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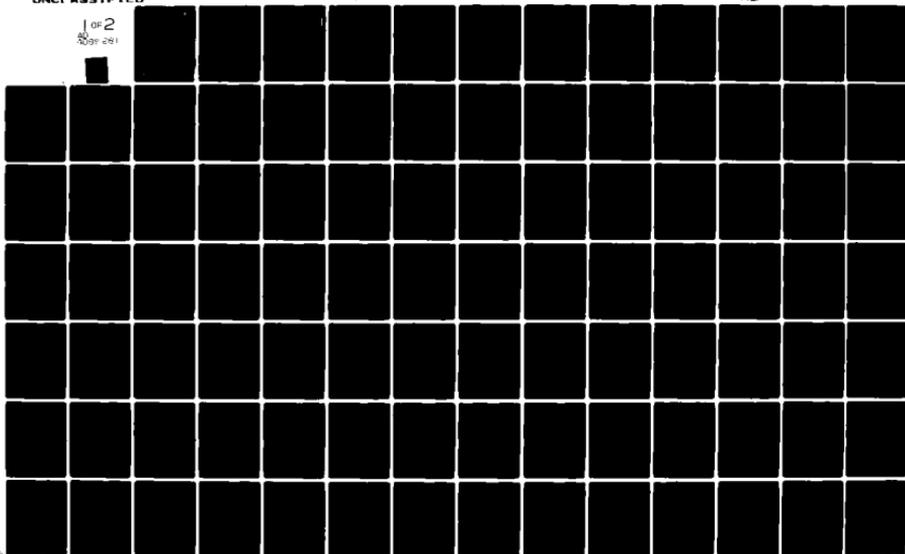
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REQUIREMENTS AND RECOMMENDATIONS FOR LEARNING STRATEGIES IN THE--ETC(U)
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REQUIREMENTS AND RECOMMENDATIONS
FOR LEARNING STRATEGIES IN THE U. S. ARMY
BASIC SKILLS EDUCATION PROGRAM

AD A095281

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The views, opinions, and findings contained in this report are those of the authors and should not be construed as an official Department of the Army position, policy, or decision, unless so designated by other documentation.

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This report was prepared under the Scientific Services Program - short term Analysis Services between the Department of the Army and Battelle Columbus Laboratories. TRADOC is seeking to provide soldiers with learning strategy skills, in addition to other Basic Skills Education approaches, to help them become more efficient and independent learners. The growing rate of academic attrition is taken as evidence of the need for such skills. This report out- lines three learning strategy models, along with curriculum revision effort, as holding promise for improving soldier's learning capacity: embedded learning -		

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FOREWARD

This report has been prepared under the Scientific Services Program - Short Term Analysis Services between the Department of the Army and Battelle Columbus Laboratories. The authors acted as independent subcontractors during the investigation described in this report.

Various sections of this report were written by individual authors, as is perhaps evident from the distinctive writing styles, but all the authors are in general agreement with the findings and recommendations contained herein. The report is presented under two covers for ease of handling. The primary document describes the investigation, findings, and recommendations. The secondary document contains appendices of supplemental information.

EXECUTIVE SUMMARY

TRADOC is seeking the means to provide soldiers with learning strategy skills as one of the four approaches to the Basic Skills Education Program. These skills will help them become more efficient and independent learners. The growing rate of academic attrition is taken as evidence of the need for such skills.

The investigators analyzed the learning situation, user populations, and research on learning strategies. The goal was to provide guidance for acquiring learning strategy material for Army use. Key findings include:

1. The learning situation in Army schools limits the acquisition of necessary skills and abilities: the social environment does not support marginal performers, instruction ignores student needs, and the values and attitudes of students, instructors and commanders may restrict training effectiveness.
2. BSEP efforts to date have had little impact because of internal problems: tests, standards, materials, and instructors are inadequate for providing an MOS integrated program. Also, impact measures are unreliable.
3. Research indicates that three learning strategy models, along with a curriculum revision effort, hold promise for improving soldiers' learning capacity. However, the data are not sufficient to recommend a specific strategy or particular materials.

It is recommended that TRADOC build on this investigation by conducting a series of closely monitored pilot studies. Embedded learning strategies, adjunct courses, strategy/text alignment training for teachers, and curriculum overhaul each deserve to be put to an empirical test.

The studies will provide a final determination of cost-effective learning strategy interventions in the Army. A single optimum approach may become apparent, but it may well be that improving the design and delivery of current training materials will meet BSEP objectives and preclude a separate learning strategy program.

I. INTRODUCTION

The Problem

The increasing technological demands of maintaining an effective national defense in the coming decade places an enormous burden on the Army's training capacity. New soldiers must be provided with more knowledge, skills and abilities without a significant increase in training resources.

The training task is made even more difficult by the "trainability" of recent recruits. At a time when recruits must know more to be proficient in their MOS, their basic learning ability is lessening. Soldiers in the All Volunteer Force come to the service less prepared to learn than their predecessors.

Since it is unlikely that the Army will be able to induct persons with significantly higher learning abilities, it must seek the means to fully develop the potential of its current recruits. As the Basic Skills Education Program Curriculum Project recognizes, a multi-faceted approach is called for. The program will assist soldiers with educational deficiencies by 1) providing missing MOS baseline skills, 2) English language skills for non-native speakers, 3) coping skills in non-academic areas, and 4) learning strategy skills to help the recruit become an efficient and independent learner.

It should be noted that a soldier may appear to be educationally deficient in only one of the four areas. Such a perspective would be an oversimplification. A more accurate view would recognize the interdependency of all areas -- acquiring MOS baseline skills requires learning strategies, coping effectively with barracks life facilitates classroom performance, etc. Thus, the focus of this report on learning strategies should be seen against the backdrop of the entire program. It is only one of the necessary elements and will be severely limited if not used in tandem with the others or is not adapted to work within the systemic constraints of Army schools.

The Investigators

The six investigators who authored this report came to the project with a familiarity with the Army environment and the state-of-the-art of learning strategies. The following profiles reflect their experience and expertise.

Dr. C. Edward Cavert is the Director of Course Development at the Extended Learning Institute of Northern Virginia Community College. He has over 20 years of experience in course design and media production from an education base of radio/television and Educational Administration. Previously he has participated in studies for TRADOC in staffing and resource management for self-paced courses. He currently serves as a member of the Editorial Advisory Committee on Adult Basic Education of the U. S. Department of Education. He has published widely in Instructional Systems Design Process and in print and non-print course material.

Dr. Beau Fly Jones is affiliated with the Department of Curriculum of the Chicago Public Schools. She has done experimental and applied research on learning strategies training effects with 2 and 4-year college students, high school students, and junior high students. Currently, she coordinates the development of the Chicago Mastery Learning Reading program with Learning Strategies. Recently she presented a paper, Embedding Learning Strategies and Structural Information in Instructional Texts: Two Models of Development, for an invitational conference on Learning and Thinking Skills, sponsored by the National Institute for Education and the Learning Research and Development Center of the University of Pittsburgh.

Dr. John A. Shtogren is President, Higher Education Leadership and Management Society, a research and development corporation. He has served as an educational consultant to TRADOC and the Command of Naval Education and Training and presented seminars in instructional design at the Army's Command and General Staff College. His clients are from business and industry, government, and education. Among his major publications is Quest: Academic Skills Program.

Dr. Walter Wager is an Associate Professor of educational research and development at Florida State University and teaches courses in the design of instruction and applications of educational technology. He is the co-author of "Handbook of Procedures for the Design of Instruction." Previously he has served as a consultant under contract to the Army in the areas of school staffing, training site analysis, curriculum analysis, materials design, and media selection models.

Dr. Claire E. Weinstein serves in the Department of Educational Psychology, University of Texas at Austin and is the Director of the Cognitive Learning Strategies Project. She has conducted learning strategies research and developed applied learning strategies training programs for junior-high school and college students and Army trainees for the Defense Advanced Research Projects Agency and the Army Research Institute. Dr. Weinstein has published a number of book chapters, monographs, and journal articles describing her research and development activities.

Dr. Paul G. Whitmore is affiliated with Mager Associates as a certified course manager in the Criterion Referenced Instruction and Instructional Module Development Workshops; with Applied Science Associates as a Principal Scientist; and also does private consulting with business and industry. He was previously affiliated with the Human Resources Research Organization for twenty-one years. He has been engaged in research and development in assessing electronic maintenance field proficiency; studies of troubleshooting, programmed instruction, front-end analyses of automotive vehicle maintenance, "soft skills" (leadership, management, decision making), and weapon engagement tasks; and development and evaluation of training management processes.

Objectives and Activities

The aim of this investigation was to determine and recommend training materials requirements in learning strategies for the first level of the Basic Skills Education Program. (All comments herein relate to level one, initial entry training BSEP only.) To do so required analyses of learning situations, user populations, and research on learning strategies. A specific outcome of these analyses was to provide guidance for determining if learning strategies training materials should be 1) purchased commercially as-is, 2) purchased commercially and modified, or 3) developed as totally new packages.

To analyze learning situations and user populations the authors visited service schools responsible for a variety of MOS's. Locations included: Aberdeen Proving Ground, Ft. Bliss, Ft. Jackson, Ft. Lee, Lowry Air Force Base, Ft. Rucker, Ft. Sill, and White Sands Missile Range. (See Appendix A for the specific information sought at each location.)

To analyze research on learning strategies, as well as current programs, the authors began with library research using Psychological Abstracts and ERIC. This was extended by contacting the special interest group on military education of the American Educational Research Association and that of the American Psychological Association on military psychology. In addition, research data was sought from other leaders in the field, at national conferences and in-service programs, and on-site visitations. In particular the learning strategies programs in the Chicago Public Schools and Youngstown Public Schools were observed for possible Army use.

The authors met three times to share the findings of their analyses and discuss implications for implementing learning strategies in Army schools.

The next three major sections of this report discuss the learning situation and user population in Army schools and the state-of-the art of learning strategies research and application in other organizations. The final section presents guidelines for continued investigations which will result in the optimal learning strategies approach within the Army training environment.

II. CHARACTERISTICS OF TRAINEES, INSTRUCTION, AND THE TRAINING CONTEXT

The successful intervention of learning strategies in Army Schools will depend upon the characteristics of trainees, instruction and the total training context. No matter the conceptual attractiveness or even the success a particular approach may have enjoyed in other settings, the idiosyncracies of Army training must be taken into account. The information contained in this section is all pertinent to the application of learning strategies, but some factors have more obvious implications than others.

1. Not only are individual trainee learning abilities decreasing, the overall social environment is less conducive to learning.
2. The current design and delivery of instruction may ignore the learner to such a degree that teaching soldiers how to learn with have little impact on classroom or job performance.
3. Instructor, command, and student values and attitudes may be the least tangible factors in the training context but will be the ultimate determinant of success.

Characteristics of the Army's Changing Trainee Population

Traditionally the Army has been a source of opportunity for disadvantaged young men. However, in only the last two decades has the Army sought out the disadvantaged as a major source of its manpower. In 1964, the Army began Project 100,000 to admit 100,000 men from the lower mental categories. An extensive literacy program was undertaken to help these men adapt to Army careers. Later, in the mid-1970s, the Army sought to meet its manpower requirements without a peacetime draft. This led to the All Volunteer Force -- a program to attract individuals into the Army in both the upper and lower mental categories.

Low mental category personnel can and do succeed in the Army. As a result of a study on the effects of aptitude, job experience, and literacy on job performance in the Army, Vineberg, et al. (1971) concluded:

1. "...while in general AFQT is related to job performance, considerable overlap exists between" low scoring (CAT IV, 10th to 30th percentile) and higher scoring (CAT III, II, and I,

31st to 99th percentile) men. "Also, with time, an increasing proportion of men at all levels of AFQT appear in the upper ranges of the performance distribution. The data suggest the potential loss of a sizable number of good performers if entry requirements were modified to exclude from service those men with AFQT scores below 20."

2. "...research showed no evidence of a relationship between AFQT and the grade reached in the Army."

In recent years, all three military services have inadvertently admitted many more individuals from the next to the lowest mental category than was expected. The Army recently determined that 46 percent of its recruits fell in Category IV rather than the 9 percent it had expected. This unexpected influx of lower mental category personnel has changed the composition of the population in the lower enlisted grades.

As a basis of comparison, it has been reported that 21 percent of those who served in World War II were equivalent to Category IV and 9 percent were equivalent to Category V (below the 10th percentile), for a total of 30 percent in the two lowest mental categories. Thus the figure of 46% represents half again as many individuals in the lower mental categories on a proportionate basis as were in the Army during a period of full wartime mobilization.

The current population of recruits contains individuals from virtually all elements of American society, but does not represent the proportions in the general population. About half of them are high school graduates. Less than five percent are grade school dropouts and less than five percent are college graduates. The proportion of females in the student population at different posts ranges from less than 5 percent to 24 percent, depending upon whether or not the corresponding branch of service is combat arms. English is the dominant language of more than 95% of the recruits.

The Social Environment

Prior to 1966, the Army dealt with its personnel from the lower mental categories by integrating them into its normal training and work activities. This integration has generally provided an effective social environment for helping lower aptitude personnel to develop job skills and coping skills. However, the increasing proportion of personnel in the lower mental categories and consequently decreasing proportion of personnel in the higher mental categories may reduce the effectiveness of this social environment.

Coleman, et al. (1966) in their study of educational opportunity in the United States observed, "The better the familial and educational backgrounds of the majority of the students, and the higher the level of their aspirations, the higher the achievement of the students, but especially that of minority group students." The familiar and educational backgrounds of the majority of recruits in the Army has probably decreased in recent years. This decrease may reduce or reverse the effectiveness of the Army's social environment for training marginal personnel in job and coping skills in its normal and work activities.

Clearly, the Army needs to take additional steps to insure that low mental category personnel have the opportunity to succeed. The social environment which facilitated learning for these personnel in the past is being eroded as their numbers increase.

Characteristics of Instruction

The following analysis of Army instruction is guided by three assumptions about learner centered training: (1) the aptitudes of a trainee should be matched with the base-line skills required for a job; (2) the methods used in conducting training should then be matched to these base-line skills; (3) it then follows that course material should be matched to the instructional method used in order to be relevant to the attributes and basic skills of the learner.

Site visits were conducted at Army schools to investigate these assumptions in Army-specific training situations. While resident AIT training is, for the most part, successful in teaching most soldiers their basic MOS skills, there are significant barriers to learning for low mental category personnel which demand recognition:

- 1) Training in AIT courses prepares soldiers to function in an entry-level MOS which requires basic literacy skills to varying degrees. It does not appear to be necessary for a soldier to have mastered all basic skills for many entry-level jobs.
- 2) The type of instruction used in AIT training also requires basic literacy skills to varying degrees. Current training models match type of instruction to the task or existing practices more than to the basic skills or aptitudes of the learner.

- 3) Instructional methods generally assume that lock-step training is synonymous with platform lectures and self-paced training is synonymous with media-based instruction. The introduction of learning strategies into this instruction will be more effective if the management dimensions are more clearly defined in operational terms.
- 4) Course materials reflect the nature of the task to be learned more than the attributes and basic skills of the learners. Even within this design dimension, many tasks are inappropriately or incompletely presented in the course materials.

Details regarding these four observations follow. The upshot is that the impact of learning strategies will be limited by these constraints. Furthermore, it may be that correcting these faults of instruction will increase the level of learning so as to preclude the necessity of a formal learning strategies intervention.

Matching Basic Literacy Skills to the Job

Data were sought from the schools to determine how closely the aptitudes of a soldier were matched with the kind of literacy skills required to perform an entry-level job in an MOS. The results of these investigations are reported in two topics: (1) the ways prerequisite skills and knowledge are tested; and (2) the prerequisite competencies required for military jobs.

Learning Strategies in Advanced Individual Training. Learning strategies associated with BSEP are more properly associated with Advanced Individual Training (AIT) and with the AIT portion of One-Site Unit Training (OSUT) than they are with other advanced courses offered at TRADOC schools. The investigation of the characteristics of Army-specific training situations, therefore, was limited to AIT/OSUT.

It should not be inferred from this focus that learning strategies are limited to training for entry-level jobs. Learning strategies can be applied in skills progression courses, NCO up-grade courses, and even in officer training courses if the needs of the soldiers as learners necessitates it.

Testing of Prerequisite Skills and Knowledge. The skills a soldier brings to the AIT training situation are measured in three ways: vocational aptitude, mental readiness, and basic literacy.

Student aptitudes for a job are measured by the Armed Services Vocational Aptitude Battery (ASVAB) tests. This is a DOD-wide test administered at the Armed Forces Entrance Examination Station to determine eligibility for entrance into the Armed Forces. It is made up of twelve sub-tests. Various composite score averages are used by the Army to determine entrance eligibility and qualifications for various training programs. The ASVAB measures arithmetic reasoning; work knowledge; classification attentiveness; attention to detail; math knowledge; general information; and electronic information.

The scores on selected individual parts of the AVSAB are combined by the Army for a composite average score. These composite scores are used as indicators of prerequisite aptitude for training in these areas: (CL) clerical; (ST) technical skills; (SC) scientific; (FA) field artillery; (EL) electronics; (CM) general maintenance; (MM) mechanical maintenance; (CO) combined arms; and (OF) operator-food.

The Armed Forces Qualification Test (AFQT) is administered to every person considered for military service prior to actual induction to determine whether he or she is mentally qualified. This test is used to measure ability to absorb military training. The test items are equally distributed among four content areas: verbal ability; arithmetic reasoning; spatial relationships; and tool functions. Examinees are classified as to mental groups by their percentile score on the AFQT.

The SelectABLE or ABLE 1A is given to each soldier immediately upon arrival at a school for OSUT or AIT training. (This test is described and evaluated detail in the next two sections of this report.) Tests in the ABLE series are given to soldiers to determine their eligibility for placement in the BSEP program.

Beyond initial screening for admission to a course, the ASVAB combined score or the AFQT mental category does not appear to influence the way a course is designed to train a soldier for an MOS.

Prerequisite Competencies Required for Military Jobs. Each Army MOS requires a specific range of prerequisite competencies. These competencies can be classified as (1) communication skills which include verbal communication (listening), written communication (reading), and pictorial communications; (2) computational skills which include arithmetic operations, arithmetic reasoning, measurement, and spatial relationships; and (3) problem-solving skills which include recognition of information sources, critical comprehension, and information processing.

Base-line skills for each MOS should be specified and matched to the aptitudes of the soldier who will be expected to function in that job.

Conclusions about Basic Literacy Skills. In the courses investigated there was no apparent evidence of identifying the prerequisite base-line competencies of the job in front-end analysis. If tests measure student aptitudes and base-line skills, they should also predict success in training. It was reported in some schools that a very low correlation exists between the stated prerequisite composite ASVAB score and success or retention in the initial AIT course. Neither was there a high correlation between AFQT score and success in the AIT course. Therefore improved prerequisite testing procedures should be developed to identify the competencies which learning strategies could be used to acquire.

Nature of Instruction

Data were sought from the schools to determine how closely the methods used in instruction matched the base-line skills or aptitudes of the students.

Instructional Methods. The types of instruction presented in the Army Staffing Guide are not descriptive of the actual type of instruction done in the schools. Based on observations of instruction in AIT courses, the following classification of instructional activities is more descriptive:

Presentation. Instruction consists of telling the students what rules apply, what procedures are to be followed, or what data is pertinent to the task or concept being studied.

Demonstration. Instruction consists of showing by examples or demonstrations how rules are applied, procedures followed, or data used in a task.

Laboratory Exercise/Practical Application. Instruction consists of guided student performance (practice) in which the student uses rules in a given situation, follows procedures for a specific task, or applies data to arrive at a conclusion.

Examinations: Student mastery of a rule, procedure, or concept is tested in three ways: (1) performance examination with verified completion where students perform a task to demonstrate competency and only the completed task is verified correct or accurate by the instructor; (2) per-

formance examination with monitored process where students perform a task and the complete process is monitored by the instructor to verify correctness or accuracy of each individual step in the process; and (3) written examinations where students respond to test items in the standard test formats which are valid indicators of performance competence or knowledge.

Self-Instruction: Instruction consists of an integration of presentation, demonstrations, guided student practice and some type of examination in a single interactive medium used by the student. While this method combines the other types described, it is listed as a basic type because of the unique instructional situations its use triggers.

Within each of these types of instruction, the primary instructional mode may be: (1) labor intensive (lectures, counseling); (2) media intensive (independent study and audio-visual); or (3) equipment intensive (practice or performance). Instructional management can be self-paced or lock-step.

Conclusions about the Nature of Instruction. Current instructional methods observed in Army schools reveal that many other factors influence the selection of instructional methods much more than the base-line skills or aptitudes of students. As a result material is not always communicated in a way most conducive to learning.

It should be possible to plot the dimensions of student skills and instructional methods on a matrix to select the optimum match between them. Once an optimum match is determined, course material designed specifically for an appropriate method of instruction and relevant to student aptitudes can be developed.

Course Material

Members of the study team also reviewed and evaluated actual course material from AIT courses taught at the schools visited. In this review the investigators looked for the match between course material and the student's ability to use and learn from it. (Additional comments on course material are in the fourth section of this report under "Curriculum Overhaul.")

Course Material Design. The basic instructional design principles embodied in TRADOC REG 350-30 (Instructional Systems Development) are followed to varying degrees in course development at schools. Each school, however, appears to have adopted its own unique ISD model. In general, new course material is selected from the base of a front-end analysis. This has resulted in the selection of content, instructional methodology, and testing from the base of the task to be learned with no apparent consideration of who is going to perform that task and what that soldier is capable of responding to in instruction.

It was observed, for example, that many tasks in an MOS that did not require reading in field performance did indeed require a large amount of reading in training. This shows evidence that there is no analysis of the student's aptitudes in the ISD models used.

It was observed that some modification to courses almost always occurs more frequently than the three-year interval required. It frequently occurs at least once a year or even three to four times a year. Thus it can be concluded that any revisions incorporated into course material (such as those to include learning strategies) can be phased in with the current pattern of course revisions.

Course Material. The dominant course material in self-paced, media intensive courses is print. Students in these courses must, therefore, possess more than minimum written communication (reading) skills. The dominant course material in lock-step, labor intensive courses is the platform lecture. Students in these courses must, therefore, possess more than minimum verbal communication (listening) skills.

Direct instructional reading material (workbooks, study guides) are written at the 9th and 10th grade reading level. Technical Manuals and other instructional reference materials are generally at a higher reading level, at times beyond the 12th grade level.

In almost every course observed, there is a single linear track of instruction. No alternative instruction is available for learners who have already mastered the skill being taught nor for those whose basic aptitudes require some other way of receiving instruction.

In media intensive courses, students are often "dumped" into an instructional environment to learn from media devices they have never seen before and whose use is often more intimidating than the task to be learned. In labor intensive courses, the lecturers display a completely different "charisma" than students are accustomed to. In either case, the interaction

between student and course material is more likely than not to be an encounter foreign to the student.

In adopting the ISD model to the unique learning situation of each school, the logical sequencing of material was often sacrificed to gain efficiencies of time and lesson space. For example, students are introduced often to undefined terms and unexplained procedures with entire prerequisite steps of a process or concepts sometimes completely omitted from instruction.

Conclusions about the Course Material. No learning strategies intervention will work with poorly designed material. In fact, better reading comprehension or increased listening skills may be a barrier to learning with material that, when fully understood, leads the learner in a direction other than that intended.

Summary

In summary, the instruction in AIT is a complex, multi-dimensional process. Each dimension itself has individual parts, each of which can cause barriers to learning. The intervention of learning strategies will only work to the extent that the nature of instruction allows it to work, or to the extent this intervention can contribute to overcoming some of the inherent barriers to learning.

Characteristics of the Training Context

During the site visits to Army schools information about the training content was obtained and is reported under three groups of contributing factors: (1) factors related to the instructional staff; (2) factors related to the physical environment for training; and (3) factors related to student attitudes toward training. The following overall factors should be kept in mind when considering learning strategies:

- 1) Instructors in AIT courses rate high in job experience and content area expertise in the skills they are teaching. For the most part, however, they have only minimal training as teachers. Time constraints do not lend themselves to extensive additional training to become better teachers much less to handle the specialized tasks of a basic skills education program.
- 2) In most Army schools, the physical environment for learning, while adequately equipped and staffed, is alien to entry-level students. Students must adjust not only to a new mode of education but to a new pattern of life.

- 3) Student attitudes toward training are a major contributing factor to academic failure and poor learning habits. There are many causal factors for student attitudes, some are within the power of the school to control, others are not.

Details regarding these three observations follow. A parallel caveat to the one stated earlier regarding faults of instruction should be noted: the training context may hamper learning to the extent that learning strategies will have little positive effect. By extension, improvements in the training context could reduce or even remove the need for a learning strategies intervention.

Instructor Factors

During the site visits, data about the staff in actual instructional contact with students were gathered. From a profile drawn from these data, it is possible to estimate the extent of staff support that can be expected for learning strategies interventions. The dimensions of this profile are reported here: (1) instructor characteristics; (2) instructor roles; (3) time in actual instructional contact; and (4) the effect of instructors on learning.

Instructor Characteristics. The following is a composite profile of the typical AIT instructor drawn from data gathered during observations and interviews at the Army schools visited.

The average age of instructors is 27 to 30 years old. Schools use some enlisted women as instructors but the percentage is very low. All instructors have at least a GED high school equivalency. It was mentioned during the visits that those with a lower education level generally make better teachers in a military training environment. The reading level of instructors is not a problem. For those few who have severe reading difficulties, developmental reading training for instructors is usually available.

Most instructors hold the rank of E6 or E7. Their military experience averages 12-14 years. Some soldiers who do exceptionally well as students in an AIT course and who show high potential as instructors can be held over after completion of AIT to serve as instructors, but this happens very rarely. Most instructors average 5-6 years of experience in the MOS they are teaching. However, even though field experience in the job gives subject matter background, it does not provide teaching expertise.

Very few AIT instructors have experience or received training in the

civilian sectors as teachers. A large number of instructors however, have previously been instructors in the military. Instructor training programs are common at most schools, but these programs tend to emphasize training for the specific role of platform lecturer.

Instructor Roles. Most instructors perceive of their role as the presenter of information. This is true not only in labor intensive modes where the platform lecture is dominant, but also in media and equipment intensive roles where mediated material carries the major instructional load.

However, the roles staff actually play in instruction are markedly different from perceived or regulated roles. Under any instructional management scheme, lock-step or self-paced, labor intensive or media intensive, instructors actually perform these roles with students:

Monitor: Instructional contact with students is made by media other than the instructional staff whose role it is to give students ready and convenient access to this instruction.

Facilitator: Instructional contact with the students is made by media other than the instructional staff whose role it is to supplement instruction by answering questions, clarifying problems, or dealing with other communication arising from the instruction in another mode.

Instructor/Presenter: Instructional contact is made with all students at the same time directly by members of the instructional staff, generally in (but not limited to) a traditional classroom setting.

Tutor/Counselor: Instructional contact is made with the individual student or with small groups of students to communicate information requested by the students themselves, not information predetermined by the plan of instruction.

Examiner: Instructional contact is focused on evaluating student performance to determine mastery of the material or task learned.

Recognition that these roles exist and are more descriptive of what does happen in the training situation will allow for more relevant training of instructors and may permit the development of skills to handle new training demands such as those required for the various phases of basic skills education.

Time in Actual Instructional Contact. Staffing in Army schools is based on the guideline of 1250 instructional contact hours each year for each instructor. However, it is very seldom that an instructor spends 1250 hours in actual instructional contact with students unless they "take it out of hide" by working off-duty hours or foregoing annual leave.

Instructor authorizations by the Department of the Army are about 60% to 70% of requirements; actual assignments to schools average about 60% of authorizations; and those instructors present and reporting for duty on any given day average about 60% of those assigned. There is a shortage of classroom instructors according to the instructor/student ratios specified in the Staffing Guide.

Turnover is also a factor in maintaining the continuity of instruction. Soldiers are assigned to the school as an instructor for approximately two years. People assigned do not really become productive as instructors until after 5 - 6 months. When leave and other duty assignments are considered, the school gets less than 15 months of use of an instructor during a 2-year tour.

This lack of continuity of instructional personnel, coupled with heavy drains on professional commitment because of time constraints and other factors, are detrimental to the teaching - learning process.

Effect of Instructors on Learning. It is axiomatic to observe that the attitudes of instructors play a crucial role in learning, academic attrition, and student motivation and morale. It was observed, many times during the site visits, that different instructors using similar instructional methods with identical course material in the same physical setting produced much different results. The only observed variable in these situations was the attitude of the instructor toward the students.

It was also observed, however, that there is no extrinsic reward system for NCOs to become better instructors. Neither are there any consistent standards against which effective training is assessed. Command directives may judge instructor effectiveness on academic attrition at one time; on military discipline at another time; and on job performance at yet another time. As a result, many instructors interviewed were hesitant about using teaching strategies that would produce a better learning environment and increase student motivation or were told specifically by their supervisors not to.

Conclusions about Instructor Factors. In summary it was observed that instructors rate high in job experience and content area expertise in the MOS skills they are teaching. Despite the lack of teacher training or extrinsic rewards, most instructors extend exceptional effort to be competent and effective in their assignment. From all of the factors contributing to this profile it can be concluded that the intervention of any learning strategy instructional staff.

Environmental Factors

The physical setting for instruction and for learning was observed during the site visits to determine how appropriate it is to the student as well as to the task for which training is being conducted.

Classroom Environment. AIT training is conducted in an instructional setting much different from that which students are accustomed to in their civilian academic experience. Students may not be sufficiently conditioned after 6 weeks of Initial Entry Training to accept a regimented environment when 9 to 12 years in civilian schools have conditioned them to more open environments where exchange of ideas, questioning of concepts and experimentation in discovering processes are encouraged.

