. Discover how much time payments cost you.
4. Want to know how much you can save on a sale.
5. Try to read charts and graphs.

But What Are Percents?

Percents are very much like fractions and decimals. They are used to describe things that have been separated into parts.

A percent is like a fraction. It tells us how many parts of something we have.

50% of $5 = $2.50

1/2 of $5 = $2.50

These two statements mean the same thing.

A percent is also like a decimal

50% of $20 = $10

.50 X $20 = $10

These two statements mean the same thing.

How do you change a percentage into a fraction?

20% means 20/100

5% means 5/100

71% means 71/100

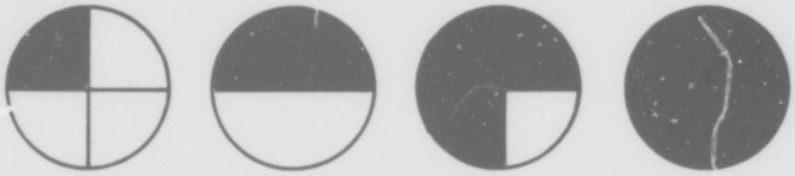
You can always change a percentage into a fraction by dividing the value by _____.

Can you change these percentages into fractions?

2% = _____ 25% = _____ 80% = _____ 100% = _____

Some fractions are quite commonly given as percentages. These you should memorize.

What part is black?



Fraction	1/4	1/2	3/4	1
Percent	25%	50%	75%	100%

When you feel you have these down pat, try to do the exercises on the next page.

After each of the following equations write whether it is true or false. (We are considering the black part of the circle.)

25% =  _____

 = 50% _____

3/4 = 75% _____

25% = 1/4 _____

100% = 1 _____

75% =  _____

If you are not sure, check back on the preceding page.

How do you change a percentage into a decimal?

You have already learned how to change a percentage to a fraction. You do it by dividing the value by _____.

20% = 20/100

You can change a percentage into a decimal by first changing it into a fraction.

For example: 15% = 15/100 = .15

(If you don't remember how to convert a fraction into a decimal just divide the top of the fraction by the bottom)

$$15/100 = 100/\overline{15}$$

$$\begin{array}{r} .15 \\ 100/\overline{15.00} \\ \underline{100} \\ 500 \\ \underline{500} \end{array}$$

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ABSTRACT

The Naval Personnel and Training Research Laboratory is conducting research aimed at developing optimal methods for training marginal personnel (Group IV) in the skills they will need in the Navy. Preliminary investigation of training in mathematics showed that Group IV men need to improve most basic arithmetic skills but that they vary widely in their ability to acquire such skills. To be effective for these personnel, course content and methods must be adaptable to individual needs. Group IV students were found capable of working effectively with an experimental self-study course. The course was judged to be suitable for experimental training methods evaluation. Plans for further research were outlined. (U)

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14 KEY WORDS	LINK A		LINK B		LINK C	
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FLASH CARDS						
MARGINAL PERSONNEL						
MATHEMATICS						
MENTAL GROUP IV						
NAVY TRAINING						
PROGRAMMED INSTRUCTION						
PROJECT 100,000						
SELF-STUDY						
TRAINING METHODOLOGY						