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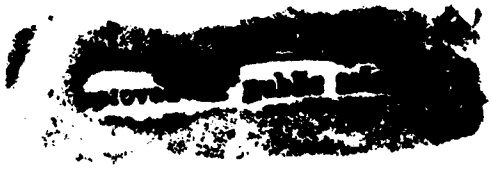
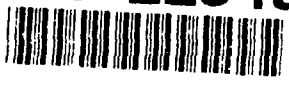
Distributed Training of Armor Officers

John D. Winkler, Susan Way-Smith,
Gary A. Moody, Hilary Farris,
James P. Kahan, Charles Donnell

Arroyo Center





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Preface

This report documents results of a research project entitled "Future Individual Training Strategies." The overall project objectives are to identify and assess alternative training strategies that may be more efficient and affordable than current techniques for conducting Army individual training, with special attention given to resident training conducted in U.S. Army schools. Here the authors present results of one of three case studies of specialized skill training in an Army military specialty. Each case study examines current job requirements and training approaches, identifies alternative methods of conducting training consistent with new Army training concepts, and analyzes resources, costs, and potential consequences of changes in training strategy.

The project has released three other publications:

> R-4228-A, *Linking Future Training Concepts to Army Individual Training Programs*, John D. Winkler, Stephen J. Kirin, and John S. Uebersax, 1992.
>
> N-3527-A, *The Army Military Occupational Specialty Database*, Stephen J. Kirin and John D. Winkler, 1992.
>
> R-4224-A, *How to Estimate the Costs of Changes in Army Individual Skill Training*, Susan Way-Smith, 1993.

The results described in this report should be of interest to policymakers concerned with military education and training, and to managers responsible for the design and implementation of training programs for specific Army military specialties. It should be noted that the results presented herein apply specifically to the Armor Officer Advanced Course and conclusions may not generalize to other Army training courses or applications of distributed training technologies.[1] The research was conducted in the Manpower and Training program of the Arroyo Center and was sponsored by the Office of the Deputy Chief of Staff for Training, U.S. Army Training and Doctrine Command.

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[1]The Army's distributed training program has evolved since the inception of this project based on research results and experiences in additional pilot studies. For more information on the Distributed Training Program, contact Director, Training Development and Analysis Directorate, U.S. Army Training and Doctrine Command, Fort Monroe, VA, 23651-5265.

The Arroyo Center

The Arroyo Center is the U.S. Army's federally funded research and development center (FFRDC) for studies and analysis operated by RAND. The Arroyo Center provides the Army with objective, independent analytic research on major policy and organizational concerns, emphasizing mid- and long-term problems. Its research is carried out in four programs: Strategy and Doctrine, Force Development and Technology, Military Logistics, and Manpower and Training.

Army Regulation 5-21 contains basic policy for the conduct of the Arroyo Center. The Army provides continuing guidance and oversight through the Arroyo Center Policy Committee (ACPC), which is co-chaired by the Vice Chief of Staff and by the Assistant Secretary for Research, Development, and Acquisition. Arroyo Center work is performed under contract MDA903-91-C-0006.

The Arroyo Center is housed in RAND's Army Research Division. RAND is a private, nonprofit institution that conducts analytic research on a wide range of public policy matters affecting the nation's security and welfare.

James T. Quinlivan is Vice President for the Army Research Division and the Director of the Arroyo Center. Those interested in further information about the Arroyo Center should contact his office directly:

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Background

In an era of declining training resources and budgets, the Army is searching for more efficient training methods to use in individual training courses. Individual training conducted in-residence in the U.S. Army school system (generally termed "institutional training") is very costly, encompassing a large portion of the entire U.S. Army budget—nearly $6 billion in fiscal year 1991, for example (Department of Defense, 1990). Conducting this training requires numerous installations, facilities, equipment, and manpower while consuming large quantities of ammunition, fuel, and other resources.

To meet Army training requirements and overcome restraints imposed by declining resources, Army policymakers are considering initiatives that could fundamentally change the nature of individual training. These include, for example, a "distributed training strategy" that envisions sizable reductions in the length and scope of resident training, accompanied by increased individual training in field units and at home stations and expanded use of training technologies. Because of their potentially far-reaching effects on soldier proficiency and Army capability, such new training strategies need thorough evaluation. Training policymakers need to know which occupations and training courses would be affected, how such changes would be specifically implemented, and whether such changes will provide savings and prove feasible in practice. More generally, the Army needs improved techniques for identifying alternatives to current training approaches and assessing potential costs and consequences of changing its customary training methods. Currently, there is no agreed-upon methodology for identifying training approaches suitable for specific occupational specialties or for evaluating the resource or cost implications of new training approaches.

Research Objectives and Approach

The overall objective of this research is to develop improved techniques for identifying alternative approaches for conducting individual training and analyzing their potential costs and consequences. Our approach first analyzes the characteristics of Army occupations and links them with initiatives for

changing individual training programs in the future, such as distributed and device-based training.[1] Then, in subsequent case studies of specific individual training programs, we define options for reorganizing training, analyze potential effects of training changes on resources and costs, and identify further implications of training changes. We conduct these analyses within specialized skill training programs selected as potentially amenable for new strategies under consideration by the Army: The Armor Officer Advanced Course (AOAC), Abrams Armor Crewman One-Station Unit Training (MOS 19K OSUT), and Cannon Fire Direction Specialist Advanced Individual Training (MOS 13E AIT).

A common analytic method is used in each of the case studies. First, we perform a *job analysis* of tasks performed in the duty assignment for which the soldier is being prepared. This job analysis is based on task performance data obtained by the Army Occupational Survey Program (AOSP), augmented with new ratings of task characteristics relevant to training organization and delivery collected from subject matter experts. The data are statistically analyzed to determine requirements and to set priorities among tasks for resident and nonresident training in conjunction with other elements of instructional design (i.e., timing, location, and methods). We use these results to suggest potential modifications to the existing program of instruction (POI), balancing key course objectives against potential changes implied by new training strategies (e.g., distributing training and expanding use of training technologies).

The result is a set of alternative POIs that are then subjected to *resource and cost analyses*.[2] The analyses provide quantitative estimates of changes in resources and costs resulting from potential changes in training organization and delivery while highlighting trade-offs and implications for all Army organizations affected by the changes. The steps of the analysis involve: (a) defining the program's current methods and resources and specifying how alternatives will be implemented; (b) detailing how activities and work load will change for training delivery, development, and support; (c) analyzing the type and quantity of resources required to accomplish the changes (manpower, equipment, and facilities); and (d) calculating specific costs and placing these in context, by considering transition costs, recurring costs and savings, break-even points, and implications for soldiers, schools, and units.

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[1]See Kirin and Winkler, 1992; Winkler et al., 1992.

[2]This method, termed the Training Resource Analysis Method (TRAM), is described in detail in Way-Smith (1993).

The Armor Officer Advanced Course

This report presents our analysis of training options and costs for AOAC, a skill progression course for senior first lieutenants and junior captains, focusing on the potential for distributed training. AOAC was one of several officer skill progression courses selected initially by the U.S. Army Training and Doctrine Command (TRADOC) for its distributed training strategy. AOAC seems appropriate for distributed training, given its informational content and resource intensity (i.e., length of resident training, extensive use of small-group instructional techniques, and requirement for permanent change of station [PCS] by attendees). Initial estimates implied that substantial cost savings were possible if course length were reduced and new training media employed to support distributed training at home stations.[3]

We review these assumptions using our analytic method while analyzing alternative approaches by which distributed training might be implemented in AOAC. Our analysis seeks to determine how much training may actually be distributed and how this might be implemented and supported in the most cost-effective manner, given AOAC's core objectives to prepare Armor officers to serve as company commanders or assistants on battalion and brigade command staffs.

Results

Our analyses suggest that AOAC can be reorganized to meet its core objectives, consistent with principles of distributed training, in ways that reduce course length and conserve resources. However, the potential for distributed training to reduce costs is bounded by the minimum amount of resident training required to produce a qualified graduate and the resources required to implement and support distributed training, as described below.

Training Requirements for AOAC

Our results indicate that the tasks of Armor captains can be characterized by a small number of general dimensions, which together indicate the extent to which the tasks are related to: (a) preparing units for combat operations, (b) planning

[3]Initial plans suggested that the 20-week AOAC could be reduced by 60 percent, to 8 weeks in length, with distributed training to be conducted using a predetermined mix of paper-based techniques, computer-based training, and televideo. These plans were subsequently revised, reducing the amount of material to be distributed. At the time this analysis was conducted, plans called for a reduction of 40 percent, to 12 weeks in length.

and directing company tactical and logistical operations,[4] (c) performing staff functions in battalions and brigades, and (d) conducting routine administrative duties. In the body of the report, we discuss criteria for identifying what tasks to train, when and where to train them, and which training technologies to use. The criteria first distinguish tasks that require further training from those that do not; then among those tasks that require training, they suggest the "minimum essential" set to train *in-residence* versus those that could be considered for nonresident training. The criteria further suggest training media and technologies for conducting resident and nonresident training.

These criteria allow us to identify the tasks that are most highly related to the duties of Armor captains and set priorities among them for training. Then, by the application of subject matter expertise, we examine how these tasks are currently trained and suggest possible changes to the POI that are consistent with course objectives and the principles of a distributed training strategy.

Options for Conducting Distributed Training in AOAC

Drawing from this analysis, we identify a potential POI for AOAC resident instruction that contains tasks performed by captains and that meets fundamental course objectives. Tasks remaining for resident instruction compose 75 percent of the current AOAC POI (approximately 15 weeks in length). This new POI focuses training toward attaining proficiency at tasks identified in the analysis as most important for preparing units for combat operations and planning and directing company tactical and logistical operations in wartime. It also includes some of the key tasks needed to perform staff functions in battalions and brigades. Consistent with current course objectives, the resident POI emphasizes the use of small-group instructional techniques to provide this training.

Of the remaining tasks, some are considered for distributed training as a prerequisite to AOAC. Tasks identified as potentially amenable to distributed training compose 20 percent of current AOAC POI hours (approximately four weeks). They entail mainly background information, routine administrative tasks, and tasks less germane for preparing units and directing wartime operations. We identify two potential media mixes for conducting this

[4]Our analysis further distinguishes whether tasks on this dimension are "combat urgent," i.e., whether the skill mastery is required immediately on duty assignment.

instruction, utilizing paper-based methods, videotape, and computer-based instruction.[5]

The remaining tasks, encompassing approximately 5 percent (one week) of current AOAC POI hours, consist of those identified by our analysis as least related to AOAC core training objectives and the duties of Armor captains (e.g., portions of the Army Writing Program). This material appears to represent unnecessary training for Armor captains and could be "trimmed" from the current resident POI to accomplish necessary cost savings.

Savings and Costs of Distributed Training

We next estimate resource and cost effects of implementing the alternatives generated by our analyses, including an additional mix of distributed training technologies initially proposed by TRADOC. We begin by examining the effects of "trimming" one week of instruction, followed by the distribution of approximately four weeks of material using one of three media mixes.[6] Further, to identify implications resulting from how the alternatives are implemented, we consider a "best-case" (low-cost) and a "worst-case" (high-cost) scenario for each of the options. The assumptions differ in how they treat requirements for conducting distributed training at home station (i.e., the need for additional manpower, equipment, and facilities), the factors used to estimate the costs of training development, and implied support requirements (e.g., amount of additional maintenance).

Our cost analysis provides three major findings. First, eliminating tasks unrelated to performance in the subsequent duty assignment from resident instruction is a viable first step to achieving cost savings. In AOAC, elimination of one week of instruction provides significant recurring savings in manpower, equipment, and facility-related costs (approximately $670,000 annually), with minimal transition costs.[7] Second, as training is distributed to home stations, we find that the costs and savings depend on the capacity of soldiers and field units to absorb the training. If the training can be accomplished using existing training equipment and facilities, without additional training manpower, and during off-duty hours, then distributed training can provide significant savings with a very

[5]One option uses only paper-based instructional methods. The other uses paper-based methods (43 percent), videodisc (11 percent), and computer-based training (46 percent).

[6]These are the two identified in our analysis and the media mix initially proposed by TRADOC using televideo, computer-based training, and paper-based methods.

[7]Much of this is attributable to conversion of AOAC from permanent change of station to a temporary duty assignment (TDY) course. Substantial savings, however, are attributable to other sources, e.g., reduced requirements for civilian training manpower.

quick payback—on the order of $1.8 million per year after one year in this case. Such savings diminish greatly, however, as resources are required to accommodate distributed training by acquiring new training technologies, expanding existing facilities, providing additional trainers, supporting additional maintenance, and so forth. Third, we find that the costs and savings that can be achieved through distributed training depend greatly on the media selected to support this training. As "higher-tech" media are employed, development and support costs increase while savings decrease at a dramatic rate. Our analysis suggests that only a paper-based strategy could provide acceptable costs and savings under both sets of assumptions, breaking even in two years or less. A strategy employing televideo costs more than the current course under both sets of assumptions used in our analysis. A distributed training strategy employing paper, videotape, and computer-based training will break even between one and eight years later, depending on the amount and type of additional resources required to develop, deliver, and support this training.

Conclusions and Implications

To cope with declining resources and budgets, the Army is reviewing its customary methods of training individual skills, with the goal of finding ways to train more efficiently. Our analysis suggests that steps can be taken to improve the efficiency of training, but the role for distributed training as a cost-reduction strategy may be limited.

Despite severe reductions in training budgets and resources in recent years, room still exists to improve the efficiency of individual skill-training courses. Our analysis shows that AOAC (and presumably similar skill-progression courses) contains material that is mandated or "nice to have" but not tied to job performance requirements and the core training objectives implied by them. The resources required to train nonessential material can be considerable.

As a first step for improving efficiency, TRADOC and the proponent schools should review the content of training programs in light of actual job requirements. Tasks that bear directly on job performance requirements should receive highest priority for resident training. A formal method for analyzing training requirements can provide the objective information needed to determine the "minimal essential" content of training programs.

As the Army considers additional methods for improving training efficiency, our analysis of AOAC provides limited support for the concept of distributed training. Our analysis suggests that some material now trained in-residence in

the AOAC is potentially suitable for distributed training. At the same time, the maximum potential for reducing course length while maintaining existing training objectives seems on the order of 25 percent—not the 40–60 percent called for in the initial implementation plan.

Moreover, whether distributed training will conserve resources and save costs depends entirely on the technologies employed and the type and amount of resources required to conduct this training at soldiers' home stations. If distributed training can be accomplished using less complex training technologies, and as it involves resources already available at home station, the cost savings can be substantial. If major capital investments are needed, or if new requirements are generated to support the distributed training, then the burden created for the Army as a whole can more than offset any savings realized in the TRADOC system.

Altogether, these considerations argue for a modest role for distributed training, involving in-place technologies such as paper, videotape, and personal computers, and only as much material as can be absorbed by soldiers and field units without interfering with daily operations and readiness. These principles imply restricted potential for expanding distributed training (e.g., to provide a small amount of prerequisite preparation for such courses as AOAC). Cost savings would be worthwhile but insufficient on their own to cope with dramatic declines in training resources and budgets.

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We also acknowledge our RAND colleague Randy Ross for his helpful technical review of an earlier draft. Jan Hartman provided invaluable programming assistance, and Velda De Cosentine prepared the manuscript in a tireless manner. The authors are solely responsible for any shortcomings.

List of Acronyms

AAR	After-Action Review
AF	Absolute Frequency
AIT	Advanced Individual Training
AOAC	Armor Officer Advanced Course
AOAP	Army Oil Analysis Program
AOSP	Army Occupational Survey Program
AR	Army Regulation
ARPRINT	Army Program for Individual Training
ARTEP	Army Training and Evaluation Program
CBT	Computer-Based Training
CODAP	Comprehensive Occupational Data Analysis Program
COFT	Conduct of Fire Trainer
COIP	Consequences of Inadequate Performance
CPT	Captain
C&S	Command and Staff
DA	Department of the Army
DAC	Deputy Assistant Commandant
DOTD	Director of Training and Doctrine
ECCM	Electronic Counter-Countermeasures
ETV	Estimated Time Value
FIST	Fire Support Team
FPS	Facilities Planning System
FRAGO	Fragmentary Order
FY	Fiscal Year
GS	General Service
ICH	Instructor Contact Hour
IVD	Interactive Videodisc
LT	Lieutenant
MAJ	Major
MOPP	Mission-Oriented Protective Posture
MOS	Military Occupational Specialty
MOUT	Military Operation on Urban Terrain
MPA	Military Pay and Allowances
MS3	Manpower Staffing Standards
OBC	Officer's Basic Course
OMA	Operations and Maintenance Account

OSMIS	Operations and Support Cost Management Information System
OSUT	One-Station Unit Training
PCS	Permanent Change of Station
PMCS	Preventive Maintenance Checks and Services
POI	Program of Instruction
POL	Petroleum, Oil, and Lubricants
RTS	Relative Time Spent
SAT	Systems Approach to Training
SGI	Small Group Instruction
SME	Subject Matter Expert
TADSS	Training Aids, Devices, Simulators, and Simulations
TDA	Tables of Distribution and Allowances
TDY	Temporary Duty Assignment
TEWT	Tactical Exercises Without Troops
TOE	Tables of Organization and Equipment
TRADOC	U.S. Army Training and Doctrine Command
TRAM	Training Resource Analysis Method
TTHS	Trainees, Transfers, Holdovers, and Students

1. Introduction

Background

The U.S. Army faces serious challenges in training its soldiers and leaders in the coming years. Training is vital to the combat readiness of the Army, but it is also very costly. In an era of declining resources and growing constraints on traditional methods of training, and as continuing technological advances increase skill requirements and drive up operating and support costs, the Army will need new methods of training that maintain proficiency but reduce operating costs, resource utilization, and manpower requirements.

The programs of military education and training conducted in the U.S. Army school system are experiencing especially intense pressures to change customary training methods. The Army conducts numerous programs of training for officers, warrant officers, noncommissioned officers, and enlisted personnel to impart the job-specific skills and military knowledge needed to perform wartime missions (Department of the Army, 1987). These occur "in-residence" at Army schools, during on-the-job training in Army units, and through self-development at home stations. The portions conducted in-residence (generally termed "institutional training") are prominent and costly, involving numerous installations, facilities, equipment, and manpower (instructors and trainees). Conducting this training consumes large quantities of ammunition, fuel, and other resources (e.g., spare parts). In fiscal year 1991, for example, individual training cost the Army nearly $6 billion (Department of Defense, 1990).

As part of its long-range planning process, the Army is considering new ways to conduct training that can maintain effectiveness while reducing costs and resource consumption in Army schools. These have been described in doctrinal publications (e.g., U.S. Army Training and Doctrine Command [TRADOC], 1990a), which identify several new concepts and strategies for conducting individual training. The overall architecture is termed "Army Training 2007," which is intended to guide training plans and resource projections at Army schools. Contained within are a number of elements, including TRADOC's long-range training plan and four initiatives, together termed the "integrated training strategy." Two of these bear directly on how training will be organized and conducted in Army schools in the future. They are

- A "distributed training strategy" that envisions a reduction in the length of institutional training courses, accompanied by increased individual training in Army field units using paper-based instruction, videotape, computer-based training, interactive videodisc, and televideo
- A "device-based training strategy" that calls for expanded use of advanced technologies, including training aids, devices, simulators, and simulations (TADSS), to reduce equipment and ammunition usage during training at institutions, home stations, and combat training centers, and as part of the distributed training system.[1,2]

These potential initiatives would significantly change the nature of current "schoolhouse" training. Such changes would affect the length and content of training courses, the location of some individual training (e.g., at home station versus in-residence), the timing of training within an individual's career, and the methods and media used to deliver training. At the same time, the initiatives contain a number of assumptions regarding the eventual costs and consequences associated with such changes. Advocates believe, for example, that distributed training will permit reduction and consolidation of schools and resident course offerings. This would be accompanied by increased training opportunity and improvements in the quality and standardization of instruction. Device-based training is also seen as permitting reductions in the resources required to conduct individual training while improving the sustainment of skills in the field. Thus, both of these initiatives are expected to provide training more efficiently at less overall cost to the Army.

