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Research Report 1436

Implementation of a Cognitive Skills Training Program in ROTC: The Leadership Enrichment Program

Paul T. Twohig, Douglas L. Rachford, Joel M. Savell, and Carlos K. Rigby

Leadership and Management Technical Area
Manpower and Personnel Research Laboratory

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March 1987

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This report describes the implementation and evaluation of the Leadership Enrichment Program (LEP), an application of the Instrumental Enrichment Program, designed to increase the cognitive performance of ROTC cadets. Steps to ensure a strong implementation in 11 ROTC programs were defined and executed. Although the project was cancelled because of priorities after 1 year, the initial results indicated positive effects on cadet cognitive performance and acceptance of the program by students and instructors.

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Paul T. Twohig, Douglas L. Rachford, Joel M. Savell, and Carlos K. Rigby

Leadership and Management Technical Area
William W. Haythorn, Chief

Manpower and Personnel Research Laboratory
Newell K. Eaton, Director

U.S. ARMY RESEARCH INSTITUTE FOR THE BEHAVIORAL AND SOCIAL SCIENCES
5001 Eisenhower Avenue, Alexandria, Virginia 22333-5600

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FOREWORD

Leaders have always needed to have excellent cognitive skills, and this need should be even greater on the modern battlefield. This report describes a project to improve the cognitive skills of ROTC cadets--future officers. It provides valuable information on the requirements for implementing such a cognitive skills training program and how such a program can improve the performance of Army leaders.

EDGAR M. JOHNSON
Technical Director

IMPLEMENTATION OF A COGNITIVE SKILLS TRAINING PROGRAM IN ROTC:
THE LEADERSHIP ENRICHMENT PROGRAM

EXECUTIVE SUMMARY

Requirement:

To improve the quality of Army officers by improving the cognitive and communicative skills of ROTC cadets.

Procedure:

The most appropriate, high-quality, available cognitive skills training program was identified--Instrumental Enrichment (IE). Then a program was designed to adapt this technology to ROTC to enhance leadership training, particularly cognitive and communicative skills. There were 11 experimental and 13 control schools (normal Military Science (MS) I curriculum). Getting a strong implementation required orienting ROTC personnel, training instructors, developing a special curriculum and set of curriculum materials to integrate cognitive skills training and the MS content, developing additional curriculum materials to enhance the IE materials (e.g., special writing assignments), and a lessons-learned and planning session with instructors after the first semester. Students and instructors were surveyed and interviewed for their perceptions of the values of the program. Results from more objective measures to evaluate the program were not obtained due to the unexpected early cancellation of the program because of resource limitations.

Findings:

The results of the surveys and interviews indicated that 75% of the students and all of the instructors perceived the program as valuable for developing leaders. Instructors consistently held that most of the students who did not respond to the program were the poorest academically. (Many of the schools have open enrollment.) Concrete results reported by the instructors included improved writing and facilitation in teaching land navigation. Instructors also found that the interactive teaching style combined with observations of the students' problem-solving styles gave them more information by which to identify promising cadets than more traditional teaching methods. The efforts to ensure a strong implementation were successful in getting the prescribed implementation in all 11 ROTC programs. The main concern of instructors was whether there were enough classroom hours available in the MS curricula to do justice to the IE approach.

Utilization of Findings:

Because the results are only preliminary, we could not draw a firm conclusion on the effectiveness of the Instrumental Enrichment Technique for training officers in ROTC. However, there were several implications of this research that can aid in improving officer training: writing assignments can be integrated within MS content and add to the learning of the content; materials analogous to some of the IE materials might aid Land Navigation training; having problem-solving sessions in class can give the instructors more insights into students' abilities; and the interactive teaching style can increase student involvement. In addition, the actions taken to implement this program can guide others in planning interventions within ROTC.

IMPLEMENTATION OF A COGNITIVE SKILLS TRAINING PROGRAM IN ROTC:
THE LEADERSHIP ENRICHMENT PROGRAM

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IMPLEMENTATION OF A COGNITIVE SKILLS TRAINING PROGRAM IN ROTC: THE LEADERSHIP ENRICHMENT PROGRAM

INTRODUCTION

Overall Purpose

This report describes the planning and implementation of a program to improve the general cognitive skills of Reserve Officer Training Corps (ROTC) cadets. This program, the Leadership Enrichment program (LEP), was largely the application of the Instrumental Enrichment (IE) program (Feuerstein, 1980) and was designed to take several years. But it had to be canceled after one year due to a shortage of resources before concrete results could be obtained.

However, there were valuable lessons learned for those interested in one of the following: (1) cognitive skills training, (2) field research on training programs in the Army, and (3) conducting intervention programs in ROTC. This report both documents the work done and provides information for those with these interests. The IE program is described in some detail because it is an important program in itself and because any general cognitive skills program would probably have analogous principles and procedures. There is also information on the issues one has to deal with in implementing training programs and in conducting intervention programs in ROTC.

General Background

It is clear that military leadership requires effective cognitive skills whether in peacetime or during war. During peacetime, the major task is to be prepared for war. Preparedness requires many activities including soldier training, learning and adapting new technologies, communicating, planning, managing, and teaching. Success on these activities requires leaders that have a high level of cognitive ability. The importance of thinking ability is emphasized throughout the leadership field manual, FM-22-100, particularly in the sections on leadership that provide direction and implementation.

In war the importance of cognitive ability is even more obvious. The FM-22-100 contains a description of Colonel Joshua Chamberlain's heroic performance at the Battle of Gettysburgh. Colonel Chamberlain showed excellent cognitive ability in conceptualizing maneuvers that his troops had never before carried out but which were required for the situation. The doctrine for Army 21 identifies even more severe cognitive demands in the very dynamic future battlefield. In addition, with a highly distributed battle, lower-ranked leaders will be making decisions that previously only much higher ranked officers have made.

One way to obtain quality leaders is through using selection standards, including selection on cognitive ability. This is a useful approach. But it should not be the only approach because: (1) even effective thinkers may still benefit from training in cognitive skills; and (2) the pool of recruits who meet cognitive and other standards will probably be too small for recruitment goals to be met.[1]

Specific Background

After commissioning, officers go to an Officer Basic Course (OBC) for further training and evaluation. Although failure rates are generally low, losing any officers at this point represents a considerable waste of resources. In recent years the Training and Doctrine Command (TRADOC) has become concerned that there was a disproportionate level of OBC failures for the students commissioned through certain ROTC programs. Since the students from many of these programs came from economically disadvantaged backgrounds, it seemed plausible that their full abilities had not been developed. The Office of the Deputy Chief of Staff for ROTC (ODCSROTC) requested that the Army Research Institute identify and evaluate a program to train cognitive skills within an ROTC environment. The program identified was Instrumental Enrichment which was developed by Feuerstein (Feuerstein, 1980). In a pilot study, this program was embedded in the MS III curriculum of 12 ROTC units for the academic year 1982-1983 (Rigby, Twohig, Rachford, Savell, 1986. But there was little time before the school year to organize the program optimally to ensure a good implementation. As a result, the implementation quality varied greatly across ROTC programs. Even if the implementation had been better, one year was too short a time to complete all of the training tasks. In addition, the only criterion measures used were the cadets' performances at the summer camp after MS III. A more precise evaluation would include more direct measures of cognitive ability.

The results showed no significant effects of the IE program. But due to the implementation and measurement problems mentioned above, it was felt that IE had not been fairly tested. The rationale for choosing IE (discussed further below) was not undercut by a questionable experiment. In addition, there was a positive subjective response from most of the students and instructors, particularly from units that had implemented the program well.

The positive reactions favorably impressed the DCSROTC, MG Prillaman, and he requested that ARI develop a new plan for implementing IE in ROTC. But he stated that it would have to be used in MS I and MS II because there is too much pressure on the instructors to prepare for summer camp in MS III. However, the lessons learned in the MS III intervention guided the planning for the later intervention (see Rigby et al., pages 18 and 19).

Recently the goal for commissioning has gone from about 8000 to 1200 per year. Preliminary information from the ROTC Study Group indicates that there is no indication that the higher goal will be met in coming years.

Instrumental Enrichment (IE)

Historical Background

Reuven Feuerstein (1980) developed Instrumental Enrichment in Israel to deal with the poor cognitive performance of adolescents. These adolescents were typically from non-western cultures and were having difficulty fitting into the main society. Not satisfied with standard, static assessment devices (e.g., IQ tests), he developed a dynamic assessment method, the Learning Potential Assessment Device, LPAD (Feuerstein, 1979). Subjects would progress through a series of tasks of generally increasing difficulty. If they got stuck, they would be given a hint or set of hints in increasing degrees of helpfulness. The assessment of learning potential was based more on how a subject used past learning to solve new tasks than on the percentage of correct solutions. For example, a subject might get several problems of a certain type wrong, but then learn a principle that would solve a problem. If that principle was used spontaneously to solve a series of problems, that would be evidence for learning potential. Based on his experience with the LPAD and theoretical considerations, Feuerstein developed the IE training program.

Critical Concepts

There are several critical ideas that influenced the development of the IE program. Feuerstein's most fundamental claim is that a child's learning is enhanced by Mediated Learning Experiences or MLEs. Piaget (1954) has presented a view of how children develop their abilities to organize information through interaction with the environment. Feuerstein added an emphasis on the importance of interaction with other people for cognitive development, somewhat along the lines of Vygotsky (1962).

Adults can provide MLEs for children by helping the children improve their abilities to conceptualize the world around them and to solve problems. Such mediation can be accomplished in a variety of ways: the adult might model effective thinking, or ask questions of the child, or explain how an adult would do it, or set up learning experiences, etc. In any case, the adult would try to make the child aware of the process of thinking, not just the products of thinking.

Thus Feuerstein's major explanation for why the adolescents he dealt with showed poor cognitive performance was that the adults who raised them did not provide enough MLEs. He recognized however that the source of the problem may not always lie with the behavior of adults. Children may have trouble having MLEs because of their own deficits such as learning disabilities. Whatever the source or sources of cognitive deficits, Feuerstein argues that major improvements can occur through providing MLEs, although special methods might be needed for those with physiologically based deficits.

Feuerstein has developed a general description of people who show poor cognitive ability. Not only do poor performers lack certain cognitive skills, but also they may fail to apply the skills that they are capable of exhibiting

in a given situation. For example, even though they may use categorization skills in one situation, they may fail to do so in another situation where the skills are appropriate. Poor performers often exhibit what Feuerstein terms episodic thinking. That is, they only superficially analyze the situation they are in and do not relate it to past or anticipated activities. They also fail to engage in hypothetical thinking to improve their understanding of the events they encounter. When poor cognitive performers do attempt to solve a problem, they tend to do so impulsively and try solution methods before effective problem analysis. Other researchers have also found that poor problem solvers tend to have an impulsive rather than a reflective style (Kagan, 1965).

The gist of Feuerstein's description of poor performers is that they do not gain much knowledge or skill when they encounter information from the environment or other people. Either they don't have the required cognitive skills to interpret information effectively or are too passive to apply the skills they have or, if they apply their skills, they do it impulsively and ineffectively. Feuerstein states that they lack cognitive modifiability since they gain so little from encountering information.

Feuerstein, of course, wants to reverse these characteristics of poor performers through the IE program. He wants them to improve their skills where they are deficient and to make them more actively use their skills in problem solving and learning (eliminate episodic thinking). He also wants them to move from an impulsive to a reflective cognitive style. Overall, Feuerstein hopes that the improvement will be more than the sum of its parts, with the parts being the individual skills trained. His goal is to create a change in cognitive structure such that the students become more cognitively modifiable.

The concept of cognitive modifiability is critical since people who improve their ability to learn will gain in knowledge and skills. But this cognitive enhancement, in turn, should increase the ability to learn and develop further. Thus there is a "rich gets richer" flavor to the hypothesized value of becoming cognitively modifiable. Feuerstein terms this hypothesis, the divergent effects hypothesis, because the difference in performance between those who are cognitively modifiable and those who are not, should diverge with time. As we shall see, this hypothesis has been tested by Feuerstein (1980).

IE Training Materials

To develop his training materials and techniques, Feuerstein (1980) combined his overall theoretical perspective and his experience with the LPAD assessment device. To help characterize training tasks, he developed a framework he termed the cognitive map. The map was essentially a set of parameters or dimensions with which one could characterize mental acts, particularly those involved in doing the training tasks. One of the most important dimensions was that of phase which had the categories of input, elaboration and output. These categories correspond to the typical major stages in information processing

models (e.g., Klatsky, 1980) in which (1) environmental information is taken in (input) (2) then it is operated on by various cognitive processes (elaboration) and (3) a response is organized and executed (output). Feuerstein also defined a set of cognitive functions in which poor performers tend to be deficient. The correction of these deficits can be used as goals for the training program. In one categorization of the deficient functions, they are grouped as to whether they fall into the input, elaboration or output phases.

The set of training materials developed have the following characteristics.

* 14 booklets (instruments) of paper and pencil tasks.

* Each instrument has a particular cognitive focus; e.g., syllogisms (see Table 1 for some of the skills taught in IE).

  - But many cognitive skills will be practiced in a given instrument.

* Each instrument can be analyzed in terms of the cognitive map.

* Usually there are a lot of small problems, many per page, rather than a small number of more extensive problems.

  - Thus the learner is brought along in relatively small steps.

* The problems tend to increase in difficulty as one proceeds through an instrument usually leading to a set of mastery problems in which the student needs to combine previously learned skills.

* The instruments are broken into sections, each with its own training goals.