In addition, self-paced media intensive courses thrust a soldier into learning modes that many have never used before. Independent study in self-paced courses requires a whole new range of prerequisite skills including being selfstarters and able to manage one's time. This kind of preparation is not given to soldiers in self-paced AIT courses, nor are soldiers screened before being placed in a self-paced, media intensive course to see if they can learn in this mode.

There are also many distractors in the military classroom to divert the student's attention from the learning situation. These distractions range from sub-standard working conditions, field locations in all kinds of weather, to a steady flow of observers and visitors interrupting established routines.

Most of the classrooms and training stations are well-equipped. Actual military equipment used in training generally exists in sufficient quantity to handle most student loads in the course and is generally in adequate shape for instruction. Media equipment is generally reliable within reasonable tolerances, and most people can learn how to use this equipment -- some more easily than others.

The problem most generally observed is that most students are not motivated to want to learn in this manner -- generally because of the quality

of the instructional material that is mediated. It is not uncommon to see film, videotape, or slide presentations that exactly duplicate other modes of presentation such as lecture or print that the student has already been exposed to.

Total Environment. Information about the total environment in which the soldier lives and works that affects learning was received from school personnel (only rarely from direct observation) during the site visits.

The absence or presence of pressures on the soldier outside the classroom is directly related to success in AIT courses and student attitudes toward training. Factors in the unit such as early reveille, strenuous physical training before AIT classes begin, harrassment, drill sergeants unsympathetic to emotional readiness for instruction, and collateral duty not related to training were among many factors cited as contributing to barriers to learning.

It is difficult in the military to separate the academic environment from the social and work environment. Yet when this separation is forced, when one is in competition with the other for control of the soldier, the training suffers along with the morale of the soldier.

Conclusions about the Environmental Factors. In most Army schools, the physical environment for learning, while adequately equipped and staffed, is alien to students who as soldiers have only 6 weeks of military experience. Students must adjust not only to a new mode of education but to a new pattern of life. The instructional environment may not be responsive to the student as much as it is responsive to the training mission.

Attitudinal Factors

Attitudes are difficult to measure. In the site visits no attempt was made to assess attitudes directly. Instead, other people's perceptions of student attitudes were solicited.

Student Expectations. One factor contributing to student attitudes is the degree to which a soldier's training matches what he or she expected to be trained for. Often a soldier's perception about a job is not the same as what the job actually is. All too often recruiters promise training for eventual civilian employment in highly technical and specialized fields for which the volunteer is not qualified to enter or complete. Also the rigor of AIT is not made clear.

Command Expectations. Command directives regarding effective instruction frequently change, and the instructor as well as student attitudes are affected. Low attrition is a standard often applied. As a consequence instructors often feel they must compromise their academic integrity and certify even the substandard performers. Consequently, students may expend little effort since course completion is almost assured.

Non-School Factors. Instructors generally feel that 90% of the academic attrition from an AIT course is actually caused by non-academic reasons. Some of the reasons for attrition cited by instructors include: impersonal nature of media intensive courses; immaturity of the soldier; burnout from other non-course related duties in the units; unrequited expectations instilled by recruiters; and general unit harassment in the name of military discipline.

Attitudes of Instructors. One common factor was observed in almost every site visited in this investigation. The instructor who relates to students as people, in a caring humanistic way, will create the most effective and efficient learning. The attitude of the instructor toward the soldier frequently overcomes many of the barriers of poor course material and low student motivation. While there is some "grumbling" about the quality of the new soldier, instructors (with rare exceptions) really want and try to help them learn.

Conclusions about Attitude Factors. Student attitudes were reported to be the factor most contributing to academic failure and poor learning habits. There are many causal factors for student attitudes, some within the power of the school to control, others not. Instructors, properly trained and equipped with the management skills of the competency process will contribute significantly to high productivity in the schools.

Summary

The context in which AIT training is conducted is influenced by factors in the academic environment and by factors in the living environment of the student. Learning strategy skills intervention must be compatible with environmental factors to be successful. Any model tried or adopted to increase a soldier's basic skills through the application of learning strategies must be compatible with this total learning context. If it is not, failure is certain no matter how academically valid the model may be.

III. BASIC SKILLS EDUCATION PROGRAM:

HISTORY, STRUCTURE, POPULATION, REDESIGN, IMPACT AND IMPLICATIONS

An analysis of the origins, current program and impact of BSEP to date can provide guidance for undertaking future attempts to enhance soldiers' learning ability. BSEP has had no demonstrable impact on classroom performance or academic attrition. Several factors are apparent which limit BSEP impact:

1. Tests and standards are inadequate to provide remedial training or meet AIT literacy requirements.
2. Materials are poor in terms of general quality and their relevance to soldiers.
3. Instructors have little knowledge of AIT or serve for a sufficient length of time to gain the necessary insight.

BSEP has been hindered by such factors and they must be corrected or they will be detrimental to any learning strategy intervention.

A Historical Perspective

TRADOC Regulation 621-1, February 1980, has a significant history. It was preceded by a number of other programs aimed at increasing the literacy skills of soldiers, and that history provides a perspective on what BSEP is and what it may become. Although literacy training in the Army dates back to the 40's and 50's, it is probably the more recent programs that have had the most impact on the present BSEP curriculum.

Project 100,000

Clawson (1974) describes the advent of Project 100,000 in 1964. In this project the Department of Defense lowered the mental standards to admit up to 100,000 men that would have previously been excluded from the Army. It was a literacy program established at each of the military institutions where combat training was given. The standard established for effective performance was the fifth grade reading level. Soldiers in the program received instruction in reading, (vocabulary, phonics, structural analysis and comprehensive skills), mathematics and social studies. The tests for these skills were developed by the U.S. Armed Forces Institute.

The soldiers attended classes for 6 hours a day for 3 weeks, at which time they were tested for reading proficiency. If they achieved a 5th grade reading level or better they went on to Basic Training, otherwise they stayed in the program another 3 weeks. At the end of 6 weeks they went to Basic Training regardless of their reading skills.

Some important characteristics of the program were:

- 1) Soldiers coming in knew they were in a special program and that they would be going to school before going to Basic Training.
- 2) The training was done prior to basic training.
- 3) It was not a class-structured program. It was individualized and success oriented. (Clawson, 1974) The materials used included the Soldier's Handbook, and the Performance Oriented Handbook.
- 4) The average student came in reading at a third grade level and 89 percent left reading at a 5th grade level. Approximately 75 percent reached this level after 3 weeks).

Sticht (1975), cites an evaluation study by A. H. Fisher on the effectiveness of this training. "Results showed that...successful (those who reached a fifth grade reading level) and non-successful trainees did not differ on most indicies of military status and performance."

Advanced Individual Training Preparatory Training

In 1968 HumRRO initiated a series of research projects to, "(1) study and develop methodologies for determining functional literacy levels of military jobs within the Army, (2) to determine the functional literacy levels for four major military occupational specialties into which marginally literate men are apt to be assigned, and (3) develop a prototype literacy training program designed to provide a level of functional literacy appropriate to present minimal MOS reading requirements." (Sticht, 1975, p. 18).

Some of the findings of these projects indicated that 1) the goal of producing a 5th grade reading competency fell far short of the reading demands of the jobs, and 2) there is a positive relation between reading ability and job proficiency.

As a result of the above and other findings, HumRRO produced an experimental Army literacy training program oriented around MOS reading requirements. There were many different activities and products from this research, but those most directly concerning this study are associated with a program called the Advanced Individual Training Preparatory Training (AITPT).

In 1974 the Army adopted AITPT with the goal of improving a soldier's performance in AIT. This program was different from Project 100,000 in that;

- 1) It sought to provide reading instruction to the 7th grade level.
- 2) The program was given after Basic Training and allowed for the reading training to be job related with regard to the soldier's future MOS.
- 3) Materials were developed for 6 MOS areas; a) Clerical, b) Communications, c) Combat, d) Medic, cook, and f) mechanic.
- 4) The instruction in each of the MOS areas was designed to teach the soldier to use the military manuals. There were units on; a) The Table of Contents, b) The Index, c) Reading Tables and Graphs, d) Reading the Body of the Manual, e) Following Procedural Directions, and f) Filling-in Forms.

The soldier proceeded to AIT if he reached the 7th grade level after 3 weeks, if not he stayed in the program another 3 weeks. At the end of 6 weeks the soldier went to AIT regardless of his reading proficiency.

HumRRO conducted an evaluation of the AITPT program at Forts Knox, Jackson, Polk, Leonardwood, and Dix. Many different analyses were done, and this data is available in Sticht's (1975) report; Sticht concludes, "the (program) has consistently produced a bit more than 2 years gain in average job reading level and increased by 45 the percentage of students reaching the minimal job requirement of 7th grade level. These findings indicate the portability and robustness of the (program)."

Basic Skills Education Program

The next reference to a program to remediate literacy skills is AR 621-445, August 1979. This regulation provided for a Basic Skills Education Program (BSEP) whose purposes were to: a) develop educational competencies required for a soldier's job performance, b) skill qualifications and, c) career growth. BSEP was to apply to persons in the Regular Army, the National Guard, and the Army Reserve. BSEP was conceived of in three phases. The first phase, BSEP 1, was to be conducted under the auspices of TRADOC during initial entry training, and "provide soldiers with basic literacy instruction in reading and arithmetic through the fifth grade level, as measured by the adult basic learning examination (ABLE). BSEP 1 also provided instruction in English as a Second Language (ESL). Eligibility for BSEP 1 was set by a score of 18 or below on the "SelectABLE," however, a soldier having academic difficulties could be referred to BSEP 1 by a troop commander.

The other two phases of BSEP (2 and 3) were to be a continuing education effort for the permanent party troops on a particular base. BSEP 2 (July 1978) was targeted at bringing competency to the 9th grade level. BSEP 3 was targeted for the development of specific educational skills needed for the advancement beyond grade E5, MOS skill level. Instruction was to be contracted with accredited educational institutions or instruction obtained through nonpersonnel services contracts.

BSEP was different from AITPT in the following ways;

- 1) the materials used are locally determined and not necessarily MOS oriented.
- 2) The skill level for exit was reduced from 7th to 5th grade reading level.
- 3) Commercial standardized tests were used to measure entry and exit levels.
- 4) Curriculum guidelines were established that recommended 4 hours per day of instruction in reading, writing, listening and oral skills in English; 2 hours per day in arithmetic. There are no standard set of materials used by different BSEPs.
- 5) The point at which the BSEP training takes place varies with the type of training site (OSUT, TSUT).

In some cases it occurs before Basic, in some after Basic but before AIT, and in some cases after the soldier has already started in AIT.

These BSEP guidelines were general enough to allow bases that had strong AITPT programs to continue using the MOS-oriented material they had. Other bases adopted different materials. Many purchased commercial materials or acquired them from other learning centers already existing on post. The regulation states that the BSEP instruction should use, as applicable, Soldier's Manuals, Field Manuals, DA Pamphlets, Army Regulations, Instructor Guides, Dictionaries, other learning aids and reading improvement materials. The degree to which military-oriented materials are used in the various programs varies widely.

Current Structure of BSEP

BSEP Objectives. The objectives of BSEP fall into two major categories; a) command objectives, and b) training objectives. The purpose in differentiating these objectives is to get a handle on the effectiveness of the present BSEP program in achieving its goals. The command objectives might be stated as;

- 1) decreasing attrition from the Army
- 2) increasing MOS performance levels

The training objectives might be stated as;

- 1) increase reading proficiency to the 5th grade level as measured by ABLE 2
- 2) increase computation skills to the 5th grade level as measured by ABLE 2

BSEP Target Skills. Within each of the training objectives stated above are a number of "target skills." These skills are defined in only very general terms by AR Reg 621-45. In fact, there are no specific outcome objectives, and the target skills are couched in terms of the 5th grade exit level. These skills can only be listed as reading, writing, listening, oral communication and computation.

The present regulation does provide some breakdown of the reading skills into the subcategories of audio-visual discrimination, phonics, structural

analysis, and word attack skills. The arithmetic area is subdivided into percentages and fundamental operations with whole numbers and fractions.

The materials to be used in teaching these skills are determined by the local Education Center. Some centers use materials left over from AITPT while others have purchased commercial materials or have developed their own materials. In some cases, the choice of materials used is left with the contracted institution. There is no apparent coordination of information about materials or techniques between or among Army bases or other BSEP programs.

An analysis of the materials presently being used in the BSEP showed many weaknesses. These included elementary school level materials being used with adults, a lack of congruence between the topics of the materials and the soldier's future MOS, inconsistent quality of the materials, and improper use of the materials by BSEP teachers. It is apparent that many of the present BSEP teachers know little of the AITPT program.

BSEP Schedule. The schedule for training is dictated by regulation to be 6 hours per day for 3 weeks. At the end of three weeks the soldier is suppose to be tested to see if he or she has reached a 5th grade reading level, in which case they leave BSEP and go to AIT. If the soldier has not reached a 5th grade reading level he or she can stay in the program for an additional 3 weeks. All soldiers go on to AIT after 6 weeks in BSEP regardless of their reading ability.

Many of the BSEP teachers feel that the 6 hour per day schedule is not the best arrangement. One school puts the BSEP teacher into the AIT schools to help the soldier without removing him or her from the AIT environment if possible. Those having the soldier for 6 hours per day report that this is too long a time for these soldiers to work on remedial academic tasks without some other type of activity.

Other factors make it difficult for the soldier to concentrate on learning reading and math skills during their stay with BSEP. Teachers report that the soldiers come into the class tired after getting up at 3 or 4 in the morning for drill and getting to bed after 10 in the evening. The general feeling is that the soldiers would rather not be in the BSEP, and this attitude does not facilitate the teacher's task.

BSEP Staffing. As noted when discussing AR 621-45, instruction is contracted annually either through an accredited institution or nonpersonnel services contract. The lowest cost, qualified bidder becomes the provider of BSEP training. This practice leads to a great deal of instructor turnover and has serious implications for the quality of the BSEP.

It is apparent that there can be no continuity of instruction if the instructors are changing yearly. Research has shown that it takes 2-3 years to successfully implement a program. High instructor turnover would lengthen this time if successful implementation occurred at all.

A change of staff also is wasteful of training materials for the materials adopted by one instructor are likely to be unacceptable to another.

The effect of this could be lessened if a standardized set of materials were developed that were used by all BSEP programs or that were MOS oriented. An example of this type of material is presented in Appendix G (MOS Cook). These materials are being used at Fort Jackson. Although the instructors may change they all use these materials, so the program has some continuity from year to year.

BSEP Support Services. There is evidently a need for a policy toward the use of support services. It was observed that the BSEP teachers had many different roles or at least perceived that they did. This causes problems when one group of BSEP students seems to be getting better treatment than another group from their teacher. The BSEP student is likely to have many problems including a poor self concept. It does not appear that the BSEP teachers are especially trained to attend to the special needs of these students, and may therefore be less successful in teaching them than they could be.

Characteristics of the BSEP Population

BSEP is intended for Army recruits who exhibit reading and arithmetic skills below the 5th grade level. Students are selected on the basis of their performance on one or more of the tests in the Adult Basic Learning Examination (ABLE) series. A score of 18 or less on the first test in the series, SelectABLE, is used as either the sole criterion or as the first of two criteria. On some posts, those students who qualify on the SelectABLE are tested again with either ABLE 1A or ABLE 1B. However, in all cases, SelectABLE is the initial screening instrument.

SelectABLE is a vocabulary and arithmetic test. It does not test reading comprehension. Furthermore, it produces a total score for vocabulary and arithmetic combined rather than separate scores. It is for this reason that some posts use a form of the ABLE 1 as a diagnostic instrument after

students have been identified by the SelectABLE. Most posts report that two to five percent of their students qualify for BSEP training as determined by the SelectABLE test.

Mental Categories

Personnel who qualify for BSEP are not drawn exclusively from the lower mental categories. A recent evaluation of the BSEP program (TRADOC, 1980) reports the following distribution of mental categories among 4,142 BSEP students:

	<u>Percent</u>
CAT I	1.4
CAT II	5.4
CAT III	70.2
CAT IV	23.0

This distribution does not differ markedly from the distribution of mental categories for the general student population at Army posts.

Personnel who qualify for BSEP are also not drawn exclusively from the lowest educational levels. The BSEP evaluation reports the following mental category by education distributions:

	Less than HS dipl.	HS GED	At least HS dipl.	TOTAL
CAT I	0.9	0.0+	0.9	1.4
CAT II	3.2	0.0+	2.1	5.4
CAT III	46.2	1.6	22.4	70.2
CAT IV	<u>11.7</u>	0.3	11.0	<u>23.0</u>
Total	62.1	2.1	35.8	100.0

Notice that 35.8 percent of the students in BSEP have at least a high school diploma. Also notice that almost half (46.2%) of the BSEP population is made up of students in mental Category III with less than a high school diploma. (See Appendix B for additional demographic information.)

Motivation

Some of the commanders and military instructors with whom we talked commented on the poor motivation exhibited by BSEP students. This is a trait often attributed to disadvantaged students and workers. "Poor motivation" can mean different things. For example, "poor motivation" can mean:

1. That the environment does not provide suitable positive incentives for desired performances from members of the target population.
2. That the environment contains many aversive elements that cause members of the target population to attempt to avoid it, both physically and psychologically.
3. That the members of the target population possess strong habits that interfere with learning and work (such as social interaction habits).
4. That the members of the target population lack concepts for understanding learning and work requirements and rewards.
5. That members of the target population are undernourished.

The last meaning is not too likely in the Army context. However, the other four may all be appropriate, singly or in combination. Each can be effectively dealt with in its own way.

BSEP students are typically educationally and socially disadvantaged. They tend to come from inner city ghettos and from isolated rural areas. They exhibit a history of academic failure. Such people tend to have low self confidence and a low sense of control over the environment. These kinds of attitudinal factors can be fully as significant as predictors of poor performance as are their academic skill deficiencies. Coleman, et al. (1966) measured both self-confidence ("How bright do you think you are in comparison with other students in your grade?") and sense of control over the environment ("Good luck is more important than hard work for success.") They conclude:

"Taken alone, these attitudinal variables account for more of the variation in achievement than any other set of variables (all family background variables or all school variables together)."

In a review of the literature on the learning abilities of disadvantaged adults, Sticht (1969) notes:

"There is abundant evidence to conclude that the environments of low SES families tend to restrict language development from early childhood throughout adulthood...In addition...most adult disadvantaged lack positive attitudinal and motivational experiences resulting from prior successes in test-taking situations. Their experiences are typically those of school failure, job failure, or general social failure."

Educationally disadvantaged individuals often score lower on standardized aptitude and achievement tests than warranted by their actual performance abilities. The pool of low scorers on such tests can be viewed as made up of two groups: (1) those who are genuinely characterized by low aptitude and (2) those whose educational achievement has been impaired by an impoverished learning environment. The latter are capable of greater performance than is indicated by their test scores. However, it is not yet possible to identify them with instruments suitable for mass testing programs.

BSEP Redesign

BSEP TRADOC Regulation 621-1 directs itself to policies and procedures for redesigning the BSEP. The impetus for redesign came from a report by TAG which detailed the history and the present state of voluntary education within the Army. As a result of this report, DCSPER convened 2 task forces from HQDA and TRADOC. The TRADOC task force is to develop plans, resources and milestones which:

- a) Outline strategies for gaining Army-wide acceptance of reading, writing, speaking and computing as "critical tasks" for soldier training.
- b) Propose cost-effective methods to teach learning strategies and life coping skills as an integral part of training.
- c) Provide a functional (job related) approach to basic skills development, instead of a general approach.
- d) Expand opportunities for participation in job related programs in reading, writing, speaking and computing, especially during IET.
- e) Develop an Army specific reading test for the diagnosis of skill deficiencies as opposed to relying on general reading grade level tests.

This regulation directs the development of an Army-specific, job-related BSEP in four areas:

- 1) MOS baseline skills
- 2) Military life-coping skills
- 3) Learning strategies
- 4) English as a Second Language

This partitioning of what is presently run as a general literacy program, bringing the soldier to a 5th grade performance level, has implications for a whole new curriculum and/or approach to BSEP. The format of this program is to be determined over the next five years (1985), with the bulk of development in 1982.

BSEP Impact and Implications

The impact of BSEP to date, that of the literacy program currently operational, has not been statistically significant. The schools visited could show no decrease in attrition or increase in classroom performance for BSEP recruits who participated in the program and those who did not. Moreover, a TRADOC evaluation indicates a negative effect--29.4% of BSEP participants subsequently were discharged during initial entry training while only 21.5% of the soldiers with the same ABLE scores not enrolled in BSEP were discharged.

An analysis of the shortcomings of the current BSEP effort can be instructive for undertaking the revised design described in the previous section. Weaknesses in elements of the current program need attention before a learning strategies intervention in particular can be successfully undertaken. As listed below, many weaknesses are internal to the program.

Testing and Standards

- The ABLE tests do not provide an accurate measure of literacy.
- No specific learning objectives are present.
- The ABLE tests do not provide diagnostic information to treat individual deficiencies.
- The 5th grade reading level criteria is too low for training material.

Curriculum Materials

- Off-shelf materials are generally poor.
- Off-shelf materials are not related to Army subjects.
- Off-shelf materials are not tailored to specific learner needs.

Instructors

- Civilian instructors are not familiar with the MOS subject matter.
- Instructor turnover limits program improvement.

These internal weaknesses are compounded by the fact that academic attrition, as a measure of program impact, is ill-defined and unreliably reported. It is entirely possible that a soldier who has been treated successfully for learning deficiencies but remains a discipline problem will be discharged for academic reasons. By the same token, a soldier with genuine learning problems may be discharged under family hardship provisions. Such inconsistencies must be accounted for before academic attrition can be used as a valid and reliable criterion for BSEP.

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IV. LEARNING STRATEGIES RESEARCH: APPLICATIONS TO THE ARMY

Due to the increasing difficulty of teaching increasingly complex technical job skills to personnel in the Army, it is important to consider alternatives that increase the effectiveness of current training practices. BSEP addresses this need. One goal of this program is to improve the ability of the educationally disadvantaged service personnel to learn from technical instruction. This may be achieved by teaching those trainees a broad range of basic skills and learning strategies in reading for those who lack reading skills; for those who can read, technical instruction may be facilitated by providing AIT-integrated learning strategies training. The purpose of this section is to review the learning strategies literature and to consider the various ways in which learning strategies training may be implemented.

This section is organized into four parts. Learning strategies are defined in the first part. The second and third parts contain, respectively, summaries of the theoretical foundations for learning strategy research and the rationale for providing learning strategy training for disadvantaged learners. Next, four implementation models are considered: 1) the embedded curriculum containing explicit learning strategy instructions, 2) the learning strategies adjunct course, 3) strategy/text alignment training for teachers, and 4) curriculum overhaul. The fourth model is not a learning strategy approach per se. It involves the replacement of poorly-designed AIT and BSEP materials which may actually limit or preclude the use of effective learning strategies, with well-designed courses which have shown to generate effective information-processing operations and study procedures.

Because the information in this section represents a highly condensed summary of extensive research, two sets of appendices are attached to serve as resources for different purposes. Appendices C to G contain summary descriptions of available reading and job-related materials. This set of appendices is given for the administrators, researchers, program coordinators, and instructors who may have to decide which of the four models are most appropriate in any given learning situation, what available materials would be most adaptable, and, where materials are unavailable, what research procedures would be most useful. Appendix H describes several mechanisms for dissemination. This appendix was included primarily to inform those who implement programs. A finding of this project is that very few of the programs developed by one branch of the military and known to or used by other branches or even other bases within the same branch.

Appendix I is for researchers, program designers, and curriculum developers who would develop new instructional materials. It contains all of the references in this section within an extended bibliography on knowledge acquisition and learning, learning strategies and study skills, structure-of-text research, cognitively-based instructional design, and mastery learning. Also in Appendix I is a bibliography of military-related references.

Learning Strategies and Text Structures Defined

In general terms, a learning strategy is any mental operation or behavior that is necessary or helpful in acquiring and remembering new information, concepts, and skills. These operations include both cognitive information-processing strategies and self-management skills. There are several broad categories of cognitive learning strategies:

Elaboration - using words or pictures to link or relate the new information to what is already known (e.g., paraphrasing and making up sentences and stories).

Text analysis during reading - identifying the key ideas and relations and/or the organizational structure of a text or lecture (e.g., previewing headings and graphic information, asking oneself about the meaning of what is read or heard, identifying or inferring the main idea and major points, and summarizing).

Extending the given information - adding to what is stated explicitly by integrating information from different parts of a text or lecture, by making inferences about the information and the context in which it is given, and by reasoning.

Systematic study after reading - organizing what is known in an outline and systematically preparing for a test by anticipating test questions, establishing what information is missing, and so on.

In any conceptualization of learning strategies, it is important to consider their relationship to various attributes of the texts to which they are applied. The learning strategies classification above is one strand of a strategy/text attribute taxonomy developed by Jones (1980). In this scheme both strategies and texts proceed from simple to complex. Simple strategies

involve few steps and relatively superficial processing of the information to be learned; complex strategies, such as outlining, involve many steps and in-depth processing.

Different levels of strategies are appropriate for different levels of text. Explicit factual information, for example, requires only minimal reasoning skills. At the same time, factual information which is vague, incomplete, ambiguous, and inexplicit requires highly developed integration, inference, and reasoning skills. Similarly, a text with few component parts requires less integration and "memory load" than one with many parts.

The "learnability" of a given text may be defined in terms of the number of component parts and the degree of explicitness in it (see Amiran, 1980). Finally, it is important to note that learning strategy operations may vary according to differences in text structure. Constructing a flow chart is an appropriate analytical strategy for learning procedural information but not for learning complex name/attribute information such as names of weapon systems and their attributes.

For a further description of the strategy/text attribute taxonomy and a typology of text structures, see Jones, Amiran, Katims, 1980. For a typology of strategy/text structure alignments for military job-related materials see Stricht (1979) and Fox and Sticht (1974).

Not all learning strategies are cognitive. Both the Weinstein and Dansereau conceptualizations referred to above describe a range of affective and selfmanagement strategies. These include a variety of techniques to reduce anxiety, to relax and concentrate, to focus on the task, to manage the available time, and to control the study environments. In addition, there are a range of metacognitive strategies. These are the diversity of operations that the learner uses to establish what is known and not known and to acquire the unknown information. These may be as simple as looking up words in a dictionary or as complex as estimating test readiness (Brown, Campione, & Barclay, 1978).

Theoretical Foundations of Learning Strategies Research

Recent research and development efforts in psychology, education, and training have resulted in a change in our perception of the roles assumed by learners and instructors. In these new conceptions of the teaching/learning act (Wittrock, 1974; 1978), learners are seen as active information processors, interpreters, and synthesizers who use strategies to store and retrieve information. Individuals are expected to take greater responsibility for their learning and to be more instrumental in adapting the learning environment to fit their needs and goals.

In the past, learning was understood largely as a response to incoming stimuli, and it was believed that the learner was greatly limited in terms of what he or she could do to improve comprehension and memory. Gradually, the growth of psycholinguistics shifted attention in many research circles to studying the ways in which the learner processed the incoming stimuli. This happened in part as a result of developing a sophisticated technology to differentiate clearly what aspects of the text the learner had in fact comprehended in terms of its explicit meaning and organization, as compared with the meaning and organization the learner constructed or inferred. The clustering measures developed by Bousfield and Bousfield (1966) and the measurement of idea units and relations described by Marshall and Glock (1978) are examples of this technology.

At the same time, learning theorists, such as Underwood (1969), were defining memory in terms of various analytical attributes. One such attribute is the ability to learn incoming information in organized chunks (Mandler, 1957; Miller, 1956). Another is the ability to infer implicit organization, ideas, and idea relations from contextual cues (Jenkins, 1974). It was also evident from a series of experiments on short and long term memory that depth of processing was a major determinant of whether information would be stored in the former rather than the latter; i.e., the greater the depth of processing, the greater the retention in long term memory (see Butterfield, Wambold, & Belmont, 1968; Craik and Lockhart, 1972).

Interestingly, almost identical findings were obtained in studies of reading comprehension. First, there has been a large body of research documenting the effects of the learner's schemata (knowledge structures) on comprehension and recall (e.g., R. C. Anderson, Spiro, and M. C. Anderson, 1978; R.C. Anderson, Spiro, & Montague, 1977). Schema theorists argue that comprehension depends on an interaction between two sets of factors: (1) the learner's knowledge of (a) the characteristics of the message and (b) the context in which it is given; and (2) his or her efforts to relate the incoming idea units to each other and to previously acquired information. Additional evidence of this interaction is found in a number of structure-of-text studies showing that experienced readers were able to infer the author's textual schemas with explicit cues whereas inexperienced readers were not (e.g., Meyer, 1980).

Finally, the conceptualization of the learner as an active interpreter and processor emerged from learning strategy training basic research studies and study skills research. As methods of measuring organization and content in recall became available, there were numerous strategy training studies (see Jones, 1980; Rohwer, 1973) and study skills training studies (Weinstein,

1980). While not all these studies showed positive effects and many of them had methodological problems, generally speaking, there were consistent and marked gains. Currently, numerous experiments have documented the positive effects for each of the strategies and study skills listed at the beginning of this section. It is also noteworthy that over the years research on study skills has gradually come to be conceptualized as a subset of learning - strategies research.

Learning Strategy Training Rationale

In most of the studies referred to above, the training was focused on a specific strategy study skill. Additionally, these studies generally involved "traditional" college students (i.e., 4-year college students with college-level reading skills). With the national trend in the 1960s to establish open admission or special admission policies, colleges and universities began to accept students who otherwise would have been dropouts. Gradually, learning theorists began to recognize what the Army's Project 100,000 had recognized earlier: that "the new students" were not only lacking in reading skills, motivation, and stress management skills (Cross, 1969) but also in active coding and information processing strategies (Rohwer, 1971).