Because such initiatives could have far-reaching effects on soldier proficiency and unit capability, a thorough evaluation of them is needed. To evaluate competing strategies, training policymakers need to know which Army military occupational specialties (MOSs) would be affected, how such changes would be implemented in specific training courses, and whether such changes would provide sufficient cost savings and prove beneficial in practice. Moreover, decisionmakers need assurance that such changes would provide the Army with sufficient capability, flexibility, and timeliness in responding to contingencies requiring the mobilization and training of Army personnel.

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[1]The remaining two initiatives are termed "combat training centers" and "Reserve Components training strategy." The former proposes continued use of assets such as the National Training Center to provide "realistic battlefield training experience." The latter provides general guidance for soldier and leader training, collective training, training support, and training management (e.g., in stating that nonprior-service soldiers will complete initial entry training in-residence at TRADOC schools).

[2]In addition to these "strategies," TRADOC's long-range training plan contains a number of additional "concepts" for changing the organization and delivery of individual training. They include, for example, expanded use of contract service training, increased reliance on civilian vocational education in lieu of military training, and expansion of joint-service training.

Research Objectives and Approach

The overall objective of this research is to develop improved techniques for identifying alternative approaches for conducting individual training and analyzing their potential costs and consequences. Specifically, we seek to determine whether and how new initiatives such as distributed and device-based training can be implemented in existing training programs to improve efficiency and reduce costs. Currently, there is no agreed-upon methodology for determining how to reorganize existing training courses while analyzing the prospective costs and benefits of future training concepts, along these or other lines. Such methods would help "flesh out" the details of existing initiatives. They may also suggest additional techniques for improving the efficiency of training, reducing resource consumption and costs, and meeting other goals (e.g., maintaining training quality and improving standardization).

The research has proceeded in two phases. First, we performed background analyses that define and analyze characteristics of Army occupational specialties related to future strategies for delivering Army individual training. We constructed a database describing training-related characteristics of Army MOSs relevant to future training concepts. Second, we analyzed these data to identify general training-related dimensions of MOSs, ranked the MOS on each training-related dimension, and linked these to concepts for changing Army individual training in the future.[3]

Our analysis, for example, suggests that the concept of distributed training, as currently described in doctrinal publications (TRADOC, 1990a) might prove especially suitable and cost-effective in leader development courses and MOSs in which cognitive tasks are dominant. It further identifies specific characteristics of MOSs that may lend themselves to a device-based training strategy (i.e., where procedural skills are dominant and similarity to civilian occupations is low). Drawing on this analysis, we selected three specialized skill training programs for further intensive study. They are: Armor Officer Advanced Course (AOAC), Abrams Tank Crewman One-Station Unit Training (MOS 19K OSUT), and Cannon Fire Direction Specialist Advanced Individual Training (MOS 13E AIT).

In the current phase, we develop analytical tools and conduct case studies of the costs and feasibility of changing training in the selected specialties. First, we analyze job requirements and current training approaches and identify new training approaches for organizing and delivering training, consistent with the

[3]See Kirin and Winkler, 1992; Winkler et al., 1992.

training concepts under consideration in each case. Then we develop and apply a methodology for estimating probable costs of changes to baseline/current approaches, based on key resource factors associated with changes in content, timing, location, and method of training. Finally, we identify the broader implications of changing training in the ways considered by the analysis. These analytical tools will be described in more detail shortly.[4]

Plan of the Document

The remainder of this document describes the results of our analysis of the AOAC, focusing on use of distributed training. The next section describes the analytical approach taken in this research. Section 3 presents our analysis of current training in AOAC and options for implementing distributed training. Our cost analyses of these options are contained in Section 4. Finally, in Section 5 we present our conclusions regarding the feasibility of implementing distributed training in AOAC. Technical material supporting the case study is contained in the appendices.

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[4]They are also described in detail in a companion publication (Way-Smith, 1993).

2. Analytical Method

This section describes how we identify and analyze alternative approaches for conducting training within specific training programs. Our method of analysis considers skill requirements, resources required to train, and cost-effective combinations of resources under alternative training approaches. The analysis proceeds in two stages, as follows.

- An initial *job analysis* analyzes tasks performed in duty assignments and compares these with the current program of instruction (POI). The analysis next develops alternative POIs that change content and length, location, timing, and/or training technologies, consistent with broad training concepts applicable to the training program (e.g., distributed or device-based training).
- A subsequent *cost analysis* estimates changes in resources and costs associated with the various alternative POIs under consideration. It identifies specific resourcing mechanisms for implementing proposed changes in POIs, ramifications of changes for training activities and resources across the Army, and resulting costs. The cost analysis further identifies start-up costs, net recurring costs or savings, and break-even points for alternatives under consideration.

Current Army Training Development Procedures

The current process for developing Army training programs, conducted as part of the Systems Approach to Training (SAT), drives the development of POIs used in-residence and for nonresident training. Training developers and subject matter experts (SMEs) identify all tasks appropriate for a specific occupational specialty and skill level and determine which tasks are critical to mission accomplishment and require training (Melton, 1988; TRADOC, 1989). Subsequently, these tasks are further analyzed to identify conditions and standards of performance, the learning objectives for training, and method of training, including media and location (TRADOC, 1988a). A task selection board then reviews the task inventory, selection of "critical" tasks, and other decisions governing training (e.g., selection of training site). Tasks selected for resident training are then configured within larger training events. A POI is generated

that displays the training events, the methods used to conduct training, and required resources, including manpower, equipment, and training technologies.

These procedures are used to develop new training programs, e.g., when new MOSs are established. They are also used to revise existing POIs, e.g., as equipment is added, deleted, or modified. Unless major changes external to existing training occur, however, POIs are subject to minimal revision with respect to methods and resources used to train. When a program faces reductions in training resources, a common response is to maintain standards with reduced resources ("take it out of hide") or, alternatively, to "salami slice" (elimin te) portions of existing training programs across the board. Major redeployments of resources within existing courses are rarely considered.

Our approach is similar to the SAT in certain respects, but it offers a number of advantages. Its goal is to suggest new and different approaches for organizing and delivering training that are less costly than current methods. It is especially useful for suggesting how to reorganize existing courses in response to reduced training budgets. Unlike the SAT, which tends to suggest single best solutions, we generate *alternative, multiple* POIs that seek to improve the efficiency of training by varying the content, location, timing, and technologies for conducting training. Whereas subjective considerations by SMEs figure heavily in designing training programs, we conduct objective analyses combining data on task performance in units with systematic ratings by SMEs of task attributes related to training. Finally, the results of the task analysis are linked to an analysis that evaluates resource and cost implications of each of the alternatives.

Job Analysis and Identification of Alternative POIs

The job analysis follows a series of steps, demonstrated in Figure 2.1. The steps involve identifying the universe of relevant tasks; collecting quantitative data regarding job performance from field surveys and SME ratings of task attributes relevant to training; analyzing these data statistically to identify general job dimensions and group and rank tasks according to training priorities; examining the current POI in light of these results; and constructing new POIs that vary content and length of resident training, location and timing of training for tasks not trained in-residence, and media and technologies for supporting resident and nonresident training.

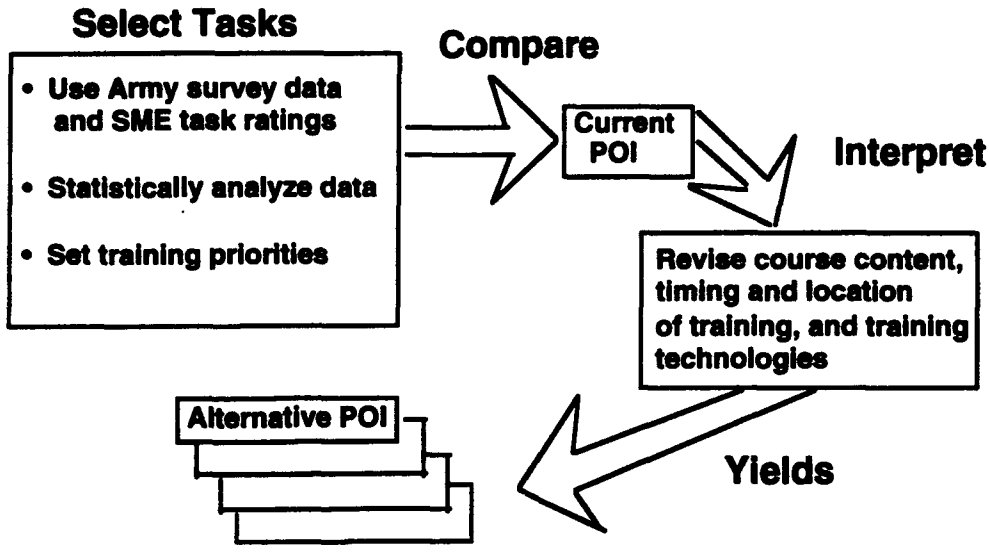

Figure 2.1—Job Analysis Method

Selection of Tasks

The universe of tasks included in the job analysis incorporates all tasks that might be performed in the duty assignment for which the soldier is being prepared. In order to determine what soldiers actually do, the universe includes tasks from adjacent skill levels. For example, consideration of a captain's tasks includes tasks performed at the grade levels immediately above and below (a major's and a lieutenant's tasks, respectively).[1] For entry-level soldiers, both skill level one and skill level two tasks are included in the job analysis. Major sources of MOS task lists include (a) the master task list, (b) the critical task list, (c) the POI, (d) the soldiers' manuals, and (e) Army Occupational Survey Program (AOSP) field surveys.

The wider selection of tasks allows for the identification of actual job boundaries, which might be different from official doctrine. By this method of task selection, some new tasks may be identified for training and some tasks may be eliminated from current training.

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[1]A similar procedure would be followed in a job analysis of noncommissioned officers.

Collection of Data

Next we seek data to characterize the tasks identified in the previous step in ways relevant to training organization and delivery. We wish to know more than whether a task is *critical;* we also seek measures that reveal organizational and delivery characteristics of "what, where, when, and how" tasks should be trained.

Measures used in our analysis are drawn primarily from three sources. One is the master task list established by proponent schools as part of the SAT process and used to develop soldiers' manuals and POIs. A second is the most recent survey of job incumbents and their supervisors conducted under the AOSP. We examine responses of only those job incumbents in tables of organization and equipment (TOE) units who are at the skill level, grade/rank, and duty position for the specialty of interest. Ideally, the job performance measures include five measures recommended in three SAT task selection models (TRADOC, 1989): learning difficulty, task significance (importance), frequency of performance, training emphasis, and consequences of inadequate performance (COIP).[2]

Measures drawn from the AOSP seem useful for determining *what* should be trained, but they do not contain information that relates directly to training organization and delivery (i.e., when, where, and how tasks could be trained). To obtain systematic information addressing these concerns, we collect SME ratings for eight additional task attributes. The measures include: the *location* where the task is most commonly performed (e.g., in garrison, field, or both); whether the skills required by the task are *prerequisite* to the performance of other tasks; the *immediacy* with which the task may need to be performed on duty assignment; the potential *transferability* of the skill between military and civilian settings; and whether the task requires *cooperative skills, reasoning skills, direction giving,* and *equipment* as part of performance.[3]

These ratings are intended to make explicit the criteria used to design and organize resident training programs within one analytic process. When integrated with field-based measures of task performance, they provide a more comprehensive and objective set of indicators for analyzing job requirements to determine which tasks are "minimum essential" (versus trainable on-the-job) for

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[2]These measures are not routinely collected in all AOSP surveys. At a minimum, the AOSP collects data on frequency of task performance from job incumbents and training emphasis from supervisors. Additional data on learning difficulty and consequences of inadequate performance may be collected from supervisors, depending on the specific survey.

[3]Complete descriptions of measures used in this case study are provided in the next section.

the initial job assignment and which require hands-on experience and interaction with instructors and peers, and so forth.

Statistical Analysis of Tasks

The next step of our job analysis evaluates task data assembled from field surveys and SME ratings using formal, statistical methods. We use factor analysis (Harman, 1976), an exploratory statistical procedure, to identify general dimensions that summarize the various task measures. The analysis is conducted using the task as the unit of analysis and including all relevant measures derived from the master task list, AOSP surveys of job incumbents and supervisors, and SME ratings. The analysis examines the interrelationships among these measures to determine if they can be represented by a smaller number of hypothetical variables.

Once we have identified general dimensions of tasks, we next use the results of the analysis to identify specific tasks with common characteristics. We do this by calculating factor scores for all tasks on all dimensions and then ranking all tasks on each of the general dimensions. The training developer may observe which tasks are ranked high, middle, or low on each dimension and use the rankings to establish cutoff values for determining the importance of each task with respect to each general dimension.

The objective of the analysis is exploratory; that is, we seek to uncover general characteristics of tasks that may be relevant to training organization and delivery. We expect that the results can be interpreted to guide training development (e.g., to select tasks for resident instruction or identify tasks that might be especially suitable for new training strategies).

Development of Alternative Training Programs

The next step uses the statistical results to suggest possible changes in training organization and delivery methods to improve operational efficiency and resource utilization. First, we consider training content, location, and timing of training (i.e., determining what should be trained in-residence and as nonresident instruction). Then, we consider media and technology used to conduct resident and nonresident training.

The analysis begins by using the statistical results to suggest key task characteristics to consider in developing resident and nonresident instruction. We attempt to identify the set of tasks necessary to assume the duty position and

distinguish these from tasks that may not need to be trained at all (e.g., because they are not actually performed by job incumbents in the duty assignment). Within these, we then seek the tasks that are "minimum essential" for resident instruction and tasks that may be considered for nonresident instruction (as prerequisites or follow-ons to resident instruction).[4] We then examine the current POI in light of these results, and we suggest options for revising or reconstituting training events to support resident and nonresident training.

When the goal is reorganization of existing training programs to implement a particular training concept such as distributed or device-based training, the concept's principles can influence revisions to the POI. For example, in developing a program of distributed training (as in our analysis of AOAC), we seek to determine how to best "shape" the POI to meet the goals of reducing the length of institutional training and increasing the use of distributed technologies in field units. The method may be also used, however, for the more general goal of reorganizing existing POIs to improve their efficiency and resource utilization.

Once options for reorganizing the content, timing, and location of training are devised, we next define options for using training media and technologies in ways that preserve training effectiveness but reduce costs. Current practices of assigning "proven" training methods and media to training events may overlook some training approaches that are potentially cost-effective. For those tasks and training events that remain in-residence and for nonresident instruction, we aim to substitute equally effective media and technologies when they are less expensive than those in current use (e.g., increased use of simulation, as appropriate). For those tasks where new training needs to be developed (for resident or nonresident instruction), we seek to identify the media and technologies with acceptable effectiveness and the lowest possible development and maintenance costs.

Identification of alternative media is guided by the results of our statistical analyses, along with principles of instructional design and media selection gleaned from the literature on educational technology (e.g., Melton, 1988). As in the earlier step, we examine current training methods and, based on the characteristics of tasks, suggest alternative media and technologies. For example, TADSS are often found to be equally effective and less costly than equipment-based training (Martellaro et al., 1985; Hughes et al., 1987; Winkler and Polich, 1990). Recent advances in the computer tutoring of individuals suggest

[4]We describe our method for doing this in more detail in the next section. Briefly, we define "minimum essential" tasks for resident instruction as those ranked most highly in the statistical analysis as *key duties of job incumbents and necessary for survival on the battlefield.*

equivalent and efficient self-paced instruction alternatives to current conference methods on a variety of abstract reasoning and technical tasks (e.g., Brown, 1985; Fischer et al., 1991; Legree and Gillis, 1991; Newman, 1991; Towne and Munro, 1991). Other technological advances in video teletraining and video teleconferencing may provide useful "distance learning" options for presenting information to students and testing their understanding (e.g., Bailey, 1989).

Cost Analysis

The next step in our analysis estimates the potential costs and savings that would result from implementing the alternative POIs generated in the job analysis. A key problem in determining the potential cost of changing training is that the Army does not now have accurate methods for estimating costs of individual training. General estimates of costs of training courses exist, but the aggregate manner in which costs associated with manpower, equipment, and base operations are estimated does not permit detailed analysis of the activities associated with producing and executing a training course. This is a serious problem because many of the proposed alternative training strategies will be implemented at the training course level and the Army needs to know whether these strategies do, in fact, reduce the costs for a particular course.

In response, we have developed a course-level costing method that can be used to develop estimates of the costs of changing Army individual training. The method evaluates alternative strategies for conducting training courses and various potential implementations of these alternatives. This method—the training resource analysis method (TRAM)—examines how an alternative training strategy would change training and training support activities and resource use.[5]

The Training Resource Analysis Method

TRAM is different from current Army training cost methods in three ways. First, the method examines activities, resources, and costs at a much lower level of detail than the current Army costing methods. TRAM examines activities, resources, and costs at the course and lesson plan/event level of detail.

Second, TRAM differs because it focuses on *changes* in costs that result from a training decision. The Army's current methods allocate total fixed and variable

[5]A detailed explanation of the training resource analysis method is provided in Way-Smith (1993).

costs.[6] While these Army methods may have been sufficient for budgeting purposes in a relatively stable environment, the present context of major end-strength reductions, budget cuts, and mission changes requires a method that can determine whether new training strategies can actually generate savings.[7]

Third, in addition to quantitatively measuring costs, TRAM also highlights trade-offs by detailing the specific changes that result from implementing alternative training strategies and places those changes in a broad context. Training activities in schools ultimately affect activities in units, and if changes are to be made to individual training programs, decisionmakers need to know not only the costs of those changes for schools *and* units, but what they are potentially trading for the savings.

TRAM has three objectives:

1. Evaluate training options
2. Assess the effects of alternative implementations of training options
3. Estimate changes in costs and savings.

TRAM uses four steps to calculate the changes in resources and costs of alternative POIs. They are (a) specify the training programs, (b) analyze activities, (c) analyze resources, and (d) calculate costs. These steps are illustrated in Figure 2.2 and described below.

Specify the Training Programs

The most important step in the analysis is to thoroughly define the current course (the baseline) and the proposed alternative training programs.

Define the Baseline. In the first step of the method, we convert the current course POI to a spreadsheet that contains each current training event, instructing department, academic hours, methods of instruction, equipment, ammunition, facilities, and instructor contact hours.

Define the Alternatives. The next step specifies the alternative training programs. We identify changes to the baseline associated with the alternatives proposed by the job analysis that affect who is conducting the training (e.g., are

[6] A cost that is uniform on a per unit basis but that fluctuates, in total, in direct proportion to changes in activity levels is variable. A cost that remains constant in total despite fluctuations in activity for a given period of time is considered fixed.

[7] The Army's current methods are able to account only for changes in student input and course length.