  - These sections are not explicitly labeled in the instruments, but they are known to the teachers through additional materials.

* Most problems are in diagrammatic, not verbal, form.

  - The populations that Feuerstein dealt with were weak in using the national language.

* Task instructions are often implicit, requiring the students to reflect on what is required.

* The 14 instruments fall roughly into two levels of difficulty.

  - Some instruments are viewed as prerequisites of others.

* Each instrument has a cover page with a symbol for that instrument and the program slogan "Just a minute, let me think".

Table 1

Sample Cognitive Skills Taught Through IE

Comparing Concepts Systematically

Categorizing/Organizing Concepts

Breaking Down Components of a Concept

Interpreting and Writing Instructions

Spatial Orientation

Frames of Reference

Manipulation of Images

Time Distance Relations

Logical Thinking

Social, Behavioral Analysis

IE Training Goals and Procedures

Goals. The goals of IE are restated and summarized here (Feuerstein, (1980):

* Make students more cognitively modifiable.
* Reduce the tendency to indulge in episodic thinking.
* Improve performance in a specific set of cognitive functions.
* Change cognitive style; examples:
  - impulsive to more reflective style
  - passive to more active thinking style
  - concrete to abstract thinking
* Improve problem solving ability.
* Increase insight into student's cognitive processes and thinking in general.
* Make effective thinking a habit.
  - Apply it in everyday activities.

Classroom Procedures. The training process can perhaps be best described by outlining a model classroom session.

* Analyze the IE task (teacher-led group student activity).
  - Look over instrument's cover and discuss and hypothesize as a group about the meaning of the instrument's symbol.
  - Flip through the pages and form a general impression of the instrument tasks and relations between types of tasks.
  - Teacher chooses the page to work on, and class tries to discover what the task is.
  - Define any needed vocabulary terms or symbols.
* Students first attempt the IE problems on one or two pages of the instrument.
  - Students may work individually or in teams.
  - Teachers will look over work and may give hints or ask questions.
  - Teacher may model how one does a task.

* Discussion of IE tasks.

  - Students may present their efforts to class.

  - Cognitive principles, strategies are discussed.

  - Errors are analyzed.

* Cognitive skills, principles are applied.

  - Skills are "bridged" to content areas (bridging will be discussed below).

* Teacher summarizes lessons learned and restates cognitive principles and skills that have been demonstrated.

* Note: If IE tasks were assigned for homework, they may also be discussed and mediated in class.

Training/Goals Match. It should be clear how the training process is designed to meet the program goals. Some examples are:

* Insight into cognitive processes is aided by a student's experience with the tasks, his or her verbalization of the strategies used, and discussion by others.

  - Both the processes and products of thinking are examined.

* Specific cognitive functions are practiced.

* The process of hypothetical thinking is emphasized to reduce episodic thinking.

* Impulsivity is reduced by the stress on careful problem analysis and also by the emphasis on self-awareness of performance.

* Problem solving is practiced, especially the problem analysis stage.

* The IE exercises and group activity are designed to be exciting and encourage an active thinking style.

* Abstract thinking is encouraged by the extraction of cognitive principles from specific exercises.

  - e.g., teacher's summarization, bridging.

* Applying cognitive principles is encouraged through bridging.

Bridging is illustrated in Figure 1. In bridging, the IE training tasks and teacher mediation are used to practice and give insight into some cognitive principles. These principles are then applied in various knowledge domains, e.g., MS (military science), academic topics, personal experience, and leadership. Bridging can be merely conceptual. For instance, one can just talk about the principles involved in giving clear instructions without the student actually giving instructions. But bridging can also be behavioral; e.g., you apply the principles while actually giving instructions. Bridging can work in both directions. For instance, while a teacher is presenting material on military science, such as land navigation, the instructor may note how it is necessary to apply the cognitive principles demonstrated in IE tasks.

Empirical Evaluation of IE

A comprehensive review of the research evaluation of IE is presented in a separate paper by the current research team (Savell, Rachford, & Twohig, 1984. But a few remarks will be made here. There are only a few field studies that seem to fit even the minimum conditions for evaluation of the IE program. But where the program has been implemented well and reliable measures used, there has been evidence for an improvement in cognitive performance (e.g., Feuerstein, 1980; Bransford, Stein, Arbitman-Smith, & Vye, in press; Ruiz, 1985a, 1985b). Typically, there is no evidence for statistically significant results until well into the program (close to 100 hours of training). In two cases, there has been evidence for the divergent effects hypothesis; Feuerstein (1980) and Ruiz (1985a). Feuerstein found that students who had gone through an IE program continued to improve in cognitive performance, relative to control groups two years after the program ended.

The overall conclusion is that the results on the effectiveness of IE are encouraging, but the jury is still out on a final evaluation. Bradley (1983) in particular makes the case for caution. An important caveat is that most of the evidence for success is based on standard paper-and-pencil tests (e.g., Primary Mental Abilities Test), particularly scales with non-verbal problems. It should be noted that most of the IE training tasks emphasize pictorial over verbal problems. Thus, the question arises as to whether there is transfer of training from IE to tasks that are different from the IE task. The ultimate goal of IE must be to improve performance in "real life" activities such as academics, job performance, etc. But such wide transfer of training has not been demonstrated.

LEADERSHIP ENRICHMENT PROGRAM (LEP)

THE IDEA OF "BRIDGING"

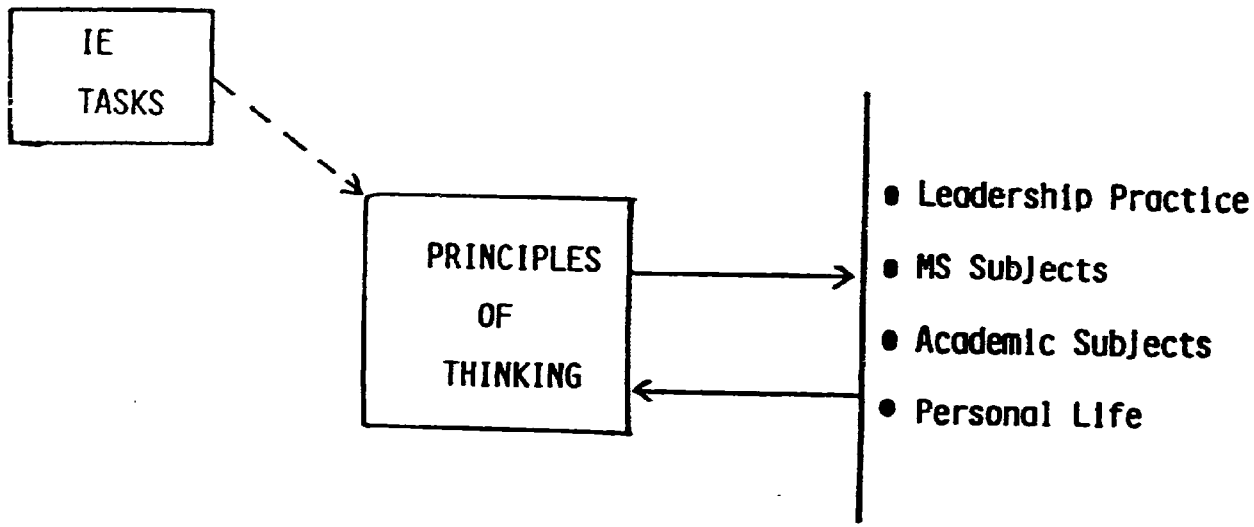

Figure 1

IE Compared to Other Programs

Theoretical Framework. As part of the decision to choose the IE program for a ROTC field study, we related IE to current theory and research on teaching thinking, including other programs. Major reviews of such programs include: Nickerson (in press) and Bransford, Stein, Arbitman-Smith, and Vye, (1985).

It will be helpful to discuss various approaches to teaching thinking in terms of a cognitive framework (Figure 2). For convenience, we might divide cognitive skills into two levels: (1) the organization or strategy level and (2) the implementing level. For instance, one might decide to do a careful analysis of a problem (a strategic decision). But to implement the analysis would require such skills as logic, categorization, etc. Some implementing skills were shown in Table 1.

The strategic level inherently involves choices, and further choices are made depending on feedback on the effectiveness of the implementing skills (Figure 2). The framework presented here is a simple one, for discussion purposes. A more complete system of cognitive skills is presented in another paper (Twohig, in press).

We may relate many types of constructs in current research to the strategic level. Three types are shown in Figure 2. The classic problem-solving stages (problem analysis, solution generation, etc.) are steps in an overall problem solving strategy. One decides how much effort to put into each stage and the general approach to use in dealing with each stage; then the appropriate implementing skills are invoked.

The construct of Meta-Cognition is getting a great deal of recent research attention (Brown, Ambruster, & Baker, 1984). Meta-cognition means thinking about thinking and implies self-awareness of one's thought processes. In a given situation one might be aware of the relevant knowledge one has, the understanding one has, the strategies one is using, and how well one's cognitive processes are operating. For instance, in listening to a lecture one can be aware of one's knowledge of the topic, how well one is understanding the lecture, the strategies one is using to understand, how well one is carrying out the strategies, etc. Being aware of one's cognitive processes clearly can provide a basis for strategic choice, especially when the operating strategies seem to be unsuccessful.

One of the reasons for the interest in meta-cognition is that it seems to be an important factor in training cognitive skills. It is commonly found that enhancing meta-cognition increases success in improving thinking skills (Nickerson, in press). For instance it has been found that poor readers fail to monitor their levels of understanding of what they are reading and also fail to adjust their reading strategies to improve understanding (Brown et al., 1984). Training that teaches poor readers to be more self-aware of the

COGNITIVE FRAMEWORK

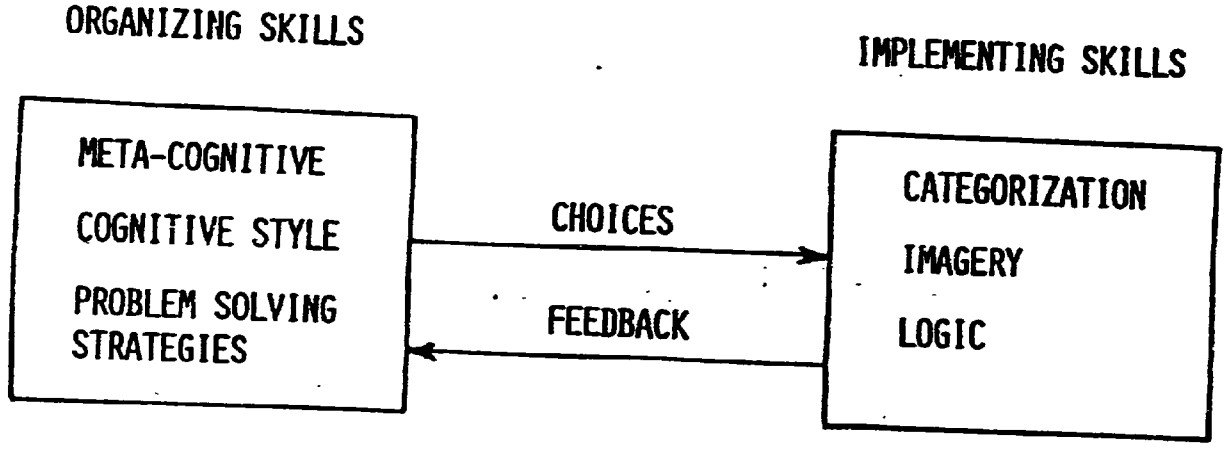

Figure 2

reading process and to consciously use good reading strategies has led to substantial improvements in reading performance. It has proved more difficult to establish the value of meta-cognition in more complex and more general programs to train thinking skills, such as IE. However, we would expect meta-cognition to be important in general-skills types of programs based on the theoretical framework presented above and extrapolation from research on specific skills programs.

Another highly studied construct related to the strategic level is that of cognitive style (Goldstein & Blackman, 1978). Cognitive style refers to trait-like predispositions to deal with categories of information and ways of organizing information. For instance, one might prefer verbal over non-verbal information and categorize the information in relatively simple or complex ways. There are many dimensions of cognitive style that have been studied such as: cognitive complexity (Streufert & Streufert, 1978), Field Dependence-Independence (Witkin, 1950), Impulsive-Reflective thinking (Kagan, 1965). The concept of cognitive style clearly belongs at the strategic level since it involves choices in information processing.

Based on the presented cognitive framework, we would want a general thinking skills program to deal with thinking at the strategic level and give practice in a wide range of implementing skills.

Strong Points of IE. There are other useful frameworks for categorizing thinking programs. For examples see Raymond Nickerson and his colleagues (Nickerson, in press; Bruce & Smith, 1983; Bransford et al., in press).

Though many of the available programs have excellent features, the IE program is probably the best current program overall because it is strong in so many critical dimensions. This is particularly true if the target group is made up of mostly below-average IQ performers. Some critical features of IE are:

* IE purports to trains skills at both the strategic and implementation levels (Figure 2) and the relations between skills at these levels.

  - Table 1 lists some of the implementation skills trained by IE.

* IE emphasizes meta-cognition, with respect to both a person's awareness of his or her own processes and of thinking processes in general (Bruce & Smith, 1983).

* IE works on changing cognitive styles, particularly the reflective-impulsive dimension that has been found critical to effective problem solving.

* IE works on problem solving in general, but particularly the important problem analysis stage. Research has shown that effective analysis may be the critical difference between successful and unsuccessful problem solvers (Bransford et al., 1984).

* IE has a comprehensive theoretical perspective that guides the approach to training.