According to Rohwer, a major difference between high and low achieving students is the repertoire of learning strategies that are used. He cited research on elaboration strategies, categorization, and concept attainment strategies, in each case comparing high and low achievers. For each type of strategy, the pattern of results indicated that high achieving students began to develop increasingly efficient strategies at about grade 6; low achieving students did not make this developmental shift without intervention. At the same time, it was clear that the low achievers benefitted greatly from explicit strategy instruction.

Since the publication of Rohwer's seminal article, there have been numerous studies which support the developmental shift hypothesis: (1) studies of the reading strategies of high and low achieving students; (2) studies comparing the information-processing strategies of 4- and 2-year college students; (3) studies comparing older and younger students in learning, reading, problemsolving, and oral communication strategies; (4) correlational studies showing high positive correlations between the use of effective reading/learning strategies and achievement; and (5) studies showing the effects of strategy training; and (6) research on learning strategy assessment instruments.

In each set of studies the pattern of results confirmed the earlier findings, namely that the two comparison groups in each study differed markedly in strategy use and that strategy training worked toward equalizing differences in performance between the two groups. Interestingly, a recent survey of the learning strategies used by low achieving Army recruits indicates that the skills of the "new recruit" closely paralleled "the new stu-

dent" in 2-year colleges: both sets of students rely heavily on role rehearsal and both sets lack (or fail to use) a range of effective strategies (Weinstein, in press, cf.; Sticht, 1979 for data on Navy personnel).

Research on Learning Strategy Training

Of all the studies investigating the relationship between learning and achievement, perhaps the most interesting were those on effects of training. These studies established that performance on specific tasks could be modified substantially by instructing students to use appropriate learning strategies. At the same time, it was also evident from this research that low achieving students required extended training to improve on complex tasks. Because of these findings, a new type of research paradigm began to emerge: the extended, multi-faceted learning strategies training program.

In contrast to the classic experimental designs, the new paradigms are often quasi-experimental, long in duration, and aimed at developing a range of learning strategies to be used for a variety of complex tasks as well as a range of metacognitive strategies. Additionally, the new paradigms address not only cognitive but also affective domains: namely, motivation and stress management (see T. H. Anderson, 1979; Dansereau, 1979; Weinstein, 1979). Currently, these new research paradigms utilize one of two different models: the embedded learning strategies curriculum or the learning strategies adjunct course. An emerging model is the strategy/text alignment training for teachers (STATT).

Embedded Curriculum Materials

Research on inserting learning strategy instructions within the instructional texts used by the students emerged from three sources. First, there was a series of studies on the effects of inserting adjunct questions in different places in text passages. (E.g., Andre, 1979; Rothkopf, 1971; 1977). Typically, the results vary greatly according to whether or not the adjunct question is a main idea or a detail question (T. H. Anderson, 1979) and the expected results are not always obtained. However, the overall conclusion of most reviews is that if the questions and text are not too difficult, students tend to learn the material identified by the questions better than other parts of the text. In fact, quite marked results have been obtained by Ellis (1979) who developed curriculum materials for the Navy in which trainees were given practice in answering All, Half, or None of the test questions for a selfstudy Naval communications course. In all cases, the group having workbooks with All of the test questions had better scores, though there were no differences between the Half and None groups.

Second, in an effort to train junior high students to use complex elaboration and categorization strategies, Jones and Hall (1978; 1979) embedded learning strategy instructions into the instructional texts for three tasks: learning pairs of names and facts, learning pairs of vocabulary terms and their definitions, and learning disorganized factual sentences (name/ attribute passages). The strategy instructions were embedded in order to standardize the training for the experiment to minimize teacher effects. Subsequently, Amiran, Jones, and Fridell (1980) and Jones, Amiran, and Katims (1980) embedded strategy instructions and information about the structure of the text in entire sets of curriculum materials for use in schools. The former were instructional texts to teach older, low achieving students to outline various types of information in two dimensional tables and then to use the tables as the basis of organizing compare-and-contrast essays. The latter were curriculum materials in reading for students in grades 5 to 8 in the Chicago Public Schools. In both instances, the rationale for using the adjunct questions was to control the quality of instruction; in both sets of materials adjunct questions are used to provide complex "thinking aloud" models of the thought processes needed to learn a concept or skill or to analyze a given text structure. Then, additional adjunct questions are used to guide the student to apply the same processes or strategy to new materials. Both field-test and other data reveal consistent positive results for both projects.

Third, Sticht (1979) and Fox and Sticht (1978) developed embedded curriculum materials for the Army and the Navy. They analyzed job-related curriculum materials for types of text structure. Most materials required the students either to learn a procedure or names and attributes. Accordingly, they developed materials for 6 job clusters requiring the students to learn what they read.

Adjunct Course Research.

Altogether, there are three major adjunct learning strategy and study skills courses: the Cognitive Learning Strategies Project a semester course developed by Weinstein at the University of Texas at Austin, the Learning Strategies Training Project a semester course developed by Dansereau at Texas Christian University, and the Study Skills Packages, an adjunct course for Navy recruits by McCombs and Dobrovolny. These courses attempt to: (1) identify the types of strategies used by successful learners, (2) investigate the nature and critical attributes of those strategies, (3) select the most important strategies to teach, (4) develop assessment methods for identifying individual learner deficits, (5) develop instructional methodologies and curriculum materials to each learning strategy, (6) create appropriate assessment instruments for training programs, and (7) foster generalization of the use of these strategies across different content areas.

All of these courses are addressed to a diversity of texts and tasks. All of them are devised to improve reading and memory and are generally not content specific, though all three contain references to texts and situations that are relevant to the military. All of them contain a heavy focus on skill management. All of them have field-test and other data demonstrating that they work.

Strategy/Text Alignment Training for Teachers

While there is no existing research or materials for STATT, the process teachers use to analyze texts and determine the most appropriate learning strategy students should follow to master the material, there is increasing evidence that traditional reading instruction is highly ineffectual and is entirely inappropriate for educationally disadvantaged students. Most of the basal texts now in use have recently been subjected to extensive analyses by psychologists and educators of several reading centers and regional labs as part of a federally funded movement to improve reading instruction in the U. S. Several conclusions are beginning to emerge with a degree of consistency that is unusual in research circles.

First, most texts are so poorly written that they are boring, difficult to comprehend, and difficult to remember (e.g., T. H. Anderson, Armbruster, & Kantor, 1980; Bruce, 1978; Tierney, Mosenthal, & Kanter, 1980). Second, there is a serious question about the effectiveness of current readability formulas based on such things as sentence length, word frequencies, and number of syllables per word (e.g., Amiran, 1980; Davison, Kantor, Hannah, Hermon, Lutz, & Salzillo, 1980; Meyer, 1980). Currently, it is argued that other factors are more critical in determining text difficulty (e.g., the number of parts in a complex passage or text or the number of inferences required for effective comprehension). Third, Durkin (1978-79) has provided a devastating critique of the lack of effective comprehension instruction in which the teacher does something to help the student to understand the meaning of what is read. Comprehension assessment involves asking comprehension questions (who, what, where, when, why, which and how) without helping the students to understand the meaning. Of 5,000 minutes of observation in these classrooms, 28 were devoted to comprehension instruction. Moreover, it was commonly observed that the teacher would switch to totally unrelated activities (such as finding the main idea and dictionary skills) within minutes and with no apparent rationale.

These practices, especially the latter, are documented also by research on time on tasks or academic engaged time (see Rosenshine, 1978 review). Particularly important here are the inordinate amounts of instructional time that are lost by poor and average teachers as they switch from one activity to another. In most instances, these abusive practices are attributed to poor pre-service training and the poor quality of instruction in basals.

To summarize, numerous strands of learning and reading research converged to provide a new conceptualization to the learner as an active processor of information who can do much to facilitate his or her learning by using effective reading/learning strategies. Numerous studies indicate that low achieving students have strategy deficits. Learning strategy training research provides strong evidence that learning strategy training is effective in both the laboratory and the classroom setting. Extended, multi-faceted programs are needed for effective instruction for low achieving students.

Four Methods of Implementing Learning Strategies Research

This section describes four ways a learning strategy effort could be undertaken within the Army training system. The first three methods were mentioned earlier when discussing learning strategies research: embedded curriculum materials, adjunct courses, strategy/text alignment training for teachers. The last method, curriculum overhaul, is not a learning strategy program per se. It involves correcting faults in the curriculum which when completed may preclude the need for a separate learning strategy intervention.

Embedded Curriculum Materials

Embedding involves inserting adjunct aids in the instructional text for the student. These aids include step-by-step models of thinking processes and strategies, information about the text structure or task to which the process/strategy applies, and questions or instructions which guide the student to apply the thinking process strategy to new materials. After this guided practice, there is independent practice without aids and prompts. The Army could implement a learning strategies embedded curriculum in BSEP programs and in AIT courses.

Provide embedded reading materials in BSEP courses for students who lack the requisite reading skills for AIT Courses. Commercial materials are available. Chicago Mastery Learning Reading/Learning Strategies is for grades 4-8 but has been used successfully with students reading below grade 4. In fact, CMLR/LS materials were used exclusively in a mandated summer school involving over 15,000 students whose reading levels ranged from 2.5 to 6.0. Moreover, although these materials are currently organized in terms of Chicago reading objectives, the units can be arranged in strands for mastery in selected job-related skills (e.g., a strand of 2-3 units on map reading, reading diagrams and graphs, or reading a dictionary), study skills (e.g., units on previewing and questioning, text analysis, and outlining), vocabulary learning, basic comprehension, or inferences and reasoning.

These materials increase cost effectiveness because they are already developed and require little or no training. A possible limitation is that maximum results are most likely to be obtained with teacher-paced group instruction, though the materials have been used successfully in a self-paced, individualized instructional mode. A summary description of MLR/LS is given in Appendix C.

Provide embedded job-related materials in BSEP courses or in AIT courses. The job-related materials developed by Sticht (see Appendix C) are currently used in Fort Jackson's BSEP program and possibly elsewhere. Altogether, there are materials available for six job clusters, (e.g., cook) in the reading-to-do learn strand and 5 tasks in the reading-to-do strand (e.g., filling out forms, following procedural directions, reading an index.)

These materials could be used as supplementary materials in AIT courses as well. The only limitation of these materials is that most of them require grade 5 reading levels. It is also possible, to develop embedded materials for additional job clusters using procedures described by Sticht (see bibliography in Appendix I or the checklist in Appendix F.) Concurrently, one would correct the reading materials for grade level.

Adjunct Courses.

Learning strategy adjunct courses are generally content free in the sense that they typically cover a broad range of texts in various content areas. These courses can therefore be aimed at improvement of achievement in reading in BSEP courses and/or performance in job-related courses. Thus, any of the learning strategies adjunct courses described in the learning strategy training research would be appropriate in BSEP courses or as supplements to AIT courses. However, it is important to note that these courses generally require basic reading skills and would therefore not be appropriate for students reading below grade 5-6, or, in some cases, grade 8.

There are, however, several high-quality study skills programs available which are designed for recruits or older students reading at grades 2-4. First, there are two computer-based programs developed by the Navy: a vocabulary learning course developed by Wishner called PREST (Performance-Related Enabling Skills Training). Second, there is a program developed in the public sector called the Rochester Secondary School Reading Program developed by V. Anderson, Raisbeck, and Smart. All three programs have been field tested (the latter two extensively) and are cost effective on a per student basis, though all three require some staff development. (See summary descriptions in Appendix D.)

Another limitation of learning strategy study skill courses is that they frequently have a history of implementation problems. In the field tests for

the Army's Study Skills Packages, for example, a number of the trained instructors were reassigned to other duties before they had an opportunity to assign the materials to recruits. Further, in three of the four courses for which the materials were designed, only nine instructors were able to assign the materials on an average of two students per instructor (Dobrovolny, et al, 1980). And the year after it was field tested, the materials were used with only two of the four courses. These figures not only make the program seem less cost effective, they also raise the question about the usefulness of implementing any adjunct program requiring teacher training in the form of workshops when duty reassignments and contracting regularly yield high teacher turnover.

Still another problem in implementing the adjunct course model is that the impact on student achievement depends largely on the instructor's skill in guiding the students to transfer and apply the strategies to other course contents (e.g., job-related content). Many instructors may lack the skill, and possibly the desire, to do this without extended training. Yet clearly the workshop has major disadvantages as a delivery system for teacher training. Because of these problems, the adjunct course given in a military setting with a workshop or the adjunct course by itself would not be likely to be cost effective or have a maximum effect on student achievement and attrition. An alternative solution to the problem of providing effective mechanisms for instructors to apply adjunct learning strategy courses to reading materials in BSEP courses and to job-related courses in AIT is given in the next section.

Strategy/Text Alignment Training for Teachers (STATT)

As Sticht's research (1979) suggests, there are a limited number of job clusters and text structures which trainees must deal with in reading-to-learn situations. Mostly, they have to learn name/attribute information, procedures, processes (how systems work), concepts, and vocabulary term/definition sets which may be found in prose passages and/or graphic representations. There are a limited number of learning behaviors which are appropriate for learning these texts--provided that the texts are relatively clear (i.e., explicit, unambiguous, complete in providing the needed information in a logical order, and well-sequenced). Given a decent military text, it ought to be fairly simple and inexpensive to develop self-instructional texts for instructors to learn how to align the appropriate learning strategy instructions with the text structure to provide effective learning strategy training.

More specifically, teachers would receive direct instruction in the booklets which would (1) define different types of texts (in prose, lectures, tapes, etc.) and learning situations (recall, performance, etc.); relate specific learning strategies to each text and learning situation; and (3) provide practice, feedback, and correction in aligning strategies, texts, and learning situations. This idea is based in part on the Curriculum Alignment Project currently in progress in the Los Angeles public schools (Monroe,

Fegan, Scott, 1980). Appendix E provides a proposal as to how strategy/text alignment materials might be developed.

The foregoing suggest that STATT would only be useful for AIT courses. While it would seem that this is largely true, STATT could be quite useful in the following BSEP learning situation. Suppose the BSEP training group has just purchased and implemented a new series of basal readers but would like to provide a limited form of learning strategy instruction. Self-instructional booklets relating learning strategy instruction to specific text structures in the readers might be highly effective. STATT for these text materials would, however, be more expensive to develop, because there are a greater diversity of texts in readers and therefore more learning strategies; more instruction in transfer and applications would also be needed. At the same time, once developed, the booklets at least would be quite cost effective.

The advantages of STATT are two-fold: well-developed self-instructional materials should be easy to use with only minimal staff development costs. And once these materials were developed, they should be highly cost effective, even with a high teacher turnover from contracting or reassignment. At the same time, it is possible that STATT may not be effective by itself. That is, it may not be effective without being introduced in conjunction with instructional and/or practice materials for students. Thus, it may be that the most powerful learning strategies implementation model would be to combine STATT with adjunct or study skills courses for students.

Appendix E contains a list of commercially available texts and/or instructional systems for teachers. These materials were selected to provide instruction for all levels of instruction from elementary grades through college. Equally important, they were selected because they involved the teacher in strategy/text alignment activities and/or effective comprehension instruction. Most of them were written by researchers in the new wave of cognitive psychology who conduct research on reading strategies, effects of text attributes, and basal systems. Consequently, most of the Appendix E selections seek to teach teachers how to apply the findings of this research by providing them with direct instruction, examples, model practice exercises for students, and brief descriptions of research data. Other selections aim to provide comprehensive and systematic instructional systems which have been demonstrated to generate effective learning behaviors from students. Almost all of the selections describe or provide effective reinforcement, time management, and classroom management techniques that would be particularly useful for the new recruit.

Clearly, the commercial materials for teachers listed in Appendix E do not constitute STATT because they do not constitute training. However, they do address the problem of instructing teachers about the need for learning strategy/study skill instruction and text analysis. In addition, they address many of the problems in the learning situation that might limit or preclude achievement in school classrooms and BSEP programs. And since they are currently available commercially, they could be implemented immediately simply by providing them to BSEP and AIT instructors, at least until STATT materials are developed.

Curriculum Overhaul

The final approach provides a parallel intervention to learning strategies which could even become a separate alternative to reaching BSEP objectives. Throughout this analysis, it has been emphasized that there is an interactive relationship between learning strategies and text characteristics. In gross terms, the ultimate goal of a learning strategy is to understand the meaning, structure and purpose of the information to be learned. If texts, lectures, tapes, and films contain inadequate information, they place a heavy "load" on the student's memory and information-processing strategies. Inadequate information is information that is vague, incomplete, ambiguous, implicit without sufficient context clues, fragmented, disorganized or contradictory. In many instances in studies which examine the effects of such texts, the subjects (usually graduate students) fail to learn or experience difficulty in learning (e.g. R. C. Anderson, Spiro, & M. W. Anderson, 1978; Bransford & Johnson, 1972; Frase, 1969; Whiting, 1980.) Many of the curriculum materials examined in sample AIT courses displayed such features as well as those in current BSEP courses.

AIT Materials. More specially, Technical Manuals, Field Manuals, Soldier Manuals, audio-visual aids, and student materials were examined for 5 courses; field artillery, auto mechanics, metal work, Chapparral equipment, and map reading. While there were marked variations between and within course materials, about 60-80% of them were so poorly designed that they would be defined as extremely difficult to learn for experienced learners.

The above statement is based on the following procedures. First, we found what appeared to be the most poorly written text and made a typology of errors, beginning with the overall design and then working page by page through specific texts. The typology of errors and their frequency per page for two field artillery texts are given in Appendix F. (Cf., example of well-written, job-related materials for a BSEP course in the same appendix.) Field manuals and technical manuals were included because they are frequently xeroxed and used as instructional materials. Then, the number of errors on every nth page were counted for materials for which whole texts were available.

Observational data were collected for course materials involving audio-visual aids, namely the self-paced Chapparral course. The most frequent errors were the failure to specify the objectives and the provision of numerous terms (names of equipment, parts of equipment, jargon, acronyms), graphs, tables, and diagrams without labels or definition at all or with difficult-to-learn definitions. A definition was difficult to learn if it had words as difficult as the term, if the definition was not on the same page, or if it referred to a part of something that was not pictured or described fully. Other errors included diagrams or procedural directions with incomplete, misleading, or irrelevant information. And these errors applied also to the tapes and films that were observed on field visits.

The point here is obvious: there are no efficient learning strategies soldiers could use to learn this type of information. Inference, reasoning, construction of diagrams or other representations might facilitate learning for the persevering and experienced learner. However, these procedures are very time consuming and demanding and probably not efficient when there are so many textual problems.

These problems have been referred to here as "errors" because they violate basic principles of learning and instruction that have emerged from a recently developed literature that seeks to apply theories of learning and cognition to instructional design. There are, for example, a number of papers on the need for specifying behavioral objectives to the students; these papers also provide criteria or direct instruction in how to write objectives (e.g., Barber, 1979; Block & Anderson, 1975; Anderson & Block, 1976). Additionally, there are now guidelines for defining text structures which facilitate learning and recall (e.g., Meyer, 1977), for embedding learning strategy instructions and structural information in instructional texts (Jones, 1980), for designing instructional activities (non-textual) that facilitate learning (Anderson & Jones, 1979), and for using typographical techniques that improve learning (e.g., Mac-Donald Ross, 1980; Meyer, 1980; Rickards, 1980; Waller, 1980). There are even guides for writing instructional texts for Army training; see Logan (1979) for an overview of the guidelines for the Instructional Systems (ISD) and the Guidebook for Development of Army Training Literature developed by Kerne, Sticht, and Hauke (1973).

One way to implement to address the BSEP objective is to use this technology: (1) to eliminate or revise the most poorly-written and difficult-to-learn AIT course materials and (2) to develop new materials which provide the recruit with complete information that is well written and has clearly specified objectives, so that the learner can use efficient strategies.

Toward that end two checklists are given in Appendix F. These checklists were developed by Jones for the Army to use as guidelines for developing new

materials, but they may also be used to evaluate existing ones. One checklist deals with program design and instruction; the other deals with textual materials. The former is a modified version of a set of guidelines for instruction for three types of objectives (informational, procedural, and conceptual) developed by L. W. Anderson and Jones (1977). The guidelines and the checklists incorporate recent advances in the literature on learning strategies and memory. They are intended to be used by curriculum developers, program coordinators, and even individual instructors.

BSEP Materials. Another major curriculum problem that was found was the system of entry and exit tests for BSEP courses described in earlier sections of the paper. In an extended analysis in Appendix F it is shown that Select-ABLE assesses impulsivity, spelling, categorizing (words and number concepts), and vocabulary that is frequently neither school related nor job related, but not comprehension of prose texts, basic thinking processes (other than categorizing), or recall. Nor does the format or content of the SelectABLE entry test bear any relation to the content and form of the two tests used for exit from BSEP. These are a battery of standardized tests which assess various comprehension skills used in reading prose texts. Quite apart from the disparity between the two tests, the most serious problem with this series of tests is that none of them assess the decoding and learning skills that are needed for achievement in AIT courses using complex passages which contain highly technical vocabulary.

What is needed, it would seem, is a battery of tests that would (1) assess decoding, basic comprehension, and learning skills; and (2) place the student in a program of instruction that addresses the needs of the student. Appendix F contains a summary of research on learning assessment instruments and a table summarizing the characteristics of each instrument. Appendix F also contains summary descriptions of reading programs for adults or older students which have decoding, comprehension, and/or study skill strands that begin with very simple words and prose and progress to the type of technical vocabulary and prose that is found in high school texts for social science and science courses. These programs include two PLATO programs as well as an excellent, validated program developed by the Navy which has job-related content throughout.

Adapting Instruction to Learner Needs

Remedial instruction of any kind, including learning strategy instruction, should be sequenced to fit the needs of the learner in terms of what strands of instruction the learner should receive, the instructional mode of delivery, and the length of instruction. Several sequencing models are presented here. First, tutoring or self-paced instruction using self-instructional materials would be appropriate for recruits who were deficient only in

a given skill such as vocabulary learning. Second, recruits who can read but lack a repertoire of learning strategies and study skills would be likely to benefit from an adjunct course (individualized or group) or a group-based embedded curriculum (job related or general). Such courses would be most beneficial if they were offered on a long-term, daily basis during some part of the AIT course in order to maximize the opportunity to learn and to transfer skills to the job-related texts during the process of instruction. Third, intensive training (6 hours a day) would be most appropriate for students who lacked decoding and comprehension skills. Development of these skills takes time, yet intensive training in only these skills all day long would be too demanding and would ignore other problem areas.

For these reasons, a diversified BSEP curriculum is suggested. Such a curriculum might include training in any of the following areas: decoding, comprehension, problem solving and basic thinking skills, oral comprehension (see Dickson, Miyake, Meto, 1979), learning strategies/study skills that focus on information-processing, metacognitive strategies that focus on test preparation skills and procedures, test taking strategies, and self-management skills which focus on anxiety reduction, management of time, and the like. (See Appendix C for summary descriptions of some excellent problem-solving and basic thinking programs that have been developed recently, including Instrumental Enrichment developed by Fuerstein.)

Summary

Four models for implementing learning strategies research into BSEP and AIT courses were considered: the embedded curriculum, the adjunct course, strategy/text alignment training for teachers in BSEP and AIT courses, and curriculum overhaul. Each model has its own strengths and weaknesses which need further analysis before a particular model or combination of models can be selected for Army-wide use.

V. SUMMARY AND RECOMMENDATIONS

This section summarizes the findings of the learning situation, user population, and learning strategies research gathered during the investigation. Based on these findings, recommendations are provided for a series of closely monitored pilot studies which will produce a final determination on cost-effective learning strategies in the Army training environment.

Findings

Characteristics of Trainees, Instruction, and the Training Context

Changing Trainee Population. As the proportion of lower mental category trainees increases in the Army, the social environment will not provide the kind of support necessary for these individuals to reach their highest performance potential. New learning improvement systems are necessary.

Characteristics of Instruction. In AIT courses, basic literacy skills are not matched with job requirements; instruction is developed from task considerations rather than student aptitudes; instructional management dimensions are not defined; and materials present content ineffectively. Improving characteristics of instruction may modify the need for learning strategies.

Characteristics of the Training Content. In AIT instructors are subject matter experts and would be hard pressed to assume additional responsibilities for learning strategies; the classroom and brigade environment make conflicting demands on the soldier which limit learning; values and attitudes of all personnel tend not to support learning. Improving characteristics of the training context may modify the need for learning strategies.

Basic Skills Education Program

History. BSEP was influenced by other efforts to improve soldiers' learning abilities, such as Project 100,000 and Advanced Individual Training Preparatory Training.

Structure. BSEP provides reading and mathematics skills during a 6 week course. Tests and materials tend not to be integrated with AIT.

Population. The majority of BSEP students are from Category III-IV, did not finish high school and also have motivation problems.

Redesign. A broadened BSEP effort will include Baseline MOS Skills, English as a Second Language, Life Coping Skills, and Learning Strategies.

Impact and Implications. Factors which account for low impact of the current program include tests, standards, materials, and instructors which are not responsive to MOS/AIT demands.

Learning Strategies Research

Learning Strategies Defined. All strategies help a learner to acquire and maintain new knowledge and skills. Cognitive strategies involve elaboration, text analysis while reading, extending the given information, and systematic study after reading. Affective strategies involve anxiety reduction, concentration, time management, ect.

Theoretical Foundations. The new conceptualization of the learner is one of an active interpreter and processor of information.

Training Rationale and Research. Data on the effectiveness of training students how to learn supports the idea of three learning strategies interventions. The need for a fourth comes from the poor quality of AIT materials.

Implementation Methods.

1. Embedded Curriculum Materials involves inserting learning aids for the student in the text.
2. Adjunct Courses are free-standing and provide a broad range of skills but can be job-related.
3. Strategy/Text Alignment Training for Teachers involves teaching instructors to provide students with learning instructions for particular texts.
4. Curriculum Overhaul attempts to correct faults in materials which would allow learning strategies to be used more effectively. It is not a learning strategy model per se.

Recommendations

Data from primarily non-military sources indicate that a learning strategies effort in the Army could help improve student learning capacity and reduce academic attrition. However, the characteristics of the learning situations and user populations from which the data were drawn are significantly different from those in the Army. At this point there is insufficient evidence on which to recommend a specific strategy or particular materials.

It is recommended that the Embedded Curriculum Materials, Adjunct Course and Strategy Text Alignment Training for Teachers approaches be tested within AIT in conjunction with the revision of course materials called by Curriculum Overhaul. By carefully monitoring development costs for each approach and

the subsequent impact on performance and attrition, the cost-effectiveness of learning strategy models and materials can be determined with more accuracy than now possible.

In addition, to the pilot testing described in the next section, TRADOC should conduct a separate investigation of MOS related learning materials developed in AITPT. There may be excellent materials available within the Army, but not currently used, which can help reach BSEP goals.

Pilot Testing Approach

The following schematic displays a design for how pilot testing could be undertaken.

	Control Group	Without Curriculum Overhaul	With Curriculum Overhaul
Embedded Curriculum Materials	1	2	3
Adjunct Course	4	5	6
Strategy/Text Alignment	7	8	9

Each model would be tested with and without Curriculum Overhaul to provide a measure of cost-effectiveness of this approach. Although not shown, the Curriculum Overhaul model could be tested separately from any of the learning strategy models. Thus, it could be determined if Curriculum Overhaul is a superior approach to BSEP objectives than learning strategies interventions. It should be noted that this approach would benefit those soldiers who already have adequate learning skills but can not apply them because of the quality of the materials.

The numerals in the schematic designate groups necessary for testing one course. Thus, nine groups would be required to test the combination of models in a single course. The design should be replicated in at least one course within the six basic clusters (clerical, communications, combat, medic, cook, and mechanic). Minimally, 54 test groups would be involved. Special attention should be given to high density courses with high attrition.

In addition it may be appropriate to further replicate the design to account for content variations within each cluster, different instructional modes, geographical differences, etc. Naturally, the extent to which pilot testing is undertaken is governed by the value of providing a validated approach to performance and attrition problems.

Additional Suggestions

The appendices to this report will provide valuable information for individuals or groups engaged in the design or materials development activities for the pilot tests. In addition, it is highly recommended that the following documents be studied by everyone involved:

1. TRADOC Regulation 621-1, Basic Skills Education Program Curriculum Development Project, February 1980.
2. TRADOC Evaluation - Basic Skills Education Program Phase I. HQTRADOC, February 1980.
3. Attrition in the Military -- An Issue Needing Management Attention. GAO, February 1980. (FPCD-80-10)
4. A Program of Army Functional Job Reading Training: Development, Implementation, and Delivery Systems. HumRRO-FR-WD(CA)-75-7, June 1975.

If civilians unfamiliar with the Army training environment are to be involved, they should supplement these documents with first hand experience. They should spend considerable time on the training floor observing instruction and meeting with students, instructors, and supervisors. Such firing line encounters may help add a much needed note of reality to the design and development of the pilot tests.

REQUIREMENTS AND RECOMMENDATIONS
FOR LEARNING STRATEGIES IN THE U. S. ARMY
BASIC SKILLS EDUCATION PROGRAM

Appendices

- Appendix A Questions to Identify Army-Specific Learning Situations and User Populations
- Appendix B Demographic Comparison of BSEP Eligible Soldiers
- Appendix C Embedding Learning Strategy Instructions within the Instructional Text
- Appendix D Learning Strategy/Study Skills Adjunct Courses
- Appendix E Strategy/Text Alignment Training for Teachers (STATT)
- Appendix F Curriculum Overhaul
- Appendix G Problem Solving and Basic Thinking Skills: Materials for Teachers and/or Students
- Appendix H Mechanisms of Dissemination
- Appendix I References and Bibliography

APPENDIX A
QUESTIONS TO ARMY-SPECIFIC LEARNING SITUATIONS AND USER POPULATIONS

Training Environment

Scope of Training: What is the total scope of resident training provided at the typical TRADOC school?