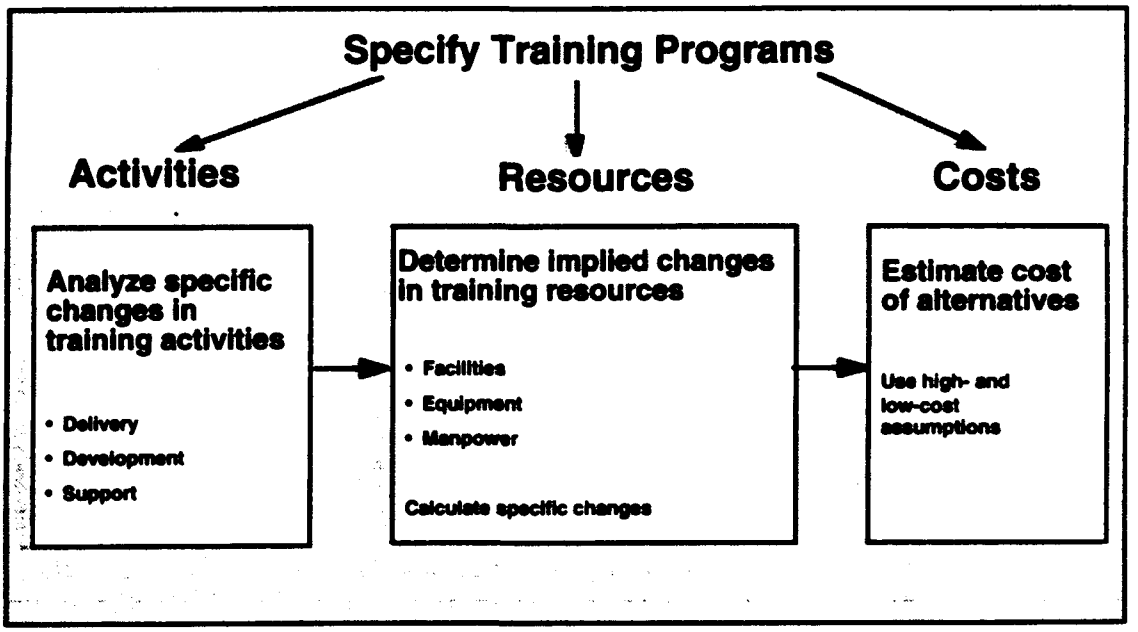

Figure 2.2—Training Resource Analysis Method

training responsibilities being transferred); what methods or lessons change; and when, where, and how the changes will be implemented. We also highlight key assumptions that may need to be made concerning how the alternative POI will be developed, delivered, and supported.

Analyze Activities

Once the baseline and alternatives are defined, the next step examines how the changes affect the activities at the school and other organizations that may be affected by the training changes. In this step, we determine which activities change, for whom they change, how they change, and when they change. The activity analysis focuses on the changes that occur in the areas of *training delivery, development*, and *support*.

Changes in activities are next translated into changes in work load. We use a balance sheet to record the changes in work load that accompany the changes in training separately for training delivery, development, and support. The balance sheet is the centerpiece of the method, and we use it to track both activity and resource changes. Table 2.1 is the template for the activity balance sheet. It contains information on four types of changes: activity/resource increases, activity/resource decreases, transfer from/to other courses or organizations, and

Table 2.1

Balance Sheet: General Format

	Targeted Organization				
Activities	Increases	Decreases	Transfer from(–)/ to (+) other courses or organizations	Transfer from (–)/ to (+) excess capacity	Net Change
Delivery					
Development					
Support					

transfer from/to excess capacity. Targeted organizations are those specifically targeted and directly affected by the change. Other courses or organizations are those that may be indirectly affected by the change. The net change then totals all types of changes for a given activity.

Each of the major activities has a number of associated work load factors. In analyzing changes in training delivery, for example, we consider implications of training changes for student input and load and instructor contact hours in schools and nonresident training locations. The major work load factors for the training development area are the estimated man-hours required to develop new training products and to sustain existing training products. Tracing the changes in support activities is difficult because support activities exist at many different organizational levels within the schools, and many support functions may not change in a linear fashion based on student load changes. However, thorough understanding of each training installation's support activities should permit inferences regarding how training changes will affect such support activities as maintenance, housing, and transportation.

Analyze Resources

The next step determines how activity changes translate into changes in type and quantity of resources required to implement and support the training changes for each alternative (i.e., for training manpower, equipment, and facilities). TRAM uses available information and resourcing factors to determine changes in resources (see Way-Smith, 1993). For example, we analyze changes in the composition of manpower using appropriate tables of distribution and allowances (TDA), authorizations, and manpower staffing standards (MS3).

We identify changes in equipment that result from a change in training, including one-time and recurring costs of the major weapon systems, support

equipment, maintenance support and test equipment, training equipment, other major end-items of equipment (e.g., trucks), spare parts, and munitions affected by a training change. Finally, we seek to identify similar costs associated with increasing, decreasing, or altering training ranges; maintenance facilities; administrative and classroom buildings; and other support facilities.

Calculate Specific Costs

Once all of the resource changes are identified, we determine the costs associated with these resource changes. We use the general equation:

$$\text{Cost} = (\text{Cost Factor}) \times (\text{Resource Change})$$

Table 2.2 defines the elements of this equation.

To develop specific cost models, we use a general cost template that includes the types of costs that may be incurred when training changes are made to a POI (see Table 2.3). The template serves as a planning tool and checklist to ensure that important cost and resource factors are considered in the analysis. Major sources of the cost data include TRADOC's *Resource Factor Handbook, Operations and Support Cost Management Information System (OSMIS)*, and *Facilities Planning System (FPS)* (see Way-Smith, 1993). We have filled in some of the cells of the template to illustrate how the analyst would develop the specific cost equations for the example we have been using. The column entitled "Activity Level" refers to specific changes in equipment-utilization rates and facility-utilization rates.

Table 2.2

Cost Model Definitions

Category	Definition
Cost factor	The dollar amounts for individual aspects of cost. They are costs per person, per piece of equipment, etc. There are typically a multitude of cost factors reflecting the variety of personnel, equipment, and facilities types.
Resource change	The changes in the particular resources involved in the alternatives. These include changes in manning type, manning quantity, equipment type, equipment quantity, and facilities that are generated by alternatives.
Cost	Cost of the category is produced by multiplying a cost factor by a resource change.

Table 2.3

Cost Template

Costs	Activity Level	Resource Factors: Manning Amount	Manning Type	Equipment Amount	Equipment Type	Facilities Amount	Facilities Type
NONRECURRING COSTS							
Civilian personnel cost							
• Acquisition							
• Initial training							
• Separation		X	X				
• Transfer							
Military personnel cost							
• Initial training							
• Transfer		X	X				
New training products		X	X				
Equipment procurement				X	X		
Equipment transfer				X	X		
Initial spares/stock							
Construction remodels						X	X
RECURRING COSTS							
Civilian personnel cost							
• Replacement acquis.							
• Replacement training							
• Pay and allowances		X	X				
Military personnel cost							
• Replacement training							
• Student PCS[a]		X	X				
• Student TDY[b]		X	X				
• Instructor TDY							
Training product maint.		X	X				
Fuel, oil, etc. (POL[c])	X				X		
Replenishment spares							
Ammunition							
Equipment maintenance	X			X	X		
Product distribution							
Product reproduction							
Facility maintenance						X	X

[a]Permanent change of station.
[b]Temporary duty assignment.
[c]Petroleum, oil, and lubricants.

Place Costs in Context

Once we have calculated the costs for the various alternatives, we need to place them in a broader policy context. This involves comparing the costs of alternatives, "sizing" the costs and savings, identifying the trade-offs, highlighting the limitations of the analysis, and identifying potentially larger issues that surface during the analysis. The decisionmaker needs to know how

the alternatives differ in terms of costs and savings and the flow of costs and savings over time. And the decisionmaker needs a meaningful benchmark to determine whether the savings are large or small. The context of the decision and the level of the decisionmaker are critical in determining the appropriate benchmark. For example, we may want to present the results in terms of a percentage of the current budget for the school, if the decisionmaker is a school commandant TRADOC- or DA-level person. In other cases the decisionmaker may be a brigade commander, and the appropriate benchmark may be the brigade budget.

Once the costs and savings are placed in context, the next step is to consider potential trade-offs and risks that may result from the decision. This step of the analysis includes consideration of potential direct and indirect qualitative effects. There are two levels of trade-offs and risks, as illustrated in Figure 2.3. The first level includes detailed effects on how training changes could further affect manpower, equipment, and facilities. The second level addresses the broader and more general consequences of the change to the Army.

Trade-off analysis begins by identifying the potential qualitative effects that may occur as a result of the specific cost and savings that are generated by the change. The upper-left box contains the major factors that are considered in the costing method. The upper-right box is a checklist of potential qualitative considerations that may be important for the training decision. For example, in the manpower area, a potential direct risk in reducing instructor manpower through distributed training is reduced morale if a greater off-duty burden is placed on students. A possible indirect effect of this lower morale is increased attrition in specialties where it is not desired.

At the detailed level in the equipment area, if new training technologies (e.g., simulators and computer-based training) are replacing actual equipment, two important considerations are reliability and flexibility of the new technologies. Reliability is important because potential downtime on the simulator may result in insufficient training or substitutions that are as costly as the original equipment. Flexibility is important because other courses may be able to take advantage of the technologies.

The more general level of the trade-off and risk analysis examines the areas of training effectiveness and soldiers' confidence in their abilities. For example, if training technologies are used extensively to replace training on actual equipment, there may be concerns about the soldiers' ability to operate the actual equipment in combat situations. Determining the effectiveness of substituting technology for actual weapons may require further research and testing.

There are also broader considerations concerning the reversibility of a training decision. For example, implementing an Army-wide teletraining system requires a large up-front investment in a technology, and associated equipment, that is changing very rapidly, in terms of both cost and capabilities. If the Army purchases current teletraining equipment, it may be outdated by the time it is fully operational. Investing in current teletraining equipment and capabilities must be weighed against the incremental training effectiveness of this current technology compared with other methods and against the large and difficult-to-reverse investment decision.

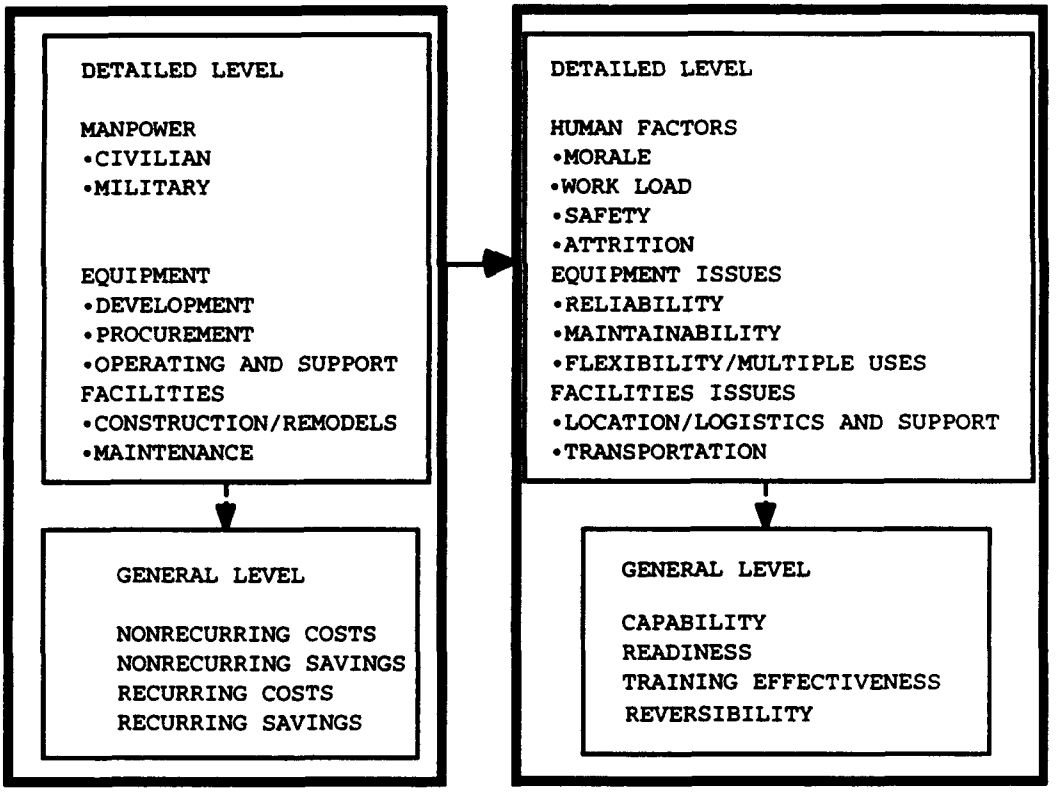

Figure 2.3—Trade-Offs and Risks in Considering Training Changes

Case Studies of Training Changes

The job and cost analysis method described in this section has been applied in several selected specialized skill training programs. The remainder of this document describes the application of the method for assessing the potential role of distributed training in conducting the AOAC.

3. Training Options in the Armor Officer Advanced Course

This section presents our analysis of training options for the AOAC. We first describe how AOAC is conducted, covering course characteristics, instructional philosophy, and current course content. Next, we apply our job analysis methodology to identify possible ways to reorganize AOAC, consistent with principles of distributed training. The training options are the basis for the cost analysis presented in Section 4.

Selection of AOAC for Case Study

We chose to examine AOAC because it exemplifies Army leader development courses, which were selected initially for TRADOC's distributed training strategy. Initial TRADOC estimates implied that substantial cost savings were possible if AOAC's course length were reduced and various new training media employed. Initial plans called for AOAC to be reduced in length up to 60 percent (from 20 weeks to 8) by the end of fiscal year 1998. Additionally, technologies for distributing training were specified, including traditional paper techniques, computer-based training, and televideo.[1]

This initial guidance provided little insight into many of the details needed to implement distributed training, however. For example, specific course material best suited for distributed training was not defined. Likewise, support requirements for distributed training were vague. Cost savings were estimated using aggregated cost and manpower estimating relationships, not specific within-course implementation costs and savings. Our analysis thus sought to determine the extent and nature of changes that were feasible and cost-effective.

Description of AOAC

AOAC is the professional development course for senior first lieutenants and junior captains. Its primary purpose is to qualify graduates to assume company command or to function as an assistant operations officer on battalion or brigade

[1]See TRADOC, 1990(b).

staff. Attendance and successful performance are vital to an officer's career progression.

Currently, AOAC is a 20-week course offered four times a year. Class size cannot exceed 122 students; 118 students is optimum. The Army projects a reduction in the number of students to 96 per class within two years. Before Operation Desert Storm and force reductions, annual AOAC student flow was 549 officers. Future force reductions are expected to reduce this student flow to approximately 413 students.

AOAC Student Population

Active-duty Armor officers constitute approximately half of the student population. Infantry officers compose an additional 12 percent. Of the remaining student population, only Marine Corps Armor officers and international students attend the full 20-week course. Army Reserve Component Armor officers attend only the small group instruction (SGI) portion of the 20-week POI and make up about 25 percent of the SGI student population.[2] Few AOAC attendees have command or staff experience. Most U.S. military attendees are in their third or fourth year of service. For most attendees, AOAC is their second professional development course.

U.S. Army Armor officers attending AOAC follow a predictable career path. Their professional development starts with the officer's basic course (OBC) that builds upon precommissioning training in basic soldier and leadership skills. The graduate of OBC has been trained in small-unit leadership, basic planning techniques, and platoon-level tactical techniques. An Armor OBC graduate typically serves as a tank or cavalry platoon leader, then company- or troop-level executive officer (second in command). Some may serve as scout or mortar platoon leader within the battalion. Successful completion of these duties provides the basis for assuming a captain's duties.

Key Duties of Armor Captains

AOAC's principal function is to prepare officers for company command. In peacetime, Armor company commanders are responsible for preparing their units for possible combat operations. They ensure peacetime tank crew, platoon-

[2]In addition, through various bilateral agreements, officer's advanced course (OAC) graduates from the Field Artillery and Engineer School attend only the SGI portion of AOAC to lend combined arms perspectives to the tactical discussions. The Armor School reciprocates by sending graduates to each of these schools to perform the same service.

level, and company-level proficiency in gunnery and tactical training. Company commanders are further responsible for the daily health and welfare of subordinates. They exercise authority over soldiers' personal lives through their powers in the military justice and administrative remedy systems. Finally, company commanders are responsible for supply accountability and combat readiness of their unit's vehicles and equipment.

In war, company commanders are combat leaders. They act as the company expert on the capabilities and limitations of the unit's vehicles and equipment. They plan company-level tactical and logistical operations and then command and control their maneuvering units in support of the battalion operations plan. Successful execution of combat operations requires the company commanders' understanding of both the situation and commanders' intent for the operations. This understanding includes knowledge of why operations are being conducted and the unit's part in the operation.

Upon graduation from AOAC, Armor captains can expect to serve on battalion or brigade staffs if they do not immediately assume company command. AOAC prepares officers to serve as assistants on these planning and operations staffs. Although captains are not principally responsible for battalion and brigade planning, they are assigned a portion of these tasks. The captain's planning staff duties require knowledge of the major's duties and responsibilities. Often, a captain assumes duties as a principal staff officer on battalion staff (S-1 adjutant, S-4 supply officer, or battalion maintenance officer). Although AOAC does not specifically prepare officers for these positions, staff officer functional courses are available, post-AOAC.

AOAC Instructional Philosophy

AOAC provides students with instruction and practical exercise on required captains' tasks. Tactical instruction includes planning considerations for brigade- and battalion-level operations, as well as in-depth instruction and practical exercise on company-level planning and directing tasks for a variety of tactical missions. Technical instruction fills out the officer's professional knowledge. Both types of instruction are critical to the captain's professional development.

AOAC Tactical Instruction. AOAC tactical instruction is designed to provide new captains with the skills to plan and execute company-level operations and to assist with planning at battalion- and brigade-level staffs. Fundamentals of planning are taught first to provide the foundation for subsequent application to a variety of missions. AOAC begins with brigade-level operations, then moves to the battalion level before concentrating on the company commander's

planning and directing tasks. AOAC tactical instruction covers both offensive and defensive combined arms operations.

Small group instruction is the primary tactics instruction technique. AOAC classes are currently organized into 16-man small groups with a senior captain acting as instructor and team leader. Throughout the course, the lieutenant colonel in charge of AOAC acts as brigade commander and his four team chiefs act as his subordinate team chiefs. The student mix in each small group reflects the course's student composition.

To augment instruction, small group instructors use terrain close to Fort Knox for tactical exercises without troops (TEWT) and force-on-force combat simulation. Time spent on the ground helps students visualize their preliminary plans on the actual terrain. Simulator time allows officers to practice the tactical execution skills of command and control.

Throughout the tactical phase, small group instructors integrate instruction with "Training the Trainers" practical exercises. This training forces students to understand the peacetime planning process and the development of short- and long-term training programs. In addition to ingraining these future commanders with training management fundamentals, this program requires officers to prepare and give formal briefings. Small group instruction allows all officers to practice this technique and benefit from a detailed after-action review.

AOAC Technical Instruction. Technical instruction, approximately 25 percent of the course curriculum, concentrates on building the officer's capability to take responsibility for company administrative and logistical operations and manage its systems. Additionally, selected topics provide background information to round out his educational experience.

Armor-specific instruction concentrates on students' knowledge of their vehicles and equipment. AOAC combines tank gunnery instruction on gunnery simulators with simulator-based instruction on developing training programs for tank gunnery. Classified briefings are given on the current threat and Abrams tank and Bradley fighting vehicle Armor and armament capabilities. Students also receive instruction on company administration and management. Instruction prepares company commanders for their military justice responsibilities. Supply accountability and maintenance instruction teaches officers the basics on vehicle and equipment readiness.