* IE is designed to allow for many hours of practice. Given the known difficulty in obtaining substantial and general improvements in cognitive skills, one can expect it will require many hours of training for successful remediation, particularly for low-level performers. It should be noted, though, that this feature can not always be exploited because of time constraints in a particular situation.

* The IE program has good curriculum support materials and the requirement of quality instructor training. The program is not just dropped into a school system.

* IE focuses on a basic set of cognitive processes which may be the best approach for working with below-average performers. This approach may also be good for training the weak areas of average or above-average performers.

Issues Concerning IE. For some purposes, particularly with high performers, you may not be aiming for remediation. Instead you may be just adding cognitive skills to the student's repertoire. In such cases you may wish a heuristics (Hayes, 1981) type of program where general strategies are taught; e.g., backward planning, brainstorming, decision trees. Such programs may not need as many hours as basic remediation programs such as IE to teach the skills.

IE trains skills to obtain a general improvement in cognitive performance rather than focusing in a specific knowledge domain such as mathematics (e.g., Schoefield, 1980). Thus IE can potentially lead to a general improvement in problem-solving and learning (improved cognitive modifiability). It should be noted, however, that some researchers question the general skills approach since there has been more success in programs that teach more focused skills (Glaser, 1984). Glaser proposes that perhaps general skills should be developed out of learning in specific knowledge domains. The general/specific issue is very complex and will not be resolved for some time. To deal with this issue, the IE program emphasizes bridging to aid the application of general principles to specific applications. Bridging should also make it more likely that the principles will be applied outside of the classroom. Some other programs do not emphasize bridging and, therefore, their training may only be useful for tasks like the training tasks (e.g., see Bransford et al., 1985, comments on the Whimbey approach). It should be noted that some IE implementations did not seem to involve much bridging (Savell et al., 1984.

There is evidence for the success of IE (Savell et al., 1984) as discussed above. There is also evidence for the effectiveness of other programs; e.g., Project Intelligence, particularly those focused on a particular domain. But IE is probably the only program with evidence that the improved cognitive performance is maintained (or even increased) for years after the intervention, e.g., Feuerstein (1980).

A major question about IE is to what extent it can be used in college populations, as was done in the ROTC implementation, since it was developed for poorly performing adolescents. No definitive answer can be given here, although there is evidence for success with college age students (Ruiz, 1985b). Also, our previous experience with IE in ROTC (Rigby et al., 1986) showed that some of the highest rated cadets felt that IE had improved their performance.

A working hypothesis is proposed here. IE is most appropriate for populations analogous to that for which IE was developed in Israel, i.e., groups with educational disadvantages, even if the target population is older than the Israeli sample. But IE may be of some help to people of a wide range of ability. Even people with high overall IQ's may have some weak specific skill areas. Also, most people probably gain from training in strategic thinking and meta-cognition.

The skills of the instructor may be particularly critical for dealing with a group of people who vary widely in cognitive performance. The instructor can raise the level of discussion to any level or series of levels of abstraction, through bridging. For example, one can bridge from the orientation in space instruments to the application of an officer mentally taking the perceptual point of view of marching troops; e.g., what is in front of them. At a more abstract level, one could take the psychological point of view of someone to whom you were writing. The ability of a talented instructor to raise the discussion level to that of the "students" has been seen in the sessions where future IE instructors were trained. Very high level performers, including Army officers, university faculty and research psychologists have been challenged in these training sessions.

Overall, then, the IE program seemed to be a particularly good choice for the defined problem. It was hoped that it would be particularly effective for culturally disadvantaged students. But there were reasons to expect positive effects even with students with strong educational backgrounds. Even if more effective programs are developed later, they will likely have many of the same features as the IE program.

The IE program has been discussed in the abstract. Before describing the implementation of IE into ROTC (LEP), the critical aspects of the ROTC system will be described.

A Partial Description of the ROTC System

ROTC Organization

The ROTC system falls within the US Army Training and Doctrine Command (TRADOC). The ROTC headquarters is the ODCSROTC, which is currently commanded by MG John G. Prillaman. Following the chain of command, the system is divided into four geographic regions, each commanded by a brigadier general. The regions are divided into areas which are commanded by colonels (06). Each ROTC unit at a college or university is headed by the Professor of Military Science (PMS). Typically the rank of the PMS is lieutenant colonel, though quite often they may be Majors. At large units, the PMS is likely to be a

colonel while at small units he or she might only have the rank of captain. Considering all the ROTC instructors, officer ranks range from captain through colonel. Most units also have non-commissioned officers as instructors.

General Purpose of MS I/MS II

The courses in the Military Science (MS) sequence are labeled MS I, MS II, MS III and MS IV, which nominally correspond to the freshman, sophomore, junior, and senior college years, respectively. Students voluntarily enroll in MS I and MS II and generally have not made any commitment to the Army. (There may be some students on a four year ROTC scholarship that have some commitment to the Army.) If a student decides to become an officer, he or she contracts with the Army and enters two further years of training in MS III and MS IV. Students with prior military experience can bypass MS I and MS II and may take MS III courses prior to the junior year. The latter group represents a significant portion of those who are commissioned through ROTC.

With this structure, the major goals of MS I and MS II are: (1) to identify and recruit good officer candidates; and (2) to present introductory education and training in military science content and the theory and practice of leadership.

Influences on the MS I/MS II Curriculum

As mentioned earlier, each ROTC unit is headed by a Professor of Military Science (PMS). The PMS has significant latitude in designing the MS program. But there are also significant constraints on his or her actions including:

(1) The MS curriculum should be convenient and attractive to students so they will select MS courses - otherwise it may be very difficult to recruit them.

(2) The host school has a veto power on the MS curriculum. In particular, the schools can limit the number of classroom hours, number of graduation credits, and which courses are taught. Some schools allow MS courses to count towards graduation while some do not.

(3) Orders and guidelines from TRADOC go through the chain of command: ODCSROTC regional commanders, PMSs at the ROTC detachments. Because the two other influences listed above are non-military (student choice and school choice), the ODCSROTC cannot order changes in the ROTC programs that ignore the civilian influences.

The consequences of the myriad of influences in a heterogeneous set of host colleges and universities leads to a heterogeneous set of ROTC programs (over 400 of them).

MS I/MS II Class Sizes

Some ROTC units recruit heavily in the freshman year and make it very attractive for students to take MS I. At a few schools, taking ROTC in the first two years is mandatory. (The latter group includes the five military academies, such as the Citadel, that are modeled on the United States Military Academy at West Point). Therefore, the MS I class enrollment can be very large at some schools, especially in the first semester. Attrition leads to a considerable drop in enrollment by MS II.

The existence of large classes means that implementing programs in MS I can be resource-intensive, especially given the small percentage of MS I students who later sign Army contracts. The LEP program affected about 2300 MS I students in the experimental schools, and IE packets cost $40 per student.

Number of MS Hours

TRADOC rules require that each ROTC unit have a minimum of 30 classroom ("contact") hours per year in MS I, which is about an hour a week at most schools. The minimum for MS II is 60 hours per year. ROTC units can have more than the minimum hours if the host schools agree. Note again that there is often little or no graduation credit for MS hours, so that it may be unreasonable to ask students to take many MS hours. Having a MS course with many hours also makes it more difficult for students to fit it into their schedules.

There are "laboratory hours" as well as classroom hours. Having laboratory hours increases the number of MS hours without requiring a commensurate number of course credits. (The term laboratory is academic jargon and usually does not reflect the actual activities). And these activities vary across ROTC programs. Some of the typical activities are: physical education (PE) programs (satisfying PE credits), marksmanship, outdoor activities, (e.g., canoeing), drill and ceremonies, and first aid. As this list shows, the activities are often those that would be attractive to many students. Also, activities such as canoeing can be used to obtain insights into the students' leadership abilities.

Sequence and Content of Courses

TRADOC specifies a core set of topics to be covered over the course of MS I and MS II. The ROTC units can choose the semester or semesters during which they teach each topic, the sequence in which courses are taught, and the number of hours to spend on each topic. There are lesson guides (Training Support Packages) for most lessons and standards to be met. However, as in most teaching situations, the instructors have considerable latitude in what is emphasized. There is no common MS final exam that could be used across the ROTC system in MS I and MS II. The ODCSROTC monitors the conduct of MS I and MS II, mainly through reviewing curriculum plans and site visits by ROTC regional representatives. The major basis for evaluating the MS program as a

whole is the performance by cadets in the summer camp after MS III and the quality of the officers who are commissioned from the unit. The first check on officer quality comes in the Officer Basic Courses (OBCs).

The lack of strict standardization in the number of MS hours and how the hours are used leads to significant curricular variations from one unit to the other:

(1) Some schools have a relatively set sequence of MS courses that students must follow. At other schools, students can choose from a long "menu" of courses each semester, with little or no constraint on the order in which they take the courses. The major disadvantage of having a relatively long menu of the same courses each semester is that the program must offer many, if not all, of their topics each semester, requiring more sections and instructors. The advantage of this approach is that it gives the students considerable flexibility and choice in course selection, which may increase the chance that they will take MS courses.

(2) The topics taught in the classroom vary, and the hours per topic vary. If the core topics specified by ODCSROTC are taken care of, the ROTC units can bring in other topics of their choosing. There is also variation in how the laboratory hours are used, as indicated above.

Program Turbulence

The PMS's and other instructors are generally Army commissioned and non-commissioned officers although sometimes civilians teach selected courses. As officers, they usually follow the standard three-year tour. Such personnel turbulence creates problems for a longitudinal research project like LEP. For instance, with respect to instructor training, new instructors will have to be trained each year and some of the trained instructors will be gone after 1 year.

A related issue is that some newly assigned instructors may not report to the school until just before the start of the school year. They may, therefore, miss any training programs that are scheduled before the school year. And they have a lot to cope with besides the intervention program that is being implemented.

Instructor Preparation

The quality of the preparation of officers to be PMS's and instructors varies, although it seems to be improving (S. Prelewicz, personal communication, April 1985). There is a need for training in specific teaching skills and other instructor responsibilities. Also, there is a need for a specific orientation to the particular school to which the instructor is assigned.

It is clear that the quality of the instructors' teaching ability is relevant for the implementation of the LEP program and other programs.

The ROTC System and LEP

* ROTC Organization Structure requires that program steps must be defined well before they are put into practice so that relevant orders can pass through the chain of command.

  - The shortest acceptable suspense date to require of the ROTC units is 30 days after a letter goes from ODCSROTC.

  - If necessary, faster action can be obtained by phone calls to regions who then call the units. This approach is frowned upon.

* The large size of some MS I classes means that implementation is resource intensive. Since IE booklets currently cost $40 per student for MS I, this was a concern.

  - Large MS I classes also require that relatively large numbers of instructors must be trained.

* The fact that most MS I students do not later sign Army contracts means that only a small proportion of the IE trained students can be followed longitudinally.

  - One criterion for allowing an ROTC unit into the program was that there would be a minimum number of students that are expected to contract with the Army.

* The fact that the host school can veto curriculum changes raised the possibility that schools would veto the LEP curriculum changes. Since curriculum changes can require 18 months for the approval process, this was a serious concern.

* The relatively small number of classroom hours in most ROTC units, especially in MS I, make it difficult to add a special program like LEP and still have time to teach military science.

* The variation in course sequences and classroom hours for each course across schools may create unwanted noise in the experimental results across schools. It also makes it difficult to create a common set of curriculum support materials to relate IE and MS. We decided to make the curricula more consistent for the units involved in the experiment.

* Since, at some schools, different students might take their MS courses in different sequences, it is difficult to organize the teaching of IE lessons. In any particular MS course, students would have taken a variety of MS courses and a corresponding variety of IE courses. (This assumes that we have embedded specific IE lessons in specific MS courses.) This problem was also dealt with by specifying set MS I and MS II curricula for the schools in the experiment.

* Personnel turbulence is an obvious concern in a multi-year program. There is no real solution except to train the necessary MS I and MS II instructors whenever they enter the program. Also, developing good teacher support materials can ease the tasks of the instructors.

With this complex system in mind, we will now specify what is needed for a successful IE implementation.

Guidelines for a Successful Implementation

Based on our review of research and theory on cognitive skills training, we identified guidelines for a successful implementation of IE and an interpretable evaluation.

1. Have enough IE contact hours

The program was designed to have many contact hours - hours where a teacher mediates for students. There may also be non-contact homework hours. The original IE field study (Feuerstein, 1980) had over 200 contact hours. Overall, it appears that there should be at least 80 contact hours. It is possible that college students would need fewer hours than adolescents, but this is speculation.

2. Use all the training instruments

It seems logical that all the 14 IE instruments should be used to ensure training on as many thinking skills as possible. But this has not been done in any IE implementation. There should be about 10 instruments so that both basic and advanced instruments are used. Typically one must conduct a multi-year program to do a sufficient number of instruments and have enough contact hours. Several IE projects have ended, after one year, without completing the planned number of instruments (Savell et al., 1984).

3. Train instructors well.

It is clear that the teacher-mediator performance is critical to the IE program. Ideally, instructors should not only be trained well before beginning the program, but should also receive support during the program, such as the service of visiting or on-site consultants. Sometimes training sessions are distributed at different points in the program. No matter what the quality of training, the IE teacher learns most by actually teaching. Therefore the maximum effectiveness of the program would be likely to occur with more experienced instructors--after training and after teaching at least one group of students.