Scope of AIT Training: How much of the school's total training effort is directed to basic 10-level AIT training for soldiers just completing IET?

Scope of AIT Courses: How many AIT courses are offered by a typical school? What percent of these are lock-step; what percent self-paced? What percent are teacher-intensive; what percent are media-intensive?

Student Enrollments: How many soldiers are typically trained in a year, and what patterns are there to entrance and exit? How many soldiers are typically in residence for training in basic 10-level AIT courses at any given time?

Instructors: What is a typical ratio of people assigned to the post as instructors and those actually working on the floor in an instructional capacity?

Instructional Organization: How is the school organized to handle all aspects of training: Who handles teaching, course writing, evaluation, and need analysis?

Training Facility: What is a typical "classroom" like for an AIT course? How well equipped are they for media use and for training on actual equipment?

Nature of Courses

Training Purpose: How much of a person's job is a soldier typically trained for in his first AIT residence course?

Training Development: How, and by whom, are courses developed and material kept up to date?

Time in Course: What is the average length-of-time in a course? Does it differ significantly with self-paced and lock-step?

Sequence of Study: What is a typical sequence of study for a block of instruction?

Nature of Instruction: What is the dominant source of information in a platform instruction-based course; in a media-based course?

Nature of Instructional Material: How much reading is a soldier typically expected to do in a course? What level is that material written? What relationship is there between reading amounts in the course and the amount of reading done on the job?

Instructional Mode: How much of a typical course is independent study? Is there faculty or peer group tutoring in the independent study mode?

Testing: What kind of testing is done in courses and when (and how frequently) is it done?

Feedback and Remedial Instruction: What happens if a student fails a test or performance check?

Alternate Course Material: Are special course materials or differentiated tasks provided for any soldier in resident training?

Instructional Stations: How many and what kind of instructional stations are in a location at a typical course?

Instructional Conditions: How many locations does instruction take place in a typical course? What are these locations like?

Age of Courses: When was the course material written; how frequently are courses revised and new material added to the course?

Feedback from Field Units: Is feedback from field units about successful performance of graduates sought? Obtained? Make any difference in the way courses are structured?

Placement of Graduates: Do those who complete the AIT course generally function in their units in that MOS?

Course Management

Student Load: What is the average class size in a typical course? How many students are trained in a typical course in a year?

Class Enrollments: When do students enter training? How many enter at once time? How many new students are recycled after failing a course for another MOS?

Instructor Ratios: On what basis are instructor-student ratios based? What are the actual ratios "on the floor" compared to the desired or requested ratios? What is the difference between lockstep ratios and self-paced ratios?

Training Locations: How are instructional stations typically arranged in a training location? How many locations does a soldier need to go to in a course?

Management of Student Flow: How is the student's progress through the course recorded and managed?

Time-In-Course: What is the typical time in course? Does time-in-course differ significantly from POI time?

Seasonal Variations: Are there predictable seasonable variations in the numbers and capabilities of the soldiers reporting for training?

Absenteeism: What is the typical amount of student absenteeism in a course? Why are students absent and how do they make up work?

Attrition: How many students do not finish courses? How many of these have had BSEP-1 training? How many attritions are BSEP-1 qualified but did not have training? How many attritions are for academic reasons; how many for "coping" or other adjustment reasons?

Peer-Group Interaction: How much help do students receive from other students?

Instructor Interaction: How much direct individual help do students typically receive from instructors?

Knowledge of Student Characteristics: What kind of data about the student is known to instructors "on the floor"?

Other Factors: What other factors (such as the female presence) affects the student's performance in a course?

Instructor Characteristics

Age: What is the average age of instructors?

Sex: Are any female instructors used?

Military Experience: What is the rank of a typical instructor? How many years of military experience does an instructor typically have?

Experience in MOS: What is the average length of time in field units in working in the MOS before entering the school to train soldiers in that MOS?

Training as Instructors: How many instructors have had civilian training or preparation as teachers? How many instructors have had military training as instructors or have served as instructors before?

Involvement in Course Development: How many instructors are actively involved in course writing (for new courses or to revise existing courses)?

Turnover: What is the average turnover of instructors in the school? Of the amount of time assigned to the school as an instructor, how much actual time is spent in an actual instructional situation?

Reading Level: What is the average reading level of instructors?

Language Dominance: How many instructors are bi-lingual?

Prior Education: What is the average education level of the instructors?

Basic Education Teaching Skills: Are AIT instructors trained and experienced in handling BSEP-1 qualified instructional problems? (Basic literacy)

Ethnic Rapport: Is there any relationship between the ethnic and social group of instructors and the success of soldiers in the course?

Job Satisfaction Level: How do instructors feel about their assignment to AIT courses?

Preferred Teaching Strategies: Do instructors prefer lock-step instruction (Platform based) over self-paced (media based)?

Reward System: What is the reward system for doing a good job? (Keeping attritions low and academic completions high)

BSEP Learning Situation

Administration of BSEP-1 Program: Who administers the BSEP-1 program? What coordination exists between the Education Center and the School?

Integration of BSEP-1 Program: Is BSEP-1 integrated with or separate from AIT training in both the time frame and material used?

BSEP Requirements: How many hours of BSEP-1 are offered? When can soldiers test out?

Placement Testing: What test is used to determine BSEP eligibility? When and under what conditions are soldiers tested? What percent tested are BSEP-qualified?

Entrance Requirements: What is the basic level for BSEP-1 eligibility? Are exceptions made (referrals from AIT instructors)?

Time-In-Course: What is the amount of time a soldier actually spends in BSEP-1 instruction? Does the BSEP-1 program add to length of time on post or is it integrated with AIT training?

Completion Standards: Is completion based on time spent or competencies gained?

Completion Testing: What tests are used to determine success after BSEP-1 training? What percent completing BSEP training achieve at least a 5.0 RGL? What is the typical amount of improvement in a soldier's score after 180 hours of BSEP training?

Training Environment: Where and under what conditions is BSEP-1 Training conducted?

Course Management: How is the progress of students through the program monitored? How are new students integrated with students who have been in the program for some time?

Structure of Courses: What primary courses (literacy skills) are taught? On what course or skill is the most emphasis placed?

Instructional Material: What instructional material is used? How much integration is there with AIT course material?

Instructional Mode: What is the primary mode of instruction in a BSEP-1 class?

Coordination with AIT: How much coordination is there between BSEP and AIT in the use of materials, facilities, and people?

Number of BSEP-1 Qualified Soldiers: What percent of all incoming soldiers are BSEP-1 qualified?

Attrition: What percent drop out of the BSEP-1 program? What happens to dropouts?

Effect of Training in BSEP-1: How many BSEP-1 "graduates" are successful in their AIT courses? How does this percentage compare to before the BSEP program was started?

BSEP-1 Instructors: Who teaches the BSEP-1 classes and what are their qualifications?

Class Size: What is the typical number of active students in the BSEP program? What is the make-up of classes and how is instruction conducted?

AIT Student Characteristics

Age: What is the typical age of a student?

Sex: What percent of the soldiers in training are enlisted women?

Army Status: How many are Regular Army? Reserves? National Guard? Foreign Military?

AFQT Scores: What is the percentage in each AFQT category? What are the trends in AFQT scores?

Prior Civilian Education: What is the average education level of the soldiers?

Prior Military Education: What percent of the soldiers in a primary MOS training have received training in another MOS?

Dominant Language: What is the dominant language when English is a Second Language?

Reading Level: What level can most soldiers read? How is reading level determined?

Effect of Prior Training and Experience: Does prior training or experience make any difference in success in an AIT course?

Socio-Economic Groups: What is the dominant Socio-Economic Group?

Attrition: What percentage of those starting do not finish their first AIT course? What reasons are given for attrition? What happens to those who attrit?

Attitudes: In general, how do students feel about being in the Army? do attitudes affect success in the course?

Other Influences: What influence does the school brigade activities have on the success of a student or the study habits they develop in AIT courses? What other factors influence success?

BSEP Student Characteristics

(Same demographic profile as that compiled for the AIT student)

APPENDIX B

DEMOGRAPHIC COMPARISON OF ELIGIBLES (Reprinted from TRADOC EVALUATION - BASIC SKILLS EDUCATION PROGRAM, PHASE I, pp. 96-108.)

Demographic Comparison of Literacy Program Eligibles. (Data Based on eligibles (personnel scoring below 19 on SelectABLE) tested during period 1 October 1978 through 30 November 1979. N=4142 for all sets of comparison.)

1.	Mental Category vs Race					TOTAL %
	Caucasian %	Black %	Amer Ind %	Oriental %		
CAT 1	28/57 = 49.1	28/57 = 49.1	1/57 = 1.8	0/57 = 0	57/4142 = 1.4	
CAT 2	100/222 = 45.0	120/222 = 54.1	2/222 = 0.9	0/222 = 0	222/4142 = 5.4	
CAT 3a	192/425 = 45.2	229/425 = 53.9	1/425 = 0.2	3/425 = 0.7	425/4142 = 10.2	
CAT 3b	1147/2485 = 46.2	1300/2485 = 52.3	15/2485 = 0.6	23/2485 = 0.9	2485/4142 = 60.0	
CAT 4	369/953 = 38.7	565/953 = 59.3	11/953 = 1.2	8/953 = 0.8	953/4142 = 23.0	
TOTAL	1836/4142 = 44.4	2242/4142 = 54.1	30/4142 = 0.7	34/4142 = 0.8	N = 4142	

2.	Mental Category vs Primary Language					TOTAL %
	English %	Insular P.R. %	Other Sp %	Other %		
CAT 1	51/57 = 89.5	4/57 = 7.0	2/57 = 3.5	0/57 = 0		
CAT 2	204/222 = 91.9	15/222 = 6.7	3/222 = 1.4	0/222 = 0		
CAT 3a	390/425 = 91.8	20/425 = 4.7	13/425 = 3.0	2/425 = 0.5		
CAT 3b	2293/2485 = 92.3	118/2485 = 4.7	70/2485 = 2.8	4/2485 = 0.2		
CAT 4	887/953 = 93.1	40/953 = 4.2	22/953 = 2.3	4/953 = 0.4		
TOTAL	3825/4142 = 92.3	197/4142 = 4.8	110/4142 = 2.7	10/4142 = 0.2	N = 4142	

3. Mental Category vs Military Component

	Nat Guard	Reg Army	Army Reserve	N
CAT 1	33/57 = 57.9	21/57 = 36.8	3/57 = 5.2	= 4142
CAT 2	92/222 = 41.4	118/222 = 53.2	12/222 = 5.4	
CAT 3a	229/425 = 53.9	182/425 = 42.8	14/425 = 3.3	
CAT 3b	1165/2485 = 46.9	1179/2485 = 47.4	141/2485 = 5.7	
CAT 4	460/953 = 48.3	358/953 = 37.6	135/953 = 14.1	
TOTAL	1979/4142 = 47.8	1858/4142 = 44.9	305/4142 = 7.3	

4. Sex vs Race

	Caucasian %	Black %	Amer Ind %	Oriental %	TOTAL %
Male	1823/4087 = 44.6	2202/4087 = 53.9	30/4087 = 0.7	32/4087 = 0.8	4087/4142 = 98.7
Female	13/55 = 23.6	40/55 = 72.7	0/55 = 0.0	2/55 = 3.6	55/4142 = 1.3
TOTAL	1836/4142 = 44.3	2242/4142 = 54.2	30/4142 = 0.7	34/4142 = 0.8	N = 4142

5. Sex vs Primary Language

	English %	Insular P.R. %	Other Spanish	Other
Male	3773/4087 = 92.3	195/4087 = 4.8	109/4087 = 2.7	10/4087 = 0.2
Female	52/55 = 94.5	2/55 = 3.7	1/55 = 1.8	0/55 = 0.0

6. Sex vs Education Level

	Less than HS Compl	HS GED	At least HS Dipl
Male	2561/4087 = 62.7	84/4087	1442/4087 = 35.2
Female	11/55 = 20.0	3/55	41/55 = 74.5
TOTAL	2572/4142 = 62.1	87/4142	1483/4142 = 35.8

7. Sex vs Military Component

	Nat Guard	Reg Army	Army Reserve
Male	1958/4087 = 47.9	1826/4087 = 44.7	303/4087 = 7.4
Female	21/55 = 38.2	32/55 = 58.2	2/55 = 3.6

8. Sex vs Mental Category

	Cat 1	Cat 2	Cat 3a	Cat 3b	Cat 4
Male	55/4087 = 1.3	201/4087 = 4.9	403/4087 = 9.9	2475/4087 = 60.6	953/4087 = 23.3
Female	2/55 = 3.6	21/55 = 38.2	22/55 = 40.0	10/55 = 18.2	0/55 = 0

9. Attrition vs Military Component

	Nat Guard	Reg Army	Army Reserve
Passed	1466/3090 = 47.4	1402/3090 = 45.4	222/3090 = 7.2
*Recycle	60/162 = 37.0	94/162 = 58.0	8/162 = 5.0
Failed	453/890 = 50.9	362/890 = 40.7	75/890 = 8.4

10. Attrition vs Race

	Caucasian	Black	American Indian	Oriental
Passed	1351/3090 = 43.7	1696/3090 = 54.9	19/3090 = 0.6	24/3090 = 0.8
Recycle	53/162 = 32.7	108/162 = 66.7	1/162 = 0.6	0/162 = 0.0
Failed	432/890 = 48.6	438/890 = 49.2	10/890 = 1.1	10/890 = 1.1

		Attrition vs SelectABLE Score							TOTAL									
		0-11	12	13	14	15	16	17	18									
Attrit	176/890	-19.8	86/890	-9.7	70/890	-7.9	84/890	-9.4	98/890	-11.0	118/890	-13.3	139/890	-15.6	119/890	-13.4	890/4142	-21.5
*Recycle	23/162	-14.2	11/162	-6.8	20/162	-12.3	13/162	-8.0	15/162	-9.3	25/162	-15.4	25/162	-15.4	30/162	-18.5	162/4142	-3.9
Pass	441/3090	14.3	183/3090	5.9	252/3090	8.2	294/3090	9.5	383/3090	12.4	449/3090	14.5	502/3090	16.2	586/3090	19.0	3090/4142	74.1
TOTAL	640/4142	-15.5	280/4142	-6.8	342/4142	-8.3	391/4142	-9.4	496/4142	-12.0	592/4142	-14.3	666/4142	-16.1	735/4142	-17.7	N	-4142

12. SelectABLE Score vs Attrition

	Attrit	Recycle*	Pass	Ait/Osout
0-11	176/640 = 27.5	23/640 = 3.6	441/640 = 68.9	
12	86/280 = 30.7	11/280 = 3.9	183/280 = 65.4	
13	70/342 = 20.5	20/342 = 5.8	252/342 = 73.7	
14	84/391 = 21.5	13/391 = 3.3	294/391 = 75.2	
15	98/496 = 19.8	15/496 = 3.0	383/496 = 77.2	
16	118/592 = 19.9	25/592 = 4.2	449/592 = 75.8	
17	139/666 = 20.9	25/666 = 3.8	502/666 = 75.4	
18	119/735 = 16.2	30/735 = 4.1	586/735 = 79.7	

13. Education Level vs Race

	Caucasian %	Black %	Amer Ind %	Oriental %
Less than HS Compl	1271/2572 = 49.4	1259/2572 = 49.0	21/2572 = 0.8	21/2572 = 0.8
HS GED	42/87 = 48.3	44/87 = 50.6	1/87 = 1.1	0/87 = 0
At least HS Dipl	523/1483 = 35.3	939/1483 = 63.3	8/1483 = 0.5	13/1483 = 0.9

14. Education Level vs Primary Language

	English %	Inular P.R. %	Other Spanish %	Other %
Less than HS Compl	2387/2572 = 92.8	93/2572 = 3.6	85/2572 = 3.3	7/2572 = 0.3
HS GED	79/87 = 90.8	5/87 = 5.7	2/87 = 2.3	1/87 = 1.2
At least HS Dipl	1359/1483 = 91.6	99/1483 = 6.7	23/1483 = 1.6	2/1483 = 0.1

Education Level vs Military Component

15.

	Nat Guard	Reg Army	Army Reserve
Less than HS Compl	1461/2572 = 56.8	861/2572 = 33.5	250/2572 = 9.7
HS GED	25/87 = 28.7	51/87 = 58.6	11/87 = 12.6
At least HS Dipl	493/1483 = 33.2	946/1483 = 63.8	44/1483 = 3.0

Military Component vs Education Level

16.

	Less than HS Compl	HS GED	At Least HS Dipl
Nat Guard	1461/1979 = 73.8	25/1979 = 1.3	493/1979 = 24.9
Reg Army	861/1858 = 46.3	51/1858 = 2.7	946/1858 = 50.9
Army Reserve	250/305 = 82.0	11/305 = 3.6	44/305 = 14.4

17.

Education Level vs Mental Category

	Cat 1	Cat 2	Cat 3a	Cat 3b	Cat 4
Less than HS Dipl	39/2572 = 1.5	133/2572 = 5.2	275/2572 = 10.7	1640/2572 = 638	485/2572 = 18.8
HS GED	2/87 = 2.3	4/87 = 4.6	16/87 = 18.4	51/87 = 58.6	14/87 = 16.1
At least HS Dipl	16/1483 = 1.2	85/1483 = 5.7	134/1483 = 9.0	794/1483 = 53.5	454/1483 = 30.6

18.

Mental Category vs Education Level

	Less than HS Dipl	HS GED	At least HS Dipl
Cat 1	39/57 = 68.4	2/57 = 3.5	16/57 = 28.1
Cat 2	133/222 = 59.9	4/222 = 1.8	85/222 = 38.3
Cat 3a	275/425 = 64.7	16/425 = 3.8	134/425 = 31.5
Cat 3b	1640/2485 = 66.0	51/2485 = 2.1	794/2485 = 31.9
Cat 4	485/953 = 50.9	14/953 = 1.5	454/953 = 47.6

19. Race vs Primary Language

	English %	Insular P.R. %	Other Spanish %	Other %
Caucasian	1552/1836 = 84.5	187/1836 = 10.2	93/1836 = 5.1	4/1836 = 0.2
Black	2227/2242 = 99.3	9/2242 = 0.4	5/2242 = 0.2	1/2242 = 0.1
Amer Ind	26/30 = 86.7	0/30 = 0	4/30 = 13.3	0/30 = 0
Oriental	20/34 = 58.8	1/34 = 2.9	8/34 = 23.6	5/34 = 14.7

Race vs Military Component

20.

	Nat Guard	Reg Army	Army Reserve
Caucasian	1029/1836 = 56.0	662/1836 = 36.1	145/1836 = 7.9
Black	919/2242 = 41.0	1165/2242 = 52.0	158/2242 = 7.0
Amer Ind	13/30 = 43.3	17/30 = 56.7	0/30 = 0
Oriental	18/34 = 52.9	14/34 = 41.2	2/34 = 5.9

Primary Language vs Military Component

21.

	Nat Guard	Reg Army	Army Reserve
English	1796/3825 = 47.0	1734/3825 = 45.3	295/3825 = 7.7
Insular P.R.	112/197 = 56.9	80/197 = 40.6	5/197 = 2.5
Other Spanish	63/110 = 57.3	43/110 = 39.1	4/110 = 3.6
Other	8/10 = 80.0	1/10 = 10.0	1/10 = 10.0

**Recycle" is defined as recycle to an MOS not taught at original AIT/OSUT installation.

Demographic Comparison of English as a Second Language Program eligibles. (Data based on eligibles (personnel scoring below 70 on ECLT) tested during period 1 March 1979 through 30 November 1979. N=1093 for all sets of comparison.)

1. Civilian Education Level vs Military Component

	Reg Army %	Army Reserve %	Nat Guard %	TOTAL %
Less than HS Compl	137/292 = 46.9	25/292 = 8.6	130/292 = 44.5	292/1093 = 26.7
HS GED	33/40 = 82.5	3/40 = 7.5	4/40 = 10.0	40/1093 = 3.7
At least HS Dipl	540/761 = 71.0	34/761 = 4.5	187/761 = 24.5	761/1093 = 69.6
TOTAL	710/1093 = 65.0	62/1093 = 5.7	321/1093 = 29.3	N = 1093

2. Civilian Education Level vs Attrition

	Failed Ait/OSUT	Passed Ait/OSUT	Recycled *	Other Attrit
Less than HS Compl	35/292 = 11.9	230/292 = 78.8	8/292 = 2.7	19/292 = 6.6
HS GED	3/40 = 7.5	36/40 = 90.0	0/40 = 0	1/40 = 2.5
At least HS Dipl	72/761 = 9.5	649/761 = 85.3	17/761 = 2.2	23/761 = 3.0
TOTAL	110/1093 = 10.1	915/1093 = 83.7	25/1093 = 2.3	43/1093 = 3.9

3. Military Component vs Attrition

	Failed Ait/OSUT	Passed Ait/OSUT	Recycled *	Other Attrit
Regular Army	64/710 = 9.0	609/710 = 85.8	10/710 = 1.4	27/710 = 3.8
Army Reserve	14/62 = 22.6	44/62 = 71.0	3/62 = 4.8	1/62 = 1.6
Nat Guard	32/321 = 10.0	262/321 = 81.6	12/321 = 3.7	15/321 = 4.7

4. Ethnic Group vs Mental Category

	Cat 1	Cat 2	Cat 3a	Cat 3b	Cat 4	TOTAL
Insular P.R.	14/874 =1.6	76/874 =8.7	74/874 =8.5	536/874 =61.3	174/874 =19.9	874/1093=80.0
Other Spanish	7/167 =4.2	5/167 =3.0	15/167 =9.0	112/167 =67.1	28/167 =16.7	167/1093=15.3
Other	0/52 =0	5/52 =9.6	2/52 =3.8	30/52 =57.7	15/52 =28.9	52/1093 =4.7
TOTAL	21/1093=1.9	86/1093=7.9	91/1093=8.3	678/1093=62.0	217/1093=19.9	N =1093

5. Ethnic Group vs Sex

	Male	Female
Insular Puerto Rican	865/874 = 99.0	9/874 = 1.0
Other Spanish	164/167 = 98.2	3/167 = 1.8
Other	51/52 = 98.1	1/52 = 1.9
TOTAL	1080/1093 = 98.8	13/1093 = 1.2

6. Ethnic Group vs Civilian Education Level

	Less than HS Compl	HS GED	At least HS Dipl
Insular P.R.	193/874 = 22.1	25/874 = 2.9	656/874 = 75.0
Other Spanish	76/167 = 45.5	15/167 = 9.0	76/167 = 45.5
Other	23/52 = 44.2	0/52 = 0	29/52 = 55.8

N = 1093

Ethnic Group vs Military Component

	Regular Army	Army Reserve	Nat Guard	
7.				
Insular P.R.	563/874 = 64.4	47/874 = 5.4	264/874 = 30.2	
Other Spanish	111/167 = 66.5	9/167 = 5.4	47/167 = 28.1	
Other	36/52 = 69.2	6/52 = 11.5	10/52 = 19.3	N = 1093

Ethnic Group vs Attrition

	Failed Ait/OSUT	Passed Ait/OSUT	Recycled *	Other Attrit	
8.					
Ins P.R.	91/874 = 10.4	736/874 = 84.2	19/874 = 2.2	28/874 = 3.2	
Other Spanish	14/167 = 8.4	139/167 = 83.2	3/167 = 1.8	11/167 = 6.6	
Other	5/52 = 9.6	40/52 = 76.9	3/52 = 5.8	4/52 = 7.7	N = 1093

Mental Category vs Sex

	Male	Female	
9.			
Cat 1	21/21 = 100	0/21 = 0	
Cat 2	80/86 = 93.0	6/86 = 7.0	
Cat 3a	87/91 = 95.6	4/91 = 4.4	
Cat 3b	675/678 = 99.6	3/678 = 0.4	
Cat 4	217/217 = 100	0/217 = 0	N = 1093

10. Mental Category vs Military Component

	Regular Army	Army Reserve	Nat Guard
Cat 1	15/21 = 71.4	1/21 = 4.8	5/21 = 23.8
Cat 2	64/86 = 74.4	7/86 = 8.1	15/86 = 17.4
Cat 3a	60/91 = 65.9	0/91 = 0	31/91 = 34.1
Cat 3b	444/678 = 65.5	32/678 = 4.7	202/678 = 29.8
Cat 4	127/217 = 58.5	22/217 = 10.1	68/217 = 31.4

N = 1093

11. Mental Category vs Civilian Education Level

	Less than HS Compl	HS GED	At least HS Dipl
Cat 1	7/21 = 33.3	0/21 = 0	14/21 = 66.7
Cat 2	30/86 = 34.9	0/86 = 0	56/86 = 65.1
Cat 3a	18/91 = 19.8	2/91 = 2.2	71/91 = 78.0
Cat 3b	191/678 = 28.2	32/678 = 4.7	455/678 = 67.1
Cat 4	46/217 = 21.2	6/217 = 2.8	165/217 = 76.0

N = 1093

12. Mental Category vs Attrition

	Failed Ait/OSUT	Passed Ait/OSUT	Recycled *	Other Attrit
Cat 1	0/21 = 0	19/21 = 90.5	2/21 = 9.5	0/21 = 0
Cat 2	4/86 = 4.7	77/86 = 89.5	3/86 = 3.5	2/86 = 2.3
Cat 3a	8/91 = 8.8	73/91 = 80.2	6/91 = 6.6	4/91 = 4.4
Cat 3b	81/678 = 11.9	559/678 = 82.4	10/678 = 1.5	28/678 = 4.1
Cat 4	17/217 = 7.8	187/217 = 86.2	4/217 = 1.8	9/217 = 4.1

N = 1093

13. Sex vs Civilian Education Level

	Less than HS Compl	HS GED	At least HS Dipl	
Male	292/1080 = 27.0	40/1080 = 3.7	748/1080 = 69.3	
Female	0/13 = 0	0/13 = 0	13/13 = 100	N = 1093

14. Sex vs Military Component

	Regular Army	HS GED	At least HS Dipl	
Male	703/1080 = 65.1	59/1080 = 5.5	318/1080 = 29.4	
Female	7/13 = 53.8	3/13 = 23.1	3/13 = 23.1	N = 1093

15. Sex vs Attrition

	Failed Ait/OSUT	Passed Ait/OSUT	Recycled *	Other Attrit
Male	109/1080 = 10.1	905/1080 = 83.8	23/1080 = 2.1	43/1080 = 4.0
Female	1/13 = 7.7	10/13 = 76.9	2/13 = 15.4	0/13 = 0

16. Inverse of #1 Military Component vs Civilian Education Level

	Less than HS Compl	HS GED	At least HS Dipl	
Regular Army	137/710 = 19.3	33/710 = 4.6	540/710 = 76.1	
Army Reserve	25/62 = 40.3	3/62 = 4.8	34/62 = 54.8	
Nat Guard	130/321 = 40.5	4/321 = 1.2	187/321 = 58.3	N = 1093

17. Inverse of #4 Mental Category vs Ethnic Group

	Insular P.R.	Other Spanish	Other
Cat 1	14/21 = 66.7	7/21 = 33.3	0/21 = 0
Cat 2	76/86 = 88.4	5/86 = 5.8	5/86 = 5.8
Cat 3a	74/91 = 81.3	15/91 = 16.5	2/91 = 2.2
Cat 3b	536/678 = 79.1	112/678 = 16.5	30/678 = 4.4
Cat 4	174/217 = 80.2	28/217 = 12.9	15/217 = 6.97

N = 1093

18. Inverse of #6 Civilian Education Level vs Ethnic Group

	Insular P.R.	Other Spanish	Other
Less than HS Compl	193/292 = 66.1	76/292 = 26.0	23/292 = 7.9
HS GED	25/40 = 62.5	15/40 = 37.5	0/40 = 0
At least HS Dipl	656/761 = 86.2	76/761 = 10.0	29/761 = 3.8

N = 1093

19. Inverse of #7 Military Component vs Ethnic Group

	Insular P.R.	Other Spanish	Other
Regular Army	563/710 = 79.3	111/710 = 15.6	36/710 = 5.1
Army Reserve	47/62 = 75.8	9/62 = 14.5	6/62 = 9.7
Nat Guard	264/321 = 82.2	47/321 = 14.6	10/321 = 3.2

N = 1093

20. Inverse of #10 Military Component vs Mental Category

	Cat 1	Cat 2	Cat 3a	Cat 3b	Cat 4
Regular Army	15/710=2.1	64/710=9.0	60/710=8.5	444/710=62.5	127/710=17.9
Army Reserve	1/62 =1.6	7/62 =11.3	0/62 =0	32/62 =51.6	22/62 =35.5
Nat Guard	5/321 =1.6	15/321=4.7	31/321=9.7	202/321=62.9	68/321 =21.1

N = 1093

21. Inverse of #11 Civilian Education Level vs Mental Category

	Cat 1	Cat 2	Cat 3a	Cat 3b	Cat 4
Less than HS	7/292 =2.4	30/292 =10.3	18/292 =6.2	191/292=65.4	46/292 =15.7
Compl	0/40 =0	0/40 =0	2/40 =5.0	32/40 =80.0	6/40 =15.0
HS GED	14/761=1.8	56/761 =7.4	71/761 =9.3	455/761=59.8	165/761=21.7
At least HS					
Dipl					

N = 1093

**Recycle" is defined as recycle to an MOS not taught at original AIT/OSUT installation

APPENDIX C

EMBEDDING LEARNING STRATEGY INSTRUCTIONS WITHIN THE INSTRUCTIONAL TEXT

In each of the programs in this appendix the students are guided to use specific information-processing strategies by adjunct aids and explicit instructions in the instructional text.

Jones, B. F., & Katims, M. (Eds.) Chicago Mastery Learning Reading Program with Learning Strategies (CMLR/LS) Levels K-N (Grades 5-8). Watertown, MA: Mastery Education Corporation, 1980.