TRADOC headquarters imposes a number of general requirements on all officer advanced courses. Included within this requirement are planning for the effects of nuclear, biological, and chemical weapon use; allied officers' briefings; and

organization of the force. All officers are required to participate in general skill improvement during the Army Writing Program and physical fitness training.

Analytical Issues

Current AOAC instructional philosophy, course characteristics, and use of training resources provide the framework for the analysis. The course is currently taught entirely in-residence. The course would appear to be a good candidate for distributed training, given its informational content and current resource intensity (e.g., length and requirement for permanent change of station). In addition, current methods of instruction using small group instruction and interactive simulation are expensive. At the same time, however, specific analysis is needed to determine how much training may actually be distributed given key course objectives, as well as which training media would be most cost-effective. The job analysis described below helps clarify these issues.

Analytical Method

As described in Section 2, the AOAC job analysis involves the following steps:

- Select tasks for analysis
- Collect measures of task attributes
- Use factor analysis to identify general dimensions and group tasks within them
- Develop alternative POIs.

Below we describe the measures used in the analyses and how we conducted the statistical analysis. Analytical results and description of POI alternatives follow.

In order to cast the widest net for tasks to be considered in our job analysis, we established these criteria for selecting tasks: The tasks were either in the current AOAC POI, listed as O3X or O3Y Armor officer tasks,[3] or identified as Tank Commander tasks by an Armor subject matter expert. These tasks were identified using the Fort Knox Master Task List (as of May 1990), the AOSP survey of Armor officers, and the AOAC POI.

[3]These indications are provided by the collective front-end analysis conducted by the Armor Center. "O3X" indicates that the task is a captain's task to be taught in-residence. "O3Y" indicates that the task is a captain's task to be taught in the unit.

We then obtained eight task performance measures from the 1990 AOSP Armor officer surveys, one common task indicator from the Fort Knox Master Task List, and eight measures of task attributes provided by SMEs. The final data set consisted of 251 tasks. The 17 measures used in our analysis are listed in Table 3.1. The mean values and standard deviations (SDs) are the average values for these measures across all tasks included in our analysis. The range of values for each measure is also provided. Each of the measures is described in more detail below.

AOSP Measures

Job Incumbent Ratings. The 1990 AOSP field survey of Armor officers contained tasks covering Armor-specific and common tasks at all skill levels. We focused attention on the subset of tasks included in our job analysis. These included data from captains who rated themselves on several training-relevant measures of tasks. Described in detail below, these measures provide input from captains on (1) their level of participation in doing particular tasks, (2) their rate

Table 3.1

Measures Used in the Analysis (in percent)

Source	Range	Mean	SD
AOSP job incumbents' measures			
Percent captains who report doing task	0–100	40.58	20.93
Number of times per year done	0–480	39.16	33.88
Task significance	1–7	4.84	0.77
Consequence of inadequate performance	1–7	4.84	0.83
Percent lieutenants who report doing task	0–100	30.32	22.61
Supervisor			
Training emphasis for captains	1–3	1.63	0.68
Task done by captains and not lieutenants	0–100	24.57	19.98
Task done by majors and not lieutenants	0–100	14.37	21.96
SME ratings			
Location	0–2	1.24	0.65
Prerequisite	0–1	0.86	0.35
Immediacy	0–1	0.38	0.49
Interactivity	0–1	0.80	0.39
Reasoning	0–1	0.84	0.37
Direction giving	0–1	0.36	0.48
Transferability	0–1	0.69	0.46
Equipment	0–1	0.06	0.23
Common task designation (Master Task List)			
Common task	0–1	0.67	0.47

of performance, (3) the significance of the task, and (4) the consequences of inadequate performance (COIP) for captains. We also included a task performance rating from lieutenants indicating their level of participation in doing the same tasks. The inclusion of lieutenants' AOSP job incumbent data enabled us to identify the overlap of their duties with captains.

Percentage of Captains Who Report Doing the Task. The AOSP questionnaire for job incumbents asks captains to indicate whether they are called upon to perform a given task. The percentage of captains who report performing a task can range from 0 to 100. The value for this measure shown in Table 3.1 is the *average* value across tasks included in our job analysis.

Number of Times Per Year Done. Captains' ratings of how frequently they perform a given task were converted from the 1990 AOSP Frequency Questionnaire's 7-point relative-time-spent (RTS) scale to the estimated absolute frequency (AF) of performance in days per year. The RTS-to-AF conversion is part of the AOSP Comprehensive Occupational Data Analysis Program (CODAP). An estimate of the number of times per year a task is performed is a useful indicator for determining training need, especially when used in conjunction with job supervisor and SME assessments of training emphasis and task characteristics.[4]

Task Significance. Data from the 1990 AOSP Significance Questionnaire were aggregated to form an indicator of task significance. Captains rated the significance of a task at their own grade level on a 7-point scale ranging from 1 (low significance) to 7 (high significance). This measure provided information on the average level of importance captains assigned to the different tasks.

Consequence of Inadequate Performance. Another measure with high training relevance is the estimated COIP of a task. High COIP ratings relative to other tasks may single out a task or group of tasks for intensive training. We used data from the 1990 AOSP COIP Questionnaire that asked captains to rate their own performance of tasks on this measure on a 7-point scale ranging from 1 (low COIP) to 7 (high COIP).

Percentage of Lieutenants Who Report Doing the Task. The percentage of lieutenants reporting they perform a particular task was computed in the same way as the similar measure for captains. This measure was included in our Armor captain job analysis as an indicator of *limited* training relevance for

[4]The RTS-to-AF conversion and rationale for its use for critical task selection are discussed in several papers published by the U.S. Army Personnel Integration Command (USAPIC). For a summary see Goldberg, n.d.

captains. Tasks showing a high percentage of lieutenants performing them may be candidates for elimination from the AOAC POI.

Job Supervisor Ratings. Along with the self-ratings of tasks relevant to captains' duties, we selected data from two 1990 AOSP Supervisor Questionnaires administered to Armor officers. In one, captains rated lieutenants under their supervision; in the other, majors rated captains under their supervision. The forms collected the same type of information, but the statements were keyed to the different grade levels being rated. Two classes of data were of interest to our job analysis: (a) the supervisor ratings identifying the grade level that primarily performs a given task and (b) the supervisor estimates of training emphasis for a task at a subordinate grade level.

Task Done by Captains and Not Lieutenants. To identify tasks done by captains and not by lieutenants, we used the percentage of captains identifying each task as a captain's task, as indicated in 1990 AOSP captains' ratings of lieutenants. Tasks with a higher proportion of captains who rated them as tasks done by captains and not by lieutenants could be considered candidates for training at the captain grade level, perhaps in AOAC.

Task Done by Majors and Not Lieutenants. Similarly, we used the percentage of captains identifying each Armor task contained in the survey as a major's task to identify tasks done by majors. These data came from the same 1990 AOSP supervisor ratings of lieutenants. In contrast to the preceding indicator, this measure serves as an indicator of *field grade* tasks that may be trained *post*-AOAC.

Training Emphasis for Captains. The 1990 AOSP supervisor ratings of captains provided the estimates of training emphasis for captains. Majors' ratings of tasks on training emphasis for captains were converted to values such that low = 1, average = 4, and high = 9.[5] These ratings were then aggregated to obtain the average training emphasis for each task. Tasks rated by majors as having a relatively high training emphasis for the captains they supervise may be likely candidates for a critical task training list. In contrast, tasks with low ratings on this indicator may require very little training.

To summarize, these first eight measures were generated from the most recently fielded job-incumbent and job-supervisor AOSP surveys. The data collected

[5]The "low," "average," and "high" training emphasis ratings in the survey forms corresponded to nonusable "scale" item numbers of 5, 6, and 7. We transformed these ratings in two steps: (1) subtract 4 from the old rating, (2) weight the result by multiplying it by a value of 1 (low), 2 (average), or 3 (high).

reflect the insights and performance experience of officers in Armor TOE units on their job-related tasks.

SME Ratings

The next group of measures included in our job analysis addresses the additional attributes of tasks relevant to training organization and delivery. The eight measures, developed at RAND, are described below. The conversions of the SME rating categories to numerical values are also given for each category.

Location. Tasks are rated according to *where* they are performed in typical units under full-standard (nonpractice) conditions.

0 = Garrison. The task is performed in a garrison setting.

1 = Both. The task is performed in the field and in garrison.

2 = Field. The task is performed in the field (including ranges and maneuver areas).

For example, if tasks are trained at the schoolhouse and practiced in garrison, but only performed to full standard in the field, then they are rated as field tasks. Alternately, some tasks, such as maintenance tasks, are expected to be done at the same level in both the garrison and the field. Others are done primarily in garrison. The location of task performance is especially relevant to decisions about *where* to train a particular task or group of tasks.

Prerequisite. This category describes how much the ability to perform the task is *prerequisite* to the ability to perform other tasks done by officers of the same grade.

0 = Specific. The task is unique and does not generalize to other tasks. Thus, a "specific" task is an isolate among tasks in terms of its performance requirements.

1 = General. The task has broad application for this grade, in that it is required as part of more specific tasks. If officers do not know how to do this task, there are other tasks that they cannot possibly do.

Identification of tasks that are prerequisite to others can provide information on the sequencing of training.

Immediacy. Tasks are rated on this dimension (low or high) according to how much lead time is available for preparation to perform the task, prior to it being demanded to full standard.

0 = Low Immediacy. Time exists to prepare to perform this task (ranging from several hours to months, depending on the magnitude of the task). In a nonemergency situation, there is little or no pressure to rush preparation. Even in a combat situation, the use of reference material can be expected.

1 = High Immediacy. The job requires this task to be done either at any time or on a regular basis. Task accomplishment is very time and situation sensitive. When needed, these tasks must be done correctly without consulting reference or training material.

This category asks the SME to assess the situation the officer finds himself in, when the task is required. It does not necessarily rate the importance of the situation (e.g., life or death), although it may be a factor in the rating. Tasks that may need to be performed right away, without much time for preparation, may require training in-residence.

Interactivity. Tasks are classified according to how they are performed within the context of group efforts or unit missions. They may be viewed as completely individual, requiring no interaction, or as part of a team effort.

0 = Limited Interactivity. In these tasks, people work individually, even if they work toward a common goal. Tasks that form part of a collective task are rated "0" if labor is divided according to specialization and does not require close synchronization, i.e., some people do some things while other people do other things. The results of these individual tasks are combined eventually to produce the unit product.

1 = Cooperative. These tasks require ongoing interaction by members of a unit. Success for the individual task is impossible to define outside the context of the unit. Roles may be well defined, or fluid collaboration may be necessary.

The key to rating these tasks is defining the outcome of the specific task, and then deciding whether the task can be achieved by one individual. Knowing whether a task is performed collectively or individually is relevant to decisions about *how* and *where* to train a task (e.g., in a small group, classroom setting).

Reasoning. Each task is rated according to the amount of judgment required to complete it.

0 = Rote. These tasks require motor skills (manipulation of equipment), memorization of a sequence of steps, or the use of a checklist or similar job aid, and no more in-depth analysis, for completion.

1 = Cognitive. These tasks require that the performer understand the underlying conditions and rationale for the task before applying professional judgment and experience to complete it. It is difficult to define such tasks without first defining a situation or context in which they will be performed.

This distinction between cognitive and rote (procedural) tasks is helpful and has special relevance for decisions about *how* to train. For example, instructional strategies employing small group discussions of case studies may be optimum for elaborating the nuances of certain cognitive planning and directing tasks. In contrast, individual, programmed instructional strategies may be most suitable for training such procedural tasks as rote administrative or maintenance tasks.

Direction Giving. Raters must decide how important receiving directions or instructions is to successful task accomplishment.

0 = Execute. The soldier (or officer) may perform these tasks alone and does not need directions or supervision to complete them correctly. Management actions taken by superiors during the course of task completion are either trivial or for the convenience of the performer.

1 = Respond. The soldier must wait to receive instructions prior to completing these tasks. Tasks requiring coordination, supervision, and oversight are "respond" tasks.

The rater must decide if the task can reasonably be expected to be accomplished without the soldier's receiving directions or instructions. This rating differs from the "interactivity" classification because, in this category, a task may require collaboration but still be rated "execute" if no directions must be given. The key is in deciding how much the actions fit into a plan or scheme in order for task accomplishment to be meaningful. The identification of these "respond" actions (as opposed to relatively independent tasks) has relevance for decisions about *how* and *when* to train tasks. The type of training options being considered and the sequencing of the task in training may be more constrained for tasks requiring direction giving.

Transferability. This category describes how similar tasks are to civilian or military tasks.

0 = Civilian. An officer placed in a civilian situation can accomplish a similar task with minimal orientation. Conversely, a civilian placed in a military unit can accomplish this task with minimal orientation.

1 = Military. Intensive, specialized, military training is required to accomplish this task.

Tasks are given a "civilian" rating when comparable tasks are found in civilian work. Tasks rated as "military" have very little civilian transferability. Tasks identified as specific to the military require specialized training in branch schools and/or units. In contrast, tasks that are not unique to the military may be open to other training options in civilian settings.

Equipment. Tasks are rated on whether or not they require the use or manipulation of equipment for successful completion.

0 = No Equipment.

1 = Equipment.

The task must *require* the use of equipment or manipulation of a device to be rated 1. Equipment that could possibly assist in accomplishing a task (e.g., binoculars for terrain observation) should not cause the task to be rated as requiring equipment. Further, a "look-up-in-a-table" type of task requiring a chart or book is not considered an equipment task. Tasks requiring equipment are ones for which device-based training approaches might be expanded or developed.

Common Task Designation

Tasks were designated whether or not they were *common tasks* according to the information available from the most recent Fort Knox Master Task List. Common tasks, not specific to a particular MOS, may have fewer constraints as to the location and timing of training.

0 = Not a common task.

1 = Common Task.

Factor Analysis and Task Rankings

Method of Analysis. We used factor analysis to uncover a smaller set of general dimensions of tasks. We structured the data in Table 3.1 as a rectangular array

and calculated correlations between each pair of measures. Listwise deletion was used in constructing the correlation matrix. This resulted in a reduction of the original sample of 274 potential tasks to 251 tasks with complete data on the 17 measures. We then used the principal component analysis method to reduce the dimensionality of the original 17 measurements. We further considered only factor dimensions with eigenvalues of at least 1.0. The factors were rotated according to the varimax criterion, for easier interpretation of the factor loadings on the 17 measures.

To aid our interpretation of each factor, we considered only measures with the strongest loadings (≥ 0.50 or ≤ -0.50).[6] These conventional cutoff values served to reduce the number of defining measures for a factor from the total of 17 to only those with at least 25 percent variance accounted for by the factor.

Calculation of Factor Scores. We next used the factor analysis results to calculate scores for each task on each dimension. Again we considered only the variables with positive loadings ≥ 0.50 and those with negative loadings ≤ -0.50. The composite factor scores were computed following a unit-weighting strategy consisting of three steps. First, we converted the values on each measure to standard scores (z-scores) with a mean of zero and standard deviation of one. Next, we multiplied the z-score of each defining measure by 1 or –1 according to their positive or negative loading on the factor. Finally, we summed the products and divided the sum by the number of measures used to calculate the score. These values were then used to rank order tasks on each of the dimensions.

Factor Analysis Results

The analysis yielded five general dimensions of Armor captain tasks, which we term: *Critical Company Grade, Frequent Procedural, Interactive Leadership, Urgent Field Command,* and *Combined Arms* tasks. Table 3.2 provides the eigenvalue and percentage of the total variance accounted for by each factor. The loadings for the measures that meet the defining criteria on each dimension are provided in Table 3.3

Our interpretations of each of the five AOAC task dimensions are based on each factor's defining measures and the tasks ranked "high" and "low" on each dimension. Tables 3.4–3.8 summarize the task rankings, using the 15 highest and

[6] A variable's "loading" on a factor is the correlation between the variable and the factor. This loading will fall within a range of 1.00 (perfect positive correlation) to –1.00 (perfect negative correlation).

Table 3.2

General Dimensions of Captains' Tasks

Factor	Name	Eigenvalue	Percentage of Total Variance Accounted for [a]
1	Critical Company Grade	3.63	21.4
2	Frequent Procedural	2.48	14.6
3	Interactive Leadership	2.30	13.5
4	Urgent Field Command	2.18	12.9
5	Combined Arms	1.51	8.9

NOTE: Total amount of variance accounted for is 71.2.

[a]Column does not add to total due to rounding.

lowest ranking tasks for illustration. The complete rankings are listed in appendix Tables A.1–A.5.

Critical Company-Grade Tasks (Factor 1)

Factor 1 (accounting for 21.4 percent of the combined variance) is defined by six measures shown in Table 3.3: (1) task significance, (2) training emphasis, (3) consequence of inadequate performance, (4) percentage of captains who report doing a task, (5) task done by majors and not lieutenants (negative loading), and (6) lieutenants perform the task. Note that the fifth of these measures has a negative loading. This means that few majors perform the tasks receiving high scores on Factor 1.

We interpret this factor as an indicator of important tasks performed by company-grade officers (captains and lieutenants) to prepare units for combat. The tasks scoring highest have high task significance, high consequence of inadequate performance, and high training emphasis. Moreover, the highest scoring tasks are not performed by majors.

To aid in the interpretation of this factor, Table 3.4 lists the 15 highest and lowest tasks based on factor scores on this dimension. The highest ranking tasks include a number of activities required to prepare a unit to accomplish its wartime mission (e.g., preparation of training plans). Other tasks are practiced in peacetime to prepare for initial wartime situations (e.g., land navigation and terrain analysis). In contrast, the bottom-ranked tasks on Factor 1 are completely

Table 3.3

Results of Factor Analysis

Measure	Critical Company-Grade Tasks	Frequent Procedural	Interactive Leadership	Urgent Field Command	Combined Arms
Task done by LT	0.58		–0.64		
Done by CPT and not LT			0.79		
Done by MAJ and not LT	–0.59				0.56
Task done by CPT	0.81				
Task significance	0.86				
Number of times per year done		0.81			
COIP	0.81				
Location (field)				0.79	
Prerequisite		–0.51			
Immediacy				0.83	
Interactivity			0.63		
Reasoning		–0.53			
Direction giving				0.81	
Nontransferability (military)		–0.70			
Equipment					–0.64
Training emphasis	0.83				
Common task					0.77

NOTE: Results are regression coefficients lying on a scale of +1 to –1. Only the critical measures that loaded high (above + 0.50) or low (below –0.50) on each of the five solution factors are shown.

majors' tasks (e.g., plan a deliberate attack at brigade level and direct a military operation on urban terrain [MOUT] at battalion level).

This factor thus appears to characterize tasks, which are important for preparing units for combat operations, that are performed by captains and lieutenants. Because the factor does not distinguish between captains' and lieutenants' tasks, further examination is required to distinguish which tasks need training in AOAC and which may be trained prior to AOAC.

Frequent Procedural Tasks (Factor 2)

Factor 2 (accounting for 14.6 percent of the combined variance) is defined by four measures: (1) number of times per year task is done; (2) nontransferability; (3) reasoning component; and (4) prerequisite to other indicates that tasks

characterized by this factor are *not* unique to the military, *do not* require much reasoning, and *do not* entail skills that enable other tasks. We interpret this factor as representing *frequent procedural* tasks. Given the number of negative loadings, lowest ranking tasks on this factor, shown in Table 3.5, are illustrative. These consist primarily of routine administrative procedures (e.g., direct arms room security and administer the unit alcohol and drug abuse program). The skills required to perform these tasks are similar to civilian administrative skills. When contrasted with the military planning and directing tasks ranked at the top of this factor (e.g., plan an area/zone reconnaissance at troop level and direct cover operations), the tasks seem more rote and less likely to facilitate the performance of additional tasks. Thus, tasks with low scores on this factor seem lowest in priority for resident training.