4. Relate the IE tasks to content topics

As discussed earlier, doing abstract IE tasks will probably have little practical effect unless the cognitive skills are related and applied to specific content domains. Bridging is one of the key techniques for doing this.

Typically, IE training is embedded in a school environment where content topics are taught. The most natural type of bridging is to bridge to the school topics. However, bridging need not be restricted to such topics. There are several interesting related issues:

(1) Will students learn content topics better because of IE training?

(2) Will the content hours "lost" to IE lead to a drop in performanc?

(3) Should the program be set up so that the IE teacher is also a content teacher? This would appear to facilitate bridging.

5. Build an iteration stage into the Program

This recommendation is based on a general model of intervention as well as specific considerations with respect to the IE program. IE is a complex program that usually is inserted into a complex system, e.g. a school system. It is difficult to optimize the intervention on the first try. Therefore, instructors should do the best they can with the first intervention, but use their experience to improve later waves of intervention. For example, begin an intervention with a fifth-grade class one year, and a year later conduct another intervention on the next 5th-grade class.

6. Monitor and control implementation quality.

Even if one designs a strong intervention, one should make sure the program followed or exceeded the plan. Surprisingly, the quality of inter-vention programs is frequently not checked or is examined superficially. Key parameters for IE would include number of IE contact hours, instruments covered, amount of homework, amount of bridging, and the quality of teacher mediation.

7. Have well specified, reliable, and valid measures of performance.

Obviously, it is important to have measures of performance that relate to program goals and that have good psychometric properties. Selecting such measures is very difficult, and a more complete discussion of our approach will be presented in an upcoming report.

8. Measure the effects longitudinally.

Feuerstein (1980) claims that the effects of IE should continue to show up and even become stronger for years after the program ends. This hypothesis has important implications and must be tested. In addition, the ROTC instructors might benefit from teaching the program. Their careers and those of the control schools' instructors can be tracked in the Officer Longitudinal Research Data Base (OLRDB) that is being developed (Rachford, 1984).

The above general guidelines were supplemented by lessons learned in our first use of IE in ROTC, and in the use of IE in an Army Basic Skills Education Program (BSEP) (Russ-Eft and McLaughlin, 1983).

These more specific guidelines included:

1. Obtain support from the PMSs.

2. Develop curriculum materials to aid the integration of IE into the ROTC curriculum.

3. Develop as much consistency in the MS/IE topic sequences, across schools, as possible.

Method

Major Design and Implementation Tasks

To define the major tasks required to implement and evaluate the LEP project, we considered:

(1) The general implementation guidelines presented above.

(2) The specific lessons learned in the first use of IE in ROTC (MS III only) as described in Rigby et al. (1986)

(3) The analysis of the structure of MS I and MS II as presented above.

The major tasks are presented in Table 2 along with steps toward accomplishing the tasks in the first school year. This information is discussed below, task by task.[2]

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[2]Personnel: From ARI, Joel Savell supervised the project and was COR on the contract with curriculum Development Associates (CDA). Paul Twohig and Carlos Rigby were the most involved in the development of curriculum materials, designing the common class schedule and observing the initial instructor training session. Douglas Rachford had the principal responsibility for defining quantitative measures for the effect of IE, while Paul Twohig was principally responsible for monitoring the implementation through questionnaires at the refresher training session. Major Jeffery Anderson organized the conference call system and schedule, but all LEP assistance from David Martin and Frances Shannon Amquist demonstrated IE at the PMS briefing, developed final versions of the curriculum materials, aided the design of a common class schedule, conducted the initial instructor training and refresher sessions, took part in conference calls, visited ROTC units, and coordinated the shipment of the IE instruments. The ODCSROTC POC was Stephen Prelewicz. The ROTC SMs for developing the curriculum material were Major Loveland of South Carolina State University (MS III) and Captain Beene, Universityu of Arkansas, Fayetteville (MS II). ROTC instructors and regional POCs are listed in Appendix B.

Table 2

LEP Implementation Goals and Tasks

Goals	Before the 1984/85 School Year	During the First Semester	During the Second Semester
Define Experimental Design and Select ROTC Units for Experiment	* Develop design * Draw sample of schools (ROTC Units) * ODCSROTC informs ROTC Units of involvement		
Get Program Support Within ROTC	* Brief PMSs and Region POCs		
Define Common Class Schedule	* Get information on current schedule at PMS meeting and from ODCSROTC. * Define schedule at meetings of SMEs, ARI, Contractor		
Develop Curriculum Support Materials	* Brainstorm ideas at meeting of SMEs, ARI and contractor * Contractor prepares MS I materials for ARI COR approval	* ROTC units use materials	* ROTC units use materials * Revise MS I materials based on instructor feeback * Prepare MS II materials
IE Training Materials Delivered to Units	* ARI gets estimate of MS I enrollments and contractor coordinates delivery.		
Define Potential Evaluatin Measures, Design test answer sheet and packets to send units.	* Measures defined and packets designed	* Tests mailed to ROTC units	* Second mailing of tests
Train Instructors	* Primary Training Session 8/84	* Make-up Training Session, 9/84	* Refresher Training and Feedback Session, 2/85
Provide Instructor Support		* Individual phone calls, conference calls	* Individual phone calls * Refresher Session 2/85
Monitor Implementation		* Conference Calls, * Instructor questionnaires	* Contractor Site Visits 4-5/85
Get Feedback on Program		* Conference Calls * Instructor/Student questionnaires	* Refresher Session 2/85 * Contractor Site Visits, 4/85

Experimental Design and Selection of Units

The most basic design decision was to have ROTC units be either experimental (LEP) or control (no LEP). It was not deemed practical to have LEP and non-LEP classes within the same ROTC detachment. We decided that having 13 schools in each condition would give a good balance between the need for generalizability and the program cost. (We had 12 schools per condition in the previous IE implementation, Rigby et al., 1986).

Because of the concern of the ODCSROTC with respect to OBC failures, we planned to include in our sample ROTC units with relatively high failure rates. Therefore, one measure of the effectiveness of LEP would be the proportion of OBC failures at experimental vs. control schools. To make the results more generalizable, on this and other measures, we did not want to restrict our sample to just schools with high OBC failure rates. Therefore the ODCSROTC provided us with a list of schools from Regions I and III that included those with the highest failure rates (19%) to those with only 1 failure in 3 years.

We first excluded schools from the sample on the following bases:

(1) where the number of graduating cadets was too small for meaningful analysis.

(2) where English was a second language for a large proportion of the students. (This factor could create additional "noise" in the results.)

The remaining pool of schools contained a significant number of Historically Black Colleges (HBCs). Since this group of schools has a significantly different history from the other schools in the sample, we decided to do stratified random sampling: HBC vs non-HBC schools. This sampling plan gave us an equal proportion of HBC schools in the experimental and control conditions, eight HBCs and five non-HBCs. (For practical reasons the 8/5 split was not followed in year 84/85, see below. The list of schools is given on page A-2 of Appendix A; the original list is on page B-8 of Appendix B.

The LEP project was designed to run for two years (MS I and MS II), which is a typical duration for an IE implementation. However, we decided to have two two-year implementations with overlap: one starting in the school year 1984-85 and the other beginning in 1985-86. This plan is presented in Figure 3.

Research Design

	1984-85	1985-86	1986-87	1987-88	Post-
	MS I	MS II	MS III	MS IV	Commissioning
COHORT 1	LEP TRAINING*		Advanced Camp	Commissioning	OBC
COHORT 2		MS I	MS II	MS III	MS IV
		LEP TRAINING*		Advanced Camp	Commissioning

* There is a corresponding set of control (non-LEP) units in each period

Figure 3

The major reasons for this approach are as follows:

(1) Lessons learned from the first cohort could be used to revise procedures for the second cohort.

(2) It was not certain that the ROTC units could revise their curriculum according to our guidelines for the first school year due to host school rules and other practical considerations.

One example of how lessons learned would be used is with respect to the curriculum support materials (see Table 2). The plan was to develop an initial set of MS I materials prior to the first semester and use them during 1984-85. These materials would be revised late in the year for use in the next MS I class in 1985-86.

A major consequence of this design is that the implementation should be more effective for the second cohort. It was expected that program evaluation would be more meaningful for that cohort.

Getting Support

We began the LEP program with the strong support of the DCSROTC, primarily on the basis of the reactions of students and instructors that were involved in the first IE implementation. We still needed to obtain support from the units involved in the experiment and from the ROTC regions.

To this end, we briefed the PMSs (or their representatives) from the experimental schools and representatives from Regions I and III. The presentation included information on the overall program and a brief demonstration of the IE method.

The response of the PMSs was very positive with the exception of one PMS. His request that his school be dropped from the experiment was granted. A PMS from a designated control school voluntarily attended the briefing and asked that his school be put into the experimental group - it was. The final schools selected are shown on page A-2 of Appendix A.

There also was a positive response from the regional POCs. In retrospect, we saw a value in briefing other region staff officers, particularly those at the higher ranks to keep as many of the key personnel as informed as possible.

In addition, we received initial information on the curricula at the ROTC units from the PMSs which; were used to define a more consistent sequence of topics across the units. Further information was gathered through phone calls to ROTC units and ROTC headquarters.

Designing Curriculum Materials/Topic Schedule

Once the participating detachments were defined and program support was developed, we could work on reducing the inconsistency in the sequences of course topics from school to school. With uniform sequences, we could more easily develop curriculum materials to support the instructors. It should

be noted that TRADOC provides guides for teaching military science (MS) subjects called Training Support Packages. There is also a potentially integrative leadership manual, FM-22-100. But commonly this manual is used only when leadership theory is explicitly taught and is not always used throughout MS I and MS II.

In addition, the IE program provides a detailed teacher's guide for each instrument. What was needed was support materials to help the instructors relate the cognitive skills trained in IE to MS subjects.

The general strategy for materials development was first to develop draft curriculum materials through meetings of Subject Matter Experts (SMEs), ARI personnel, and the contractor representatives. Then the contractor would develop draft materials for approval by the ARI Contracting Officer's Representative (COR) and revise according to COR guidance.

There were two meetings of SMEs, contractor's representatives, and ARI personnel. The SME's were two ROTC instructors. One had used IE in MS III and one in MS II (footnote 4). The use in MS II was a one-school pilot falling between the earlier MS III implementation and the subsequent (1984-85) MS I implementation.

The results of the effort to define a more consistent curriculum sequence is shown in Appendix B, as an attachment to a letter from the DCSROTC. This plan tried to strike a balance between creating consistency and allowing some flexibility for the varied programs.

* The plan was set up based on the minimum number of classroom hours, 30 in MS I, 60 in MS II.

* The IE instruments and hours were specified.

  - IE hours (including pre-post measures) took about half the minimum MS I curriculum and 24/60 of the MS II class hours.

* A "common core" approach was used. That is, only some of the required topics were assigned sequence positions, and not all of the minimum hours were scheduled.

  - For schools with the minimum number of hours, there was no flexibility in MS I. But there were some open hours in MS II. The "free" hours could be used for unscheduled TRADOC-required courses or PMS-selected topics.

With the curriculum defined, we could then more easily prepare support materials. After brainstorming ideas and formats at the meetings, two types of materials (manuals) were developed.

The first was the Bridging Manual (BM) for LEP in MS I which mostly contained a set of bridging ideas for relating MS topics and IE cognitive principles (Appendix C). Recall that bridging involves the application of abstract cognitive principles in some content area. The BM is cross-referenced such that one can look up an IE instrument and find MS applications. Or one can look up an MS topic and find out what cognitive principles are applicable. Thus, whether instructors were planning an IE class or an MS class, they could easily find bridges. Instructors, of course, had the option to use their own bridges. The BM also contained model lesson plans for each IE class, to be followed at the instructor's option. And there was a master schedule of the IE/MS topic sequence.

The second manual was the Work Journal Manual (WJM). In the Work Journal (WJ) aspect of the LEP program, students had to keep a notebook containing homework or class writing assignments. The WJM provided instructors with suggested assignments for each IE class. An example is shown in Figure 4. The purpose of these assignments was to give students practice in applying cognitive skills and increasing the student's awareness of his or her cognitive processes. Using the WJ is also consistent with the recent TRADOC emphasis on having writing assignments in Army schools, e.g., Command and General Staff College (CGSC).

The WJM was developed specifically for the IE/ROTC integration and is an example of how LEP became less of a pure IE program and more of an ROTC-oriented program.

Work Journal Assignment Sample

Topic: Checking for Errors

Think about situations where checking for errors might be crucial. Write down some of your thoughts about how a military leader might check for errors. What about you? Where do you check for error on tests, in driving, in making judgments or decisions, or when making a purchase? Can you think of a situation where failing to check for errors could endanger someone's life?

Sample Journal Entry:

Date: January 20, 1985
Topic: Checking for Errors

I have a friend who plays football for the college. After each game the team and coaches watch the videotapes of the game and they talk about all the mistakes the players made and how to prevent them next time. Sometimes the errors are in the quarterback's plan, but sometimes the guys just get confused or sloppy and run the wrong way or botch the play.

I bought a used car last year, and we had a mechanic check it for problems. Also I proofread my papers, so I do check for errors.

I never thought about endangering someone's life if you didn't check for error. I think on the battlefield it might be important to check the instructions or check a location with a compass, so you didn't accidentally wander into enemy territory. It has happened that officers have given a wrong location and accidentally called in fire on themselves. Certainly the checking of commercial airplanes before take-off is a matter of life and death.

Self Evaluation:

Your Journal entry should demonstrate your ability to define a problem, perceive the errors logical to that problem, and analyze the strategies for prevention of errors.