Target Population

The materials were developed primarily for use in upper elementary school (grades 5-8). However, it was assumed from the outset that due to transfer and classroom practices that the materials would be used by students reading as low as grade 4. In fact, CMLR/LS has been used successfully in a mandatory summer school for 13- and 14-year olds reading between grades 3 and 4 (Jones & Katims, 1980). CMLR/LS has also been used with low achieving high school students in various school settings.

Objectives

To improve reading comprehension as measured by norm-referenced tests and by criterion-referenced tests (CRTs) developed locally to assess mastery for 273 key objectives in the Chicago Curriculum Guide in Reading for the Elementary School (1974). For grades 5-8 there are 127 key objectives.

Content

Reading objectives are divided into two strands: comprehension and study skills. Study skills objectives include finding the main idea, summarizing, and outlining as well as the range of skills required to ready study content area texts (previewing; questioning; reading diagrams, tables, maps, and other graphic materials) and skills required to locate information (learning to use the parts of a book, the dictionary, and all major reference materials in a library). Comprehension skills include various inductive and deductive skills, critical thinking skills such as differentiating facts from propaganda and opinions, and comprehension of figurative language forms such as analogies and symbols. Various vocabulary learning

techniques are taught over both strands: visualizing, marking up stories or poems, categorizing, inferring meaning from context clues in the text, creating contextual meaning from dictionary definitions, and structural analysis. Test taking skills are taught across strands also.

Organization

Instruction is organized in terms of learning units. Each unit consists of student exercise, a formative test (FT) that parallels the CRT in structure and test format, a corrective activity using a different teaching strategy for those who failed the FT, an enrichment activity for those who passed the FT, and the CRT itself. Additionally, there are optional fun activities and subject-related activities which apply each objective to a different instructional context. Instruction time varies according to the needs of the school and student.

Method of Instruction

While the materials could be used in a self-paced, individualized mode, they were intended to be used in a teacher-paced, group instructional mode. The content of instruction is standardized in the student workbook text of each mastery learning unit. Instruction is direct and includes providing a definition of the structure of each type passage or graph or word problem to be comprehended, learning strategy instructions, guided practice using adjunct aids. (These are step-by-step or content-specific prompts in the form of "ask yourself" questions or "think" statements.) Guided practice is followed by independent practice. Additionally, the content and skills in each unit are sequenced to progress from simple/concrete/explicit to complex/abstract/inexplicit. This is why grade 5-8 materials can be read by students with lower reading levels.

Placement/Assessment

Reading levels are correlated with standardized norms. Thus, a student reading at grade 5 would be given level K reading materials. Mastery of specific skills is assessed by specific CRTs. Any norm-referenced tests may be used on a pretest/posttest basis to assess initial reading level and/or growth after instruction. The program is cost effective.

Limitations

Students must be able to decode at grade 3 or more.

Strengths

There is data from various sources that the program is easily implemented with little or no inservice, is strongly supported by teachers and students in large-scale implementations in Chicago and New York City's District 19 (Brooklyn), and is effective in improving reading comprehension. Units can be rearranged to create instructional programs to serve special needs.

Research Basis and Use

Intensive and extensive field test data for each unit in a minimum of six classrooms, data from field test classrooms matched to control classrooms; variance and correlational data showing near-zero correlation between initial reading level and achievement; data showing transfer to comprehension of math concepts; data showing large gains of high school tutors using CMLR/LS with upper elementary students as tutees. CMLR/LS is used widely in Chicago and New York. See references for Jones and Katims and Jones, Amiran, and Katims in Appendix I.

Applicability to the Army

CMLR/LS would be useful in BSEP programs for students who can decode.

Sticht, T. G. Developing literacy and learning strategies in organizational settings. In H. F. O'Neil, Jr. & C. D. Spielburger (Eds.) Cognitive and Affective Learning Strategies. New York: Academic Press, 1979.

Target Population

Army, Air Force, and Navy recruits reading at grade level 7 or above.

Objectives

To improve literacy among low achieving recruits; to facilitate course completion in advanced training.

1981

... analyzed the curriculum to develop an inventory of job descriptions involving reading. He found that there were two types: jobs involving reading-to-do and those reading-to-learn. The former were jobs which required the recruit to locate information that can be applied and then

forgotten (e.g., using a recipe). The latter were jobs that required the trainee to learn the information for later use, such as passing an examination. Students were then interviewed to determine the problems in learning for each type of job and to determine the strategies that were useful for each type of job. Useful reading-to-do strategies identified were: using the table of content, index, and glossary; skimming and scanning, and following directions. Reading-to-learn tasks required four types of strategies: reread-rehearse, problem-solve-question, relate-associate, and focus attention.

Rather than train students to use these strategies in some type of adjunct course, Sticht developed curriculum materials that defined the different types of job situations and involved students in the appropriate strategy by providing instructions and adjunct aids in the instructional text. The reading-to-do strand for the Army involves six modules: the use of tables of contents, indices, and tables and graphs; looking up information in the body of a manual; following procedural directions; and filling out job forms: The Air Force program is similar but has only four modules. All contents are derived from the job-related materials. The reading-to-learn strand centers around six job clusters (e.g., cook). In each job cluster, 12 major concepts were identified, and specific knowledge objectives were developed (e.g., using recipe cards and serving are two concepts for the job cluster for cook). For each of the 12 concepts, a 300-400 word passage was written such that it included the knowledge objectives for each concept. Similar passages were written for two job clusters for the Air Force program.

Organization

The module is the unit of instruction. In the reading-to-learn strand the modules are written around a major concept. Each module consists of source materials and numerous worksheets. Instruction is presented in a mastery learning format. Each module is accompanied by a Pre-Proficiency Test and Post-Proficiency Test which define eligibility for the module training and which are used to assess mastery. If a student fails the pretest, he/she receives the instruction. If the student fails the posttest, there is additional instruction and testing until the skill is mastered.

Method of Instruction

The worksheets simulate the structure and content of the materials to be learned or used. Specific questions were developed to require the student to process both the structural features of the materials and the contents. The questions proceed from simple to complex. Additionally,

in the reading-to-learn strand, the students are forced to use effective information processing strategies because each set of materials requires the student to transform the information into a table or flow chart. The students then discuss their representations with each other so that each student has access to at least one other representation. Finally, the reading-to-learn strand for the Army includes special instruction in how to find the main ideas of the information that is read.

Strengths

Unlike many of the so-called mastery learning formats used in the military, the model developed by Sticht provides feedback and remediation for those who fail to pass the proficiency test, the heart of a mastery learning instructional system. The method combines mastery learning and learning strategies and is cost effective. The materials are very well-written and the program is well-conceived. The data is generally not experimental but there are numerous indications of positive effects. No inservice is required.

Limitations

The materials require grade 7 reading level.

Research Basis

The materials were field tested in various military basis. Research and development have been conducted at various stages over several years, each stage feeding into the development of the next stage. Evaluations are formative and summative; the data were derived from experiments, quasi experiments, surveys, interviews, correlations, and curriculum analyses.

Applicability to the Army

This model is AIT-integrated and would be excellent for use in any BSEP course and could be used as a model for developing materials for AIT courses.

Amiran, M. R., Jones, B. F., & Fridell, R. Matrix Outlining and Analysis.
(A college-level course to be given at the Citywide Community College,
Chicago, Illinois, as an experimental course.)

Described in B. F. Jones, M. R. Amiran, and M. Katims, Embedding structural information and learning strategies in two instructional programs: Two models of development. Paper presented at a conference on Learning and Thinking Skills, sponsored jointly by the National Institute of Education and the Learning Research and Development Center, University of Pittsburgh, Pittsburgh, October 1980.

Target Population

College age student reading at grade 8 or above.

Objectives

To outline complex, cross-classifiable information (e.g., descriptions of attributes or parts of weapons) in a two-dimensional table or matrix; to use the matrix as the basis for memorizing, for generating analytical statements, and for writing compare-and-contrast essays.

Content

Discussion of matrix outlining and analysis uses. Instruction moves from classifying sentences into name and attribute categories, to cross-classifying increasingly complex passages into 2-level matrices (which include main ideas, details, and inferences. Students learn to produce twelve different types of analytical statements (e.g., trends, probability, co-variance). Covers diverse text structures, including name/attribute, expository, survey, autobiographical and biographical, and various fictional structures.

Organization

Instructional materials are organized in terms of three books. Book I provides instruction for constructing matrices involving essentially one text (e.g., one sociology text) and therefore requires little integration or synthesis. Book II deals with matrices for fiction. Book III focuses on constructing matrices for information from diverse sources (lectures, diaries, surveys, political propaganda, textbooks, etc.)

Method of Instruction

Deductive and inductive instructions, guided practice, and independent practice.

Test-Taking Strategies

Provides specific steps for memorizing any information in a matrix and for writing compare-and-contrast essay tests.

Strengths

Memorizing and writing procedures have been tested with eighth graders and college students. Materials provide "how to" instructions.

Limitations

Materials do not deal with learning/thinking paradigms other than compare-and-contrast (e.g., procedural paradigms).

Research Basis and Use

Extensive field-test data; some experimental research; currently used only in experimental field-test courses.

Applicability to the Army

Book I is highly appropriate for the diversity of name/attribute and vocabulary/definition passages in Army curricular materials. Book II is not relevant at all. Book III would be appropriate for high order instructional objectives involving analysis of diverse text passages.

APPENDIX D

LEARNING STRATEGY/STUDY SKILLS ADJUNCT COURSES

Each of the programs in this appendix provides explicit instruction in the use of specific learning strategies and study skills. These programs differ from other study skills courses in that the students are provided with explicit information about the nature of each strategy as well as instruction in how to apply it to diverse situations.

Anderson V., Raisbeck, D., & Smart, D. The Rochester Secondary Reading Program (RSRP). LaSalle IL: Open Court, 1980.

Target Population

Students of high school age or older who have remedial reading problems.

Objectives

General: To facilitate reading comprehension and achievement in the content areas.

Specific: Each story has a lesson which has a range of objectives. These include vocabulary learning, use of context clues, note-taking, outlining, paraphrasing, generating word patterns, analyzing question demands and sentence meanings, summarizing, finding the main idea, and transferring text to graphic representations.

Content

Instruction has three components: (1) reading materials for the students provided in newspaper-size tabloids, (2) abbreviated teacher activities in the tabloid; detailed teacher activities in the teacher manuals, (3) and skill sheets (for the student) which are correlated to tabloid passages and to teaching activities. Tabloid texts include poems, diverse fiction structures, expository sequential argumentative/persuasive, classification, opinion, graphic, and name/attribute text structures. Text passages simulate passages from novels, poetry books, history and social studies texts, myths and legends, essays, and news articles. Teacher's manual includes punctuation checklist, summary of key word parts (affixes), and capitalization checklist.

Organization

Instruction is organized in terms of lessons. Each tabloid has ten lessons. Lessons extend from 5-8 days. Day 1 typically involves teacher's (motivational) introduction to the text, silent reading, discussion, including relating old and new information, and vocabulary exercises. Day 2 may involve word analysis; underlining, note-taking, or some other text-processing procedure; a second reading (oral); and analysis of graphic text/written text relations. Subsequent days involve similar instruction for 1-2 other passages in the tabloid.

Method of Instruction

Generally, instruction about motivation, concepts, strategies, and procedures is explicit. Instruction is based on analysis of possible reasons for failure to process literal meaning, failure to integrate complex information, failure to analyze content to infer from text, and inability to express verbal information in writing. Heavy emphasis is put on re-ordering what is read into alternative contents by recognizing paraphrasing, by restating the information in paraphrases, by transforming it into notes and summaries, and by relating new information to old. Oral reading is emphasized so that the teacher can correct errors as they occur. It is also argued that oral reading facilitates comprehension, literary appreciation, and interpersonal communications.

Inservices

Inservice is only minimum.

Strengths

Texts are designed to cover a very broad range of text structures and information-processing skills. Levels are designed for older adolescents. Instruction combines the best of basals with the best of study skills programs.

Limitations

The focus on oral reading in a group context may be inconsistent with current instructional practices.

Applicability to the Army

Excellent reading instruction for recruits who can decode. This program would be useful in a BSEP course. It would also be a useful model to use for AIT-integrated materials; i.e., to develop AIT-integrated materials using the format, organization and procedures developed in this program.

Dansereau, D. (Ed. Evaluation of a learning strategy system. In H. F. O'Neil, Jr. And C. D. Spelburger, (Eds.) Cognitive and Affective Learning Strategies. New York: Academic Press, 1979.

The learning strategy system developed is currently a course that is taught at Texas Christian University.

Target Population

College students and other older students who have difficulty in reading comprehension and/or in studying for tests.

Objectives

To develop a specific system of Comprehension/Retention strategies for acquiring, processing, and recalling complex information in long prose passages; to develop a system of support strategies for goal setting and scheduling, for concentration management, and for monitoring and diagnosis. The content of the course revolves around the concept of network outlining, a method developed by Dansereau and his colleagues largely as means of implementing the classic Survey-Question-Read-Recall-Review (SQ3R) approach. An assessment of student learning strategies (based on a self-report inventory developed by Dansereau et al) indicated that students lacked the strategies to apply SQ3R to complex texts.

Content

Network outlining is a method of classifying information and note taking in hierarchial representations consisting of nodes and linking lines indicating idea relations. The students are taught a series of procedures which integrate the cognitive/retention strategies and the support strategies. The acronym for these procedures is called MURDER (mood, understand, recall, digest, expand, and review). Network outlining is taught in the recall segment. As part of network outlining, the students learn to classify information in terms of the following relations: part-to-whole, example of a type, causal/sequential, analagous, name/attribute, and evidence for a proposition. Additionally, the students learn the "key words" in the text which signal each type of relation; e.g., "illustrates" is a key word signaling that the information in the sentence is evidence of a proposition. The classified information is then outlined in a hierarchial structure. Exactly how the students learn to reduce the content to core ideas and content in order to go into the nodes in the hierarchy is not clear. Expand strategies involve, among other things, efforts to apply the information, and review refers to a review of the errors and an analysis of the reasons for the errors. The support strategies are listed above.

Organization/Method of Instruction

The program is organized in terms of the regular meetings for a course using a combination of instructional modes: lecture, class discussion, teacher demonstrations, guided practice with selected readings and worksheet activities. The experimental data on the cognitive strategies refers to 5-1/2 hours of training and on the support strategies to 2-1/2 hours of training.

Strengths

The program does provide a system of learning strategies instruction. There are data from numerous sources over a 6-year period indicating that the system works.

Limitations

Requires reading levels of grades 8 or more.

Research Basis

Experimental and quasi-experimental; comprehension and recall; correlational and survey data repeated field testing and revisions.

Applications to the Army

The course would be good as part of a BSEP program for students who can read at grade 8 but who lack learning strategies. The theory and procedures for the course may be used to serve as a model to develop a similar course using passages and text for lower reading levels.

Dobrovoly, J. L., McCombs, B.J., Judd, W. A. Study skills remediation: Beneficial effects of individualized skill training. Paper presented at the annual meeting of the American Educational Research Association, Boston, April 1980.

Judd, W. A., McCombs, B.J., & Dobrovoly, J. L. Time management as a learning strategy for individualized instruction. In H. F. O'Neil, Jr., and C. D. Spielburger, (Eds.) Cognitive and affective learning strategies. New York: Academic Press, 1979.

Target Population

Air Force recruits reading at grade 5.

Objectives

To determine the characteristic problems that students encounter in a computer managed instructional system; to determine or define effective learning strategies to help students cope with these problems; to design, develop, and implement a limited set of self-contained instructional modules to increase the effectiveness of students in four computer-managed courses offered by the Air Force as part of its Advanced Instructional System (AIS).

Content

Altogether, six modules were developed: four modules in a Study Skills Package and two modules in a different package. The Study Skills Package modules were Reading Comprehension, Concentration Management, Memorizations Skills, and Test Taking. The Reading Comprehension package focused on such study skills as finding the main idea. The Concentration Management package applied many of the concepts and techniques developed by Danserea (see description in this appendix). The Memorization Skills package utilized diverse elaboration and other strategies developed by Weinstein (see description in this appendix). The Test Taking unit involved students in trying to think out logically the correct answer to various types of problems. The text in each unit is job-related in that the examples and concept content are taken directly from typical work-related situations in the four AIS courses. The other two units were a time management module and a unit orienting the students to the computer-managed course. The time management module focused on having the students construct a map of the estimated progress that they should make in moving through the computer course and then plotting their actual progress. This was done because it was found in the exploratory part of the study that students in computer managed courses frequently had little sense of time and felt isolated in being outside of the traditional group-paced courses that they were accustomed to attending.

Organization

The module is the unit of organization of instruction. Each module consists of direct instruction in easy-to-understand, narrative texts, examples, and practice. Performance for each module is assessed by a criterion-reference test.

Method of Instruction

Instruction is self-paced and involves working through textual materials, assisted by course instructors. Essentially, their function was to monitor the progress of the students but they did try to help some of the slower students as well. All essential instruction is contained in the programmed text that the students work through for each module.

Limitations

The data for the effects of the modules on the computer-managed courses was limited by problems of implementation; namely the reassignment of trained instructors to other duties before they assign the modules to the trainees.

Strengths

The content of all of the examples is job-related. The time management strategy is innovative and all of the modules appear to be cost effective. The strategies and implementation of them in the workbook form seems to be well-conceived and generally well-written.

Research Basis

There were several points of investigation and field testing including an interview administered to students in the computer managed courses. Both fast and slow students were interviewed. The interview data was analyzed to establish what the problems of the slow learners were and to ascertain what the strategies of the fast learners were. The modules were field tested using a small sample of students. Summative evaluations involved both assessments of the modules in terms of student gains and assessment of the effects of the modules on the AIS courses.

Applicability to the Army

All of the modules could easily be adapted for use in the Army at very little cost because although the content is job-related, the examples are fairly general and simple (i.e., they do not involve a great deal of technical terms or descriptions)

Stohlte, J. B., & Smith, S. C. A computer-based approach to functional training for recruits: Performance Related Skills Training (PREST). Paper presented at the annual meeting of the American Educational Research Associates Boston, April 1980.

Target Population

Navy recruits entering the service with reading grade level (RGL) of 4.0 to 6.0 and recruits who fail academic tests during recruit training.

Objectives

To provide Navy recruits with basic reading and study skills necessary for their successful completion of recruit training; to provide Navy recruits with a Navy-related curriculum that will increase the probability of their successful completion of recruit training; to enable Navy recruits reading below 6.0 RGL to achieve at least a 6.0 RGL on the Gates-MacGinitie Reading Test, Level D.

Content

Reading instruction for 3.0 to 8.0 RGL (designed for Navy recruit specific needs)
word analysis
vocabulary development
literal comprehension
interpretive comprehension
evaluative comprehension
Study skill instruction for 6.0+ RGL (designed for Navy recruit specific needs)
prereading/lecture activities
information finding
notetaking and listening
studying for and taking tests

Organization

Instruction is organized into reading and study skill modules (see above). Instruction is individualized, following a pretest/instruction/posttest procedure for each module. The reading component of PREST is a modified version of Control Data Corporation's BSLS (Basic Skills Learning System), a computer-based instructional program designed for use with adults reading below grade 8 and delivered through PLATO. Instruction time involves five hours per day for five days a week. Average completion time for recruits entering at grade level 4.0-5.9 on the Gates MacGinitie is 4-6 weeks. Exit criteria are defined in terms of mastery on criterion-referenced tests for each skill area. Apparently, there is no norm-referenced reading level required for exit.

Assessment

The Stanford Diagnostic Reading Test is used for diagnosis and prescription in each strand.

Method of Instruction

Computer-based diagnosis, prescription, instruction, drill and practice, and recordkeeping; augmented by Navy-related content in practice reading activities and simulations of actual recruit reading, lecture, and test taking situations.

Research Basis

Analysis of Navy recruit reading and study skill needs; study skill strategies based on T. H. Anderson¹; field testing and revision. Summative evaluation is in progress.

Applicability to the Army

Could be easily adapted to Army recruit specific needs because of similarity in population and outcome behaviors.

Limitations

There is no evidence that the exit criteria are adequate for facilitation of performance on job-related measure.

Strengths

There is anecdotal evidence that the recruits enjoy the training. The program is cost effective.

¹Thomas B. Anderson. Techniques for studying textbook materials in preparation for taking an examination. Final report of project funded primarily by Advanced Research Projects Agency (Contract #N00123-77-C-0622) and National Institute of Education (Contract #US-NIE-C-400-76-0116).

Weinstein, C. E. The Cognitive Learning Strategies Project. (A college level course given in the Department of Educational Psychology at the University of Texas at Austin, Austin, Texas.)

Described in C. E. Weinstein & V. L. Underwood, The cognitive learning strategies project. Paper presented at a conference on Learning and Thinking Skills, sponsored jointly by the National Institute of Education and the Learning Research and Development Center, University of Pittsburgh, Pittsburgh, October 1980.

Target Population

College students who may be reading at seventh and eighth grade reading levels.

Objectives

To be proficient in the use of study skills and learning strategies; to improve reading, understanding, and remembering; to improve note taking and test taking skills; to generate monitoring and modifying learning activities; to generate effective use of time and management skills; to develop effective stress management techniques.

Content

Problem solving strategies; systematic study strategies and formal study systems involving note taking, text marking, and test taking; and a range of cognitive learning strategies especially elaboration. Diverse task/test paradigms (e.g., term papers), scheduling, procrastination, concentration, and stress techniques (such as modifying irrational beliefs) are also covered. A broad range of text passages is covered.

Assessment

Learning strategy use is assessed by having students take a battery of verbal learning tests which approximate the information-processing demands in reading and learning classroom texts. These reports are used later for instruction.

Organization/Method of Instruction

Each topic is presented in diverse modes: readings, instructor demonstration, class discussion, guided practice. Student practice involves generating examples of applications of learning strategies. Some student worksheets are provided.

Test Taking Strategies

Two types of strategies are covered: cognitive and affective. Each type is covered both generally (in terms of the need to monitor test taking behaviors) and specifically (in terms of specific strategies).

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ARMY TRAINING DEVELOPMENTS INST FORT MONROE VA
REQUIREMENTS AND RECOMMENDATIONS FOR LEARNING STRATEGIES IN THE--ETC(U)
NOV 80 C E CAVERT, B F JONES, J A SHTOGREN

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Strengths

Diverse cognitive and affective strategies are covered. Instruction utilizes the learner, strategies assessment instructions. The emphasis on elaboration strategies is important because these strategies are most effective for information that is difficult to learn because it lacks inherent meaning and logically ordered relations. Much of the name/attribute, jargon, and vocabulary/term information in technical manuals is of this nature.

Research Basis

Experimental, correlational, survey. See references in Appendix I by Weinstein et al.

Applicability to the Army

Good for recruits who have basic reading skills.

Wishner, R. A. Efficient approaches to learning job-related vocabulary using CAI. Paper presented at the annual meeting of the American Educational Research Association, Boston, April 1980.

Target Population

Navy recruits reading below grade 6 as measured by the Standard Diagnostic reading Test.

Objectives

To improve vocabulary knowledge and retention; to reduce attrition; to compare computer assisted instruction (CAI) to classroom instruction.

Content

A word pool was generated from Navy recruit manuals. In order for a word to be included, it had to appear at least 10 times. Apparently, words were selected to form two separate lists: one for classroom instruction and one for computer instruction. There was only about 30% overlap, but there was no significant difference between the estimated grade levels of the two lists: the grade levels for the CAI and classroom word pools were 7.2 and 7.0 respectively.

Participants

100 recruits were randomly assigned to the CAI or the classroom group.

Test Materials and Procedures

The dependent measure was the number of words learned per instructional hour. This was determined by a multiple-choice mastery test given at the end of the instructional period. The CAI course lasted 5 hours; the classroom course lasted 12 hours. A retention test was administered seven days after completion of the program. This test utilized the same words covered during the respective programs with words and distractors reordered.

Organization

Instruction was organized in terms of learning exercises in both delivery system. CAI was individualized and generally automated including the decoding which was achieved by a computer controlled voice synthesizer (a solid state device which is able to imitate 63 different phonemes as well as different languages for each word). For the classroom delivery method, the students had to look up the words in a dictionary and use the pronunciation guide.

Method of Instruction

Students read the target word in a context sentence, spelled the word, decoded it into its sound pattern, reviewed and copied the definition, and finally "memorized" it.

Results

According to Wishner, the teaching efficiency of the computer was three times greater than that of the classroom method. CAI students learned 20 words per instructional hour, compared to 7. Retention dropped 18% for the classroom group but only 5% for the CAI group.

Limitations

While the acquisition data seems to be firmly based, a methodological problem casts serious doubt over the retention data. The delivery system was confounded with instruction time. That is, the CAI students had to retain the words for seven days plus five instructional hours/days while classroom students had to remember the words for seven days plus 12 instructional hours/days.

Moreover, to make inferences about the advantages of CAI versus "traditional" classroom methods, there should have been three comparison groups: (1) the CAI group, (2) the traditional group defined in the study (the one that involved looking up words in a dictionary and sounding them out with a pronunciation guide), and (3) a traditional classroom using the same words and curriculum as the computer (i.e., curriculum materials containing the words and their definitions and a teacher to pronounce the words as the computer did).

Finally, there is no explanation as to why the words in both groups were not identical. Although the estimated grade level of the words for both groups were identical, grade level estimates assess readability, not "learnability" (the degree of difficulty to retain). Additionally, learning in this study was heavily dependent upon the context clues provided and no effort was made to establish that these were equally effective for the two groups.

Applicability to the Army

If the same results were obtained in a study using the methodology suggested above, the CAI method here could be easily adapted for Army manuals.

APPENDIX E

STRATEGY/TEXT ALIGNMENT TRAINING FOR TEACHERS (STATT)

Part I. Strategy/Text Alignment Training for Teachers: A Proposal

The following is a summary of a proposal to develop self-instructional materials to train teachers to apply learning strategy and structure-of-text research to classroom instruction. This proposal was accepted by Northwestern University in June 1980. It was then submitted to TRADOC where it is currently being processed.

Laboratory for Instructional Research. A Proposal for the U. S. Army

Low reading achievement continues to be a major problem throughout the U. S., but especially in large cities, the Armed Services, and many industries. Recent research suggests that this happens largely because low achieving students (LAS) do not seem to develop spontaneously the repertoire of reading/ learning strategies that high achieving students develop. It is also evident that LAS benefit greatly from strategy training and explicit instruction regarding text structures; yet both are lacking in most schools. The authors propose to establish a Laboratory for Instructional Research which aims to improve the quality of instruction at institutions which teach teachers, the quality of instruction in the classroom, and achievement in reading and the content areas. These activities would be an integral part of Northwestern University's program of instruction at the MA level and would be funded by the US Army for a 3-1/2 year period.

The proposed Laboratory has three components: an instructional component, a research component, and an evaluation component. The instructional component involves the development of self-instructional units for MA level courses and workshops for teachers, administrators, publishers, and other educators in seven subject areas: learning strategies, mastery learning, instructional technology including text structures and sequencing, metacognitive strategies, effective implementation procedures including staff development and classroom management, field testing, and classroom research. Each unit would involve both instruction and the development of teacher-developed materials which applied the concepts and research contained in the content. These materials, called School Applications, would be of two types: units for teachers and units for students; and they would be developed systematically within a specific content area with heavy input from Laboratory staff at every stage of development, field testing, and revision. The research component would utilize a "bottom-up model" which focuses heavily on investigating questions about cognitive development, the quality of instruction, and reading achievement that are pertinent to classroom practices and decisions

made by school administrators. The evaluation component involves evaluating each of the Laboratory activities periodically. The instruction, research, and evaluation activities would be focused largely on several Demonstration Schools solicited on a voluntary basis from the Chicago Public Schools and several implementation sites outside Chicago (e.g., an Army base).

The Laboratory would consist of nine "permanent" staff (two directors, three writers, one cadre coordinator, and three researchers), three temporary staff Cadre Interns sent to Northwestern to be trained to implement effective comprehension instruction and mastery learning at other sites (such as an Army base), and five clerical staff. The activities for the Laboratory staff would begin in January of 1981 and continue for a period of three and one half years. The budget for the entire project period is \$2,275,243. Of this \$589,426 would be spent in the first year, \$637,951 in the second, \$682,632 in the third, and \$365,234 in the final half year. These figures assume a 7% increase yearly to account for modest inflation.

Part II. Applications of Cognitive Research to Classroom Instruction Commercially Available Texts for Teachers

This section of Appendix E consists of summaries of commercially available instructional texts for teachers. Each text seeks to apply the findings of cognitive psychology to classroom instruction in reading. While none of them is limited to applying learning/reading strategies research to the classroom, all of them discuss a broad range of information-processing techniques and study skills for comprehending and learning various types of texts.

Buzan, T. Use Your Head. London: British Broadcasting Corporation, 1974.
See also T. Buzan, Use Both Sides of Your Brain. New York: Dutton, 1974.

Target Population

Researchers and teachers who are interested in improving reading and learning for students from junior high to junior college.

Objectives

To make researchers and teachers aware of research data relating eye movements during reading and memory research; to provide exercises for teachers to use to facilitate memory, note taking, and creative thinking.

Content

While the first part of the book is devoted to generalized teaching/learning strategies, most of the latter part is devoted to instruction

in an innovative form of note taking and outlining (referred to as the organic study method). This method is based on the theory that reading left to right and linear outlining are inconsistent with eye movement capabilities and tendencies. Buzan believes that eye movements take in complex sets of representations in much larger spaces than traditional theory indicates. To capitalize on this extended area space Buzan has developed numerous searching/skimming/scanning techniques for reading and memorizing and a form of outlining which outlines details, facts, etc. in circular lines from an apex.

Organization

Each chapter deals with a different aspect of the brain's functioning: reading, memory, noting keywords, creative thinking, and studying.