Interactive Leadership Tasks (Factor 3)

Factor 3 (accounting for 13.5 percent of the combined variance) is defined by: (1) task done by captains and not lieutenants, (2) percentage of lieutenants doing the task (negative loading), and (3) interactivity. This factor appears to capture collective tasks for which captains are responsible, i.e., they require leadership and are performed by captains.

Table 3.6 shows that tasks ranking at the top of this dimension involve directing various company operations (e.g., direct a MOUT at company level and direct a defense of a battle position at company level). The tasks of lowest rank are individual tasks, most of them performed by lieutenants. This group includes land navigation, communication, and administrative tasks (e.g., use a map overlay and prepare/review an enlisted evaluation report).

This factor has special significance for decisions about *where*, *when*, and *how* to train. Interactive leadership tasks appear to be important parts of tactical instruction, as emphasized in AOAC. This contrasts with the stand-alone, procedural tasks that Factor 2 may identify for nonresident training. Further, the interactive nature of these leadership tasks has implications for the method of training as well as the location of training. Tasks identified by this factor may *not* be good candidates for self-paced, individual training. Their interactive nature may mark these tasks for training in the schoolhouse using small group techniques.

Table 3.4

Tasks with Highest and Lowest Ranking on Factor 1: Critical Company-Grade Tasks

Rank	Title	Factor Score
Highest ranking tasks		
1	Perform map reconnaissance	1.720
2	Analyze terrain	1.568
3	Recognize threat tactics and battlefield organization	1.443
4	Prepare a battalion situation report	1.339
5	Prepare an officer evaluation support form	1.261
6	Use a map overlay	1.253
7	Prioritize and resource tasks for training	1.201
8	Collect/report information	1.178
9	Prepare/review an enlisted evaluation report	1.168
10	Conduct collective training	1.159
11	Prepare to conduct training	1.135
12	Select missions for training	1.125
13	Prepare and issue a company/troop operations order	1.113
14	Determine a location on the ground by terrain association	1.089
15	Prepare and issue a fragmentary order (FRAGO) at company/troop level	1.085
Lowest ranking tasks		
237	Direct a MOUT at battalion level	–1.263
238	Plan combat service support operations at brigade level	–1.376
239	Plan a movement to contact at brigade level	–1.432
240	Plan a delay at brigade level	–1.489
241	Plan a withdrawal at brigade level	–1.490
242	Plan a relief in place at brigade level	–1.517
243	Plan a deliberate attack at brigade level	–1.530
244	Plan a defense in sector at brigade level	–1.540
245	Plan an exploitation at brigade level	–1.584
246	Plan a pursuit at brigade level	–1.586
247	Plan assembly area activities at brigade level	–1.597
248	Manifest personnel involved in airborne operation	–1.858
249	Develop airborne assault plan	–1.894
250	Direct airborne assault	–2.020
251	Direct assembly of tactical unit after jump	–2.084

Urgent Field Command Tasks (Factor 4)

Factor 4 (accounting for 12.9 percent of the combined variance) is defined by three measures: (1) immediacy of task performance, (2) direction giving required for the task, and (3) task performed in the field. We interpret Factor 4 as measuring *urgent field command* tasks. Tasks ranking highest on this factor are

Table 3.5

Tasks with Highest and Lowest Ranking on Factor 2: Frequent Procedural Tasks

Rank	Title	Factor Score
Highest ranking tasks		
1	Direct guard operations at squadron level	0.636
2	Direct airborne assault	0.636
3	Plan guard operations at squadron level	0.629
4	Plan a zone/area reconnaissance at squadron level	0.629
5	Direct a zone reconnaissance at squadron level	0.629
6	Direct assembly of tactical unit after jump	0.629
7	Engage targets with the M240 machine gun in the commander's weapon mount on M1/M1A1 tank	0.621
8	Plan a route reconnaissance at troop level	0.621
9	Plan a screen at squadron level	0.621
10	Develop airborne assault plan	0.621
11	Direct cover operations	0.621
12	Plan a withdrawal at brigade level	0.614
13	Plan an area/zone reconnaissance at troop level	0.614
14	Direct an area reconnaissance at squadron level	0.614
15	Manifest personnel involved in airborne operation	0.614
Lowest ranking tasks		
237	Establish accountability of TOE equipment	-1.338
238	Inspect ammunition for compliance with storage, safety, and security regulations	-1.439
239	Conduct inventories of supplies, weapons, and equipment	-1.579
240	Supervise AOAP (Army Oil Analysis Program)	-1.668
241	Administer the unit alcohol and drug abuse program	-1.838
242	Direct storage of repair parts/maintenance supplies	-1.912
243	Administer unit physical security program	-1.956
244	Monitor manual or automated property accounting procedures	-2.015
245	Administer unit crime prevention program	-2.052
246	Prepare a materiel condition status report	-2.105
247	Review a request and authority for leave form (DA Form 31)	-2.111
248	Direct arms room security	-2.140
249	Maintain accountability of TOE equipment	-2.391
250	Review a personnel action form (DA Form 4187)	-2.450
251	Draft and edit military correspondence using the Army writing style	-2.582

shown in Table 3.7.[7] These tasks play an integral role in the command and control of combat operations and include tasks fundamental for survival (e.g., implement mission-oriented protective posture [MOPP] and direct strongpoint defense at company level). Tasks with the lowest ranking on this factor have a

[7]Note that the binary rating choices (1,0) for two of these task attribute measures are responsible for the clustering of the composite factor scores in this table.

Table 3.6

Tasks with Highest and Lowest Ranking on Factor 3: Interactive Leadership Tasks

Rank	Title	Factor Score
Highest ranking tasks		
1	Direct a MOUT at company level	1.110
2	Plan combat service support operations at battalion/squadron/task force level	1.083
3	Direct the battalion maintenance program for unit equipment	1.029
4	Direct defense of a battle position at company level	0.985
5	Plan a MOUT at company level	0.961
6	Direct combat service support operations at battalion/squadron/task force level	0.954
7	Direct a counterattack at company level	0.940
8	Direct delay operations at company level	0.939
9	Direct occupation of battle position at company/troop level	0.938
10	Direct a deliberate attack at company level	0.935
11	Direct actions on contact at company/troop level	0.922
12	Direct a movement to contact at company level	0.920
13	Direct a withdrawal at company level	0.920
14	Direct a hasty breach at company level	0.917
15	Direct strongpoint defense at company level	0.903
Lowest ranking tasks		
237	Inspect DA form 2408-4 (Weapons Record Data) for accuracy	-1.407
238	Encode and decode messages using KTC600 tactical	-1.451
239	Use the KTC1400 to authenticate transmissions and encrypt/decrypt numbers and grid zone letters	-1.487
240	Recommend enlisted personnel for promotion to sergeant	-1.522
241	Prepare/operate communication security equipment TSEC/KY-57 with AN/VRC-12 series radio	
242	Prepare/review an enlisted evaluation report	-1.739
243	Prepare an officer evaluation support form	-1.767
244	Recognize threat tactics and battlefield organization	-1.934
245	Measure distance on a map	-1.950
246	Identify terrain features on a map	-1.988
247	Analyze terrain	-1.992
248	Determine a location on the ground by terrain association	-1.995
249	Use a map overlay	-2.001
250	Orient a map to the ground by map-terrain association	-2.003
251	Perform map reconnaissance	-2.023

low immediacy rating and ample preparation time prior to performance. T y are less likely to be performed in the field and do not require direction giving (e.g., conduct/prepare a staff study and prepare a unit training schedule).

Table 3.7

Tasks with Highest and Lowest Ranking on Factor 4: Urgent Field Command Tasks

Rank	Title	Factor Score
Highest ranking tasks		
1	Implement MOPP	1.255
2	Engage targets with the M240 coax machine gun from the commander's weapon station	1.255
3	Engage targets with the main gun from the commander's weapon on an M1/M1A1 tank	1.255
4	Direct main gun engagements on an M1/M1A1 tank	1.255
5	Conduct electronic counter-countermeasures (ECCM)	1.255
6	Conduct combat operations according to the law of war	1.255
7	Direct unit bulk petroleum (fuel) operations	1.255
8	Direct a route reconnaissance at troop level	1.255
9	Direct an area reconnaissance at troop level	1.255
10	Direct a zone reconnaissance at troop level	1.255
11	Direct screen operation at troop level	1.255
12	Direct guard operations at squadron level	1.255
13	Direct delay operations at company level	1.255
14	Direct defense in sector at company/troop level	1.255
15	Direct strongpoint defense at company level	1.255
Lowest ranking tasks		
237	Conduct/prepare a staff study	-1.146
238	Write a staff paper (information, decision, after-action report, etc.)	-1.146
239	Administer the unit alcohol and drug abuse program	-1.146
240	Prepare the officer evaluation report (DA Form 67-8)	-1.146
241	Prepare a unit training schedule	-1.146
242	Review a personnel action form (DA Form 4187)	-1.146
243	Review a request and authority for leave form (DA Form 31)	-1.146
244	Review the unit manning report	-1.146
245	Establish controls to preclude obligations in excess of available funds	-1.146
246	Conduct unit reenlistment program	-1.146
247	Initiate/remove a report for suspension of favorable personnel actions (DA form 268, flagging action)	-1.146
248	Administer unit physical security program	-1.146
249	Develop skill qualification training program	-1.146
250	Schedule use of local training areas	-1.146
251	Determine status of maintenance publications in unit	-1.146

A comparison of this factor's *urgent field command* tasks with those most similar to them, the *interactive leadership* tasks of Factor 3, suggests some overlap between the high-ranking tasks on each. As it happens, most of a captain's interactive tasks are direction giving tasks that are performed in the field. The distinguishing feature of Factor 4, however, is that it identifies the need for

immediacy (e.g., engage targets with the M240 coax machine gun from the commander's weapon station, engage targets with the main gun from the commander's weapon on an M1/M1A1 tank). Factor 4 may be interpreted as measuring tasks with high-readiness requirements.

Combined Arms Tasks (Factor 5)

Factor 5 (accounting for 8.9 percent of the combined variance) is defined by three variables: (1) common task designation, (2) equipment needed for performance, and (3) performed by majors and not lieutenants. The second variable's negative loading on this factor means that these tasks do *not* require the manipulation of equipment in their performance. The task rankings in Table 3.8 support the *combined arms* designation for this factor. The tasks in the top ranked group are common tasks performed by majors that do not require the manipulation of equipment (e.g., plan a deliberate attack at brigade level and direct a hasty attack at battalion level). The tasks in the lowest ranking group may be performed by lieutenants, as well as captains, and are not above the company level (e.g., determine status of maintenance publications in unit and attain a sustainment level of proficiency on conduct of fire trainer [COFT]).

This factor has special relevance for decisions about *when* to train tasks. Tasks identified by Factor 5 are performed above the company level. Although captains may need some training to become familiar with these tasks, this factor can serve as an indicator for *post*-AOAC training.

Developing Alternative POIs for AOAC

Each of the general dimensions described above contributes to the interpretation of an Armor captain's duties. Key company-grade officer tasks are identified by Factor 1; however, this factor cannot distinguish between a lieutenant's and a captain's tasks. Moreover, this general dimension is silent about attributes of these tasks relevant to training organization and delivery. Factor 2 measures frequent, procedural tasks. These could be excellent candidates for nonresident training. Factors 3 and 4 measure important attributes of an Armor captain's tasks, indicating tactical leadership tasks involving planning and directing of unit combat operations. Insofar as an objective of AOAC is to provide some staff training, Factor 5 may help identify tasks that may be designated for some training to a degree of familiarity at the AOAC level. Otherwise, the combined arms measure might serve as a good indicator for post-AOAC training.

Table 3.8

Tasks with Highest and Lowest Ranking on Factor 5: Combined Arms Tasks

Rank	Title	Factor Score
Highest ranking tasks		
1	Plan a deliberate attack at brigade level	1.232
2	Plan a movement to contact at brigade level	1.210
3	Plan an exploitation at brigade level	1.210
4	Plan a pursuit at brigade level	1.210
5	Plan a delay at brigade level	1.210
6	Plan a relief in place at brigade level	1.210
7	Plan a withdrawal at brigade level	1.147
8	Plan assembly area activities at brigade level	1.147
9	Direct a hasty attack at battalion level	1.125
10	Plan a defense in sector at brigade level	1.125
11	Direct occupation of battle position at battalion level	1.083
12	Direct a deliberate attack at battalion level	1.062
13	Direct battle handover/passage of lines at battalion/squadron level	1.062
14	Direct withdrawal at battalion level	1.040
15	Direct a counterattack at battalion level	1.040
Lowest ranking tasks		
237	Determine status of maintenance publications in unit	–0.607
238	Determine range to a target using the immediate and deliberate method	–1.298
239	Transmit/receive messages on platoon/company radios	–1.320
240	Implement methods to extend range of radio communications	–1.320
241	Attain a sustainment level of proficiency on COFT	–1.320
242	Engage targets with the M240 coax machine gun from the commander's weapon station	–2.005
243	Engage targets with the M240 machine gun in the commander's weapon mount on M1/M1A1	–2.004
244	Construct field expedient antennas	–2.026
245	Prepare/operate communications security equipment TSEC/KY-57 with AN/VRC-12 series radio	–2.026
246	Perform tank commander's prepare-to-fire checks and services on an M1/M1A1 tank	–2.026
247	Engage targets with the main gun from the commander's weapon on M1/M1A1 tank	–2.026
248	Zero a caliber .50 M2 HB machine gun on M1/MIA1 tank	–2.026
249	Direct main gun engagements on an M1/M1A1 tank	–2.026
250	Install/remove an M240 machine gun in the commander's weapon mount on M1/M1A1 tank	–2.026
251	Establish silent watch from M1/M1A1 tank	–2.026

Based on such logic, we developed a number of decision rules for using task rankings to suggest possible changes in the organization and delivery of AOAC. We sought, for example, to use tasks' factor scores to indicate: (a) what tasks should be trained and what should be eliminated from training, (b) where and when tasks could best be taught, and (c) how different groups of tasks might be trained with alternative media.

The development of these rules was guided by additional goals: to suggest changes in training consistent with a distributed training strategy while remaining true to the principal training objectives of AOAC. These objectives may be summarized as follows.

- Train captains to plan and direct combat operations tasks at the company level.
- Train captains in critical leadership tasks.
- Train captains in planning combat operations tasks at the combined arms level (to a degree of familiarity).

Identifying Training Content for Armor Captains

Tasks that rank "high" on the dimensions characterizing Armor captains' tasks are potential candidates for training. According to our analyses, these would represent the most important of the tasks involved in preparing units for wartime operations that are performed by company-grade officers (Factor 1), the frequent procedural tasks (Factor 2), the captains' leadership and combat urgent tasks (Factors 3 and 4), and the key combined arms tasks (Factor 5). Because Factor 1 fails to distinguish between captains' and lieutenants' duties, however, some further screening of the tasks ranked high on this dimension would be required to exclude tasks in which captains are already well versed. Subject matter experts could accomplish this by reviewing the tasks scoring high on this dimension that are not already identified as high on another dimension.[8]

In contrast, tasks with "low" rankings on the dimensions might be less important for training. These tasks could be reviewed to determine whether they might be best accomplished in nonresident training, or whether they need to be trained at

[8]A general rule for identifying the high-scoring tasks on a dimension could be to set a cutoff that requires the task's factor score to be within the top third of the distribution of scores on the dimension.

all.[9] Possible criteria for identifying tasks to be considered for Armor captain training are shown in Table 3.9.

Determining Location and Timing of Training

Next we seek to determine location and timing of training, i.e., whether tasks could be taught in-residence or not. The selection of tasks for resident training is guided by key course objectives identified earlier, which are to prepare the Armor captain to lead a company or serve as a battalion or brigade staff assistant. Our analyses would suggest that a "minimum essential" set would consist of tasks performed by captains that possess either an interactive leadership component or an urgent field component (i.e., tasks ranked "high" on the third and fourth factors). This would, of course, point to those tasks with "planning and directing" components at the heart of tactical instruction. In addition, the highest ranking combined arms tasks performed by captains would be included as long as this remains a core course objective.

Other tasks, however, could be considered for distributed training in units. These might be frequent procedural tasks, or less important planning and directing tasks. Simply put, all tasks identified as *not* minimum essential for resident instruction but still necessary for training could be considered for distributed training. Some possible decision rules to aid these decisions about *"where to train?"* are provided in Table 3.10.

Table 3.9

Decision Rules for Identifying Tasks for Armor Captain Training

	Dimensions				
Training Content	F1	F2	F3	F4	F5
Include	high				
Include		low			
Include			high		
Include				high	
Include					high

NOTE: Dimensions are labeled as follows: F1=Critical Company Grade, F2=Frequent Procedural, F3=Interactive Leadership, F4=Urgent Field Command, F5=Combined Arms.

[9] In this analysis, the tasks identified as "nonfrequent, nonprocedural" (low Factor 2) contain a number of tasks identified elsewhere as interactive leadership or combat urgent tasks. Within these rankings, the tasks requiring review for training would be those in the middle of the rankings.

Table 3.10

Decision Rules for Suggesting Tasks for Resident and Nonresident Training

	Dimensions				
Training Location	F1	F2	F3	F4	F5
Resident			high		
Resident				high	
Resident					high
Nonresident		low			
Nonresident			low		
Nonresident				low	

NOTE: Dimensions are labeled as follows: F1=Critical Company Grade, F2=Frequent Procedural, F3=Interactive Leadership, F4=Urgent Field Command, F5=Combined Arms.

The consideration of the *timing* of training is closely linked to decisions about where to train. The tasks identified as candidates for distributed training will be trained either *prior* to attendance at AOAC or in follow-on training in the unit or in a later course. Table 3.11 contains some decision rules using the results of the analysis to suggest *"when to train"* selected tasks.

Tasks identified as lieutenants' tasks (i.e., company-grade tasks that captains do not perform) should be known already to captains attending AOAC. If this is not the case, however, such tasks may be marked for refresher training rather than mainstream AOAC. In addition, routine, procedural tasks could be learned easily on the job. Similarly, the less important planning and directing tasks might also be distributed post-AOAC. Tasks identified as primarily majors' tasks could be distributed *post*-AOAC for apprenticeship training in units or for training at a higher level course.

Table 3.11

Decision Rules for Suggesting When to Train Distributed Tasks

Timing of Training	F1	F2	F3	F4	F5
Pre-AOAC	high		low	low	low
Pre-AOAC		low			
Post-AOAC	low		low	low	

NOTE: Job Dimensions F1=Critical Company Grade, F2=Frequent Procedural, F3=Interactive Leadership, F4=Urgent Field Command, F5=Combined Arms.

Identifying Alternative Media

Training developers assume that certain methods of instruction are preferable to others for training certain tasks. These decisions, however, are not always made in a straightforward fashion. For example, there is a common practice of selecting training methods based on "proven" approaches. Such an approach however, may overlook some potentially more cost-effective methods. Moreover, although the training developer may wish to consider a variety of instructional methods and technologies, no hard rules exist for assigning tasks to specific methods, media, and technologies, nor are these routinely tested for efficiency and effectiveness. Our job and cost analyses can provide some insights.

The statistical analysis has identified general dimensions of Armor captains' tasks relevant to training. The current AOAC POI shows the current method of training. Alternative technologies employing similar instructional principles can be linked to tasks and subsequently screened according to costs. Table 3.12 presents some initial criteria.