Figure 4

Instructor Training and Support

To train the ROTC instructors, a ten-day session was held at Ft. Monroe, TRADOC HQ. The IE training was conducted by Frances Link of Curriculum Development Associates, with part-time help from her associates.

Twenty-two MS I instructors were trained along with the two regional POCs and the PMSs from two units (Appendix D). The goal was to train all the Ms I instructors from the experimental schools. (The two PMSs volunteered to attend due to their interest. One PMS did decide to teach in MS I). Unfortunately, several instructors were assigned too late to their units to attend the training sessions and had to attend a make-up session shortly after the start of the school year.

The initial training technique was for the trainees to take the students' role and learn the approach from interacting with the trainer and observing the trainer. Towards the end of the session, the MS instructors did more and more practice teaching of IE.

It appeared to the first author, who attended the entire session, that the instructors showed an adequate level of proficiency by the end of the training session. It should be understood that training prior to teaching can only go so far with a complex program like IE. There is a lot of learning-by-doing prior to attaining proficiency. The ROTC instructors showed the potential to continue to learn the method.

At the end of the training session, the instructors were surveyed with respect to their opinions about their IE training, their preparation for IE, and LEP. The gist of the results was that (1) they were extremely enthusiastic about the quality of the training and (2) they were positive about the potential value of LEP for their students. On the other hand, they were concerned about (1) their mastery of the IE method (see above remark on learning-by-doing) and (2) the time constraints on teaching both LEP and MS.

Overall, then, the instructors seemed to leave with a positive attitude towards the program and the intention to make the implementation as strong as possible.

This may be a proper place to bring in the important issue of the effect of the LEP program on the instructors. Of course, the program was developed to aid potential officers. But anyone who has taught knows how much you learn about a topic through teaching it. Not only should the instructors have learned more about cognitive skills and their own thinking styles, but they received training and experience in important interpersonal skills. The interactive style of teaching uses many of the skills required to be an effective teacher-leader. One of the reasons the instructors were so enthusiastic about the training session was the lessons learned in interactive teaching. The instructors spontaneously bought a journal for the trainer, and 14 of them wrote personal comments about what they got from the training session. One officer wrote that it was the "best Army training he had ever

had" (emphasis added). This and other comments showed that the instructors viewed the training session as personally developmental and, presumably, that development would continue through teaching LEP.

These speculations concerning instructor development could be evaluated by tracking the careers of instructors from the LEP schools and control schools.

Make-up Training Session

As mentioned earlier, some MS I instructors did not report to their unit until after the ten-day training session. Therefore it was necessary to conduct a three-day training session for these five instructors shortly after the start of the school year. Three of the instructors came from a school with two trained MS I instructors who could coach them. The other two instructors came from a school where only a MS III instructor had been trained. The instructors are listed in Appendix D. The training session went well, and the instructors appeared to be reasonably prepared to conduct LEP. But we did not expect them to be as prepared as those that attended the ten-day session.

Instructor Support During School Year

Teaching LEP is a complex task, and the instructors need support. In a high school it is relatively easy to provide IE experts who can observe and meet with instructors on a regular basis and counsel them on their teaching. This type of support is not practical with a widely distributed group of ROTC units. Instead, we used the following methods to support instructors:

(1) Phone calls to individual units,

(2) Conference calls involving several units,

(3) Bringing all the instructors to a central place,

(4) Site visits by the trainer.

Individual Phone Calls. The instructors had the option of calling ARI personnel or the trainer for any questions they had. Also, ARI researchers periodically called the units to find out if the instructors needed any help. Not much information was passed on concerning teaching strategies by this route.

Conference Calls. We scheduled conference calls with groups of schools in the first semester of the program. All the ROTC units were eventually involved in a conference call. The only unit involved in more than one call was Alcorn State; we had to cover the two sets of instructors who were trained in different training sessions. The conference calls seemed to be successful in giving us a picture of how the LEP classes were going and of providing the ROTC instructors with some advice and guidance.

Instructors' Refresher Course. The instructors were brought together early in the second semester to share ideas, successes and problems, and to receive further training in the IE methodology. The meeting was also attended by the trainer and the first author. This seemed to be an efficient way to exchange information or teach approaches and to fill in some of the gaps in training.

Site Visits

All of the above methods for instructor support have advantages and disadvantages. But in each case the teaching experiences are just talked about. We decided that we had to have some direct observation of how the LEP classes were conducted. Therefore ROTC units were visited to evaluate how well LEP was being taught and to give guidance on teaching LEP.

Defining Potential Evaluation Measures

The first working guideline was to use measures of a wide range of constructs. Obviously, the most relevant measures would be indicators of such cognitive skills as classification, problem solving, making comparisons, etc., since these are the skills that are supposed to be trained by IE. But IE is also supposed to affect cognitive styles, so measures of cognitive styles constructs are relevant. If IE training improves cognitive performance, it might affect the personality and behavior of students; e.g., motivation, self-concept, expressiveness. So there are arguments for using measures of personality, motivation, and degree of participation in class. Finally, changes in the above constructs are not relevant for the basic goals of LEP unless they affect performance in leadership tasks. Thus, it should be clear why we considered a wide range of evaluation measures.

Another working guideline was that our research would require longitudinal data gathered over a period of years. At a minimum, there should be measures at the start and end of the two-year implementation for a pre-post comparison. We also planned to get data after the program ended:

(1) for students who contracted into ROTC.

(2) for those who were commissioned and attended an Officer Basic Course (OBC).

We had to temper our evaluation design due to the limited number of classroom hours that we could use for testing (2 hours in MS 1). Other periods, such as MS laboratory and non-class hours were prohibited, at least in the first year of the program. Our strategy was to choose a limited number of tests for in-class administration and get other data that was collected on the students by TRADOC.

The measures in our evaluation plan fell into three categories:

(1) Measures selected by ARI for specific inclusion in the LEP evaluation and to be taken in LEP class time.

(2) Paper-and-pencil measures that ODCSROTC used in all ROTC units regardless of their involvement in LEP.

(3) Other measures of performance in a cadet's career, especially those related to officer performance. All three groups of measures are summarized in Table 3.

The ARI-defined measures were aimed at cognitive skills and cognitive styles constructs since these constructs were most directly related to the goals of the IE training. We defined two potential measures of cognitive skills:

(1) The Problem Solving Test (PST):

The PST is a pictorial, non-verbal problem solving test, somewhat like the better-known Ravens Progressive Matrices test. It was designed for one-to-one administration, and our use in group testing was a non-standard situation. We had permission from the PST developers to try the PST on our samples in exchange for information on the psychometric analysis.

(2) Sections of the Army Classification Battery (ACB):

The ACB is a U.S.Army general test of cognitive ability and achievement with varied subtests. It is similar to a commercial test, the Differential Aptitude Test. We used four of the subtests:

Arithmetical Reasoning

Word Knowledge

Pattern Analysis

Mechanical Comprehension

Since the ACB is no longer an operational test, it was available for research use.

(3) Decision Styles Inventory (DSI):

The DSI is a measure of cognitive styles and has been used in research on officers. It has two dimensions, each with two sub-categories. One dimension contrasts the orientation towards ideas or concepts vs. preferring a more hands-on, action approach. The other dimension contrasts the analytic, component by component thinking style with a more holistic style.

Table 3
Evaluation Measures

ARI-Defined Measures

* Cognitive Ability
  - Problem Solving Test
  - Army Classification Battery Subtests
  - Selected 1E Training Tasks
* Cognitive Style
  - Decision Styles Inventory

ODCSROTC Achievement Testing

* Basic Skills Tests
  - Nelson-Denny
  - Missouri College English
  - Stanford Math Achievement
* Leadership Potential
  - Officer Selection Battery

Leadership Performance

* MS III Summer Camp
* Officer Basic Course

General Competence

* Grade Point Average

(4) Instrumental Enrichment Tasks:

We also chose selected IE training tasks for pre-post measures. We expected a strong increase in performance on these problems due to the direct IE training. But these measures are useful as checks that there was at least a minimum of IE training and practice. We chose IE pages that were not to be used in the LEP program to minimize the use of problem solving by direct recall from memory.

Both the ACB and PST have two forms and therefore can easily be used as pre-post measures. There were enough similar IE task pages so that we had fairly equivalent pre-post IE tasks. The DSI only has one form.

For the PST, ACB and DSI, special machine scoreable answer sheets were designed. In fact the DSI had items and response blocks on the same sheets. The testing in the LEP program was atypical for all three tests; the PST is not normally a group test and we changed the format of the DSI. Also, we were using only part of the ACB.

Because of the limit on classroom hours we could not use all these tests in every school. We also were using tests in atypical ways on a specific sample of schools. Therefore we decided to use the psychometric analysis of the results of these tests with the first cohort to help select the best tests for later evaluating the LEP program. The selected tests could be used as pre-post measures for the second cohort.

Each ROTC unit, experimental or control, was sent only some of the tests. But overall the distribution of tests and test forms was designed to help us select the best measures for evaluating LEP. The results of the psychometric analysis will be published in a later report.

Besides the tests defined by AR1, the ODCSROTC had selected a set of paper and pencil tests as part of its program to maintain the quality of pre-commissioning programs. Tests are to be given in freshman and senior years providing long-interval pre-post measures. As shown in Table 3, three of the tests tap basic skills. The other, the Officer Selection Battery (OSB), is a general test that has been validated on OBC performance (Fischl, Edwards, Claudy, & Rumsey, 1983).

Other measures pertain more directly to the roles of officers and leaders. There are a variety of measures in the summer advanced camp after the junior year. Cadets are evaluated on cognitive, leadership and other dimensions. After a cadet is commissioned, he or she will go to an OBC. Again there are a variety of technical and leadership tasks available for evaluation. Attendance OBCs would occur about two years after the IE implementation, which is enough time for the IE and non-IE groups to diverge in performance based on prior research (Feuerstein, 1980).

Monitoring the Implementation

The quality of implementation was monitored mainly by checking if the instructors were able to follow the LEP plan:

(1) Teach at least the minimum IE hours that were specified.

(2) Cover the specified IE instruments.

(3) Use IE pages as homework regularly.

(4) Conduct the work journal program as designed.

(5) Be able to conduct the IE classes using the recommended teaching approaches; e.g., bridging.

Our major approaches to program monitoring involved gathering information from the instructors on how the program was being implemented. We got this information when we were directly interacting with them, over the phone or face to face; that is, all the times we were providing support. (See previous section on instructor support.) We also received written feedback at the end of the first semester by using two forms for the instructors:

(1) The Basic Class Record (BCR), which is basically a listing of the topics covered (Appendix E).

(2) The Instructors Insights Questionnaire (IIQ) which required detailed responses with respect to the instructors' experience with LEP (Appendix F). These questionnaires, therefore, provided information on the perceived effectiveness of the program as well as on implementation.

The information on implementation has been integrated from these sources and is summarized below.

Results

The only results obtained are with respect to the quality of implementation from FY 84-85.

Meeting Basic Specifications

1. The specified minimum number of IE hours were taught. One detachment with more available classroom hours was able to spend about twice as much class time on IE as the other schools.

2. The specified IE instruments were covered, although the recommended sequence was shifted at the discretion of the instructors.

3. Instructors selected the IE pages that they wished to use in class or for homework.

4. The instructors assigned IE pages for homework.

5. The instructors conducted the Work Journal aspect according to specified guidelines.

6. At two ROTC units the entire LEP program had to be done in one semester because the MS topics were organized for one semester. This meant that the instructors did the LEP MS I program twice in one year.

Thus the essentials of the overall implementation plan were met by all the ROTC units. This outcome contrasts with the more varied implementation in the prior use of IE in ROTC (Rigby et al.,1986). The major reason for differences is probably that, in the later project, we had more time to obtain program support and to provide program direction and instructor support.

Approach to Class Preparation

1. Instructor preparation time for IE classes ranged from 1.5 to 3 hours. Preparation time for MS (no-IE) classes was less than an hour.

2. The coordination between instructors at an ROTC unit varied. (Note that for three units there was only one instructor and there were no other instructors for coordination of IE lesson plans). At a minimum, the instructors talked over general approaches and shared ideas. At some units, the instructors came up with a common lesson plan for each IE class.

3. Instructors made slight adjustments in their approaches as they learned what worked in prior classes.

4. At one school (Alcorn State) the instructors tried out presentations on each other.

Conducting IE Classes

1. The IE homework was typically reviewed in each IE class for about 10-15 minutes.

2. The Work Journal entries were also discussed, usually by having volunteers read entries aloud. At one school the Work Journal entries were written in class, not for homework.

3. The instructors were able to apply the IE methodology to a varying degree:

   a. Instructors felt they were able to do an adequate amount of mediation of IE tasks.

b. They frequently answered students' questions in class.

c. There was a substantial amount of in-class discussion.

d. For most instructors, there was little opportunity to model effective thinking, due to time constraints.

e. About half the units regularly stopped the class to refer to standard references; e.g., dictionaries.

f. Using questions to encourage student thinking was a frequently used strategy by all instructors.

g. Units varied in whether cognitive goals were stated explicitly for the students. Some did this in every IE class, but most did not.

h. In all units instructors, took time to sum up the classroom activities.

4. The effective teaching strategies that were described included bridging to students' or instructors' experiences, explaining the rationale for IE training, challenging students, getting students to ask questions, and the using student "experts" to answer questions in specific knowledge domains.