Method of Instruction

Each chapter presents the research data in very simple language using numerous easy-to-understand visual aids. Self-administered pretest/training/post test paradigms are effective motivational and instructional devices. Many sections contain practice exercises and practical suggestions.

Strengths

Extremely well-written and provocative as well as practical.

Limitations

The organic study method has the advantage of showing idea relations (by tangential diagram lines and by use of arrows) more effectively than linear outlining and is similar to network outlining. The method is therefore highly appropriate for representing causal paradigms which involve the interaction of many related factors. It is not ideally suited to other paradigms (such as sequential name/attribute, and compare-and contrast) which require representations showing orderly linear and parallel items and relations. It is also obvious that a certain amount of in-service should be provided for average teachers, though this is not discussed by Buzan.

Research Basis

Since the book is intended for teachers, specific studies are not referenced. There is a brief bibliography, however, and a knowledgeable researcher would recognize that the arguments are well-supported by existing data.

Applicability for the Army

Excellent guidelines for teaching strategies which generate learning.

Herber, H. L. Reading in the content Areas. Englewood Cliffs, N. J.: Prentice Hall, 1970, 1978. (Text for Teachers)
GO: Reading in the content Areas. New York: Scholastic Book Services, 1974, 1975. (Materials for Students)

Target Population

Teachers of junior high school students; teachers of high school and junior college students who need remediation; students from junior high through junior college.

Objectives for Students

General: to facilitate reading achievement and comprehension, reasoning, and interpersonal communication.

Objectives for Teachers

To provide teachers with a method for analyzing the existing curriculum, for preparing student materials, and for guiding students in the reading of the required resources so that they can apply the reading/thinking skills identified by the teacher as essential.

Content

Instructional materials for teachers cover assumptions about reading/learning from texts and assumptions about instruction and guidelines for preparing lessons. Three levels of comprehension are distinguished: literal interpretative (involving analyses and inferences), applied (relating presented ideas to prior knowledge and experiences), and reasoning about what has been read. Reasoning may be open (content-free) or closed (content-bound). Also critical are the assumptions (1) that students can best learn how to read by simulating the component processes: that is, by completing a prepared series of activities that approximate the learning strategies and study skills to be used in a given type of selection, and (2) that the teacher must prepare the students for reading, guide them as they read, and gradually develop independent use of information processing strategies.

Organization

Student materials: practice exercises in the form of student workbooks (each about 160 pages) for different grade levels. Skills in each workbook cover four content areas: literature, social studies, mathematics, and science. Skills in each area vary (e.g., skills in social studies

section include vocabulary building exercises such as using context clues and categorizing, exercises relating the content to prior experience and providing a purpose in reading, reasoning, including compare-and-contrast analysis.

Teacher materials: models of practice exercises and expository text.

Methods of Instruction

During the guidance stage, students use teacher-prepared guides (and/or the student practice exercises prepared by Herber) to apply the reading/thinking skills to the text. Next, teachers present the end product of the applied process to students in the form of declarative statements. Finally, students read the text in order to judge the appropriateness of the declarative statements. Students must cite evidence from the text to support their decision about the appropriateness of the statements.

Inservice

Requires 60-75 clock hours of inservice instruction for formal study of the rationale and instruction in creating materials. Follow-up sessions are given for review, refinement, and additional information.

Strengths

Models can be applied to any content, including AIT.

Limitations

Although the program may be implemented with limited inservice along with the use of the student materials, maximum implementation requires the inservice indicated above.

Research Basis and Use

Extensive field-test data; network of ten demonstration areas, including District 11 (the Bronx) in New York; Orange County, Florida; and Norfolk, Virginia, public schools (each school has unpublished evaluations); and about twenty unpublished doctoral dissertations at Syracuse University. Published in United States, Japan, Canada, England, and Australia.

Applicability to the Army

Excellent tool for teachers of reading (because of skills taught) and AIT teachers because of models for adaptation to content areas.

Gerhard, C. Making Sense: Reading Comprehension Improved Through Categorizing.
Newark, D. E. : International Reading Association (IRA), 1975.

Target Population

Classroom teachers, especially for grades 6-8, but the principles discussed apply to all grade levels through junior college for students who lack categorizing strategies.

Objective

To explain the importance of grouping ideas and experiences in reading and writing. To give methods for teaching this ability to categorize.

Content

The book explains what categorizing is and shows the diversity of ways it can be used throughout the process of reading, reviewing, and systematic study. Categorizing is used in traditional ways (e.g., to group items in a series of related ideas) and in novel ways (e.g., to determine author's purpose). Additionally, there are categorizing strategies for finding meaning in what is read (e.g., identifying supporting items and analyzing different types of statements such as cause-and-effect statements, conditional statements and negative statements. Methods of using categorizing to facilitate creative writing and organization in writing are also emphasized.

Organization

Initial chapters discuss theories of organization and categorizing and theories of the importance of categorizing as a reading/learning strategy. The remainder of the chapters involve the application of categorizing skills to reading and writing.

Methods of Instruction

The initial chapters are essentially textbook-type text. The application chapters define each type of categorizing strategy and discuss its application. Sample procedures are provided as models.

Strengths

The book beautifully integrates research from diverse fields without being too heavily focused on the research basis for teacher's use. The style is clear and suggestions cover a broad range of texts and purposes for reading.

Research Basis

The effects of categorizing related words in lists and related sentences have been well-documented in numerous experiments. Support for other uses of categorizing is borrowed from research on reading; i.e., these strategies are derived from studies of the effects of knowledge of text structure, finding the main idea, and other reading research studies. Like all IRA books for teachers, the research basis is not explicitly referenced in the text. The text is available through the IRA.

Applicability for the Army

Extremely useful since so many Army texts are name/attribute or sequential which involve categorizing.

Johnson, D. C. and Pearson, P. D. Teaching Reading Vocabulary. New York: Holt, Rinehart, and Winston, 1978.

Target Population

Educators at every level from primary through adult education.

Objectives

1. To clarify terms commonly used in teaching vocabulary development and word identification.
2. To provide a theoretical basis for teaching vocabulary skills.
3. To recommend sound teaching suggestions.
4. To suggest assessment procedures.

Content

Methods for developing a sight vocabulary, relationship between language and meaning; techniques of teaching meaning vocabulary, explanation of what phonics analysis is and analysis of methods of teaching it; definition of structural analysis and methods for teaching what it is; use of content clues in figuring out words that are unknown; use of the dictionary and the thesaurus.

Organization

The book follows the pattern usually found in teaching of developmental reading. It starts with sight vocabulary, moves to somewhat wider vocabulary through study of more words, covers skills involved in phonics and structural analysis, and concludes with use of dictionary and thesaurus.

Method of Instruction

Description of many different techniques. Includes discussion of four dichotomies in pedagogy:

1. Analytic vs. synthetic
2. Systematic (early introduction of phonics skills) vs. intuition (begin with sight words)
3. Rules vs. no rules
4. Inductive vs. deductive

Progress Evaluation

Each chapter includes techniques for assessing and evaluating students' progress in that particular skill area. For example, in area of phonics analysis, authors recommend having students read orally, use "synthetic" or nonsense words to test knowledge of sounds, and have students decode by applying sounds to letters.

Strengths

Clear explanation of theory. Very well-organized. Good practical suggestions. Comprehensive because covers most important skills. One of the few texts for teachers to provide criteria and techniques for assessment.

Research Basis

Johnson and Pearson are cognitive psychologists who have done extensive research in applying cognitive psychology to reading instruction.

Applicability to the Army

Gives excellent ideas for Army instructors who must develop reading skills of recruits. Good theoretical background.

Pearson, D. P. and Johnson, D. D. Teaching Reading Comprehension. New York: Holt, Rinehart, and Winston, 1978.

Target Population

Educators at any level from primary through adult education.

Applicability to the Army

Gives excellent ideas to Army instructors for improvement of recruits' comprehension skills. Equally useful for remedial, average, and advanced readers.

Robinson, H.A., and Rauch, S. J. Corrective Reading in the High School. Newark, D.E.: International Reading Association (IRA), 1966.

Target Population

High school teachers.

Objective

To give both reading teachers and subject-matter teachers theoretical background and specific techniques in helping students improve reading skills.

Content

There are 10 essays covering different aspects of reading. Half of them related to developmental reading and half to reading applied to subject-matter areas. The authors also deal with study skills, including the subject of matrix outlining.

Organization

Essays on developmental reading come first. These are followed by essays applying reading to subject areas.

Methods of Instruction

The book includes exposition, examples, description of group activities, references to audiovisual materials, and methods of implementing SQ3R methods. Several essays review practice teaching techniques.

Strengths

The book is clearly written and provides theoretical background but also has practical suggestions. Topics dealt with are relevant.

Limitations

There is no material on helping students learn to comprehend more technical writing.

Research Basis

Specific field-test data and experimental research are not presented. However, IRA authors are selected by IRA because of their expertise and knowledge of research and practices. The text is available through the IRA publications division.

Applicability to the Army

General articles on developmental reading would be helpful to Army instructors who want to gain insight into the reading process. Articles pertaining to subject-matter areas not relevant.

Selz, N. and Ashley, W. L. Teaching for Transfer: A Perspective. Columbus, OH: The National Center for Research in Vocational Education (NCRVE), 1978.

Target Population

Educators involved invocational education.

Objective

To help teachers teach students how to transfer academic skills to life situations, such as jobs.

Contents

Opportunities for transfer. Discussion of whether most teachers teach for transfer. Theoretical principles of transfer of learning. Practical suggestions for teaching transfer of learning.

Organization

From abstract principles to concrete applications.

Method of Instruction

Provides specific tips and suggestions to teachers on ways to encourage transfer of learning in students. Describes good practice techniques. Emphasizes that practice should be based on mastery of skills and techniques.

Inservice

One to three days.

Strengths

Clear exposition of principles that encourage transfer of learning.

Limitations

Because of the short length of the booklet, there are few practical applications and examples of transfer of learning.

Research Basis

The principles discussed are based on research on learning and transfer. Text is available through NCRVE.

Applicability to the Army

Very relevant for Army instructors, since recruits must be able to transfer academic skills to military situations, but there is only a general introduction to the subject.

Smith, D.E.P.(Ed.) Learning To Learn. New York: Harcourt Brace, & World, 1961.

Target Population

Adult students, though it could be adapted for use by teachers of younger students needing remediation.

Objective

To help students improve reading comprehension, vocabulary and study skills.

Content

The scope of the content is broad: skills for improving comprehension, techniques of test-taking, vocabulary-building skills, critical reading skills, study procedures in different subject areas, SQ4R method of improving comprehension. Diverse types of text structures are considered (Cause-and-effect, sequential, name/attribute, dialogue, etc.)

Organization

The book is divided into 5 sections and 15 lessons. The five sections are (1) Diagnosis, (2) How to Learn, (3) Reading Improvement, (4) Application

of reading methods to different content areas, and (5) 8 timed readings for evaluation.

Methods of Instruction

The lesson is the unit of instruction. Each lesson includes exposition of a principle or skill, examples, methods for applying skills, and summaries of skills taught. Exercises in each lesson include fill in the blanks; Cloze tests as exercises.

Test-Taking Strategies

Exercises contain numerous paragraphs that students must read, record rate, and answer multiple choice questions on. In addition, Lesson 7 is devoted entirely to "The Techniques of Test-Taking." It includes tips like outlining the answer before writing on an essay exam.

Strengths

Excellent and comprehensive explanations of important skills in reading comprehension. Well-organized. Interesting examples.

Limitations

Aimed at adults who already have developed good reading vocabulary.

Inservice Training

Long term workshops optional.

Research Basis

Field tested with 2000 students in various institutional settings. Commercially available.

Applicability to the Army

Very applicable with recruits who have basic reading skills but need further work on comprehension.

"Teaching Methods/Designs for Learning," Theory into Practice, Winter, 1980.
Columbus, OH: The Ohio State University.

Target Population

Educators from grade school through adult education.

Objectives

To inform teachers of popular contemporary teaching methods and describe their application in the classroom.

Content

This issue has articles on the following topics:

1. Definition and history of teaching methods, strategies, and techniques.
2. Areas in which learners must be prepared for new learning.
3. Matching objectives and the experiences that occur during instruction.
4. Overview of different models that describe how people learn.
5. A description of a new method of individualizing instruction.
6. Different methods of managing the instructional situation.
7. Methods of fielding and answering student questions.
8. Description and methods of improving "the silent curriculum" -- attitudes and values that students pick up from teachers in the classroom.
9. Methods of tutoring to increase achievement and motivation.
10. Description of contemporary developments in application of learning theory.
11. Description of mastery learning and how it works.
12. Review of advantages and disadvantages of classroom games and simulations.

Organization

Articles in first half are generally theoretical, while those in second half refer to more specific situations and programs.

Strengths

Together, these articles form a comprehensive and contemporary view of most important current issues in our understanding of learning strategies and how those strategies can be applied to the learning situation.

Limitations

Articles tend to be somewhat theoretical in nature.

Research Basis and Use

Most of articles are reviews of literature combined with conclusions of author of article.

Applicability to the Army

More relevant articles are:

1. Teaching Methods: History and Status
2. Preparing the Learner for New Learning
3. Matching Events of Instruction to Objectives
4. Learning How to Learn
5. Tutoring to increase Achievement and Motivation
6. Promoting Excellence Through Mastery Learning

Tierney, R J., Readence, J. E., and Dishner, E. K. Reading Strategies and Practices: A Guide for Improving Instruction. Boston: Allyn & Bacon, 1980.

Target Population

Instructors of reading and content areas at elementary, secondary, and college levels.

Objectives

To give the reader a summary of strategies and practices that can be used to improve the reading capability of students. All strategies presented are based (partly or wholly) on cognitive theory and research.

Content

For each strategy, the book gives the purpose, rationale, target population, procedure, comments, and illustrated examples for the use of the strategy. Strategies are relevant for reading, content-area texts, study skills, recreational reading, and oral reading as well as teaching strategies for individualization of strategy instruction. In Unit 1 (Part I), for example, the authors describe the Request procedure in which students learn to ask anticipatory questions as they read. Additionally, parts of the book are directed to beginning reading instruction. Diverse text structures are discussed where appropriate.

Organization

The book is divided into three parts. Part I covers all of the reading strategies described above and others. Part II discusses diagnostic strategies, and Part III reviews strategies for examining and evaluating teacher effectiveness.

Method of Instruction

The book is meant to serve both as a text and an instructional tool for teachers. The text is oriented directly to the teacher to inform him/her about the use of the strategy. The illustrated examples are meant to serve as models for application of the strategy for classroom use at different age levels. These are given in the section entitled "Specific Teaching Suggestions" and include a variety of student practice activities to use the strategy: writing, group discussion, practice exercises, and directed-reading activities.

Test-Taking Strategies

Test-taking and study strategies are described in Unit 2 of Part I.

Strengths

The reviews of each strategy are excellent, and the collection does represent the most widely used and the most effective strategies (effectiveness being defined by what is known from field testing and basic research). Moreover, the text is extremely well-written.

Research Basis and Use

After each strategy the authors include a bibliography on that strategy.

Applicability to the Army

Excellent background reading and models of instruction for Army instructors. The section on skills is particularly relevant.

University of the State of New York, Bureau of Reading. Comprehension Through Active Processing. Albany, NY: University of the State of New York, 1979.

Target Population

Instructors of reading for learners from junior high through junior college.

Objective

To provide ways of integrating different subskills involved in teaching of reading comprehension.

Content

Much of the text describes several key strategies in the teaching of reading: categorization, use of key words, use of the "cloze" procedure, summarizing and paraphrasing, and sharpening of focus through questioning. Includes oral and written activities. An important idea is concept attainment (using reading to learn new ideas or concepts). Text passages include sequential, compare-and-contrast, name/attribute, poetry, and fiction.

Organization

Each chapter is directed to a specific strategy. That is, the strategy is the unit and focus of instruction. Strategies were selected to force in-depth processing of what is ready. This selection was based on the assumption that the student must interact with the text during the process of reading in order to comprehend and retain information.

Method of Instruction

Each chapter contains 5 or 6 teacher-led activities, each of which teaches a subskill leading to the attainment of the objective of the chapter. Nearly all chapters are inductively organized. Each starts with an "experience." After reading a passage, there is discussion and formation of a generalization on how to use that particular subskill. The first two chapters develop discussion skills necessary for students to use this inductive strategy. Each strategy has a specific lesson plan. Each lesson plan has a student activity to be prepared individually by the teacher for student practice. Most are writing activities.

Progress Evaluation

Throughout the book, there are methods to evaluate student attainment of the strategy.

Strengths

Excellent variety in activities. The book focuses on important skills.

Research Basis

While the manual was field tested extensively by the state of New York, no experimental research is indicated. Available from the State Department of Education.

Applicability to the Army

Good background on reading comprehension skills for Army instructor. Especially relevant is chapter on concept attainment.

APPENDIX F

CURRICULUM OVERHAUL

Part I Analysis of Serious Problems in the Army's Current Curriculum

- A. Typology of Errors in a Poorly-Written AIT Course
- B. Analysis of SelectABLE

Part II Guidelines for Developing a Learning Strategies System of Instruction

- A. Example of a Well-Written BSEP, AIT Integrated Text
- B. Checklist for Evaluating Instruction
- C. Checklist for Evaluating Textual Materials
- D. Table Self-Report Study Skill Instruments

Part III Effective Reading Materials for Adults which Begin at the Beginning

I-A. Typology of Errors in Military Text Materials

In this typology, the material is arranged as follows:

1. Statement of pedagogical or design problems
2. Two examples that illustrate that particular problem
3. Frequency with which the problem appears in all of the materials surveyed

Note: We have used field manuals (FM) and training manuals (TM) for two reasons. If the information to be learned is unclear to the teacher, it is as serious an error as information that is unclear to the student. More important, instruction consists of xeroxed copies of TMs and FMs.

Design of Program

The relationship of one particular manual to the entire training program is not made clear.

1. FM 44-5 (p. ii)
This preface states that "FM 44-5 complements the 'How to Fight' manual for Vulcan, FM 44-3." Yet FM 44-5 clearly tells how

to fight, so how does it differ from FM 44-3? And what does FM 44-3 cover? Confusion arises because the relationship of individual manuals to the entire Vulcan training program is not made clear.

2. TM 9-2350-300-10 (p. 1-1)

The introduction of the manual states that it "contains instruction for operation and maintenance of 20 mm self-propelled Air Defense Artillery Gun." Yet the manual gives no indication how this technical manual is to be used with the other manuals about the Vulcan weapon system.

Frequency: half of materials supplied

Objectives

Objectives are not stated for particular manual.

1. FM 44-5 (p. 1-5)

In the subchapter entitled "System Operations," the introductory paragraph never states what the purpose of the subchapter is or what the objectives are of the trainee in reading it.

2. TM 9-2350-300-10 (p. 1-1)

In the first sentence of Section II, "Description and Data," the objective or purpose of the section is never stated making it difficult for the teacher or trainee to know why he is reading it.

Frequency: 1 per 2 pages in the materials supplied.

Objectives are stated unclearly

1. FM 44-5 (p. 11)

The preface to this manual states "The purpose of this manual is to support the training of individuals to function as members of a Vulcan squad." This objective is so general as to be unhelpful in giving the recruit a clear idea of what he will learn.

2. TM 9-2350-300-10

The first sentence of this manual says that it "contains instruction for operation and maintenance. . . by operator and crew." Yet this statement of purpose is extremely vague. Are the squad members to commit these steps to memory or not? Are they to read the manual once and file it? Are they to study it in preparation for a test? None of these questions is answered by this introduction.

Frequency: 1 per 5 pages

The stated objectives are not consistent with the actual content of the manual.

1. TM 9-2350-300-10 (p. 2-1)

The introduction to the table that follows states that the objective is to provide "the operator/crew with sufficient information to assure proper operation of the XM163 system." Yet the table that follows does not include such information. It simply tells the function of each control found in the weapon system.

2. FM 44-5 (p. ii)

The preface to this manual states that one of the objectives is to train "individuals to function as members of a Vulcan squad." Yet the manual contains only one example of teamwork; the emphasis throughout is on individual skill acquisition.

Frequency: 1 per 10 pages

Desired performance outcomes are not stated or are stated unclearly.

1. FM 44-5 (p. ii)

Nowhere does this preface state specific observable criteria by which the trainee will know that he has learned the required knowledge and skills. The preface says that "When skilled individuals are molded into efficient, smooth-functioning teams, their ability to accomplish assigned missions is greatly increased." Words like "efficient" and "smooth-functioning" are so imprecise as to be useless in providing performance guidelines.

2. TM 9-2350-300-10 (p. 1-1)

The introduction on this page never states specific, observable criteria by which trainees will be evaluated on their acquisition of the information and skills to be described in this booklet.

Frequency: 1 per 2 pages

Diagrams

More diagrams are needed to allow visualization of processes.

1. TM 9-2350-300-10 (p. 1-7)
The text refers to two different muzzle clamps and their placement on the weapon. There should be a diagram of where the muzzle clamps are mounted at the muzzle end of the barrel cluster. Without that diagram, the trainee cannot visualize where those clamps go.
2. FM 44-5 (p. 9-5)
The first safety precaution for the Senior Gunner warns him of what may happen if he moves the weapon before warning other squad members. However, the sequence of events described in the rest of the paragraph is nearly impossible to visualize without an accompanying diagram.

Frequency: 1 per 5 pages

The relationship of the figures within an individual diagram is not clear.

1. FM 44-5 (p. 3-4)
A diagram labeled "Where to look in an alert" shows four objects with lines emanation from two of them. The array of lines within this illustration is totally confusing. For example, where is the aircraft to which the soldiers are alerted? If it is represented by "ALERTED," then why is the Senior Gunner looking along the line of the "Primary Target Line," which is nowhere in the vicinity of "ALERTED"? Finally, how are the solid lines different from the broken lines?
2. FM 44-5 (p. 3-3)
This diagram features pictures of four objects. Yet there is no indication of how these objects are related. For example, is the little device in the middle of the diagram the same as the walkie-talkie into which the soldier is talking? And what is the soldier looking at? These questions are unanswered by the diagram.

Frequency: 1 per every 3 pages

The text outside the diagram is poorly related to the diagram.

1. FM 44-5 (p. 3-5)
The text below this illustration tells the soldier to work his eyes "up and across" the horizon. Yet the arrows in the diagram do not represent a movement that is "up and across," but rather "from side to middle." Moreover, the illustration does not clarify where the soldier should start his search.
2. FM 44-5 (p. 9-6)
This diagram shows dismounted and mounted posts for squad members. However, because the diagram bears little relation to how the weapon system actually looks, it is difficult to visualize what is meant by such directions in the text as "Standing inside the vehicle in a position to observe through the open aft hatch." A more detailed illustration is needed.

Frequency: 1 per each page

The explanation of a procedure in the text refers the reader to several different diagrams or figures that are not adjacent or on adjacent pages.

1. TM 9-2350-300-10 (p. 1-2)
In paragraph (2) (b) on this page, entitled "Power plan compartment," the reader must refer to three different figures on three different pages, making it impossible to integrate the illustrated information with the textual information.
2. TM 9-2350-300-10 (p. 1-3)
In the paragraph on the electrical system, the reader must refer to figure 1-5 and to figure 2-1 in order to follow the explanation, again requiring the integration of separate pieces of visual information.

Frequency: 1 per page

Parts and equipment referred to in the text are not labeled in corresponding diagrams.

1. TM 9-2350-300-10 (p. 1-4)
In the paragraph entitled "Tracks and suspension," the reader refers to center guides for maintaining track alignment, to

two shock absorbers, and to one rubber bumper. Yet these parts are not labeled in the accompanying figure 1-7.

2. FM 44-5 (p. 1-3)
The paragraph below the diagram on this page refers to a towing pintle that is adaptable in height. Yet this important part is not labeled in the accompanying diagram.

Frequency: 1 per 5 pages

The columns that appear in tables are unclearly marked.

1. FM 44-5 (p. 9-8)
In this table of drill directions for the self-propelled Vulcan weapon, the horizontal tables are not marked, causing confusion to the learner. Thus, it is unclear why the sequence of directions accompanying the command "Mount" are divided into four horizontal columns. Is it because this command initiates a four-step sequence of events? The answer is unclear because of the lack of labelling.
2. TM 9-2350-300-10 (p. 2-11)
In the table describing controls and instruments, the middle column is marked "Function." It is unclear, however, whether this is the function of an instrument or the function of one of the squad leaders in using that instrument.

Frequency: 1 per 6 pages

Textual Errors

There is a lack of explanation of how to perform operations.

1. FM 44-5 (p. 1-5)
The subchapter title, "Systems Operations," indicates that the recruits will learn how to operate the Vulcan weapon system. Yet the entire subchapter contains no specific directions or steps on how to perform the operations that are referred to.

2. FM 44-5 (p. 3-3)
In this diagram, the trainee is told about the forward area alerting radar (FAAR) and target alert data display set (TADDS). This equipment presumably plays an important part in detecting other aircraft. Yet at no time is the soldier given a step-by-step lesson in how to operate them. If that information is explained in another manual, it should at least be referred to and summarized in this manual.

Frequency: 5 per page

The explanation is confusing.

1. TM 9-2350-300-10 (p. 1-1)
The first paragraph in this manual says "Also included is Appendix B which contains a list of the basic issue items that are required to constitute the major end item for issue to users." This explanation is impossible to follow because of the undefined terminology that is used.
2. FM 44-5 (p. 9-5)
The explanation of how to tell left, right, front, and rear while on the weapon system is extremely confusing and difficult to visualize.

Frequency: 1 per page

The phrasing is vague and imprecise.

1. FM 44-5 (p. 1-1)
The introductory paragraph says that Vulcan is to protect combat elements "and other critical assets." But there is no indication of what those assets might be. At least one example is needed.
2. FM 44-5 (p. 1-5)
The last paragraph says that Vulcan systems "may support maneuver forces." But there is no indication of what these maneuver forces might be. Further examples and explanation are required.

Frequency: 2 per page

Technical terms are used without adequate definition.

1. FM 44-5 (p. 3-4)

The sentence above the diagram reads "When alert warning is received, all squad members shift search emphasis to the azimuth of approach." Nowhere is the phrase "azimuth of approach" defined in the entire manual.

2. FM 44-5 (p. 3-4)

The text of this diagram refers to the "forward area alerting radar (FAAR)/target alert data display set (TADDS), "but neither is ever defined or explained in the manual.

Frequency: 5 per page

The word choice is not correct for the context or for the meaning implied in the text.

1. FM 44-5 (p. 1-5)

The first paragraph on this page states that the Vulcan weapon should be positioned "without degrading its own capabilities." This is an incorrect use of the word degrade. The phrase "interfering with" would be clearer.

2. FM 44-5 (p. 9-5)

On this page, the Senior Gunner is told to alert the rest of the squad before "traversing the turret." "Traverse" means "to cross," yet from the context it would seem that the word "rotate" would be more accurate.

Frequency: 1 per 2 pages

Needlessly difficult vocabulary is used.

1. FM 44-5 (p. 1-3)

On this page, the recruit is told that the oval clamp produces an "oval dispersion pattern." The word "dispersion" is too difficult, and it could be replaced by a simpler word or phrase.

2. TM 9-2350-300-10 (p. 1-1)

In the introductory description of the weapon system, words and phrases are used like "low-silhouette," "amphibious," "propels," "transported," "components," and "comprising." All are needlessly difficult and could be replaced by simpler words.

Frequency: 3 per page

Abbreviations and numbers are used without having been defined.

1. FM 44-5 (p. 9-6)
The diagram on this page shows posts for four squad leaders, and these posts are occupied by "SL" and the numbers 1, 2, and 3. But the manuals never explain what SL means nor which squad members are referred to by 1, 2, and 3.
2. FM 44-5 (p. 3-4)
This diagram contains the abbreviations "SL," "CP," and "OP." But the manual never says what terms these abbreviations refer to.

Frequency: 1 per page

Details are included that are irrelevant.

1. FM 44-5 (p. 1-4)
The entire page on "System Characteristics" gives details that are irrelevant to the performance of the tasks in this manual. This information should be in the technical manual.
2. FM 44-5 (p. ii)
The statement in the fifth paragraph that technical information like boresighting is not included in this manual is irrelevant and confusing.

Frequency: 1 per 5 pages

Organization cues like topic sentences are lacking.

1. FM 44-5 (p. 1-5)
The first line of the second paragraph reads "The squad operates as a disciplined, well-coordinated team in all phases of its activities." This topic sentence gives no cues as to the purpose of the paragraph. Indeed, the rest of the paragraph mentions the location of weapons and the ability of crewmen to detect approaching aircraft -- neither topic of which is even hinted at in the topic sentence.
2. FM 44-5 (p. 1-1)
The first sentence of the section "System Description" reads "Both self-propelled Vulcan and power Vulcan use the same weapon system but have different carriers." This topic sentence is totally inadequate, giving no idea of how this section fits in with the previous and following sections or what general topics will be covered in this section.

Frequency: 1 per page

The information is arranged in illogical order.

1. TM 9-2350-300-10 (p. 2-39)
Two paragraphs before the operator is told to push the button to start the engine, he is told not to crank the engine for more than 15 seconds if it doesn't start. This caution should logically come after the operator is told to start the engine.
2. FM 44-5 (p. 9-1)
Chapter 9 is entitled "Squad Organization and Drill." Yet it is difficult to see why a section on squad organization -- which would seem to be at most a basic topic -- is not introduced until so late in the manual. The explanation of squad organization should be covered in Chapter 2, "Preparation for Action." That is where each of the four squad members should be informed of the appropriate stations to take in preparation for battle.

Frequency: 1 per page

Style

Sentences are too long.

1. FM 44-5 (p. 9-5)
The first sentence of the directions to the Senior Gunner is 59 words long and should be divided into 3 shorter sentences for easier reading for even the most experienced reader.
2. TM 9-2350-300-10 (p. 1-1)
The sentence in the first column reading "These items include spare component assemblies and subassemblies for maintenance, and the operators and crew accessories, tools and supplies which accompany the equipment" could easily be divided into two sentences for easier reading.