These criteria suggest that procedural tasks currently trained using conference methods or "hands on" instruction might, in selected instances, be trained more cost effectively using such tools as paper, computer-based training (CBT), interactive videodisc (IVD), videotape, or training devices. Similarly, some planning and directing tasks that are now trained using conference or SGI could be trained using simulation. Such methods could substitute for existing approaches for conducting resident training, and they might be considered as distributed training products are developed. The specific choice, of course, would be made considering the costs and effectiveness of the alternative training technologies.

Table 3.12

Decision Rules for Suggesting Alternative Training Technologies

Methods of Training	F1	F2	F3	F4	F5
Paper, CBT, IVD, videotape, training devices		high			
CBT, IVD, simulators			high	high	

NOTE: Job Dimensions F1=Critical Company Grade, F2=Frequent Procedural, F3=Interactive Leadership, F4=Urgent Field Command, F5=Combined Arms.

Implications of Analysis for the AOAC POI

The final step of our job analysis develops alternative POIs based on the results of the statistical analysis. As stated earlier, our goal was to suggest ways that AOAC could be reorganized consistent with principles of distributed training while supporting fundamental course objectives. Given principles of distributed training, we sought ways to reduce the length of resident instruction and distribute appropriate training using the most cost-effective tools.

To do this, we examine the current program of instruction in light of the job analysis results described previously. Initially, we sought to identify tasks and events that are consistent with core objectives and isolate the remaining training events. Events judged as not in need of training (e.g., because they are not actually performed by Armor captains) could be recommended for elimination. We term the results of this review a "trimmed POI," i.e., one in which nonessential training has been removed.

Next, we examine the remaining tasks and training events in the AOAC POI and, using rules described previously along with expert judgment, we separate the "minimum essential" tasks needed to assume company command and serve as an assistant staff officer from the remaining tasks. The "minimum essential" tasks remain within the AOAC resident POI. The remainder are considered individually for resident or nonresident instruction.[10] For analytic purposes, we sought to determine the maximum amount of AOAC course material that could be distributed.

Potential for "Trimming" of AOAC

Our initial finding was that *approximately 5 percent of current AOAC POI hours could be eliminated*. Our analysis suggests AOAC students already perform (and should know) tasks that consume 40 academic hours, or one week of instruction. Table 3.13 shows the specific events.

Although sound arguments could be made to retain each of these training events, ultimately it seems that these events provide only reinforcement training for the vast majority of active-duty Armor officers. Eliminating these events should

[10]The training developer could also use the results of the job analysis to determine whether tasks need to be *added* to the POI. If the analysis suggests tasks, for example, that are performed by captains and are key command or staff tasks, these might be added if they are not currently contained in the POI.

Table 3.13

Events Eliminated in the Trimmed Course Alternative

Department	Event Eliminated	Hours Reduced
Weapons	Conduct of Fire Sustainment Training	-20
Weapons	Boresight and Armament Accuracy	-6
Weapons	Anti-Armor Weapons	-4
Command and Staff	Army Writing Program	-10

NOTE: The Army Writing Program could be transformed from an in-class exercise to a resident homework assignment.

reduce the demand for resources without seriously affecting the ability of AOAC graduates to assume their subsequent duty assignment.

Potential for Distributed Training

Our review of the AOAC POI also suggested that *up to 20 percent of AOAC POI hours could be distributed* to students for completion prior to their attendance at AOAC. Altogether, we find that a maximum of 152 POI hours could be considered for distributed training. These include the following types of tasks and events.

- Some tasks identified for distributed training involve background knowledge that is only somewhat relevant to core course objectives. Such training events include orientations to other branches of the Army and foreign armies, military history, and weapon system instruction. Specific AOAC training events included in this category are shown in Table 3.14.
- Tasks involving routine administrative and maintenance duties could also be considered for distributed training. The job analysis suggests that many of these tasks were already performed by these officers when they were lieutenants. These tasks include filling out various forms in the personnel, training, and maintenance areas. Table 3.15 lists training events in this category.
- Some tasks involving leadership instruction, though important, are meant to buttress skills and philosophies taught in previous courses or learned on the job. This material, however, may have less of a claim on scarce resident instruction time than other tactical topics. They might be good topics for distribution prior to AOAC. Table 3.16 identifies leader training topics that could be considered for distribution.

Table 3.14

Distributable Training—Background Knowledge for Captains

Department	Event Distributed	Hours Reduced
Weapons	Directed Energy Weapons	–1
Weapons	Intro to Weapons Dept. and Safety	–1
Weapons	Tank Gun Error Budget	–2
Command and Staff	Foreign Army Orientations	–6
Command and Staff	Evolution of Combined Arms Warfare	–2
Command and Staff	The Laws of War	–2
Command and Staff	Battle Analysis	–4
Command and Staff	Cavalry Organizations and Missions	–4
Command and Staff	Army Aviation Orientation/Operations	–2

Table 3.15

Distributable Training—Routine Administrative and Maintenance Duties

Department	Event Distributed	Hours Reduced
Maintenance	Battalion/Company Maintenance Program	–16
Command and Staff	Short Range Training Plan	–21
Command and Staff	Army Training Program	–10
Command and Staff	Army Writing Program	–6
Command and Staff	Introduction to Military Justice	–3
Command and Staff	Evaluation Reports	–2

- Some training events conducted as part of SGI could be conducted prior to course attendance. These include conference (lecture) material and practical exercises. These training events provide background for subsequent planning and directing tasks. Nearly all of the course hours so identified are shaved from current training events; only one such event appears wholly distributable. This particular event, "military symbols and terms," contains information that sets the stage for the remainder of AOAC's tactical instruction. The distributed SGI events and hours are shown in Table 3.17.

Potential Media and Technology Options

Identifying distributable tasks is only part of developing a distributed training strategy. It is equally important to match the best training medium for each distributed task. Thanks to advances in training technology, alternative methods are available to dispense information and provide individualized instruction.

Table 3.16

Distributable Training—Leadership Instruction

Department	Event Distributed	Hours Reduced
Command and Staff	Time Management	–1
Command and Staff	Battlefield Stress	–1
Command and Staff	Small Group Leadership	–2
Command and Staff	Values and Ethics	–2
Command and Staff	Motivation	–2
Command and Staff	Combat Leadership	–2
Command and Staff	Team Building	–2
Command and Staff	Taking Command	–2
Command and Staff	Decisionmaking	–1
Command and Staff	Leadership Doctrine	–1

Table 3.17

Distributable Training—Topics in Small Group Instruction

Department	Event Distributed	Hours Reduced
Command and Staff	Military Symbols and Terms	–2
Command and Staff	Introduction to Tactical Operations	–3
Command and Staff	Troop Leading Procedures	–4
Command and Staff	Intelligence Preparation of the Battlefield	–7
Command and Staff	The Operations Estimate	–7
Command and Staff	Integrate Combat Support and Combat Service Support	–12
Command and Staff	Nuclear, Chemical, and Biological Effects	–4
Command and Staff	Company/Team Reconnaissance/Combat Trains Consolidation	–4
Command and Staff	Defensive Intelligence Preparation of the Battlefield	–5
Command and Staff	Engineer Support and Counterattack Planning	–2
Command and Staff	Heavy/Light Defensive Operations	–4

Additionally, some of these methods can relieve the administrative burden of evaluating students' grasp of that information.

By the application of principles described earlier, we identified two illustrative potential media mixes. In the first, all distributed material utilizes paper-based methods. In the second, paper-based methods are used for approximately 44

percent of the distributed material, while videotape was used for 11 percent, and computer-based training accounted for the remaining 46 percent.

We chose the 100 percent paper-based strategy as the baseline. For the alternative, videotape instruction was used for topics of general interest to all Officer Advanced Course students (not just those in the Armor course).[11] Included in this videotape instruction are the foreign army orientations, military justice and laws of land warfare, military history, and the Weapons Department introduction and Armor Safety Briefing.

The Armor School already conducts some computer-based training. Instruction sponsored by the maintenance department serves to illustrate the type of instruction that can be accomplished using this medium. We chose CBT to support training that required understanding of Army administrative processes and tactical planning procedures and techniques. Examples include training and maintenance management, intelligence preparation of the battlefield, and operations estimate instruction.

Tasks Remaining for AOAC Resident Instruction

Based on the job analysis and our understanding of current course assumptions and objectives, *approximately 75 percent of the current AOAC would be retained at the institution.* This equates to 576 hours (14.4 weeks) of academic instruction. The analysis points to three categories of skills that are critical to an officer's capability to qualify for his subsequent assignment: critical thinking skills, planning and directing tasks, field leadership tasks, and the captain's component of field grade tasks. Major groups of tasks retained in the institutional POI include the following.

- *Small group instruction on planning and directing tasks.* The complexity of the modern battlefield requires that young officers be thoroughly schooled in detailed requirements of planning operations. Examples of such training events are: Make a tentative plan for a Brigade Attack, Battalion Deliberate Attack and Company/Team Consolidation, and Reorganization Planning.
- *Leadership and management seminars.* These seminars allow the officers to converse with subject matter experts in maintenance, supply, and combat leadership to see how others deal with problems and issues. Examples of

[11]Much of this instruction is required by HQ TRADOC and hence could be centrally developed and delivered by the HQ.

training events left in the POI are Small Group Leadership, Values and Ethics, Taking Command, and the Brown Bag Leadership Seminar.

- *"One Source" orientation briefs.* The task analysis does not treat this class of AOAC POI training events. However, most professional development courses offer students background knowledge on unique topics of interest that, although the topics do not fit directly into a task description, actually help officers function within the Army. The current POI contains topics that contain classified information or are professional currency topics that must be updated continuously and disseminated to targeted audiences only. Examples of "one source briefings include: Directorate of Combat Developments Briefing (classified), Armor Branch Officer Professional Management System, and Abrams Tank Live-Fire Briefing.

Conclusion

The job analysis demonstrates the potential for several key elements of a distributed training strategy. Some course material seemingly can be distributed prior to course attendance, and there is also potential for post-course distribution as well. However, there is a limit to which AOAC material can be distributed. It appears that about 15 weeks of resident instruction is the minimum required for Armor captains to meet current course objectives. An additional four weeks are potentially distributable, while a single week of training could be regarded as superfluous to the current course objectives. Thus, the maximum potential for reducing course length in AOAC is about 25 percent.

In addition, the job analysis suggests that alternative media could be used to support the distributed training options. Our analyses suggest that these need not be the "highest technology" options. A simple paper-based strategy could suffice, possibly augmented with videotape and computer-based instructional tools.

Thus, the results of the job analysis suggest two alternative POIs for the AOAC for further analysis—a course that eliminates one week of the current course and distributes four weeks using one of two media options.[12] The next section examines the costs of these alternatives.

[12]Additional options could be considered that distribute less material.

4. Cost of Training Options

This section presents our resource and cost analyses of alternative programs of instruction generated by the job analysis. Since our methodology was described in Section 2, the following discussion will focus on comparisons of savings and costs between alternative AOAC training programs.

We limit our analysis in two important ways. First, we use a static course baseline to identify resource and cost changes. We examine the operation of AOAC at a specific point in time (FY 92) and measure the differences in resources and costs generated by the alternatives we examine. The second way we limit the analysis is by considering the effects of changes only for the Active Component.

Analytic Steps

Our analysis focuses on changes in savings and costs that result from implementing alternative training strategies. The most important step in the analysis is to thoroughly define the current AOAC course and the proposed alternatives.

Definition and Specification of the Changes in AOAC

Current Course. The FY 92 AOAC POI supplied much of the necessary information for defining the baseline. The POI designates a minimum class size of 110 students, an optimal class size of 118 students, and a maximum class size of 122 students. For FY 92, the Army Program for Individual Training (ARPRINT) forecasts a total of 413 students attending the course.[1] This student population includes active and reserve officers, other branch officers (e.g., Infantry, Artillery, etc.), and foreign students. Four iterations of the course occurred in FY 92. The course is 20 weeks long and students are in-residence at Fort Knox, Kentucky, for the duration. AOAC is a PCS assignment, meaning the officer's family accompanies him to Fort Knox for the duration of the training.

[1]The Army Training Requirements and Resources System (ATRRS) is an automated information system that provides input to training management information for the schools and training centers. A major product of ATRRS is the ARPRINT, which provides officer and enlisted training requirements, objectives, and programs for the Army.

Of the 20-week total, 19.2 weeks (768 hours) are designated as academic or instructional hours. An additional 80 hours are reserved for processing and testing students. The Command and Staff Department manages the AOAC and conducts 85 percent of the training. Most of the remaining training is about evenly split between the Maintenance and Weapons departments.

The training departments' choices of instructional methods (e.g., conference, demonstration, and practical exercises) are extremely important, because these methods eventually determine manpower, equipment, and facilities requirements. Practical exercises conducted in a small group setting are the dominant method used in the AOAC and represent over 54 percent of all academic hours. These methods of instruction have predetermined student groupings and instructor manpower requirements.[2] The end result of combining the method of instruction and the predetermined student grouping is the instructor contact hour (ICH). Course manpower requirements are determined largely by the ICH computation. There are a total of 8,260 ICHs for one iteration of the current AOAC.[3] Table 4.1 shows the current distribution of ICHs among the training departments.

Table 4.1

Departmental Instructional Methods and Instructor Contact Hour Summary for Current AOAC

Method of Instruction	Deputy Assistant Commandant ICHs	Maintenance ICHs	Weapons ICHs	Command and Staff ICHs	Total ICHs
Conference	7.0	30.8	80.0	1420.6	1538.4
Computer-based instruction	0.0	156.0	0.0	280.0	436.0
Demonstration	0.0	25.6	12.0	26.4	64.0
Practical exercises	0.0	112.0	1840.0	3720.8	5672.8
TV/seminar	0.0	.8	0.0	3.8	4.6
Exams	0.0	8.0	8.0	528.0	544.0
Total	7.0	333.2	1940.0	5979.6	8259.8

NOTE: These are the ICHs for *one* course iteration. For FY 92 there will be four course iterations, so each cell must be multiplied by four to arrive at the annual ICHs required during FY 92.

[2]The Training Requirements Analysis System (TRAS) integrates the training development and implementation process with resources (personnel, construction, training equipment, ammunition, etc.). TRAS prescribes the size of student groups and the number of instructors per group based on the method of instruction (TRADOC, 1988b).

[3]These are not presently approved ICHs but represent the integration of the course's changes and the application of the TRAS requirements for the appropriate number of ICHs.

Proposed Alternatives to the Current AOAC. Drawing on the results of the job analysis method described in Section 3, we examine two alternative AOAC POIs, the "Trimmed POI" and the "Distributed POI." We analyze three different media mixes for the distributed training option—a "high-technology" alternative that includes the use of teletraining; a "medium-technology" version that includes CBT, videotapes, and paper-based training; and a "low-technology" alternative that is 100 percent paper based.[4] However, there is a multitude of ways to actually implement these alternatives that could bear importantly on the results of the analysis. To understand the importance of how distributed training is implemented, we consider a best-case (low-cost) and worst-case (high-cost) scenario for both the trimmed and the distributed alternatives. Table 4.2 summarizes the alternatives and the implementation options we consider in this analysis.

The "trimmed" alternative eliminates 40 academic hours (one week) of the original AOAC POI. By being reduced to a length of 19 weeks, the course is transformed to a TDY assignment (by current Army doctrine). This means students are not relocated, but rather are on temporary duty while they attend the course. This fundamental change from PCS (relocation) to TDY (temporary duty) has important activity and resource effects that we highlight later in our analysis.

Table 4.3 summarizes the training events eliminated in this alternative. Of the 40 hours dropped from the POI, 30 hours of instruction are based in the Weapons Department.

Table 4.2

AOAC Alternatives

Alternative	Low Cost to Implement	High Cost to Implement	Total
Trimmed course	X	X	2
Distributed course: High tech	X	X	2
Distributed course: Medium tech	X	X	2
Distributed course: Low tech	X	X	2
Total	4	4	8

[4]In developing its Distributed Training Strategy, TRADOC initially considered only one implementation alternative (in this case, the high-technology alternative).

Table 4.3

Events Eliminated in the Trimmed Course Alternative

Department	Event Eliminated	Hours Reduced
Weapons	Conduct of Fire Sustainment Training	20
Weapons	Boresight and Armament Accuracy	6
Weapons	Anti-Armor Weapons	4
Command and Staff	Army Writing Program	10

NOTE: The Army Writing Program is transformed from an in-class exercise to a resident homework assignment.

The distributed training alternative includes the 40 eliminated hours from the "trimmed" option and a transfer of 152 academic hours to the soldiers' home units. The remaining academic hours total 576. The length of the resident course is reduced from the original 20 weeks to 15.2 weeks. The 152 distributed academic hours are now prerequisite study hours that each soldier completes in his unit or its associated learning center prior to course attendance. In this analysis, we assume that the units and associated learning centers that are now responsible for this training are 69 worldwide active Armor battalions.

We examine three different variations for distributing these 152 academic hours to these field units. The first variation, the high-technology[5] option, trains 20 percent of the hours through televideo, 50 percent of the hours are trained using computers, and the remaining 30 percent of the hours use paper media. This is the variation called for in TRADOC's original implementation plan. The additional variations were suggested by our job analysis. The second variation, the medium-technology option, trains 10 percent of the hours using videotape instruction, 40 percent of the hours using paper, and 50 percent of the hours using computers. The low-technology option uses 100 percent paper.

Assumptions and Alternative Scenarios. In addition to limiting assumptions described earlier (static baseline and limitation of changes to the Active Component), we use two different scenarios concerning how the alternatives will be implemented. These scenarios are a best-case (low-cost) scenario and a worst-case (high-cost) scenario.

Best-Case/Low-Cost Scenario. Table 4.4 lists the assumptions associated with the best-case or low-cost scenario.

[5]The form of televideo is assumed to be one-way video with two-way audio.

Table 4.4

Best-Case (or Low-Cost) Assumptions

Training Activity	Location	Assumption
Delivery	Field Learning Centers	No additional instructional manpower
	Field Learning Centers	Off-duty course preparation
	Field Learning Centers	No additional training equipment
	Field Learning Centers	No additional facilities
	Field Learning Centers	No facilities modifications
Development	School	Estimated time values for media development
Support	Field Learning Centers	5% incremental maintenance on existing training equipment
	School	Temporary quarters available/ No meals

Here we make five key assumptions. First, we assume the training in the field units will be conducted at learning centers located on post. These learning centers are TDA organizations and are under the supervision of TRADOC. These learning centers use the same work load factors as TRADOC. We assume that no additional instructors are required in the learning centers and that students will be required to train during off-duty hours. We assume that because students are training during off-duty hours they can utilize existing computer and video equipment. We further assume there are no new facilities or facility modifications required. Thus, we assume that the transfer of 152 academic hours to prerequisite distributed training can be accomplished using existing resources at home station.

For the training development activity in our low-cost scenario, we use TRADOC's estimated time values for media development.[6] We assume that these current time values, which estimate the man-hours by training product, are accurate predictors of the manpower required to develop and sustain the new training products.

In analyzing support activities for our low-cost scenario, we also make several important assumptions. We assume that minimal additional maintenance will be required for computer and video equipment used to provide distributed

[6]These time values were developed in the 1980s and may not accurately reflect current development requirements. These standards are currently being revised. However, these values are what the Army now uses to resource training development, and we use them to serve as a benchmark for establishing a lower boundary on training development costs.

training.[7] We also assume that because the course is changing from a PCS to TDY assignment, the school has the capacity to handle this additional temporary housing load. However, the current food facilities at Fort Knox cannot handle this additional load, so we must provide the students with food allowances. Finally, we assume that the course's students are "TDY en route" to their next assignment, and that they do not have to be replaced in their units.