5. Bridging in Class

a. Typically, instructors presented three or four bridges between cognitive principles and applications in each class. A few instructors were able to do more.

b. Most bridges were to topics related to the personal experiences of students rather than military science. And there was little change over the semester.

c. Instructors tended to make up their own bridges rather than use those in the bridging manual.

d. Instructors believed that only a few students could develop bridges spontaneously.

IE Homework

1. Most students did the IE homework pages regularly. The proportion who did not varied from 5 to 30 percent.

2. At most schools, there were groups of students who did homework together (it was allowed).

3. At most schools, some students did unassigned pages. But one instructor commented that they would stop when things got too hard.

Work Journal (WJ)

The Work Journal was implemented as designed in the sense that an assignment was given for each IE class and the assignment was mediated in some way. For all instructors, there were class presentations of journal entries by students. Instructors varied in the extent to which they analyzed and gave comments on the written entries. They also varied in what they criticized in the journals; e.g., clarity of ideas, grammar. Instructors with many students had a difficult time giving detailed feedback, but they gave some. Thus the WJ aspect of the LEP program was well implemented, especially given the constraints on instructor time.

Conducting MS Classes

Instructors varied widely in the extent to which they related the IE classes and the MS classes. Typically the instructors made a few bridges between IE activities and MS topics. In one school, however, the IE and MS topics were connected by relating the goals of each class. It was difficult under the time constraints for instructors to make many IE-MS connections.

Discussion of Implementation Quality

Overall, it appears that the instructors did an excellent job of implementing IE, especially given the time constraints. All the major program elements were instituted conscientiously and even creatively, both classwork and homework. Strong areas included the encouragement of in-class discussion, use of instructors' questions to spark thinking, the work journal program, the mediation of homework in class, and the summarization of lessons learned in class.

Implementation was more spotty with respect to the stating of cognitive goals or principles, instructors modeling thinking, and bridging. Instructors were able to bring in only a few bridges per class. Of most concern, perhaps, is that connections to the MS content were not frequently made. In part, this was probably because the students may not have had enough military experience to provide a basis for bridging.

The major reason for weak areas in the implementation is undoubtedly time constraints. Going over both IE and WJ homework alone should normally take more than half a period, leaving little time for other in-class activities. Another factor is that the instructors were still learning the technique and undoubtedly would steadily improve, even under difficult conditions.

These weaker areas are described as an aid to planning future work and should not obscure what was accomplished and the tremendous effort of the instructors. Most of the areas of spotty implementation were done well at some units. The major reason for variations was probably that some units had more contact hours. With experience and the exchange of ideas between units, these areas would be more uniformly strong.

Our methods of evaluation were generally self-report, with the exception of the site visits. (Our plans for site visits were terminated when we knew the program was ending after one year.) But the conclusions that the implementation was above the minimum specified seems warranted. At every ROTC detachment, there were signs of instructor commitment and creativity. Examples include:

(1) Instructors meeting as a group to try out lessons

(2) Instructors wearing and handing out lapel buttons that said "Dare to Think," and so on.

Instructors' Judgments of Program. The instructors' overall response to the program was quite positive. They saw the value of cognitive skills training for the development of leaders.

In-Class Experience. The instructors liked the interactive teaching style associated with IE and the student enthusiasm that resulted.

Identifying Prospective Officers. Instructors felt that the LEP activities gave them improved insight into student abilities and interests. The IE tasks, class interactions and Work Journal entries helped instructors identify potential officer prospects.

Perceived Improvement in Student Performance. Instructors perceived improvements in the performance of students in the following areas.

(1) Writing-communication,

(2) Thinking skills, planning,

(3) Cognitive styles - reduced impulsiveness, increased precision,

(4) More awareness of thought processes (meta-cognition),

(5) Motivation.

The instructors perceived that a solid majority of the students thought positively about the program. Interestingly, they reported that the students who were most negative about the program were the students that needed it the most; that is, students with poor academic performance and motivation. This perception is consistent with prior work on teaching learning strategies (Collins, Gentner, & Rubin, 1983). The poorest students tend to show the least interest in learning the strategies.

If the instructors' perceptions are correct, the results are both reassuring and disturbing. They are reassuring because it appears that a high proportion of the students reacted positively to the LEP program. There was a concern that the IE tasks were too easy for college students, and some good students did feel that way. But most such students found the program valuable and were very positive about it.

The disturbing point is that the IE program is designed to motivate students with low self-concept and motivation. And in fact, instructors did report "spreading enthusiasm," with more and more students becoming excited about the program. Since a number of the schools in the program have an open-enrollment policy, there may be some students who are very difficult to motivate. But the biggest factor may be the low number of IE contact hours and the distribution of IE hours. Typically, students would get IE for 1 hour every other week. It is clear that these are difficult conditions for motivating very passive students.

Work Journal. The instructors, with one exception, were extremely positive about the WJ. It was generally well received by students, promoted class discussion, and aided learning communication and thinking. Several instructors were able to employ the WJ format in their exams as essay questions. Thus the skills practiced in WJ assignments could be tested.

Student Tutoring. The IE materials and methods were sometimes used by instructors for special out-of-class tutoring. This tutoring sometimes involved students who were not in the LEP program; e.g., MS III students. Examples:

1. Some instructors found it beneficial to tutor MS II and MS III students in Land Navigation, using the Orientation-in-Space instruments. These instruments gave the students a conceptual framework prior to outdoor exercises.

2. One instructor prepared some students for the Aviation Branch test using some IE instruments. The students scored much higher than is typical for the school. Of course we can't attribute this success to IE without a control group comparison. But it is an example of how IE was perceived to be useful.

Support Materials. As mentioned above, the instructors liked the Work Journal aspect very much and they found the WJ support materials quite adequate. They also seemed fairly satisfied with the Bridging Manual. Since they tended to make up their own bridges, this manual was mainly just a back-up.

One major issue that came up is that the instructors did not like having to look through the lengthy IE teachers guide to plan their lessons. Several suggested that the IE training instruments be prepared with fewer pages, to be more in line with the limited classroom hours. Instructor support materials could then be developed to correspond to the now reduced training materials.

Self-Development. Instructors identified several areas where the training they received and the teaching that they did helped their own development:

1. Teaching in a more interactive way.

2. Interacting better with students outside of class.

3. Using thinking skills more effectively, such as planning and organizing.

4. Changed cognitive styles; less impulsive and more precise.

5. More aware of own thought processes.

6. More aware of the critical aspects of communication.

Concerns

Class Time. The major concern of the instructors was the limited amount of classroom hours to do the program justice. They felt that they could not completely follow the IE teaching model in class and that the MS topics were also being undertaught.

Distribution of LEP Hours. Many instructors felt that it was difficult to maintain the momentum of student enthusiasm and understanding when LEP was taught every other class or so. Several suggested that IE be front-loaded in some way; e.g., start with 6 weeks of IE. In that way, the students could be brought to a level of proficiency that could be built on in later training.

There are several possible disadvantages of teaching IE in big blocks.

1. We do not know the effect of massed vs. distributed practice of IE on learning. But it seems reasonable that there is a need for a considerable amount of distributed practice. Ideally one would have the option of some massed and some distributed practice.

2. By front-loading IE, there is no subject content being taught in parallel to which to bridge. Of course, the LEP instructors did not do much bridging to military applications. But in principle, we wish to relate thinking and communication skills to leadership activities.

3. Students enrolling in an MS course might be put-off by a solid block of IE. There were, in fact, a few complaints from students about the non-military nature of IE.

All in all, a case can be made for mass-practice periods of IE if the above concerns can be dealt with. The main problem is the low number of available classroom hours which limits the flexibility in distributing hours. It is clear that the available number of hours is much smaller than is usually recommended and that the instructors' concerns about this are justified.

Preparation Time. The instructors also stated that the LEP program took a lot of their out-of-class time. Part of the problem is that their level of other duties stayed the same. Another factor is that many of the instructors were so conscientious that they spontaneously extended the use of IE; e.g., tutoring. To some extent, this problem would be alleviated in later years as the instructors gained experience.

The only other significant concern was with respect to the development of a smaller set of materials. This issue was discussed above.

Despite these concerns, the instructors were quite enthusiastic about their experiences in the program and its usefulness.

Student Response. The attitude of the students to LEP was evaluated through a questionnaire (Appendix G) which contained three open-ended questions and twelve "Likert" items. One factor making interpretation of results difficult is that some of the students evaluated the MS 1 class as a whole, not just the IE and WJ aspects. But the comments to question 3 were definitely focused on these aspects.

Over 1500 responses were obtained, and the results have not yet been tabulated. But random samples of responses have been examined. Basically, the results were consistent with the perception of the instructors.

Students were generally positive about the program at a ratio of at least 3:1. Positive comments were with respect to improved cognitive skills, awareness of own thinking improved communication, and more effective cognitive styles. Negative comments included observations that IE was too easy and not useful.

These comments are consistent with the descriptions by instructors of the opinions of their students. The instructors also commented that many of the students that had negative reactions to IE were generally poorly motivated students.

Observations by the contractor's representatives who conducted the second semester site visits indicated that almost all the students were very positive about the value of LEP.

Therefore, the converging evidence is that students generally reacted positively to the LEP program.

OUTCOME AND CONCLUSIONS

Despite the promising start of the LEP implementation, the program had to be canceled after one year. There were higher priority programs, such as the ROTC achievement testing program, that needed the same resources as LEP. The use of IE in ROTC is not necessarily ended since some of the host schools are including IE in grant proposals for programs designed to enhance basic skills. But there is no direct follow-up to LEP planned in the near future.

Based on prior research, we do not expect any significant cognitive changes after only a 13-hour-or-so implementation. Thus the major value of this project will be as a potential foundation for future cognitive skills training within ROTC.

The following conclusions seemed warranted.

1. Cognitive skills training can be integrated into ROTC programs.

2. Instructors and students generally see the relevance and value of cognitive skill training.

3. The fact that some instructors spontaneously used IE materials for special tutoring indicates a need in ROTC for some abstract training materials for some topics; e.g., Land Navigation.

4. ROTC instructors are capable of creatively implementing a cognitive skills training program.

5. Writing assignments can complement teaching MS topics and cognitive skills training.

6. Programs that require cognitive activity on the part of students, e.g., IE exercises, can aid the identification of potential officers.

7. Instructors respond well to using an interactive style of teaching.

8. The biggest difficulty in inserting a special program into ROTC is the limited number of classroom hours.

The best approach may be a combined program between ROTC and the host schools. ROTC could help fund such programs and the schools could provide other resources such as instructors and class time.

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APPENDIX A

ROTC DETACHMENTS THAT TOOK PART IN THE LEP PROJECT

This appendix contains those schools that actually took part in the LEP project. For the original set of schools selected plus additions and deletions (see page B-8 in the Appendix B).

ROTC DETACHMENTS THAT TOOK PART IN THE LEADERSHIP ENRICHMENT PROJECT (1984-1985)

EXPERIMENTAL* (LEP)	CONTROL*
FIRST ROTC REGION	**FIRST ROTC REGION**
Morgan State (Maryland)	Florida A&M
Norfolk State (Virginia)	Fort Valley State (Georgia)
South Carolina State	Hampton Institute (Virginia)
Widener (Pennsylvania)	Howard University (District of Columbia)
	North Carolina A&T
	St Augustine College (North Carolina)
	St Peter's College (New Jersey)
	Virginia State
THIRD ROTC REGION	**THIRD ROTC REGION**
Alcorn State (Mississippi)	Alabama A&M
Jackson State (Mississippi)	Henderson State (Arkansas)
Southern University and A&M College (Louisiana)	Nicholls State (Louisiana)
Stephen F. Austin (Texas)	University of North Alabama
Tuskeegee Institute (Alabama)	Prairie View A&M (Texas)
University of Central Arkansas	
University of Arkansas at Pine-Bluff	

*State where school is located is given if not obvious.

APPENDIX B

"LEP Implementation"

Description	Pages
Letter from ODCSROTC MG Prillaman Setting Up LEP.	B-2
Implementation	
LEP Course Outline.	B-5
Example of MS I Course Outline with Suggested IE Pages. . .	B-6
Original Set of Schools Selected with those dropped . . . . indicated by (DELETE); those added indicated by (ADD). Note University of Arkansas, Pine Bluff went from the control to experimental group.	B-8
Original LEP Milestones as of date of letter.	B-9

DEPARTMENT OF THE ARMY
HEADQUARTERS UNITED STATES ARMY TRAINING AND DOCTRINE COMMAND
FORT MONROE, VIRGINIA 23651

Office of the Deputy Chief of Staff for ROTC

REPLY TO ATTENTION OF:

31 MAY 1984

ATRO-TA

SUBJECT: Implementation of the Leadership Enrichment Program (LEP) (Formerly called Instrumental Enrichment) SY 84-85-SY 86-87

Commander, US Army First ROTC Region, Fort Bragg, NC 28307
Commander, US Army Third ROTC Region, Fort Riley, KS 66442

1. Reference:

a. Letter, ATRO-EE, HQ TRADOC, 20 March 1984, subject: Instrumental Enrichment (IE) Phase II Pilot Project SY 84-85 and SY 85-86.

b. Message, HQ TRADOC, ATRO-EE, 091000Z Apr 84, subject: Instrumental Enrichment (IE) Project - Professor of Military Science (PMS) Training Session, 24 April 1984.

c. Professor of Military Science (PMS) Training Session, held at US Army Research Institute for the Behavioral and Social Sciences (ARI), 24 April 1984.