Frequency: 2 per page

The style of a particular passage is too wordy.

1. FM 44-5 (p. 1-5)
In the first sentence of the third paragraph, the phrases "Working closely with the squad leader," "be able to," "designated," "using the appropriate firing mode," could all be omitted without affecting that sentence's important idea, which is that the Senior Gunner keeps the aircraft in his sights and does battle with it until it is destroyed or retreats.

2. FM 44-5 (p. 9-4)

In the paragraph on Safety Precautions, the first two sentences could be condensed to read: "The squad leader must know and apply all safety precautions so that no one is injured." As it now stands, the sentence is far too wordy.

Frequency: 1 per page

The manual uses the passive voice where the active voice would be more effective.

Use of the passive voice instead of the active voice in writing often makes material more difficult than it has to be. Writers should use the active voice whenever possible.

1. FM 44-5 (p. 1-5)

All four sentences in this paragraph are in the passive voice, making for a style that is difficult to read. Moreover, the paragraph never answers the question of who is supposed to perform each of the operations described.

2. TM 9-2350-300-10 (p. 1-7)

The first two sentences of the paragraph entitled "muzzle clamp assembly" are also in the passive voice. A writer could easily revise these so that they are in the active voice.

Frequency: 1 per page

There are typographical errors or other errors that could be eliminated through closer proofreading.

1. T-16 Theodolite

In the first line of the second paragraph, the word "less" should be omitted.

2. T-16 Theodolite

In the third line of the second paragraph, "you" should read "your."

Frequency: 1 per page

Testing

In multiple choice tests, the choices presented as possible answers are not clear.

1. AR-8: Vocabulary and Vocabulary Test on Maintenance In question #1, choice b ("a stage") has no applicability in this context. What is more, the reader has no idea what "a going" is, since "going" is a verb. The alternate choices here are very poor. Choices in a multiple choice question should be clear and parallel.
2. AR-8: Vocabulary and Vocabulary Test on Maintenance In question #12, choice a says "turn it into liquid." In this context, "it" has no referent and is therefore confusing.

Frequency: 2 per page

The question tests information that has not been given to recruits.

1. AR-8: Vocabulary and Vocabulary Test on Maintenance
The correct choice for question #4 is obviously "malfunction." However, neither "malfunction" nor the other choices were defined in the list of vocabulary items on the previous page.
2. AR-8: Vocabulary and Vocabulary Test on Maintenance
Question #13 asks for the meaning of "compound," which was not defined in the vocabulary items on the previous page.

Frequency: 5 per page

The question is poorly stated.

1. AR-9: Vocabulary and Vocabulary Test on Military Maps
Question #1 says, "What other tool do we use to help us locate where we are?" The word "other" makes the question confusing, since there has been no mention at all of any previous tool.
2. AR-9: Vocabulary and Vocabulary Test on Military Maps
Question #10 says, "Besides contour lines, there is another way to see relief features on maps." The question is poorly stated because the recruit may be unsure what is meant by "relief features," which has not been previously defined.

I.-B. Analysis of SelectABLE

SelectABLE is a product of Harcourt Brace (1974). It is used as an entry test for many BSEP courses. Why it was selected is unclear. It is a univariate test involving only one skill: categorizing (selecting out the item in a series that does not belong to the same

category as the other item). About half of the items involve numbers, mathematical symbols (e.g., a plus sign), and/or number analogies. The non-numerical items (32 or 45) consist of four words. Several of them are antiquated (e.g., lad, dome, commence). Others are seldom used (e.g., quandry, roster), or involve seldom-used forms of choices which test spelling and impulsiveness rather than comprehension: This is seen in the examples below.

<u>according</u>	piano	slippers	sneakers
trumpet	guitar	<u>shoves</u>	moccasins
cheek	<u>month</u>	east	north
nostril	teeth	<u>went</u>	south

In each instance the underlined words are almost identical to a word which is a strong natural-language associate of a correct category member (according/accordion, month/mouth, went/west, shoves/shoes). Note also the highly unusual inclusion of words from different parts of speech (e.g., shove is a verb which is mixed with nouns in Problem II. Finally, many of the items pertain to fictional writing rather than expository or descriptive texts. Note also that the upper left example involves unparallel items as do several others.

Comments:

1. The name (SelectABLE) suggests that those who fail are either unable or disabled. Whatever inference is drawn from the title may be unnecessarily damaging.
2. There does not seem to be any reason for having a univariate test to select out recruits for remedial reading instruction. That the test does not involve reading more than single words and focuses exclusively on a skill that is not typically associated with reading ability seems highly inappropriate.
3. Equally inappropriate are the use of words which are antiquated, uncommon, and lacking in parallel form.
4. The author is well aware of the extensive literature on the use of natural language foil words in analogies as effective predictors of school achievement (e.g., Auchenbach, 1971). However, Auchenbach's instrument was extensively field tested and tested for reliability, and in no instance did it involve foils which were almost identical spellings of a natural language foil. Nor did his test involve numbers. Nor, finally, did his test purport to test reading comprehension. The Children's Associate Responding Test was developed by Auchenbach for

use with fifth graders to test for impulsivity and reflectiveness, which is a stable characteristic unless the impulsive individual is trained specifically to be reflective.

The point here is twofold: SelectABLE does not test for reading comprehension skills, and the skill that it does test for (categorizing) is confounded by inappropriate selection of items. SelectABLE therefore seems highly inappropriate for any type of assessment.

5. Given these inadequacies, it is hardly surprising that data related to SelectABLE are inconsistent or equivocal. Worse still, it is entirely possible that the instrument, because of its inadequacies, could be selecting a virtually random population for remedial training.
6. Finally, there may be considerable data chaos and personnel loss caused by the fact that there does not seem to be any relationship between SelectABLE as an entry test and the diversity of tests used as exit tests, tests which are totally different in skill and format.

Part II Guidelines for Developing a Learning Strategies System of Instruction

A. Example of Well-Written MOS Materials

The materials described below come from the unit on Procedural Directions from the materials for MOS-Cook in a BSEP AIT/Integrated course developed by Sticht (1979).

1. Instructor's How Chart
2. Job Reading Record Sheet
3. Proficiency Test: Food Service Recipes (TM 10-412)
4. Proficiency Test: Army Mess Operations (TM 10-405)
5. Teacher Manual: Recipe (TM 10-412)
6. Teacher Manual: Procedures (TM-405)
7. Worksheets: Food Service Recipes (TM 10-412)
8. Worksheets: Dining Equipment and Maintenance (TM 10-410)

Design of Program

Instructional materials (Worksheets 1-15) were entirely consistent with the model in the TM, with each other, and with the Proficiency Test. This was true with regard to structure, content level and nature, and format. The Instructor's Flow Chart indicated requisite entry skills

and plan of instruction that is consistent with the checklist for mastery learning instruction in that additional practice is provided after each failure. Even in this example of good materials, however, there is no instruction regarding the content or the use of warning strategies, i.e., instruction consisted entirely of practice.

Objectives

These were not present for Food Service Recipes. Thus, it is not known if these were well-written and publically stated to the student. The other skills in the course did have well-written objectives: materials to be used were specified, test format was clearly indicated, and skills were clearly identified.

Tests and Worksheets

The test were fill-in-the-blank tests for food services to be completed by reading the recipe card for baked custard from the TM. Altogether there were eight blanks requiring the following types of items: ingredients, procedures, measures (e.g., one half), utensils, temperatures, and equipment.

Although most of the worksheets were in an entirely different format (checklists), there was at least one worksheet providing practice in identifying each of the type of items listed above. There were, for example, two worksheets on liquid measures and two on dry measures. The worksheets were parallel to each other in format, content, and test structure. Thus, the worksheets provided good practice in identifying (separately) each of the component parts (ingredients, procedures, etc.) of the MOS. Additionally, three of the worksheets utilized the fill-in-the-blank format of the test and were essentially parallel forms of the test.

Quality of Instruction

There was no explicit instruction in the relevant content areas (e.g., presentation of a table of liquid measures or standard definitions of liquid measure and their use) or in learning strategies (e.g., instructors to make a flow chart of steps in a procedure or table of standard measures). However, all of the vocabulary (e.g., "reconstituted"), utensils, ingredients, and other items used in the test recipe were covered in the worksheets. Thus, the practice activities provided comprehensive knowledge and experience in identifying all of the relevant items.

Progress Evaluation

As stated earlier, the flow of student progress is indicated in the chart presented here. Additionally, each recruit has a record of which worksheet activities were presented and what score was obtained. In this way it is possible to track the progress of each student. At the same time, it should be noted that the criteria for passing was not clear on any test or record sheet.

Cycle of Instruction

The same cycle of instruction was repeated using the procedural directions for cleaning equipment, though the extent of practice and coverage of content for this procedure was limited (only four worksheets), compared to the practice and coverage for using recipes.

Text Characteristics

While there were only a few visual aids, instructions and text content were concisely and clearly written on the worksheets, the tests, and the TM.

Additional MOS Materials

Also available were the same type of materials for other units for MOS-Cook: Table of Contents, Index, Tables and Graphs, and Body of the Manual. These materials reflected the same high quality and consistency of instruction.

II-B Checklist For Effective Learning Strategy/Mastery
Learning Instruction

<u>Criteria for the Objective</u>	Present	Absent
1. The objective should identify the materials or context for the test situation. e.g., given a Table of Contents for the cookbook, . . .	—	—
2. The objective should specify clearly exactly what the learner will do. e.g., the learner will locate the glossary of terms, tables of measures, and recipes for the following . . .	—	—
3. The objective should be consistent with the instruction and the exit test. e.g., the instruction and exit test should utilize actual or simulated cookbook materials (as opposed to descriptions of them). And since the objective specifies an actual performance, instruction should involve practice <u>use of</u> specified materials, not just lecture type instruction <u>about</u> their use.	—	—
4. Pretests or tests for prerequisite skills should be parallel to or consistent with posttests or exit tests in the following dimensions:		
a. Test format (multiple choice, fill in the blank, completion, etc.)	—	—
b. coverage of skills	—	—
c. level of processing (literal, inferential, application, synthesis, etc.)	—	—
d. structure of text and test format		
1) <u>length</u> of passage or graphic	—	—
2) <u>complexity</u> of information to be processed (complexity refers to the number of component parts in sentence and passages)	—	—
3) degree of explicitness required (literal vs. inferential)	—	—
4) degree of text difficulty for inference questions (difficulty is defined by the distance between sentences needed to make the inference).	—	—

- 5) number of negatives — —
- 6) type of text (name/attribute, compare-and-contrast, etc.) — —
- 7) referents for pronouns and indefinite articles such as "this" or "that" should be immediately adjacent to pronouns and indefinite articles — —
- 8) words and definitions for acronyms should be immediately adjacent to the presentation of the acronym — —
- e. content interest — —
- f. content difficulty — —
 - 1) number of unfamiliar words — —
 - 2) presence of effective content clues — —
 - 3) structural complexity of unfamiliar words — —
 - 4) presence of signal words or cues — —
 - 5) presence of organizational guidelines such as subtitles and italicized words — —
- g. clarity of text function (expository, description, persuasion) — —

Consistency of Instruction and Assessment

- 5. Instruction should provide experience in processing the type of text structure and content used in the exit test. — —
- 6. Objectives involving performance outcomes should involve practice using the specified materials under the specified conditions. — —
- 7. The diverse parts of the instructional texts should be clearly labeled. — —
- 8. The functions of each part should be clearly specified to the student so that he/she is fully informed about which parts are essential for the desired outcomes. — —

Instruction to the Objective

- 9. Instruction should involve the following:
 - a. some activity to establish mental set/motivation — —
 - b. preteaching difficult vocabulary mnemonics wherever possible — —

- c. relating new information to prior experience by advance organizers, analogies, discussion _____
 - d. clear input (see 10 below) _____
 - e. clear examples and, where possible, non-example _____
 - f. guided practice _____
 - g. independent practice; discrimination tasks _____
10. Each type of text or performance demonstration should display the appropriate features:*
- a. Steps in a procedure and series of events should be clearly differentiated by use of different sentences, numbers, context clues, or other emphasis devices _____
 - b. Texts/demonstrations describing concepts or vocabulary terms should present the critical features and identification of these features on examples with text showing how these features are missing from non-examples. _____
 - c. The key elements in problem/solution, cause/effect, compare/contrast, conflict/resolution, texts/demonstration forms should be clearly identified by emphasis devices such as using italics for the word "problems." _____
 - d. Description of parts of items in a class (e.g., parts of weapons) should be clearly identified by labels, and, wherever possible, displayed by tables with the names (e.g., barrel shape, triggering device) as row headings. _____
11. Graphic texts should have the following characteristics:
- a. They should reflect the meaning of the text. _____
 - b. Each component part should be labeled. _____
 - c. The label (itself, not a number or letter) should be near the part _____
 - d. The labels at best should be organized by area or sequence _____
 - e. Each figure should have a title which clearly explains the nature of the figure or the variables _____

*Text structure definitions are based on Jones (1980).

- f. Each graphic representation should have an explanatory text (i.e., physically adjacent to the representation) which tells the reader what is being displayed (e.g., what to notice or look for) — —
 - g. Each representation should be complete by itself (without reference to other representations or texts other than the adjacent explanatory text) — —
12. The learner should be provided with
- a. information about the structure of text — —
 - b. information about the appropriate information-processing strategy (such as paraphrasing, underlining, note-taking*, summarizing) with instruction in how to apply each one to the appropriate text — —
 - c. where appropriate, memorization guidelines — —
 - d. test taking strategies — —
 - e. "thinking aloud" models in the text or in the words of the instructor — —
 - f. guided practice in applying the strategy to the text — —
 - g. independent practice — —
13. All instructional texts and practice should address the objective directly:
- flow charts are appropriate for sequential charts — —
 - tables are appropriate for name/attribute information — —
 - hierarchical networks are appropriate for hierarchically organized information — —
 - linear outlines are appropriate for all of the above texts and also others such as for opinion/reason and argument/fact texts — —
14. All practice exercises should be corrected by any procedure which allows the learner
- a. to understand why an error was made — —
 - b. to correct the incorrect information — —
15. Each unit of instruction should have a diagnostic test, prior to the exit test, to identify who is ready for mastery and who needs remediation. — —

*Note-taking should be appropriate to the text.

Diagnosis

- 16. This diagnostic test should be parallel
 - a. in text structure and content
 - b. in test format to the exit test
 - c. in mastery level

Remediation

- 17. Those who fail the diagnostic test should be provided with
 - a. a review of the key information
 - b. additional practice
 - c. a different teaching/learning strategy

Textual Characteristics

- 18. Print should not be extremely small or large (Courier 12; 12 pitch is ideal)
- 19. Passages and paragraphs should be labeled with headings and subheadings which follow the author's outline
- 20. All new terms, acronyms, and abbreviations should be emphasized and defined immediately after their introduction
- 21. Acronyms and vocabulary should be defined in simple, easy to understand terms which do not require a dictionary
- 22. There should be no more than two to three acronyms per page; preferably one to two or less
- 23. Acronyms and technical terms not used for two to three pages should be redefined
- 24. Vocabulary should be appropriate to grade level or minimum fifth or eighth grade standard
- 25. Difficult-to-pronounce vocabulary should have phonetic guide(s)
- 26. Only relevant details should be presented

27. Every paragraph should have an explicit topic sentence that tells the reader what the paragraph is about _ _
28. Information should be presented in a concise, logical fashion _ _

II-C. Checklist for Evaluating the Quality of Textual Materials

Note: Not all questions pertain to all texts. At the same time, the greater the number of check marks in the yes column, the better the text.

<u>Features</u>	<u>Yes</u>	<u>No</u>
Does the textbook contain the following:		
A. Preface/Introduction Explaining Objective	_	_
B. Table of Contents	_	_
C. Chapters	_	_
D. Topographical Aids	_	_
1. Bold-Face Type Headings	_	_
2. Italics	_	_
3. Leads	_	_
E. Illustrations	_	_
1. Pictures	_	_
2. Diagrams	_	_
3. Maps	_	_
4. Charts	_	_
5. Graphs	_	_
6. Cartoons	_	_
F. Comprehension Questions	_	_
G. Self-Tests	_	_
H. Glossary	_	_
I. Index	_	_
J. Appendix	_	_
K. Bibliography	_	_
L. Instructor's Manual	_	_

Analysis of Features: Student Text

- A. Does the cover state the title and author? _ _
- B. Are the chapters printed on non-glare paper? _ _

	<u>Yes</u>	<u>No</u>
C. Does the title reflect the content of the book?	_____	_____
D. Are the author's purposes clearly stated?	_____	_____
E. Are the student objectives clearly defined?	_____	_____
F. Is the student told how to use the book?	_____	_____
G. Are the chapter titles, sub-divisions, page numbers clearly stated in the table of contents?	_____	_____
H. Does the design of the pages facilitate readability?	_____	_____
I. Is each page in the book clearly numbered in sequential order?	_____	_____

Analysis of Features: Instructor's Manual

Does the Instructor's Manual contain the following:

A. Table of Contents	_____	_____
B. Rationale	_____	_____
C. Objectives	_____	_____
D. Correlation between Objectives and Individual Lessons	_____	_____
E. Copy of Student Text	_____	_____
F. Teaching Strategies	_____	_____
G. Supplementary/Enrichment Activities	_____	_____
H. Answer Key	_____	_____
I. Tests	_____	_____

Chapters in Text

A. Does chapter title reflect content?	_____	_____
B. Does chapter contain advance organizers:	_____	_____
1. Bold-face Type Headings	_____	_____
2. Italics	_____	_____
3. Leads	_____	_____
4. Transition Paragraphs	_____	_____
C. Does chapter contain:	_____	_____
1. Introduction	_____	_____
2. Body Paragraphs	_____	_____
3. Visual Aids	_____	_____
4. Conclusion	_____	_____
5. Questions	_____	_____
a. at beginning	_____	_____
b. within	_____	_____
c. at end	_____	_____

	<u>Yes</u>	<u>No</u>
D. Are ideas arranged in appropriate manner?	---	---
1. Logical order	---	---
2. Spatial order	---	---
3. Chronological order	---	---

Paragraphs Within Chapter

A. Does introductory paragraph include following:		
1. controlling idea, proposition, thesis statement, or argument?	---	---
2. sub-topics to be discussed?	---	---
3. statement of topic?	---	---
B. Does each paragraph relate to author's overall objective?	---	---
C. Is there a main idea in each paragraph?	---	---
D. Are propositions/arguments supported by reasons, facts, examples?	---	---
E. Are steps in process, sequence of events, clearly differentiated?	---	---
F. Are cause-effects, comparison-contrasts, classification-divisions clearly stated?	---	---
G. Are extended definitions clearly stated with term, class, difference (s)?	---	---

Vocabulary

A. Are words used at appropriate student grade level?	---	---
B. Are technical words defined in the adjacent text?	---	---
C. Are technical words identified with visual cue?	---	---

Questions

A. Are the following types of questions included:		
1. Vocabulary?	---	---
2. Literal Meaning?	---	---
3. Inferential Meaning?	---	---
4. Evaluation?	---	---
5. Application?	---	---
6. Oral Discussion?	---	---

	<u>Yes</u>	<u>No</u>
B. Are questions clearly stated?	—	—
C. Are directions clearly stated?	—	—
D. Is a student answer key provided in text?	—	—

Illustrations

A. Are illustrations readable?	—	—
B. Are illustrations clearly labeled?	—	—
C. Are the labels adjacent to the illustrations?	—	—
D. Do illustrations reflect ideas expressed in text?	—	—
E. Are illustrations placed appropriately near the text to facilitate understanding?	—	—

Content

A. Are ideas expressed outmoded?	—	—
B. Are passages free of racial, ethnic, religious, and sex bias?	—	—
C. Is content and format compatible with particular group of students?	—	—
D. Is information given in text relevant to course objectives?	—	—
E. Are learning strategies and thinking skills embedded in text?	—	—

II-D. Table: Self Report Study Skills Instruments

Test, Author, Publisher & Date	Description	Adm. Time	Age Range	Subscales
California Study Methods survey by H. D. Carter, Monterey, CA: California Test Bureau, 1958	The California Study Methods Survey is a self report instrument which assesses student's study practices. The manual states that it may be Used for study skills counseling, as a group survey to evaluate students' study practices and attitudes, and as a predictor of academic achievement. Items from the test deal with several aspects of studying, including questions concerning specific subject areas, attitudes toward studying, reading practices, study environment, study scheduling and memorization techniques	untimed, 35-50 min.	Grades 7-13	(1) Attitude toward school (2) Mechanics of study (3) Planning & System (4) Verification
<u>College Adjustment and Study Skills Inventory (CASSI)</u> by F. A. Christensen, Berea, OH: Personal Growth Press, 1968	The College Adjustment and Study Skills Inventory is a self report instrument which assesses students' study practices and attitudes. The manual states that its primary purpose is as a counseling tool to assess college students' practice of recommended study techniques, attitudes, and adjustment.	untimed, 15-20 min.	College students	(1) Time distribution (2) Attitude & personal adjustment (3) Reading & class participation (4) Taking notes (5) Taking examinations
<u>Minnesota Study Habits Blank (MSHB)</u> by A. Raygor, Rehoboth, Mass.: Twin Oaks Publishing Co., 1980.	The Minnesota Study Habits Blank is a self-report instrument primarily designed as a counseling tool for college students of average ability and achievement. Items are divided into two major categories of problems indicators: reading and study skills, and possible personal problems. Item are designed to identify student problems in the areas of reading, study skills, and personal life that may adversely affect academic achievement. Results are presented in the form of an individual profile of problems for counseling or referral purposes.	untimed, approx. 30 min.	High school & college students	(1) Reading and Study skills, subdivided into (a) Problems relating to exams (b) Time scheduling (c) Note-taking (d) Basic skill (2) Possible personal problems. subdivided into (a) Organization of study effect (b) Concentration-distractive (c) Motivation attitudes-goals (d) Possible personal problem

# of Items	Item format(s)	Norm Group	Reliability	Validity
150	yes/no	Standard scores & percentile ranks and stanines are provided. These are based on the responses of 972 from 45 communities in 25 states	<u>Test-retest</u> = .86 for total test, .07-.80 for subscales. <u>Kuder-Richardson formula 21 (split-half)</u> = .85-.86 for total test, .64-.74 for subscales.	In studies reported in the test manual, the CSMS correlated .50-.57 with GPA, .41 achievement test scores, and .30-.33 with intelligence test scores for high school students. CSMS scores discriminated between high and low achieving students of the same intelligence level.
57	4-point scale	Norms based on 250 students from 9 Midwestern colleges are provided.	No reliability data is provided.	A rank order correlation of .19 was obtained between the CASSI and GPA. No further validity information is provided.
150	True/False	Percentile norms are provided based on administrations in several different institutions. The norms vary considerably among the different settings (high school, community college and four-year college.)	<u>Test-retest</u> (one year interval) = .63 <u>Kuder-Richardson formula 20 (split-half)</u> = .90-.95.	In studies reported in the manual, the MSHB correlated .35-.56 with high school grades, .11-.14 with college grades and .93 with with the <u>Survey of Study Habits and Attitudes</u> (Brown & Holtzman, 1955, 1967).

Test, Author, Publisher & Date	Description	Admin. Time	Age Range	Subscales
<u>Study Habits Checklist (SHC)</u> by R.C. Preston & M. Botel, Chicago, Ill.: Science Research Associates, 1957-1967.	The Study Habits Checklist is a self-report instrument. Each item describes a "superior" study practices in areas such as study scheduling, note taking, and report writing. The manual states that the test may be used to pinpoint weaknesses in students' study habits for counseling purposes, or to help students assess their own study habits.	untimed, approx. 20 min.	Grades 9-12, College freshman & sopho- mores	none
<u>Study Habits Inventory (Revised Edition) (SHI)</u> by C. C. Wrenn, Stanford, CA: Stanford University Press, 1933, 1941.	The Study Habits Inventory is a self-report instrument consisting of items which discriminated between high and low achieving students matched on intelligence. The author lists several uses for the test; these uses center upon the use of students' responses to individual items for counseling purposes.	untimed. approx. 10 min.	Grades 12-16	Items are divided into 4 general categories: (1) Reading & note taking (2) Habits of concentration (3) Distribution of time & social relationships study (4) General habits and attitudes about work
<u>Survey of Reading/Study Efficiency (SR/SE)</u> by F.L. Christ, Chicago, IL: Science Research Associates, 1968	The Survey of Reading/Study Efficiency consists of statements about five major reading/study problem areas. The respondent circles the most appropriate answer to describe himself on 2-point and 3-point scales. The author states that the SR/SE is not a test or measurement instrument, but a survey to help individuals pinpoint weak areas in their study practices.	untimed, approx. 35-45 min.	Grades 9-12, college students	Items are divided into 5 major reading & student problem areas: (1) Study management (2) Auxiliary course skills (3) Major course related skills (4) Attitudes interests & habits (5) Physiology

# of Items	Item format(s)	Norm Group	Reliability	Validity
37	5-point scale	Decile ranks are provided, based on the responses of 4,367 high school students from 4 Pennsylvania high schools and 1,630 freshmen from the University of Pennsylvania	Corrected split halves reliability = .90-.91	The authors claim that the SHC is a valid measure of study skills based on the procedure used for item selection. Items were selected on the basis of ratings from Phi Beta Kappa seniors at three Penn. universities concerning the usefulness of certain study practices for classmates who have academic difficulties. The authors report that the SHC discriminated between over and under-achieving college women at an unspecified university.
28	3-point scale	No norms are provided	No data is provided	Items included in the inventory were selected on the basis of their ability to discriminate between high and low GPA college students matched on intelligence & field of study. The author states in the test manual that correlations of .24-.58 were found between GPA and SHI scores in three independent studies. The citations for these studies and the populations used in each of the studies is not given.
144	T/F or 3-point scale	No norms are provided	No data is provided	No validity information is supplied. Items were selected on the basis of their relation to the five areas where major reading & study problems occur. It is not clear how the author decided these were important areas of reading and study, and what constituted desirable study practices.

Table Objective Study Skills Instruments

Test, Author, Publisher & Date	Description	Admin. Time	Age Range	Subscale
<p><u>Effective Study Test (EST)</u> (High school version) by W. F. Brown, San Marcos, Tex: Effective Study Materials, 1964.</p>	<p>The <u>Effective Study Test</u> is designed to test students' knowledge of commonly recommended study practices. The manual states that it may be used as a counseling aid, screening instrument, or as an examination following study of the <u>Brown-Holtzman Effective Study Guide</u> (Brown & Holtzman, (19). Items concern traditional areas in study skills, such as proper lighting, a quiet study environment, and time management.</p>	<p>untimed, approx. 40 min.</p>	<p>Grades 9-12</p>	<p>(1) reality orientation (2) Study Mechanics (3) Writing behavior (4) Reading behavior (5) Examination behavior</p>
<p><u>Study Skills Test (SST)</u> by A. L. Raygor, Monterey, CA.: McGraw-Hill 1970.</p>	<p>The <u>Study Skills Test</u> is designed to measure how well students learned the material covered in four texts which are part of the McGraw-Hill Basic Skills System. The test is also designed so that it can be without the texts as a measure of study skills knowledge. Topic areas covered in the test include problem solving, use of the library and knowledge of study techniques. There are two equivalent forms of test available.</p>	<p>46 min.</p>	<p>Grades 11 & 12, two-year college students, college freshman and soph- omores.</p>	<p>(1) Problem solving (2) Underlining (3) Library in-formation (4) Study skills information</p>

# of items	Item format(s)	Norm Group	Reliability	Validity
100	5 pt. scale	Percentile norms for grades 7-9 and 10-12 combined based on a total of 11,218 students in 16 different towns in 6 states. Percentile norms for college students are provided based on a total of 3,054 freshmen in 9 colleges in 6 states.	<u>Kuder-Richardson formula 8 (split half) reliability</u> for subscales = .87-.89. <u>Test-retest reliability</u> for subscales (14 wk. interval) = .83-.93, for total test = .84-.94. (Reliabilities for Form C.)	In studies reported in the test manual, Form C correlated .25-.45 with one semester GPA (average correlation = .36). The SSHA had a low correlation with measures of scholastic aptitude, .05-.27 (average correlation = .21). The SSHA used with an aptitude test increases correlation with grades .07-.16 over grades alone. The average correlation of each of the subscales with GPA is: Delay avoidance = .31 Work methods = .32 Teacher approval = .25 Education acceptance = .16 Form H was found correlated from .31-.85 with high school GPA (average = .55) Form H also had a low correlation with scholastic aptitude (.20-.32). The average correlation of each of the subscales with GPA is: Delay avoidance = .41 Work methods = .47 Teacher approval = .35 Education acceptance = .48
49	Yes/No	Percentile norms are provided based on three reference groups; 4-year college freshmen, first year students at a two-year college, and college-bound high school juniors and seniors.	<u>Split-half reliability</u> = .87. <u>Split-half reliabilities</u> for the subscales range from .50-.74.	No validity data is provided

Test, Author,
Publisher & Date

Description

Admin.
Time

Age
Range

Subscales

Survey of Study
Habits and Atti-
tudes (SSHA) by
W. F. Brown &
W. H. Holtzman,
New York: The
Psychological
Corp., 1953,
1967.

The Survey of Study Habits and Attitudes is a self report instrument available in two forms for use with high school students (Form H) or college students (Form C). Items measure traditional areas of study skills, such as study environment, scheduling, and note taking, as well as attitudes toward scholastic activities. According to the authors, it may be used as a screening instrument, a diagnostic test for students with academic difficulties, a teaching aid, and in research as a measure of students' study skills and attitudes.

untimed,
approx.
20-35
min.