Worst-Case/High-Cost Scenario. A key difference between the low-cost scenario and the high-cost scenario is the ability of the units and the school to absorb the changes in training activities without a significant attendant increase in resources and costs. Our high-cost scenario postulates that the units and their learning centers will need additional resources in order to conduct this training. Table 4.5 lists the assumptions for our worst-case or high-cost scenario.

In the set of high-cost assumptions for training delivery activities, we make four important assumptions.[8] We assume there is no excess resource capacity in the learning centers to absorb the additional training and that instructors will have to be added. However, instructors will be required for only the computer-based

Table 4.5

Worst-Case (or High-Cost) Assumptions

Training Activity	Location	Assumption
Delivery	Field Learning Centers	Additional instructional manpower
	Field Learning Centers	On-duty course preparation
	Field Learning Centers	Additional training equipment
	Field Learning Centers	Facilities remodeled
Development	School	High flat dollar rate for media
Support	Field Learning Centers	25% incremental maintenance on new training equipment
	Field Learning Centers	Increased facilities maintenance
	School	No temporary quarters available/No meals

[7]The 5 percent factor we use was derived from discussions with the Command and Staff Department at Fort Knox. This department uses this type of equipment regularly, and it tracks maintenance requirements for incremental use.

[8]We also assume under this high-cost set of assumptions that the learning centers will be responsible for the training.

portions of the training. We also assume that training will take place during on-duty hours. We further assume that additional computer and video equipment will be required. The training facilities will also have to be remodeled in order to accommodate the additional students, instructors, and equipment.

For development, we use a different factor to determine the requirements for developing and sustaining new training products. TRADOC's current estimated time values assume a static time period to develop a particular type of product. For example, a computer-based training product requires 49 developer man-days to develop. One product may be one hour or five hours in duration; yet, the man-days requirement remains the same. In our high-cost scenario, we dissect development products into hourly increments and assign a flat dollar rate per hour for each type of product.[9] For example, a one-hour class costs $7,000 to develop, and a two-hour class costs $14,000 to develop. In the high-cost scenario, we track each new product by hour rather than by product.

For training support, we make two important assumptions. We assume that learning centers will be faced with additional maintenance for the new equipment and the new facilities.[10] We further assume that the school does not have the facilities to house the additional students. As a result, temporary housing and meals will be provided by commercial establishments and students will be given the full TDY allowance for Fort Knox.

Activity Analysis

Next we examine how these changes affect the activities of the course at the school and learning centers and their impact on other organizations affected indirectly by the change. We focus principally on the medium-technology, distributed training option, compared with the current course, in the following discussion. This alternative incorporates the majority of changes included in the other alternatives.[11]

The activity analysis identifies the principal delivery, development, and support activities that produce the current AOAC, and it examines how these activities would change and which organizations would be affected as a result of

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[9]To develop these rates, we conducted a simple survey of various training development firms, and our flat rates represent the median values we collected. These rates and the survey are described in greater detail in Way-Smith (1993).

[10]For the maintenance of new equipment, we use TRADOC's standard factor of 25 percent of the value of the equipment to represent continuing maintenance.

[11]For a detailed discussion of the trimmed alternative and the other media options for the distributed strategy, see Way-Smith (1993).

implementing the proposed alternatives. The activity analysis requires a comprehensive understanding of the overall functions and organizations of the school and how they affect a particular course. This is important because if activities are omitted, they will not be included in the resource or cost analysis phases of the method. In short, the activity analysis is an organizational analysis for the affected course. The activity analysis uses balance sheets to determine which activities change, how they change, for whom they change, and when they change.

Once we have completed the balance sheets for each major activity area, we summarize these balance sheets and make initial estimates as to whether these activity changes are one-time or recurring types of changes. Table 4.6 lists activity and work load changes for our low-cost, medium-technology, distributed training option. Table 4.7 lists activity and work load changes for our high-cost set of assumptions. Both tables show specific activity and work load changes in the stubs of the table. The most significant activity changes are indicated in the columns.

As can be seen in the tables, significant changes in activities and work load in training delivery, development, and support occur under both of the options. Most of the one-time changes occur in training development as new products are developed to support new programs of resident and nonresident instruction. Some one-time changes in support requirements are also needed (e.g., to sustain new products or remodel facilities). However, more extensive changes (i.e., increases in activities/work load) occur under the high-cost assumptions.

Recurring changes in activities are also called for under each of the options profiled in Tables 4.6 and 4.7. Many are similar under each set of assumptions (e.g., reduction in school ICHs). The most important differences derive from the assumptions regarding whether preparation time for distributed training occurs on-duty and requires additional field manpower, and from differences in support requirements governing training product and facilities.

Resource Analysis

The resource analysis details specific manpower, equipment, and facilities changes that result from implementing the alternative.[12] To identify these changes, we proceed as we did with the activity analysis, using the balance sheet to record the specific changes and then summarizing these changes.

[12]The definition of equipment includes supplies, fuel, and materiel.

Table 4.6

Catalogue of Low-Cost, Medium-Technology, Distributed Training Activity and Work Load Changes

Activity/Work Load Changes	Type of Activity	
	One-time/Transition ?	Recurring ?
DELIVERY		
Installation course length (–192 hours)		X
Student load reductions (–39 man-years)		X
School ICH (–11653.6 ICHs)		X
• Deputy Assistant Commandant (DAC) (–4.0 ICHs)		
• Maintenance (–612.8 ICHs)		
• Weapons (–7712.0 ICHs)		
• Command and Staff (C&S) (–334.8 ICHs)		
Tank mileage		
• M1 (–48 miles)		X
• M1/M1A1 (–120 miles)		X
• M60A3 (–160 miles)		X
DEVELOPMENT		
New product development (+43 products)		
• Computer-based products (+7)	X	
• Videotaped products (+11)	X	
• Printed products (+23)	X	
• POI revision	X	
• New instructor course	X	
Development sustainment (–24 products)		
• Conference products (–41)		X
• Computer-based products (+5)		X
• Demo products –1)		X
• Practical exercises (–18)		X
• Videotaped instructional products (+10)		X
• Exam products (–2)		X
• Printed products (+23)		X
Product distribution (+30 products)		X
SUPPORT		
Training management (–11653.6 ICHs)		X
Training publications (+43 new/–24 old)	X	X
Relocations (–413 officer moves)		X
Family housing		
• Active/occupied (–165 officer family yrs)	X	X
• Idled (+165 family yrs)		X
Temporary housing		
• Active/occupied (+165 officer man-years)		X
• Idle (–165 officer man-years)	X	X
Food allowances (+413 officers)		X

Table 4.7

Catalogue of High-Cost, Medium-Technology, Distributed Training Activity and Work Load Changes

Activity/Work Load Changes	Type of Activity	
	One-time/Transition ?	Recurring ?
Installation course length (–192 hours)		X
Field unit course length (152 hours)		X
Student load reductions (–1 man-years)		X
School annual ICH change (–11653.6 ICHs)		X
• DAC (–4.0 ICHs)		
• Maintenance (–612.8 ICHs)		
• Weapons (–7712.0 ICHs)		
• C&S (–334.8 ICHs)		
Tank mileage		
• M1 (–48 miles)		X
• M1/M1A1 (–120 miles)		X
• M60A3 (–160 miles		X
Learning center ICHs changes (+4830 ICHs)		X
DEVELOPMENT		
New product development (+344 hours)	X	
• Computer-based hours (+70)	X	
• Videotaped hours (+16)	X	
• Printed hours (+66)	X	
• POI revision	X	
• New instructor course	X	
Development sustainment		
• Conference hours (–83.9)		X
• Computer-based hours (+67)		X
• Demo hours (–5.2)		X
• Practical exercises hours (–90.5)		X
• Videotaped hours (+14.6)		X
• Exam hours (–8.0)		X
• Printed hours (+66)		X
Product distribution (+66 hours)		X
SUPPORT		
Training management (–11653.6 ICHs)		X
Learning center management (+4830 ICHs)		X
Training publications (+43 new/–24 old)	X	X
New instructor training (+80 academic hours)	X	X
Equipment maintenance (+1500 hours)		X
Remodels (69 classrooms)	X	
Classroom maintenance (34000 hours)		X
Relocations (–413 officer moves)		X
Family housing		
• Active/Occupied (–165 officer family yrs)	X	X
• Idled (+165 officer family yrs)		X
Off-post housing (+413 students)	X	X
Full TDY allowances (+49943 days)		X

Table 4.8 lists the types of changes generated by the low-cost implementation of the medium-technology, distributed training alternative. Most of the entries under "basis for estimate of costs and savings" are the same numbers noted under "work load changes" on the balance sheets. These entries form the basis of the calculation in net changes in cost. The right-hand columns of the table indicate which types of costs are potentially involved. The first type is the

Table 4.8

Catalogue of Cost-Causing Changes for the Medium-Technology, Distributed Training Option: Low-Cost Assumptions

Type of Change	Basis for Estimate of Cost or Savings	Type of Cost: Nonrecurring	Type of Cost: Recurring
ACTIVITIES			
School delivery	–11653.6 ICHs(–39 load)		X
M1	–48 miles		X
M1A1	–120 miles		X
M60A3	–160 miles		X
New product development	+43 new products	X	
Development sustainment	–24 products		X
Training support			
• Training management	–11653.6 ICHs		X
• Training publications	+413		
Distribution			
• PCS relocations	–413 relocations		X
Field computer maintenance	+1445 hours		X
Field video maintenance	+330 hours		X
MANPOWER			
Civilians			
• GS-5	–2	X	X
• GS-7	–6	X	X
• GS-9	–3	X	X
• GS-11 temporary	+9	X	
Military transfers			
• Officer-3	+3	X	
• Officer-4	+1	X	
EQUIPMENT			
DOTD computer equipment	+7 development computers	X	X
Ammunition/missile simul.	–69 rounds		X
FACILITIES			
Idled classrooms	–41,400 sq ft	X	X
Occupied classrooms	+41,400 sq ft		X
Family housing: Occupied	–784,700 sq ft	X	X
Family housing: Idled	+784,700 sq ft		X
Temporary housing: Idled	–165,000 sq ft	X	X
Temporary housing: Occupied	+165,000 sq ft		X

nonrecurring cost, which is required during the transition period. The second type is the annually recurring costs and savings once the change is implemented.

Military manpower changes are also not included in this table. However, military transfers are listed. The reason is that although end-strength may not be affected by the change, these military personnel will have to be transferred to other assignments, which will likely involve significant nonrecurring costs. The number of transfers in the "basis for estimate of costs and savings" column comes from the manpower balance sheet and the column "transfer from/to other organizations." We simply total the number of moves by rank and grade to and from other organizations to determine the number of military transfers.[13]

Table 4.9 lists cost-causing changes for the high-cost assumptions. Several areas are different. The balance sheet shows the transfer of ICHs to the units, resulting in an increase in instructor manpower at those locations. We also reflect the student status of the AOAC participants through the transfer of the 31 student man-year factor. We reflect the development activities as product hours rather than a total number of products as is listed in Table 4.9 because we use flat dollar rates for estimating training development costs under these assumptions. This table also reflects the increased requirement of equipment and facilities for the units, and the attendant increase in maintenance. In addition, replacement training for the new field instructors is part of the cost causing changes. The final difference is in how we reflect the lack of temporary housing capacity at the school.

Cost Models

Cost results are derived from the resource and activity changes through the application of a cost template. We use this general template as checklist to determine which aspects of cost apply to our medium-technology, distributed training option. Table 4.10 lists our cost model for the distributed training option.[14] An X under "resource factors" indicates that this resource factor is an element of the equation to calcu[illegible] the cost for our distributed training alternative. For example, in the low-cost model, we need to acquire and train temporary civilian developers. To determine the cost for this element, we multiply the number and type of developers we need by the acquisition cost factor for each developer. Under recurring costs for large equipment, an

[13]For further discussion of the treatment of military manpower, see Way-Smith (1993).

[14]Cost models for other options examined in our analysis are contained in Way-Smith (1993).

Table 4.9

Catalogue of Cost-Causing Changes for the Medium-Technology, Distributed Training Option: High-Cost Assumptions

Type of Change	Basis for Estimate of Cost or Savings	Type of Cost: Nonrecurring	Type of Cost: Recurring
ACTIVITIES			
School delivery	–11653.6 ICHs(–39 load)		X
Learning center delivery	+4830 ICHs(+31 load)		X
M1	–48 miles		X
M1A1	–120 miles		X
M60A3	–160 miles		X
New product development	+43 new products	X	
Reproduction	+413 training manuals	X	X
Distribution	+413 mailings	X	X
Development sustainment	–24 products		X
School training support			
• Training management	–11653.6 ICHs(–39 load)		X
Instructor training	+2 weeks/instructor		X
• Other (DEH,DOL,DRM)	–39 student load		X
Unit training support	+31 student load		X
PCS relocations	–413		X
MANPOWER			
Civilians			
• GS-5	–2	X	X
• GS-7	–6	X	X
• GS-9	–1	X	X
New training products	+344 product hours	X	X
Sustainment of products	–152 product hours		X
Military transfers			
• Officer-3	+7	X	
• Officer-4	+2	X	
Replacement training	+2 weeks annual turnover		X
EQUIPMENT			
Field computer equipment	+69 computer units	X	X
Field computer spares	+69 computer units	X	X
Televideo equipment	+69 units	X	X
Field computer maintenance	+138 units		X
Field video maintenance	+69 units		X
Ammunition/missile simul.	–69 rounds		X
FACILITIES			
Learning center construction	+41,400 sq ft	X	X
Family housing: Occupied	–784,700 sq ft	X	X
Family housing: Idled	+784,700 sq ft		X
Temporary housing	+Commercial facilities		X

Table 4.10

Medium-Technology, Distributed Training Cost Model: Low-Cost Assumptions

Cost Factors • Cost Element	Activity Rate (miles or hours, etc.)	Resource Factors: Manning Amount	Manning Type	Equipment Amount	Equipment Type	Facilities Amount	Facilities Type
NONRECURRING COSTS							
Civilian personnel cost							
• Acquisition		X	X				
• Initial training		X	X				
• Separation		X	X				
Military personnel cost							
• Transfers		X	X				
Equipment procurement				X	X		
Publications proofs				X	X		
Facility activation		X	X			X	X
Facility deactivation		X	X			X	X
RECURRING COSTS							
Civilian personnel cost							
• Pay and allowances		X	X				
Military personnel cost							
• Student PCS		X	X				
• Student TDY		X	X				
Fuel, oil, etc. (POL)	X			X	X		
Replenishment spares	X			X	X		
Ammunition	X			X	X		
Equipment maintenance				X	X		
Product distribution		X					
Product reproduction		X					
Facility maintenance						X	X

additional resource factor is added—activity rate. This factor refers to the operating activity (miles or hours) of equipment.

Table 4.11 is the cost model for the medium-technology, distributed training option using the high-cost assumptions. There are two additional cost elements included in this table that were not included in the low-cost model. One element is initial training for field instructors. The second element is replacement training for these instructors. However, the results of applying this cost model to the high-cost assumptions will produce significantly different results because the basic resource factors are different. There are different manpower, equipment, and facilities requirements under the high-cost assumption option.

We use a spreadsheet to apply cost factors to the changes in resources. In this example, we simplify the analysis by assuming that all nonrecurring costs occur

Table 4.11

Medium-Technology, Distributed Training Cost Model: High-Cost Assumptions

Cost Factors • Cost Element	Activity Rate (miles or hours, etc.)	Resource Factors: Manning Amount	Manning Type	Equipment Amount	Equipment Type	Facilities Amount	Facilities Type
NONRECURRING COSTS							
Civilian personnel cost							
• Separation		X	X				
Military personnel cost							
• Transfers		X	X				
• Initial training		X	X				
Equipment procurement				X	X		
Initial spares				X	X		
Facility activation		X	X			X	X
Facility deactivation		X	X			X	X
RECURRING COSTS							
Civilian personnel cost							
• Pay and allowances		X	X				
Military personnel cost							
• Replacement training	X	X	X				
• Student PCS		X	X				
• Student TDY		X	X				
Fuel, oil, etc. (POL)	X			X	X		
Replenishment spares	X			X	X		
Ammunition	X			X	X		
Equipment maintenance				X	X		
Product distribution		X					
Product reproduction		X					
Facility maintenance						X	X

in FY 92 and the recurring costs and savings begin in FY 93 and continue indefinitely into the future. Table 4.12 presents the cost results of the low-cost, medium-technology, distributed training option. The first group of costs (nonrecurring costs) represents the one-time costs of distributing the training. The second group of costs (recurring costs) shows both recurring costs and savings (in parentheses). Major nonrecurring costs for this option include the acquisition of temporary training developers to design and produce the distributed material (approximately $45,000), as well as the cost to deactivate family housing (approximately $785,000). Altogether, we estimate the nonrecurring cost of this option to be approximately $1.7 million.

The recurring savings compensate for the one-time costs involved in implementing this option—if we believe we can implement this change under the best-case conditions. Most of the savings are personnel-related. The reduction in

Table 4.12

Results of Low-Cost, Medium-Technology, Distributed Training Option

Costs	
NONRECURRING	
Aquisition of temporary developers	$455,000
Initial training of new developers	$30,000
Separation costs of civilian personnel	
• GS-5	$15,000
• GS-7	$57,000
• GS-9	$35,000
Officer transfers	
• O-3	$27,000
• O-4	$10,000
DOTD Computer equipment procurement	$22,000
Publications new proofs	$28,000
Family Housing deactivated	$785,000
Temporary Housing activated	$165,000
Unit classrooms activated	$41,000
Total costs	$1,670,000
RECURRING/(SAVINGS)	
Civilian personnel pay and allowances	
• GS-5	($52,000)
• GS-7	($192,000)
• GS-9	($117,000)
Student PCS	($3,421,000)
Student TDY	$2,241,000
DOTD computer maintenance	$6,000
Reproduction	$29,000
Distribution	$21,000
Ammunition	($95,000)
Major weapons systems (POL and Spares)	
• M1	($3,000)
• M1A1	($8,000)
• M60A3	($4,000)
Family housing maintenance reduction	($785,000)
Temporary housing maintenance increase	$495,000
Classrooms' maintenance increase	$124,000
Total savings	($1,761,000)

civilian instructors and department staff coupled with the transformation of the course from a PCS to a TDY assignment represent the greatest portion of the savings. Another significant recurring savings area is in the reduction of maintenance for family housing—if it is deactivated.

Table 4.13 lists the specific cost changes for the high-cost, distributed training alternative. The transition (nonrecurring) costs under this set of assumptions are significantly higher than the low-cost option, increasing from approximately $1.7

Table 4.13

Results of High-Cost, Medium-Technology, Distributed Training Option

Costs	
NONRECURRING	
Civilian personnel costs	
Separations	
• GS-5	$15,000
• GS-7	$57,000
• GS-9	$12,000
Military personnel costs	
Initial training	$3,000
Transfers	
• O-3	$64,000
• O-4	$20,000
New training products	$1,942,000
Equipment procurement	
• Computers	$224,000
• Video recorders	$131,000
Initial spares	$224,000
Facility deactivation	$785,000
Temporary housing activated	$165,000
Construction of classrooms	$3,728,000
Total costs	$7,370,000
RECURRING/(SAVINGS)	
Civilian pay and allowances	
• GS-5	($52,000)
• GS-7	($192,000)
• GS-9	($39,000)
Military personnel costs	
• Student PCS	($3,421,000)
• Student TDY	$3,340,000
• Replacement training	$1,000
Training product maintenance	$46,000
Reproduction	$29,000
Distribution	$21,000
Computer equipment maintenance	$112,000
Video recorder maintenance	$33,000
Ammunition	($95,000)
Weapons	
• M1	($3,000)
• M1A1	($8,000)
• M60A3	($4,000)
Learning center maintenance	$124,000
Family housing maintenance reduction	($785,000)
Total savings	($893,000)

million to $7.4 million. The key elements that increase the transition costs are the development and construction costs associated with new products and facilities. The recurring savings are also significantly reduced, largely as a result of increased costs of equipment and facilities maintenance.