2. Per references, the Leadership Enrichment Program (LEP) will be implemented into the Basic Course curriculums of LEP experimental schools beginning SY 84-85. Overall, the LEP will be implemented in three phases:

a. Phase I (SY 84-85) will affect experimental schools only. Phase I will incorporate LEP into the first year of the 4-year Senior ROTC program and will begin the fall term, SY 84-85. Course outlines for the Basic Course are provided at Enclosure 1. A detailed MS I course outline is at Enclosure 2.

b. Phase II (SY 85-86) will affect experimental and control schools. For Phase II, LEP will be incorporated into the first year of the 4-year Senior ROTC program at all schools and in the second year at all experimental schools. A detailed MS II course outline will be provided prior to SY 85-86.

c. Phase III (SY 86-87) will affect experimental and control schools. Phase II will incorporate LEP into the entire Basic Course and will begin fall semester, SY 86-87.

3. The goal of implementing LEP into the Basic Course is to improve cadet leadership skills, specifically those required for problem analysis and decision making. This will be accomplished by incorporating LEP throughout the entire Basic Course at designated experimental schools and comparing these schools to a group of designated control schools (reference a). To support

this goal the standardized Basic Course curriculms provided at Enclosures 1 and 2 have been developed. A final list of experimental and control schools is at Enclosure 3. Each school should designate a primary POC for this project and forward POC name and phone number to the appropriate Region POC with copy furnished to ATRO-TA, Fort Monroe, VA, not later than 29 June 1984.

4. A training course for the MS I LEP instructors and Region POC's will be conducted 1-10 August 1984, per reference a. A site for this course will be announced shortly. Regions will provide travel funds for this course. Additional instructor training courses will be conducted in August 1985 and August 1986. Note that all MS I instructors from the experimental schools are required to attend the August instructor training course in 1984. This training requirement does not affect control school instructors. Regions may send experimental school PMS to the instructor training course based on expressed interest and availability of resources.

5. A LEP Training Support Package which includes lesson plans is being developed and will be distributed at the instructor training course to be held in August.

6. For research purposes, Basic Course MQS I subjects must be taught sequentially in a designated semester as will LEP tasks. During the first year of the Basic Course, a minimum of 15 hours of LEP will be taught (Enclosure 1). This instruction will be incorporated throughout the school year, not just at the beginning, end, or in spurts. LEP subjects in some cases may not correlate directly with the MQS subjects being taught. The LEP is designed to cover all facets of problem solving and decision making over the length of the Basic Course. There are some required Basic Course MQS I tasks that have not been specified to be taught during any particular semester. Professors of Military Science have the flexibility to designate when they want to teach these subjects in the Basic Course.

7. Homework assignments and student work journals are integral parts of the program. These items are to increase the value of lessons learned in the classroom and for the cadet and the cadre to provide students with valuable feedback on their writing and communications skills. Homework and journals should be a part of the course grade in addition to class participation and MQS subject knowledge. Required homework assignments will be specified in LEP training support packages.

8. The ARI will provide test support to document program progress. This will be accomplished with a pretest at the beginning of the fall semester and by a posttest at the end of the spring semester. Time for these tests has been built into the course outline for the Basic Course (Enclosure 2). Arrangements for test administrations by ARI personnel are to be coordinated between ARI scientists, Region POC, and individual schools. Regions may authorize schools direct contact with ARI as desired.

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9. This headquarters recognizes that the experimental schools may have difficulty implementing this program and realigning MOS subjects in the time remaining prior to the beginning of SY 84-85. However, the benefits gained by starting the program in SY 84-85 far outweigh these difficulties. Per reference c, experimental schools will implement the program as outlined. Request Region POC verify those experimental schools who are able and unable to meet this requirement for SY 84-85 and reply to this headquarters, ATTN: ATRO-TA, stating their reason for noncompliance. Response to this tasking would be appreciated by 15 June 1984, but in any case must be provided not later than 2 July 1984.

10. A list of near-term project milestones is provided at Enclosure 4.

11. Point of contact at ODCSROTC is Mr. Stephen Prelewicz, AUTOVON 680-3826. US Army Institute for the Behavioral and Social Sciences points of contact are Dr. Carlos Rigby and Dr. Paul Twohig, AUTOVON 284-8293.

(s) PRILLAMAN

4 Encl
as

JOHN P. PRILLAMAN
Major General, GS
Deputy Chief of Staff for ROTC

CF:
Cdr, 2ROTCR
Cdr, 4ROTCR
Cdr, USARIBSS
(ATTN: Dr. Savell)

LEP COURSE OUTLINE FOR BASIC COURSE PHASE I (SY 84-85)
THROUGH PHASE III (SY 86-87)

1. MS I - 1st Semester

   a. Customs and Traditions (Task # 3)
   b. Organization of U.S. Army (Task # 9)
   c. Role of U. S. Army, United States Army Reserves, and National Guard (Task #'s 6, 7, 8)
   d. Physical Readiness (Task # 47)
   e. LEP (Minimum of 8 hours which includes Pretest

   (1) Pretest (1 hour)
   (2) Instructions (2 hours)
   (3) Comparisons/Classifications (3 hours)
   (4) Orientation in Space I (2 hours)

2. MS I - 2d Semester

   a. Land Navigation (Task # 24)
   b. LEP (minimum of 7 hours which includes a Posttest)

   (1) Orientation in Space III (2 hours)
   (2) Organization of Dots (2 hours)
   (3) Analytical Perception (2 hours)

3. MS II - 1st Semester

   a. Leadership (Task # 1)
   b. LEP (Required hours to be determined)

4. MS II - 2d Semester

   a. First aid (Task #s 29-36 and 41-44)
   b. LEP (Required hours to be determined)

5. Non-specified tasks (MQS I tasks which must be given during MS I or MS II school year)

   a. Conduct an Inspection (Task # 1)
   b. Drill and Ceremony (Task # 2)
   c. Principles of War (Task # 4)
   d. Branches of the Army (Task # 10)

LEADERSHIP ENRICHMENT PROGRAM (LEP) IMPLEMENTATION

Example of MS I Course Outline

MS I (1st Semester)

Class Session	MQS Subject	LEP Exercise	LEP Exercise Pages In Class	Homework
1	In process			
2	Pretest			
3		Instructions	C, 3, 4, 6-8	5, 9-14
4		Instructions	15, 21, 24	25-26
5	Customs and Traditions			
6		Comparisons	1, 9, 12	2-3, 8, 14-20
7		Classification	1, 2, 5, 7-8, 11-12	3-4, 6, 9, 16-18
8	Organization of the Army			
9		Classification	21-24	28-31
10	Role of US Army, USAR, and NG			
11		Orientation in Space I	1, 3, 6	7-9
12	Role of US Army, USAR, and NG			
13		Orientation in Space I	11, 12, 16	13-15
14	Role of US Army, USAR, and NG			
15	Physical Training			
16	Final Period Exam			

NS I (2d Semester)

Class Session	MOS Subject	LEP Exercise	LEP Exercise Pages In Class	LEP Exercise Pages Homework
1	In Process			
2	Land Navigation			
3		Orientation in Space III	C, 1, 3-4 6-7, Bb, 9, 13	2, 5, 8, 10 10-12
4		Orientation in Space III	Part 15, 17, 19-21	Rest 15 16, 18, 22-24
5	Land Navigation			
6	Land Navigation			
7		Organization of Dots	1, 8	2, 5, 10-11
8		Organization of Dots	17, B5	17-20, B1, B6
9	Land Navigation			
10	Land Navigation			
11		Analytic Perception	C, 1, 3, 5, 9-11	2, 4, 6-8 10, 12-13
12		Analytic Perception	14, 19, 25 29, 34	15, 17, 20-21, 26-28, 35-38
13	Land Navigation			
14	Land Navigation			
15	Posttest			
16	Final Period-Exam			

ROTC DETACHMENTS SELECTED FOR INSTRUMENTAL ENRICHMENT TRAINING
SY 84-85 THROUGH SY 86-87

EXPERIMENTAL	CONTROL
FIRST ROTC REGION	FIRST ROTC REGION
Augusta College	Florida A&M
Morgan State	Fort Valley State
Norfolk State	Hampton Institute
South Carolina State	Howard University (ADD)
Widener	North Carolina A&T
	St Augustine College
	St Peter's College
	Virginia State (ADD)
THIRD ROTC REGION	
Alcorn State	THIRD ROTC REGION
Central State	
Jackson State	Alabama A&M
Southern University and A&M College	Auburn University (DELETE)
Stephen F. Austin	Henderson State
Tuskeegee Institute	Nicholls State
University of Central Arkansas	University of North Alabama
University of Mississippi (DELETE)	Prairie View A&M
University of Arkansas at Pine-Bluff) (ADD)	University of Arkansas at Pine Bluff

LEP MILESTONES

DATE	AGENCY	ACTION TO BE TAKEN
1 Jun 84	TRADOC	Provide contractor purchase request for LEP material
1 Aug 84	ARI	Deliver Pretest material to ROTC Detachments
1-10 Aug 84	Contractor	Conduct instructor training Deliver instructor support package
6 Aug 84	Contractor	Deliver student LEP materials to ROTC Detachments
15 Aug 84	Experimental Detachments	Confirm receipt of LEP materials to Region HQ
Aug/Sep 84	Experimental Detachments	Implement LEP in MS I
Aug 85	Contractor	Conduct instructor training Deliver instructor support package Deliver student LEP materials to ROTC Detachments
Aug/Sep 85	Experimental and Control Detachments	Implement LEP MS I Basic Course Curriculums (ALL) Implement revised MS I Basic Course curriculum (Experimental).
Aug 86	Contractor	Conduct instructor training Deliver instructor support package Deliver student LEP materials to ROTC Detachments
Aug/Sep 86	Experimental and Control Detachments	Implement LEP MS II Basic Course Curriculums (ALL)

APPENDIX C

LEP Bridging Manual

Appendix C contains sample pages from the Bridging Manual (BM). The sample pages are with respect to the IE instrument "Instructions." There were similar pages for all the instruments taught in MS I in the full manual.

The first three pages (C-2 to C-4) contain lists of bridging ideas from Instructions for several of the Military Service (MS) topics. There are bridges to more topics in the complete manual.

The next section (C-5 to C-7) contains the model lesson plan for teaching a lesson on Instructions which instructors could follow or dispense with at their discretion.

The next section (C-8 to C-9) shows bridges in the opposite direction from that described above: from a MS topic (Customs and Traditions) to an IE instrument (Instructions). The complete manual had bridges from each military subject to a variety of instruments.

INSTRUCTIONS
(From Bridging Manual Section 1)
Applications or Bridging Suggestions to be Incorporated in Lessons

Roles of Army Reserves, and National Guard

Bridge A. Contrast the roles of the three components (Army, Reserves, National Guard) on the criterion of type of service rendered to the nation.

(Collecting all the data; using the data for comparisons)

Bridge B. Write a description of your advice to a high school drop out, a high school graduate, and a college graduate as to which to the three components is most appropriate for service.

(Relating instructions to context and tot he needs of the direction follower)

Bridge C. Describes precisely how one enlists in the ROTC.

(Creating precise instructions)

Bridge D. Critique a written description provided by the Army for the steps involved when enlisting in the National Guard, ROTC, and the and the regular Army. Use what you know about the functions of components.

(Critiquing instructions given by others)

Bridge E. Compare the directions found in Bridge D (above) for similarities and differences.

(Directions may be similar but not exactly the same)

Bridge F. Describe at least three unique features of each of the three components, as if you were speaking to high school senior.

(Selection of relevant data for the needs of the direction follower)

INSTRUCTIONS

Applications or Bridging Suggestions to be Incorporated in Lesson

Establish Physical Readiness Program

Bridge A. Identifying two instructions during physical training which are similar but not identical.

(Instructions may be similar but not exactly the same)

Bridge B. Relating instructions to personal appearance within physical training; name three aspects of personal appearance of an officer which result from instruction by a leader.

(Instructions lead to specific results)

Bridge C. Looking around the room, identify three instructions which could be created to improve the appearance of the students in the room.

(Creating instructions to produce a desired result)

Bridge D. Analyzing the directions given by the physical training instructor for a specific exercise and identifying where they could have been strengthened.

(Critiquing instructions for improvement)

Bridge E. Identifying those specific places during physical training where a point of view is important in giving and following instructions particularly in areas relating to right and left directions.

(Involving point of view in following and giving instructions)

INSTRUCTIONS

Application or Bridging Suggestions to be Incorporated in Lessons

Land Navigation

Bridge A. Following given instructions to go precisely from point to point on a land map.

(Precision in following instructions)

Bridge B. Creating precise instructions to help another person to go from point to point using a land map.

(Invention of instructions which are precise and sequential)

Bridge C. Following instructions carefully in the use of a lensatic campass.

(Precision in following given instructions)

Bridge D. Collection of all relevant data on map before getting to follow the route

(Completeness in data collection before beginning to solve the problem .

Bridge E. Looking carefully at a map created by another person and critiquing that in regard to which information is missing.

(Analyzing instructions for missing information)

Bridge F. Orienting a land map correctly before beginning to use it.

(Making certain to get the first instruction correct before following the next in the sequence).

MODEL LESSON PLAN FOR INSTRUCTIONS

Objective: Students will percisely follow the given instructions, without being confused by the change in directions.

Students will correctly apply the concept of size order to the execise on the page.

Materials: Instructions Instrument, page 15.
Refer to Teacher's Guide for Instructions, page 32 for Introduction to this page.