Grades
7-12,
college
students

(1) Delay avoidance
(2) Work methods
(3) Teacher approval
(4) Education acceptance
(5) Study habits (subscales 1+)
(6) Study attitudes (subscale 3+4).

Inventory of
Study Habits and
Attitudes (ISHA)
by A. L. Raygor
Monterey, CA:
McGraw-Hill,
1970.

The Inventory of Study Habits and Attitudes is an optional portion of Raygor's Study Skills Test. The inventory consists of statements concerning study practices and attitudes and was designed to screen students whose poor attitudes negatively affect studying.

approx.
10 min.

Grades
11-12,
2-year
college
students
and
freshman
and
sopho-
mores at
4-year
colleges

(1) Listening and notetaking
(2) General study habits
(3) Relationship with teachers courses
(4) Motivation
(5) Organization of effort
(6) Concentration
(7) Emotional problems

# of Items	Item format(s)	Norm Group	Reliability	Validity
125	T/F	Centile norms, based on 2,354 high school students in 6 Texas high schools, are provided for total test scores. For subscales, scores are divided into 9 categories.	No reliability data is provided.	Items selected for the test discriminated between high and low GPA high school students. In studies reported in the manual, the EST correlated .60 with GPA, .43 with the Survey of Study Habits and Attitudes (Brown & Holtzman, 1955), and .69 with the Iowa Test of Education Development. With IQ held in constant, the EST correlated .39 with GPA.
65	Multiple choice	Norms based on three reference groups are provided; four-year college freshman, first year students at a two-year college, and college-bound high school juniors and seniors. A total of 925 students were used to establish these norms.	Split-half reliability for total SST score = .78-.80. Subscale reliabilities range from .46-74.	Items for both forms of the test were selected on the basis of a high point biserial correlation with subscale scores. No additional validity information is provided.

Test, Author Publisher & Date	Description	Admin. Time	Age Range	Subscales
<u>Inventory of Learning Processes (ILP)</u> reported in Schmeck, Ribich, and Ramanai-ah (1977).	This experimental instrument was developed to measure individual differences in study practices and cognitive learning strategies. Each item is a behavioral description of a learning strategy or study practice.	not reported	College students	(1)Synthesis analysis (2)Study met. (3)Fact retention (4)Elaboratio processing
<u>Learning Activities Questionnaire (LAQ)</u> , reported in Weinstein, Wicker, Cubberly Roney, & Underwood, 1980.	This experimental instrument was developed to measure students' methods for learning. Students are asked to describe the methods they would use to learn paired-associate lists, free recall lists, and information contained in a prose passage.	approx. 30 min.	College students	(1)Grouping strategies (2)Rote strategies (3)Elaboratic (4)Imagery (5)Physical strategies (6)Study skills
<u>Learning Strategy Inventory (LSI)</u> reported in Dansereau, Long, McDonald, and Actkinson (1975).	The <u>Learning Strategy Inventory</u> is still in the developmental stages. Items are designed to assess both study skills and cognitive learning strategies. The results of studies using this questionnaire were part of the basis for a learning strategies training program developed by Dansereau and his associates (Dansereau, Collings, McDonald, Holley, Garland, Diekhoff, & Evans (1979).	untimed, average time not reported	College students	

# of Items	Item format(s)	Norm Group	Reliability	Validity
62	True/ False	Means and standard deviations are provided for male and female college students for each of the four subscales. This data is based on the responses of 434 undergraduates in one college.	<u>Test-retest</u> reliability estimates for the subscales range from .79-.88.	In two articles (Schmeck, Ribich & Ramanaiiah, 1977; Schmeck & Ribich, 1979), the results of several validation studies are reported. These studies correlated ILP subscales with measures of verbal learning, and with tests which measured constructs thought to be measured by the ILP. Briefly, the Elaborative processing and the Synthesis-analysis subscales correlated with performance on an exam following a lecture. ILP subscales also correlated with performance on an intentional and an incidental learning task.
24	Open-ended & M/C	No norms are provided.	<u>Interrater reliability</u> = .90 <u>Test retest</u>	The Elaboration and Imagery subscales combined are significantly correlated with performance on verbal learning tasks.
201	M/C	No norms are provided.	No reliability data is provided.	LSI items have been correlated with the SAT-Verbal, SAT-Math, and GPA. These correlations are low to moderate.

Test, Author Publisher & Date	Description	Admin. Time	Age Range	Subscales
<u>Study Behavior Questionnaire</u> (SBQ) reported in Biggs (1970a, 1970b, 1973, 1976).	The SBQ is an experimental instrument that has been developed by Biggs to study how different personality and information-processing variables affect study be- havior. In Bigg's studies using the SBQ there have been several similar versions which varied in number of items and factor scores.	not reported	College students	(1976 version) (1)Academic aspiration (2)Academic interest (3)Academic neuroticism (4)Internality (5)Study skills and organization (6)Fact-rote strategy (7)Dependence (8)Meaning as- simulation (9)Test anxiety (10)Openness

# of Items	Item format	Norm Group	Reliability	Validity
72-80 items, depending on version	M/C	No norms provided	No date provided for the test as a whole. In Biggs (1970a), the SBQ was administered to 314 college students at the beginning and close of an academic year. Test/retest correlations for the factor scores ranged from .21-148.	In Biggs (1970a) factor scores on the SBQ correlated with first year GPA for college students enrolled in the Arts college of a university. Biggs (1973) found that high achievers in a course which involved several methods of evaluation (essay, objective and short answer tests, and a paper) scored high on the Wide reading subscale of the SBQ and low on the Fact-Rote and Class Orientation subscales (1973 version). The Fact Rote scale measures the degree to which the student depends on rote learning in study. The Class Orientation scale measures the students' orientation toward instruction in a class situation. Several other studies with the SBQ are described in Biggs 1970a, 1970b, 1973, 1976.

Part III Effective Reading Materials for Adults
Which Begin at the Beginning

Academic Remedial Training (ART). In J. D. Fletcher, Historical Perspective on Training in the Navy. (NPRDC Tech Rep. 77-15). San Diego: Stohlte & Smith, 1980.) What follows below is a description of one of two ART programs. See PREST description in Appendix D.

Target Population

Many recruits who needed remedial skills and were considered to be "marginal personnel". Generally, these are recruits reading between 4.0 to 5.9 as measured by the Gates-McGinitie Test (a widely used measure of reading comprehension).

Objectives

Mastery in the following skill areas: phonetic analysis, structural analysis, auditory vocabulary, reading comprehension (literal and inferential), reading rate, SQ3R, note taking and test taking. Each area has a series of more specific objectives.

Content

Assigned commercial materials (typically): SRA kits, such as the Boring Specific Skills and Multiple Skills Series. Study skills materials include Nila Banton Smith's Be a Better Reader. SRA's How to Study, and others. Recently the Navy developed a job-related remedial reading workbook, Improving Your Navy Reading Skills (Kincaid and Curry, 1980*).

Organization

Varies with kit. Length of instruction is about 4-6 weeks. (0830 to 1100 and 1230 to 1500).

Method of Instruction

Varies by kit.

*Kincaid, J.P. & Curry, T.F. Jr. Job-Related Reading Material: A Navy-Relevant Remedial/Workbook. Paper presented at the American Educational Research Association, Boston, April 1980.

Limitations

According to Stohlte and Smith, ART (including the job-related materials presumably) is effective but not cost effective. It is too costly in terms of student/teacher ratios.

Research Basis and Use

The Kincaid and Curry materials were field tested using Navy recruits in Orlando, Florida.

Applicability for the Army

See limitations above. Kincaid and Curry do not see the problem of cost effectiveness in the same unequivocally negative terms as Stohlte and Smith, however.

Engelmann, S. (Ed.) Corrective Reading. Chicago: Science Research Associates, 1980. Series titles:

Comprehension A: Thinking Basics
Comprehension B: Comprehension Skills
Comprehension C: Concept Applications
Decoding A: Word Attack Basics
Decoding B: Decoding Strategies
Decoding C: Skill Applications

Target Population

Students in grades 4-12 who have been identified as having reading problems. Could be used by older students.

Objectives

These are divided into two overall areas: decoding and comprehension. Although never explicitly defined to students, the objectives of each lesson are clearly stated in the Skills Profile Folder.

Decoding A emphasizes sounds, rhyming, sounding out, word and sentence reading. Decoding B focuses on critical letter and word discriminations, letter combinations, story reading, and questions. Decoding C involves word build ups, affixes, vocabulary, story reading with comprehension questions outside reading applications.

Comprehension A has objectives for deductions, inductions, classifications, memorization of poems, analogies, and vocabulary building.

Comprehension B includes numerous world knowledge objectives (e.g., knowledge of the systems in the human body), build up of vocabulary or words related to information objectives, classification, structural analysis of sentences, inferences, and writing skills such as writing step-by-step directions. Comprehension C objectives go far beyond concept applications. These objectives include several study skill objectives such as finding the main idea, reading maps and charts, outlining, and diverse critical and deductive reasoning skills.

Content

Objectives are spiraled within and between strands. Deductions, for example, are taught in Comprehension A, B, and C. Generally, instruction at each point begins with a review of previous instruction and expands to involve new and/or increasingly complex problems and diverse text structures.

Organization

The basic unit of instruction is a lesson. Levels A, B, and C have a total of 60, 140, and 140 lessons respectively. A lesson consists of scripted presentations of instruction (e.g., the concept of opposites, going up and going down, involve five specified instructional operations to present the concept), tests for individual comprehension, correction of comprehension mistakes, and positive reinforcement.

Method of Instruction

Both inductive and deductive, guided practice, and independent practice. Most instruction is paced in two ways. Teachers are instructed to use fast pacing by speaking quickly and demanding immediate responses. Oral readings are timed to work toward prespecified (increasingly faster) reading rates.

Placement Tests

The Corrective Reading Placement Test is administered by the teacher on a one-to-one basis. Teacher judgment is used to evaluate responses to many items. Test length and time depends on level and strand. No data is given for test reliability or validity.

Progress Evaluation

Points are awarded for worksheet exercises, group story reading, individual checkouts, and other activities.

Test Taking Strategies

None are indicated.

Inservice

Minimum is one full day plus any number if follow-up merits.

Strengths

Instruction is systematic and involves diverse, high-order skills. Corrections component is distinctive and quite useful. Classroom management and system of positive reinforcements are built into the system of instruction.

Limitations

Many teachers simply do not like to use the prescribed scripts for each lesson. (Other teachers would not use anything else after trying it.)

Research Basis and Use

Field-test data

Applicability to the Army

Excellent for remedial reading skills for students with difficulties in decoding and/or comprehension.

Kincaid, J.P., & Curry, T.F., Jr. Development and evaluation of a remedial reading workbook for Navy training. (Training Analysis and Evaluation Group Report ((TAEG)) #79) Paper presented at the annual meeting of the American Educational Research Association, Boston, April 1980.

Note: The workbook developed is entitled, Job-Related Remedial Reading Material: A Navy-Relevant Remedial Reading Workbook. It has three component parts: reading comprehension, word analysis, and vocabulary. The vocabulary section was developed by Wishner and is described in Appendix D because it may be used as an adjunct study skills course or as a component part of such a course. The workbook was developed as part of the Navy's Academic Remedial Training Program (ART).

Target Population

Navy recruits who read between grades 4-6.

Objectives

To improve comprehension of the two training manuals used throughout the Navy; to reduce attrition.

Content (Reading and Word Analysis)

Objectives are divided into three strands: comprehension, word analysis, and vocabulary. Comprehension focuses on such skills as following directions, understanding pay schedules, telling military time, and learning Navy language as well as concepts and information on the following topics: recognizing officers, understanding the rules for personal conduct, equal opportunity employment, military justice, and Naval history. Word analysis covers consonants, vowels, and blends. Additionally, there is a Navy glossary, several optional instructor-led exercises, and speed reading practice.

Organization

Instruction is organized in terms of topic areas. Each topic typically has 2-8 pages of content and practice exercises followed by a short quiz.

Method of Instruction

Instruction is direct in that the student is told what he/she needs to know in order to learn. Instruction and practice is given entirely in a single workbook and therefore could be individualized or group instruction. Practice tests involve a range of tests: multiple choice, fill-in-the-blank, underlining, sentence completion.

Placement

The Stanford Diagnostic Reading Test is used to place students into the program but apparently no effort is made to match instruction with diagnosed weaknesses.

Strengths

The contents are job-related and deal with numerous topics that are typically not available in workbooks of any kind. The print is very large and the text is generally well-written with numerous well-placed visual aids. Instructors need no inservice and students can use it with minimum guidance. The program is cost effective.

Limitations

Other than the computer vs classroom instruction experiment by Wishner, there is no quantitative data to show that the program improves reading or attrition.

Research Basis and Use

Extensive interviewing with subject-matter experts (both Navy Personnel and remedial reading specialists); extensive curriculum analysis; field testing of rough draft plus field testing with 150 students; questionnaire data from instructors; on-site observational data. Almost all exercises have been incorporated into the five ART modules used throughout the Navy.

Applicability to the Army

Although there is no systematic data on the effects of the program, the topics covered seem in the comprehensive strand highly appropriate for adaptation to the Army. Moreover, the text is well-conceived and consistent with learning theory. The vocabulary strand and instructor-led exercises are also highly appropriate for adaptation.

University of Illinois, PLATO. Urbana: University of Illinois, Engineering Research Laboratory, 1980. (Description below provided by PLATO Staff, October, 1980).

Target Population

Primary target is the pre-GED population. These are students who have completed Adult Basic Education courses and are not yet ready to take their GED exam. These students perform on about the fifth grade level on a test of adult achievement in basic skills areas.

Objectives

The objectives of this instruction are to present basic skills curricula in reading, language, and math to work on literal and inferential comprehension, grammar, punctuation, capitalization, and mathematics from simple addition through decimals and fractions. This three-strand approach provides the materials for instruction and practice in the major areas of basic skills.

Content

Math assignments include addition and subtraction, addition and subtraction with carrying, multiplication with single and double digit numbers, area, division and division on the number line, fraction addition and subtraction of fractions, decimals. The language instruction involves, capitalization, punctuation, spelling, subjects, predicates, semicolons, commas, quotation marks, passive verbs, verbs, past tense, pronoun agreement, grammar and usage, singulars, plurals, and possessives, and writing. Reading requires the students to read a variety of passages and answer questions such as who, what, when, where, and why about the passages. The passages are of increasing length and difficulty and test literal and non-literal comprehension. There are extensive lessons in vocabulary development and "automaticity" in reading via "pacer passages."

Organization

Students are assigned to all three strands of the basic skills instruction simultaneously. Their entry into each strand depends upon performance on pretests. Students generally work on PLATO lessons for about an hour. This time is divided by the student between reading, math, and language instruction online. An equal amount of time is spent in offline work in the three areas. This means that students spend about two to two and half hours in PLATO offline and online instruction during each school day.

Method of Instruction

The materials used with the PLATO CMI (computer managed instruction) program are direct instruction. Students are told what they are to do. They are told what the objectives are for the different units, and they are given precise feedback when they make errors. Students who need additional work (as measured on the unit posttests) are given additional assignments before they progress to a later unit.

Placement/Assessment Instructions

Each unit in each strand has its own pretest and posttest. Students take the pretest for the first unit. PLATO randomly selects from an item bank the specified number of easy, medium, and hard items. The student then completes these items. A score is specified for passing the unit, or in some marginal cases, the teacher determines whether or not the student should possess to the next unit. Students complete work assignments in units for which they failed the pretest. After finishing the work, the teacher then assigns the posttest. Upon passing the posttest, the students then move on to the next unit. These on-going assessment procedures are used for reading, language, and arithmetic.

Program Evaluation

Questionnaires are administered on a schedule for each student in the program. PLATO keeps usage data on all students. These data keep track of how much time is spent in lessons and other activities. Data are collected on the norm-referenced instruments used in the school, and the performance of PLATO and non-PLATO students is kept on the GED. In addition, further evaluation will be conducted with a case studies approach beginning late fall of 1980. It is believed that this evaluation will round out the data on the PLATO implementations.

Strengths

PLATO instruction is efficient, and it is very appropriate for disadvantaged populations or for any group of students who have met with failure with other types of instruction. PLATO is "private," and students appear to react very favorably to this privacy. PLATO allows students to work at their own pace and yet allows teachers to work with more students.

Limitations

PLATO is expensive as the terminals are costly, and the fees for operating from the central computer require phone-line connections. There is the

need for staff training and monitoring during the initial and during ongoing stages of implementation. It is recommended that staff work with PLATO site managers often during the initial stages of implementation. During the later stages it is recommended that the local staff receive inservice training approximately one day per month.

Research Base in Use

The primary research base in use has been field-testing. The materials are field-tested with as adult population as they are being developed. Data are collected during these tryout stages. The materials will be evaluated more carefully with norm-referenced and criterion-referenced measures during the 1980-1981 fiscal year. Case study evaluations will also be completed during this time.

Applicability for the Army

The PLATO CMI curriculum in basic skills is particularly appropriate for use with the Army. It has been developed for use with adults in the prisons in the State of Illinois and for youth in the Job Corps. These projects have been going on for a number of years. The anticipation is that the youth and adults in the Army are similar in educational background and need to those in the sites in which PLATO is currently being used, particularly the Job Corps. These major areas are basic skills lessons designed for students who have neither graduated from high school nor have received the GED. The goal is more than getting students to pass tests; the goal is to teach educational skills that will be necessary for future training and employment.

APPENDIX G

PROBLEM SOLVING AND BASIC THINKING SKILLS:

MATERIALS FOR TEACHERS AND/OR STUDENTS

The programs described in this appendix are either textbooks or student workbook materials to develop a broad range of problem solving and thinking skills. While none of these programs are oriented to developing memorization strategies as such, all of them involve developing a wide range of analytical and reasoning strategies which could facilitate achievement in specific military courses and reading comprehension as well as motivation, self-confidence, and leadership.

Covington, M. V. , Crutchfield, R. S., Davies, L. B., & Olton, R. M., The Productive Thinking Program: A Course in Learning to Think. Columbus, OH: Merrill, 1974

Target Population

Students from junior high upward.

Objective

To help students learn to solve problems intelligently, effectively, and creatively.

Content

Fifteen lessons on evaluation and practice that focus on the following skills areas:

- Approach problem solving situation in an organized way
- Think of several alternative solutions
- Evaluate the solutions
- Have a positive attitude toward own thinking skills

Method of Instruction

Extensive use of clear examples; techniques taught are general (applicable to all types of problems). Instruction assumes that all types of techniques should be tried on every problem.

Strengths

Provides large number of problems.

Weaknesses

Strategies are too general; no guidelines for appropriate use.

Inservice

None indicated.

Research Basis and Use

Field-test data and experimental research. Sold commercially.

Applicability to the Army

More relevant to training of officers than to training of recruits.
More advanced skills.

De Bono, E. CoRT Thinking Materials. Cambridge, England: Cognitive Research Trust, 1978. See also Lateral Thinking. New York: Harper and Row, 1971.

Target Population

Students from junior high through junior college.

Objectives

To help students improve thinking skills in problem-solving situations, in discussions with other people, and in situations that call for creative thinking.

Content

Explanation of the principles involved especially the key concept of lateral thinking; examples of how the techniques are used; short practice items; a lengthy project in which the student must apply the techniques.

Organization

Six units, each with ten lessons. The units are:

1. Fundamental thinking skills
2. Basic operations such as comparison
3. Thinking in an argument or debate
4. Creative thinking
5. Effect on thinking of beliefs, information, values and emotions
6. Concrete procedure for using thinking skills

Method of Instruction

Presentation of techniques with example and discussion of generation of alternative solutions.

Strengths

Numerous techniques are covered. Each lesson focuses on one principle. All techniques are practical and require no prerequisite knowledge. Transfer is emphasized.

Weaknesses

No guidelines for differentiating which technique to apply to which problem. Requires training of teacher trainers and teachers.

Research Basis and Use

Field-test data; documentation of extensive use in England, Canada and Venezuela where the program has been mandated for use throughout the country by the Ministry of Intelligence. The Venezuela Project involves 42,000 teachers.

Applicability to the Army

Good program for development of administrative and leadership personnel. Covers skills that are particularly important in leadership, but deals with numerous practical problems and the attitudes that defines one's mental set in approaching problems in school and on the job.

Feuerstein, R. Instrumental Enrichment: An Intervention Program for Cognitive Modifiability. Baltimore: University Park Press, 1980.

Target Population

Students from ten to adulthood; may have IQ from 40 to 90; may be illiterate; may be gifted with learning disabilities.

Objectives

General: To modify achievement level of retarded performers; to provide prerequisites for all basic thinking operations having structural changes in intellectual functioning.

Subgoals: Correction of specific cognitive deficiencies (see LPAD below); acquisition of vocabulary, labels, concepts, operations, relationships; formation of specific thinking habits; production of intrinsic motivation; shift from role of passive recipient and reproducer of information to role of active generator of new information; creation of insight and reflective thinking.

Content

Five hundred pages of pencil-and-paper exercises divided into 20 instruments: Each instrument focuses on a specific cognitive function such as spatial relations. However, each task addresses multiple deficiencies. Other examples of instruments are numerical progressions, family relations, temporal relations, analytic perception, syllogisms, and categorizing.

Organization

Each lesson includes a problem definition, practice, basic concepts, and when relevant, the meaning of labels.

Methods of Instruction

Feuerstein argues that the function of the teacher is to "mediate" the learning experience of the student. Essentially, this involves helping the student interpret his/her experiences so that learning takes place and success is experienced. Toward these ends students and teacher work together to solve the exercise problems. Teacher is also responsible for translating application of each skill to school problems in reading and math as well as to content areas and interpersonal relations in the classroom. Instruction may involve working in small groups and group discussion.

Assessment/Placement

A series of tests called the Learning Potential Assessment Device (LPAD). This device involves providing the student with learning problems so that both strengths and weaknesses in cognitive functioning may be assessed. Evaluation is based on the amount of intervention required to product change (solution). Using this non-verbal test, Feuerstein was able to demonstrate that numerous individuals who had been classified as retarded or low in IA had learning potential; therefore, their cognitive functioning could be modified.

Progress Evaluation

Correct completion of exercise problems; teacher evaluation, self-evaluation on objective criteria such as speed, accuracy, decrease in erasures.

Inservice

Minimal training for trainers is six weeks; for teachers is about 18 days.

Strengths

The skills taught cover a broad range of basic thinking paradigms such as following directions, summarizing, conservation, compare-and-contrast, and factor analysis. Problems very well conceived and developed. Strong task-intrinsic motivation; self-correctives in same exercises.

Weaknesses

Requires extensive inservice training. Program relies heavily on teacher applying processes and skills to school problems.

Research Basis and Use

Field-test data; experimental research; follow-up studies showing higher achievement in school, improvement in measures of intelligence, and increased student participation and responsibility in the thinking/learning process. Used throughout Israel and incresingly in the United States and Europe.

Applicability to the Army

Excellent training for broad range of academic and vocational problems as well as for development of motivation to achieve and goal-oriented behavior.

Samson, R. W. The Mind Builders. New York: E.P. Dutton, 1965.

Target Population

Teachers of students from junior high through junior college.

Objectives

General: To modify the IQ of low achieving and low ability students.

Specific: To improve performance in specified basic thinking skills: "thing making" (concept attainment), qualification (factor analysis/compare-and-contrast), classification, structure analysis, analysis of operations (procedures and processes) and figurative language.

Content

The book provides a theoretical rationale for teachers regarding the general idea that IQ is modifiable and the specific skills taught in the book. Additionally, there are lessons for the teacher to give to students as well as answer keys.

Organization

The book is divided into three parts: Part 1, chapters 1-12, provide the rationale. Part 2 consists of the exercises which progress from very simple to very complex. Each lesson consists of verbal and nonverbal problems involving the range of skills specified. The answer keys are in the last part.

Assessment/Evaluation

Any standardized verbal or nonverbal IQ test.

Strengths

Few textbooks to teachers contain actual exercises and answer keys for use in classroom instruction. The exercises provide a broad range of basic skills. No inservice is needed and there is some experimental evidence. Exercise problems include items from astrology, biology, geometry, physics, history, geography and literature.

Limitations

The text for teachers (the theoretical rationale) is written in very simplistic terms and shows no evidence of being an application of

cognitive theory. This is not true of the exercises themselves, however. They embody sound principals of cognitive research and instruction.

Research Basis and Use

Field testing and quasi-experimental research. Text is available commercially.

Applicability to the Army

An excellent book for Army instructors because the exercises are so well-sequenced to build up to analysis of complex vocabulary, diagrams, shapes, and classification systems.

APPENDIX H

MECHANISMS OF DISSEMINATION

This appendix includes descriptions of diffusion networks and dissemination research projects which have direct application for the Army's BSEP objectives.

Cates, C.: Malkas, M.; Sulkis, B.; Hood, P., ed. The State of the States: Report of Discussions at the 1978 Dissemination Forum. San Francisco: Far West Laboratory, 1979.

Target Population

Educators at all levels.

Objectives

To report on discussion groups at the 1978 Dissemination Forum. The report describes methods by which information about educational programs is being disseminated within 38 states and territories.

Content

Each report provides information about a state's or territory's:

1. Demographic, economic, and school statistics
2. Forces for change. These are ways in which the state is attempting to deal with educational problems in the state.
3. Dissemination programs and resources. Describes programs for dissemination of educational information about educational programs within that state or territory.
4. Dissemination actors. People and organizations that disseminate information.
5. Coordination and exchange. This tells when dissemination workshops are held.
6. Client impact. Description of how schools use the dissemination network.
7. The future. Description of steps to be taken to improve availability of dissemination network.

Organization

Organized along lines of the ten districts of the U. S. Office of Education.

Inservice

Describes dissemination workshops held in each state and territory.

Strengths

Gives thorough explanation of dissemination networks in each state.

Limitations

Discussions do not describe specific kinds of programs disseminated through the networks.

Applicability to the Army

Dissemination information described here could lead Army instructors to resources that could prove helpful, particularly in areas of reading, technical training, and adult education.

National Diffusion Network of the Department of Education. Educational Programs That Work. San Francisco: Far West Laboratory, 1979.

Target Population

Educators.

Objectives

Describes educational programs that are judged "exemplary" by Department of Education and therefore worthy of emulation.

Content

Describes various projects. Each project description includes summary of content of project, target audience, detailed description of project, evidence of project's effectiveness, what's required for implementation of project, what materials and financing are required in the program, the services provided by the project, and the person to contact about the project.

Organization

Arranged into 12 sections listed in Table of Contents. Of special relevance are sections on adult education.

Strengths

Clear descriptions of programs. Well-organized. Some very interesting programs are described here.

Applicability to the Army

Of particular relevance are:

- Section 1: Adult Education
- Section 8: Preservice and Inservice Training
- Section 9: Reading/Language Arts/Mathematics

Orth, M. N. Department of Defense Curricula: Feasibility of Conversion for Vocational Education. Paper presented at the annual meeting of the American Educational Research Association, Boston, April 1980.

Target Population

Military and vocational education educators.

Objective

To report on evaluation of 20 military courses to see how well they could be converted to civilian vocational use. Focus on 3 areas: allied health, environmental health, occupational health.

Content

Background on vocational effort of the military. Advantages of conversion over writing "from scratch." How assessment was conducted. Criteria for assessment. List of courses reviewed. Statement of conclusions.

Applicability to the Army

The procedures used by Orth could serve as a model for use in curriculum overhaul and as a mechanism of dissemination between military and vocational education institutions. Orth has conducted curriculum analysis of each course and her research covers the various branches of the military.

Seltz, N. and Lotto, L. Basic Skills in Vocational Education. Columbus, OH: Natural Center for Research in Vocational Education, 1980. (A recently funded research project).

Target Population

Administrators, policy makers and practitioners in secondary and post-secondary education, including correctional, military and adult basic education.

Objectives

1. To investigate basic skill attainment of secondary level pupils in order to make comparisons between vocational and nonvocational students and investigate relationships between basic skill proficiency and student outcomes (placement, wages, etc.).
2. To examine effective intervention strategies for enhancing basic skill attainment through vocational education.

Content and Organization

1. Literature searches are conducted and documents reviewed toward producing a synthesis report on basic skill attainment, the effect of vocational education on basic skill attainment and proficiency, and effective intervention strategies for developing and enhancing basic skill attainment.
2. Student basic skill data (test scores) are collected from national, state, and local data sources and analyzed. Data analyses results are synthesized and evaluated for describing basic skill attainment levels and relationships between student and outcome variables.

Applicability to the Army

Literature and data analysis syntheses will be useful for persons planning instructional programs on secondary or postsecondary levels. The reports afford a knowledge of basic skill of present day youth and some possible intervention strategies, especially as use of basic skills applies to the world of work or working. The information contained should be useful to persons planning programs and institutional methodologies in the public schools and in instructional or on the job training as occurs in industry, correctional institutions, and military training. Given the age group of the students under study, the information pertaining to basic skill level description and use of intervention strategies for enhancing basic skills through occupational training should be of particular use in military training and development programs.

United States Office of Education. Dissemination Networks: Information Resources for Education. San Francisco: Far West Laboratory, 1978.

Target Population

Educators at all levels.

Content

1. Description of various networks of information through which educators can obtain information about specific educational programs. Each description tells the following:
 - a. Network title
 - b. Acronym
 - c. Sponsoring bureau
 - d. Major function
 - e. Network members
 - f. Target audience
 - g. Description
 - h. Available information
 - i. Network contacts

Organization

Description of various networks is followed by addresses through which networks may be contacted.

Strengths

Clear description of networks; manual is easy to use.

Applicability to Army

Following networks would be of particular interest to Army instructors:

1. Educational Resources Information Center (ERIC)
2. National Diffusion Network
3. National Network for Curriculum Coordination in Vocational and Technical Education
4. National Reading Improvement State Leadership and Training Program.
5. State Vocational Education Research Coordinating Units

APPENDIX I

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