Time:
Introduction, 5 minutes
Page solution, 15 minutes
Checking solution, 10 minutes
Discussion for insight and bridging activities, 20 minutes
Total: 50 minutes

Secuence of Activities:

1. Ask students to summarize the principles they have learned thus far about following instructions (read carefully, plan response, check response against original instructions, etc.)

2. Without further discussion, distribute copies of page 15 to students, asking them to apply these principles in following the instructions on this page.

3. Some students will inevitably continue correcting the pictures on the entire page, although the same instructions ont he right side shift to correcting the instructions. Ask those who discover their error not to communicate this pitfall to others so that all students in this situation can discover their own impulsiveness.

4. Ask pair of students to check each other's work. Thus, more students who have incorrectly followed the instructions on the second half of the page will discover their impulsiveness.

   Note: Pairs of students, who finish and check each other's work while others are still working, may benefit from their own problem frames and testing each other on them.

5. In large group discussion, ask students to share with the group what they would identify as the "trickiest" part of this page--the shift in the instructions. Discuss why people tend too fall into this "trap." (We are expecting the same instructions to continue; this is the first page where instructions shift; acting too quickly).

Sequence of Activities (cont.):

6. Ask students to compare this page with 5 to confirm the similarity of layout, but the difference in the instructions.

7. In discussing the answers to the right side of the page, ask the students why, in frame 2, row 2, it is unnecessary to write that the smallest circle is in the middle (The corrected instructions say that the circles will not be drawn according to size, and that the biggest circle is on top --thus, by inference, we know that the smallest circle must be in the middle.)

Note: Further discussion about the concept of size order can take place in conjunction with Comparisons Instrument, page 21, where the concept of rank order is the subject.

8. In bridging, ask students to compare the experience on this page with the experience of receiving a written set of orders from a field commander during a field exercise; the orders require your company to move as a unit around the left flank of the enemy to a prescribed position and provide multiple cues for land navigating to that objective.

   The unit moves successfully to that objective.

   On the following day, the company receives a similar set of orders, but this time requiring the company to move to an objective which involves moving around the right flank of the enemy. This time, the company commander expects the directions of movement to be the same, because all of the other sequences in the move are similar, and the cues to be used in the navigation are similar.

   However, this company will at best be in the wrong place, and at worst be annihilated by the enemy because the direction-follower had a "mind-set" expecting all instructions to be the same, since the general layout and appearance of both tasks were the same.

9. Ask students to share one incident from their own personal lives in which all except one aspect of a written instruction was the same as a previous set, resulting in an error in direction-following.

Evaluation:

1. Accuracy of students in following instructions on page 15.

2. Relevance of student comments in identification of the challenging parts of this page.

3. Breadth and relevance of student bridging suggestions in both military (no.8) and personal (nop.9) applications, as described in this Lesson Plan

MODEL LESSON PLAN FOR INSTRUCTION

Homework:

1. Assign pages 25-26 in Instructions.
2. Assign pages 21 & 24 in Instructions, if not completed in class.
3. Assign Work Journal Topic 02 on Implicit/Explicit Instructions.

CUSTOMS AND TRADITIONS

WITH APPLICATIONS AND BRIDGING SUGGESTIONS

RELATED TO

COGNITIVE SKILL DEVELOPMENT

(FROM BRIDGING MANUAL SECTION 3)

CUSTOMS AND TRADITIONS

Applications or Bridging Suggestions to be Incorporated in Lessons

Instructions

Bridge A. Correctly following instructions of a unit commander in a drill ceremony.

(Following instructions correctly according to a prescribed sequence)

Bridge B. Creating instructions for a unit leader under you command in a drill ceremony.

(Investing instructions which will produce precisely the desired result)

Bridge C. using Military Leadership (FM-100), analyze an example from military history where success in battle was dut to the clear and precise instructions of a leader

(Importance of clear and precise instructions)

Bridge D. Using the same manual, identify one example fro military history of failure in battle which was due to the lack of complete instructions given by the leader during battle.

(Importance of completeness in instructions)

Bridge E. List the qualities of a leader which relate to the giving of instructions.

(Clarity of wording, percision, proper sequence, and completeness as characteristics of appropriate instructions)

Bridge F. Plan a pass in review ceremony for a change of command which can be accomplished in 30 minutes.

(Planning the entire task, anticipating outcomes from given instructions)

* For use with Model Lesson Plan for Instructions on Pages 10-12

APPENDIX D

ROTC Instructors Trained in IE

August 1984, 10 Days

University of AR, Pine Bluff

LTC Robert Dalton (PMS)
CPT James Otto
CPT Ernest Starks

South Carolina State

CPT Cornell Richardson
CPT James Archer
CPT Levern Bethea

S.F. Austin

LTC Paul Kellerhals (PMS)
MAJ Richard Clark

Jackson State

CPT Michael Smith
CPT Eugene Payton
CPT Richard Segres
SG Paula Stuckey

Central Arkansas

MAJ Daniel Brittain

Norfolk State

CPT King Cooper
CPT Lillian Smith
MSG Ralph Mackey

Alcorn State

MAJ John Kelly
CPT John Quigley*
SG Rufus Smith

Tuskeegee Inst.

CPT William Adams
SG Bobby McBride*

Southern A&M

MAJ William Wolfe*

Morgan State

MAJ Errol Pratt

Widener

CPT James Robert Hibbard

Also attending were Region POCs
REGION I: CPT Ira Watkins
REGION III: CPT Micheal Koralevich

* Did not take part in LEP

Make up Training, February 1985, 3 Days

Alcorn State
CPT Arthur Martin
SGM David Lambert
SG George Chandler

Southern A&M

CPT James Ball
CPT William Jones

APPENDIX E

Basic Class Record

Appendix E contains the Basic Class Record which was filled out by instructors. The purpose was to document the sequence of actual MS and IE topics taught and associated information, e.g. homework.

LEP PROGRAM

Basic Class Record

School_____ Instructor_____ Section_____

Session	IE or MS Subject	IE Pages	
		In Class	Homework

Session	Goal-Cognitive Principles	Work Journal Assignment

APPENDIX F

LEP Instructor Insights Questionnaire

In contrast to the Basic Class Record (Appendix E), this questionnaire calls for more detailed responses from the instructors on the LEP project.

LEP Instructor Insights Questionnaire

Basic Information

School: _____

Instructor Name: _____

Give the following information for your LEP/MS sections:

Section Number	End of Semester Class Size	Is it in a Cross-Enrolled School?

List other courses that you taught, including labs.

Instructions

Please answer the following questions on separate sheets and place the question number by each answer. If your answers are handwritten, please write as clearly as you can. The questionnaire is organized by sections and you may wish to read through it first to get a picture of what is asked. You will get a chance to add comments beyond your answers to the questions.

Questions

A. Preparing for IE Classes

For the questions in this section describe your typical experience in preparing for an IE class. Also, indicate whether anything changed over the course of the semester.

1. How much time did you usually spend preparing for an IE class?

2. Did you work with others in preparing for IE classes? If so, in what way?

3. If you taught more than 1 section, how did you use the experience of teaching one section affect how you planned and taught other sections?

4. Describe how you used the following support materials. Indicate the good and bad aspects of each and suggestions for improvement. (a) LEP bridging manual, (b) Work Journal manual, (c) IE Teacher's Guide, (d) Other.

5. Comment and give examples of how the ideas of others affected your planning (PMS, other instructors, students, etc.).

6. What was your typical final product in preparing for an IE class?, e.g., list of goals, by-the-minute plans, list of bridging ideas, teaching strategies.

7. Other comments about preparing for IE classes.

B. Preparing for MS classes.

8. Describe how you planned for the MS classes and how it differed from IE class preparations. Include comparisons of preparation time.

9. Did you discover any ways to relate IE task experience cognitive principles to the MS content? Please give examples.

C. Conducting IE Classes

10. First, give the overall structure of your own approach to conducting your IE classes, etc. That is, how did you conduct a typical class?

11. Describe the approach you took to going over IE homework pages in class - the amount of time spent, how you mediated homework, etc.

12. Same as 10, but do for Work Journal homework.

13. To what extent did you have the time to do the following in class?

    a. Mediate students in-class performance on IE pages.

    b. Answer student questions.

    c. Allow free-flowing student discussion and questions.

    d. Model effective thinking yourself, such as by showing how to hypothesize, etc.

    e. Stop to use standard references, define vocabulary, etc.

    f. Use your own questions to encourage student thinking.

    g. State or list cognitive goals or functions relevant to that class.

    h. Summarize what went on in class.

14. What were your most effective teaching strategies?

D. Bridging in IE Classes

15. Did you have much time to do bridging in class? About how many bridges were made per hour?

16. What kinds of topics did you typically bridge to: MS, other subjects, personal life, etc.? Did the bridging topics tend to change over the course of the semester?

17. Did you tend to use the suggested bridges in the manual or your own?

18. To what extent did your students begin to make bridges on their own? Were there many students who could develop good bridges, or just a few?

19. Give examples of some of the better bridges that were developed in or out of class. You can list your own and/or those of others.

E. Conducting MS Classes

20. Describe your general approach towards teaching your MS classes. How did it differ from that for IE classes?

21. Did your experience in teaching IE classes affect the way you taught MS classes?

22. How did you handle IE/MS transitions from class to class? List any procedures that you used.

23. Did you usually bridge to cognitive principles or IE activities during the MS class periods? About how many such bridges per hour were you able to fit in?

F. Student Response/Effects

24. Did most students seem to think the LEP program was valuable? Were there exceptions? What were the approximate proportions of students having a favorable/unfavorable opinion?

25. What reasons did students give in complimenting or criticizing the program?

26. Did you note any "critical incidents" that indicated important effects on the students? For example, students being able to express themselves better or breakthroughs in insight, or increases in the motivation of some students?

27. Was there evidence that the students applied the LEP training outside of the classroom? For example, in leadership lab, other courses, etc.?

28. Did you note any other important changes in student behaviors or abilities?

29. Were the noted changes in students true for many students or just a few?

30. Other comments on the effects of the students or their opinions on the program.

G. Homework

IE

31. Did the students put good effort into their IE homework pages? What proportion did not?

32. Did the students ever work in teams and mediate each other?

33. Did the students do "extra" pages on their own?

34. Do you think these homework assignments were useful? Did it help you learn about your students?

35. Give examples of student criticisms and compliments about the homework.

Work Journal

36. How did the quality of the work journal assignments change over the semester?

37. What did students seem to think about the Work Journal program?

38. Do you think the students saw any value in the assignments in terms of developing thinking skills or was it just a "composition" exercise to them?

39. What value do you see in the Work Journal program? Does it affect thinking skills as well as communication skills? Does it diagnose student abilities and attitudes?

40. What method did you use to evaluate the students' entries and provide feedback?

41. Please make other comments on the journal program.

H. Instructor Development

42. Please comment on whether teaching in the LEP program has aided your personal development.

43. Has it affected the way you interact with students? Do you think it will affect the way you deal with others in other assignments?

44. Has it affected your insight into your own thinking? Are there other effects?

I. General

45. Which IE instruments seemed more successful and which seemed less successful?

46. Did any of the components of the LEP program, IE exercises, Work Journal, discussion, etc., help you in evaluating the leadership skills of your students?

47. Please make any final comments either by describing your experience or making suggested changes. Include any techniques that you found successful in solving problems or making the program work better.

APPENDIX G

LEP Student Questionnaire

This questionnaire was given to all the students in the LEP who took part in the LEP training (not control schools). It has both open-ended and fixed response modes.

LEP STUDENT QUESTIONNAIRE

SCHOOL _____ MS I SECTION _____

(If you are cross enrolled, put your own school.)

We are asking you to fill out this questionnaire so we can improve the LEP program. As you know there are two main parts to the program: (1) instrumental enrichment training and (2) work journal writings. Your comments will be kept private and you should not put your name or social security number on this questionnaire. Therefore no one will know who made the positive or negative comments on the program. Just put your school name and your class section at the top of this form.

The questionnaire is split into two sections. Section A contains 3 questions that require you to write out your answer. In section B, however, you just put an x to give an answer. There are more instructions on section B next page.

SECTION A

1. Do you think the LEP program helped you in any way? If it did help you, give some examples. If it did not, please say so and comment on your experience.

2. Please comment on what you liked about the LEP program and what you did not like.

3. Did both the instrumental enrichment training and the work journal program training help you or did one help you more than the other? Please explain your answer. If either or both of them did not help you, please say so.

SECTION B

Now we wish you to show the ways that the LEP training helped you. Below, you will find a list of abilities that the LEP training may have helped.

Read each ability and show whether you thought that the LEP training improved that particular ability. If LEP helped you a lot put an x in column 3. If it only helped a little, put an x in column 2. And if LEP did not help at all, put an x in column 1.

The first line is an example. The ability is "understanding basketball". I don't think LEP helped me understand basketball so I put an x in the "did not help me" column.

Please put an x along side the remaining abilities to show the abilities that LEP did not help, helped a little bit, or helped a lot.

	(1) LEP Did not help me	(2) LEP Helped a little bit	(3) LEP Helped me a lot
Abilty to understand basketball (EXAMPLE ONLY)	X		
1. Ability to analyize problems			
2. Ability to be precise and reduce errors			
3. Ability to discover solutions to problems			
4. Ability to learn Military Science subjects			
5. Ability to learn other college subjects			
6. Ability to conduct yourself with self-confidence			
7. Ability to give and understand instructions			
8. Abilty to be a leader			
9. Ability to express ideas by writing			
10. Ability to express ideas through speaking			
11. Abilty to think about the way you think			
12. Ability to take time to think things out			