Before we compare the cost results for all of the alternatives, we need to consider the implications of the options for military manpower. Table 4.14 compares the military manpower results for two sets of assumptions. Requiring students to take the prerequisite hours during off-duty time would reduce the number of authorizations that are assigned to the TTHS (trainees, transfers, holdovers, and students) account by a significant amount (almost 10 percent of the student manpower). The reductions in authorizations may then be applied to operating end-strength.

The high-cost set of assumptions requires additional military manpower spaces for filled learning centers. While there are reductions in spaces at the school, it is likely that the field learning center personnel will come from other parts of the Army. In a context of declining end-strength, the summary of military manpower would show that these spaces are available for reducing military manpower.

Savings and Cost Results for Alternative AOAC POIs

The final step of our analysis places the costs in context. This requires comparing the alternatives, "sizing the costs and savings," and identifying the trade-offs.

Table 4.14

Military Manpower Results: Low- and High-Cost Assumptions

	Low-Cost Option		High-Cost Option	
	Transfers to Other Organizations		Transfers to Other Organizations	
Type of Manpower	From	To	From	To
Officer: O-3		3	4	3
Officer: O-4		1	1	1
Students		39		8
Total		43	5	12

Comparisons of the Alternatives

We first compare the costs and savings associated with each of the major alternatives examined in our analysis. Table 4.15 lists the savings and costs for all alternatives using the low-cost assumptions. Savings and costs under the high-cost assumptions are shown in Table 4.16.

Figure 4.1 shows the various break-even points for both the high- and low-cost assumptions. The high-technology option costs more than the current course and does not break even.

Certainly, under either set of assumptions, the trimmed course is a viable first step. In analyzing individual training, it is important to thoroughly understand the basic course objectives and eliminate those events and tasks that are tangential to the basic objectives. The distributed paper (low-technology) option under either set of assumptions also provides savings opportunities within a short period of time. Alternatives that use higher-technology mixes increase the costs of distribution and diminish savings. The degree to which the costs increase and the savings decrease depends on the assumptions and the actual methods of implementation.

The large differences in cost under the best- and worst-case scenarios suggest the need to determine the degree of excess capacity in the units. The point where distribution exceeds the capacity of the units is the point where costs will escalate significantly and savings will diminish significantly. Distribution that exceeds the excess capacity of the units requires the establishment of unit training infrastructures that duplicate those at the schools.

Sizing the Costs and Savings

If we focus for a moment on the trimmed course and extrapolate its savings across the Armor school, this "scrubbing" of the courses offers respectable savings. Figure 4.2 shows the potential "slice of savings" for AOAC and what might be achieved by reexamining all Armor school courses,[15] if all Armor courses have the same level of potential savings as the AOAC.[16]

[15]We used the 1992 Armor BMG as the baseline for determining the context of the potential savings.

[16]For certain courses, this extrapolation is relevant. As we will show in a parallel case study, there is little to be eliminated from the M1 Armor Crewman Course. However, leader development courses, such as AOAC, seem to offer more opportunity for scrubbing courses down to the essentials.

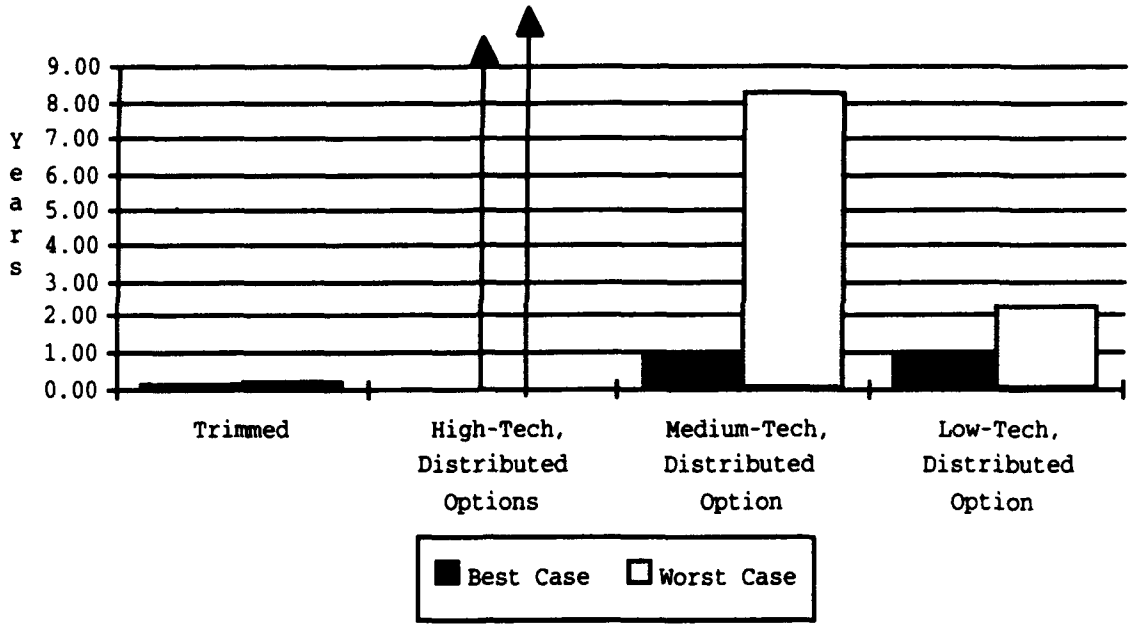

Figure 4.1—Break-Even Analysis

Table 4.15

Comparisons of Alternatives: Low-Cost Assumptions

Costs/Savings	Trimmed	Distributed: High Tech	Distributed: Medium Tech	Distributed: Low Tech
Recurring costs/(savings)				
Manpower	($1,041,000)	($893,000)	($1,541,000)	($1,580,000)
Equipment	($126,000)	$1,459,000	($54,000)	($33,000)
Facilities	$495,000	($166,000)	($166,000)	($166,000)
Total	($672,000)	$400,000	($1,761,000)	($1,779,000)
Nonrecurring costs				
Manpower	$77,000	$651,000	$629,000	$587,000
Equipment	$1,000	$1,358,000	$50,000	$43,000
Facilities	N/A	$991,000	$991,000	$950,000
Total	$78,000	$3,000,000	$1,670,000	$1,580,000

NOTE: 1992 dollars rounded to thousands.

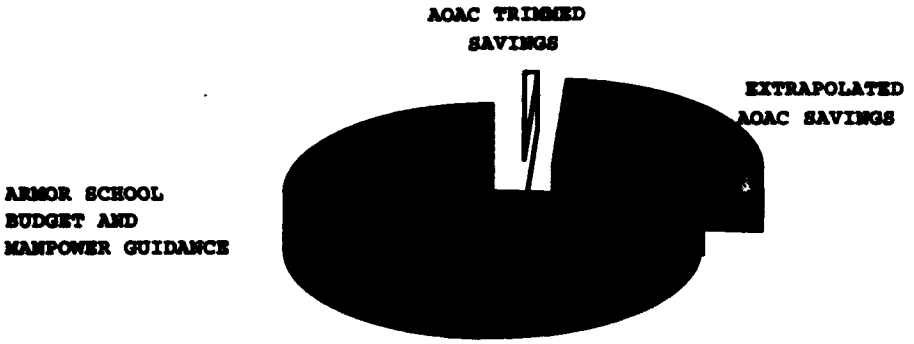

Figure 4.2—Sizing the Change

Table 4.16

Comparisons of Alternatives: High-Cost Assumptions

Costs/Savings	Trimmed	Distributed: High Tech	Distributed: Medium Tech	Distributed: Low Tech
Recurring costs/(savings)				
Manpower	$464,000	($266,000)	($363,000)	($363,000)
Equipment	($190,000)	$1,632,000	$131,000	($33,000)
Facilities	($785,000)	($400,000)	($661,000)	($537,000)
Total	($511,000)	$966,000	($893,000)	($933,000)
Nonrecurring costs				
Manpower	$77,000	$171,000	$171,000	$171,000
Equipment	$8,000	$5,521,000	$2,521,000	$1,064,000
Facilities	N/A	$3,513,000	$4,678,000	$950,000
Total	$85,000	$9,205,000	$7,370,000	$2,185,000

NOTE: 1992 dollars rounded to thousands.

Trade-Offs

There are some important qualitative trade-offs that need to be considered in the analysis. These include the potential effects on proficiency for the units that result from changing the training, the morale effects of family separations if AOAC changes from PCS to TDY, and extended workdays if extensive distributed training occurs during off-duty hours.

Under our best-case or low-cost assumptions, we are requiring these soldiers to spend their off-duty time training. We are increasing the soldiers' workdays without any real compensating changes, and this requirement may have spillover effects on both morale and attrition. Also, under the best-case scenario, the extent of the training is reduced, and it is self-directed. The magnitude of the effects of these two factors on the soldiers' proficiency and the units' capability is not known.

In addition, under our best-case scenario, we are not adding any additional equipment or facilities. The potential costs for reversing the decision to distribute the AOAC training, if the effects on proficiency are sufficiently negative, are not as great as those for the worst-case scenario where the Army is investing in both equipment and extended learning centers.

Under the worst-case scenario, we are expecting that the soldiers are trained during on-duty hours. This has a less negative effect on morale because we are not increasing the workday, but there is a trade-off in readiness and capability. These soldiers are not available for their regular assignment in the units, and they are still not as thoroughly trained at the end of the changed AOAC.

5. Conclusions and Implications

To cope with declining resources and budgets, the Army is reviewing its customary methods of training individual skills, with the goal of finding ways to train more efficiently. New concepts, such as distributed training, have been proposed as a means for reducing training costs and increasing efficiency, but further analysis is needed to refine such concepts to ensure that they reduce costs and prove feasible in practice. The goal of our research effort is to develop and apply new tools for linking new training concepts with specific individual training programs and for analyzing the effects of training changes on Army individual training costs. To this end, we have developed a method that analyzes military occupational specialties, selects training programs for in-depth study, analyzes job duties, suggests training options, and assesses cost and resource implications of training changes.

This document details the results of applying our training and cost analysis methods in a specific specialized skill training course—the AOAC. It considers changes in training content, timing, location, and media consistent with concepts of distributed training and the fundamental training objectives of the AOAC. We draw three general conclusions from our analysis.

Current Training Programs Can Be Made More Efficient

Despite severe reductions in training budgets and resources in recent years, steps can still be taken to improve the efficiency of individual training programs. Our analysis shows that AOAC contains approximately one week of material unrelated to job performance that could be considered for elimination from resident training. Some of this material is mandated by TRADOC; other tasks reflect the philosophical preferences of commanders and training developers. Other training programs presumably also contain material that is mandated or "nice to have" but that is not as closely tied to job requirements as other tasks in the POI.

As part of the continuing effort to reduce training costs and improve operating efficiency, training managers should review existing training programs to ensure close alignment of training programs and job requirements. Topics and tasks that bear directly on job performance requirements should be accorded highest priority for resident training. A formal method for analyzing training

requirements and costs of alternative training programs, such as that described in this report, can provide objective information for determining the tasks that need training, and which of these need to be trained in-residence.

A broad and objective review of training programs, aimed at "scrubbing" training courses to remove extraneous material, could free a respectable amount of resources. These could be used to reduce training costs or to provide necessary training that is not currently resourced.

Distributed Training Can Provide Limited Savings

Our analysis suggests that distributed training has a limited role as a strategy for reducing training costs and increasing the efficiency of individual training. Routine administrative tasks and background information that are now included in AOAC resident training appear suitable for distributed training. In principle, AOAC's course length could be decreased by as much as 25 percent by eliminating or distributing current course material while still meeting the core training objectives. In this sense this analysis "validates" the potential applicability of distributed training for AOAC, and presumably for similar skill progression courses.

However, the potential for distributed training is limited because the amount of distributable material is smaller than that associated with initial expectations. Our analysis suggests the maximum potential for reducing course length appears on the order of 25 percent—not the 40–60 percent called for in initial planning. But even this quantity of distributed training could prove excessively taxing for soldiers to accomplish and for field units to administer. Four weeks of institutional training may take many months to complete. Given the time span required to undergo this training, material may be forgotten by the time the AOAC student arrives for resident training.

The degree to which distributed training can provide cost savings depends on two additional considerations. One is the mix of training media and technologies used to conduct distributed training. The higher the level of technology used in the mix, the greater the start-up costs and the smaller the recurring savings. In this analysis, using paper-based training media to support four weeks of distributed training seems cost-feasible under all sets of assumptions in our analysis. A media mix employing televideo does not appear cost-feasible under any circumstances. A mixture of paper-based tools, videotape, and computer-based training could be feasible, if capital investments are minimal and distributed training technologies are already available at home station.

But selection of training media to support distributed training will also alter the quality of the instruction. Paper-based instruction may be lowest in cost but less effective than current training methods. The sheer volume of paper combined with the duty demands on the average junior Armor officer may well make this a futile option. Varying training media may well help the student move through material quicker and help him retain the information better, but the cost of training development and support may exceed the Army's ability to pay—even if the short-run costs are potentially recouped in the long run.

Cost savings also depend importantly on whether sufficient capacity exists to conduct distributed training at soldiers' home stations. If distributed training can be conducted during off-hours in existing facilities (e.g., learning centers) with no additional requirements generated for training manpower (e.g., for the persons managing the learning center), then cost savings can be substantial. As facilities require expansion or remodeling, or as new requirements are generated to support the distributed training, the costs for the Army as a whole can more than offset any savings realized in the TRADOC system.

The capacity of soldiers, learning centers, and field units to accommodate distributed training is among the most critical issues in determining the costs and feasibility of distributed training. Whereas some resource "slack" may exist in some units that would enable some amount of distributed training to be implemented at fairly low cost, there is a point at which this "slack" is exhausted and significant investments will be required in order to support distributed training. This point will become apparent quickly as more training is distributed within and across existing training programs.

Ultimately, implementing this concept requires careful consideration of the effects on the field units and the qualifications of the graduates themselves. An extensive distributed training requirement may seriously affect daily operations and readiness of field units. Course work may require officers to use on-duty time; conversely, implementing an extensive distributed training course may mean reduced soldier morale if already lengthy duty days are extended. This dissatisfaction may be compounded by the separation from family to attend the resident course as it converts from PCS to TDY. Although our analysis assumed that only active component Armor officers attended the AOAC, there may be significant impact on other current student populations. All student populations must be considered in the design of distributed training course requirements and instructional content.

Altogether, these considerations argue for a modest role for distributed training, involving in-place technologies such as paper, videotape, and personal

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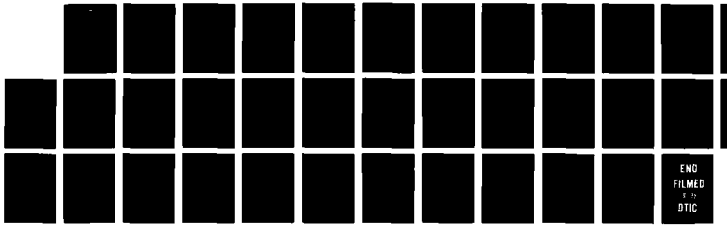

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computers, and only as much material as can be absorbed by soldiers and field units without interfering with daily operations and readiness. These principles imply restricted potential for expanding distributed training (e.g., to provide a small amount of prerequisite preparation for courses such as AOAC). Cost savings might be worthwhile but not sufficient on their own to cope with dramatic declines in training resources and budgets.

The Potential to Reduce Course Length Is Limited

Through systematic consideration of the job duties of Armor captains, and in balancing AOAC's training objectives with principles embodied in the distributed training strategy, we gained insights into the limits of a strategy that seeks to reduce course length and resource utilization. Whereas shrinking resident training is a logical mechanism for reducing training costs, such efforts will eventually require senior leaders to seriously reevaluate the basic assumptions upon which a training program is built. There is a limit to which a training program can absorb a reduction in resources without undermining training objectives and the competency of course graduates. At that point, training policymakers will need to reconsider basic assumptions governing individual skill training, including its objectives, roles, and responsibilities, and resourcing mechanisms.

Appendix
A. AOAC Task Rankings

Table A.1

Tasks Ranked on Factor 1: Critical Company-Grade Tasks

Rank	Title	Factor Score
1	Perform map reconnaissance	1.7198
2	Analyze terrain	1.5682
3	Recognize threat tactics and battlefield organization	1.4426
4	Prepare a battalion situation report	1.3387
5	Prepare an officer evaluation support form	1.2607
6	Use a map overlay	1.2528
7	Prioritize and resource tasks for training	1.2011
8	Collect/report information (SALUTE)	1.1781
9	Prepare/review an enlisted evaluation report	1.1679
10	Conduct collective training	1.1591
11	Prepare to conduct training	1.1353
12	Select missions for training	1.1253
13	Prepare and issue a company troop OPORD	1.1131
14	Determine a location on the ground by terrain association	1.0894
15	Prepare and issue a FRAGO at company/troop level	1.0847
16	Orient a map to the ground by map-terrain association	1.0649
17	Identify terrain features on a map	1.0576
18	Implement mission-oriented protective posture (MOPP)	1.0209
19	Coordinate with adjacent units	1.0018
20	Designate positions for key weapons systems	0.9810
21	Measure distance on a map	0.9764
22	Monitor preventive maintenance checks and services (PMCS)	0.9695
23	Control techniques of movement	0.9256
24	Call for/adjust indirect fire	0.9149
25	Supervise unit movement operations	0.9072
26	Assign fields of fire	0.9071
27	Evaluate the conduct of training	0.9003
28	Plan occupation/defense of a battle position at company/troop level	0.8920
29	Maintain accountability of TOE equipment	0.8783
30	Direct defense of a battle position at company level	0.8714
31	Plan a hasty defense at company level	0.8669
32	Direct actions on contact at company/troop level	0.8629
33	Provide input concerning the status of training	0.8568
34	Plan a deliberate attack at company level	0.8517
35	Direct a hasty attack at company/troop level	0.8417
36	Direct a movement to contact at company level	0.8403
37	Plan a hasty attack at company/troop level	0.8307
38	Direct defense in sector at company/troop level	0.8302
39	Conduct inventories of supplies, weapons, and equipment	0.8239
40	Plan a movement to contact at company level	0.8208
41	Prepare/operate communications security equipment TSEC/KY-57	0.8208
42	Establish accountability of TOE equipment	0.8191

Table A.1—continued

Rank	Title	Factor Score
43	Direct a hasty defense at company level	0.8125
44	Conduct a training meeting	0.8069
45	Adjust indirect fire through FIST (fire support team)	0.8061
46	Transmit/receive messages on platoon/company radios	0.8052
47	Direct a counterattack at company level	0.8052
48	Direct a deliberate attack at company level	0.8020
49	Direct battle handover/passage of lines at company level	0.7911
50	Prepare the officer evaluation report (DA Form 67-8)	0.7905
51	Conduct an After Action Review	0.7633
52	Plan a counterattack at company level	0.7610
53	Direct occupation of a battle position at company/troop level	0.7577
54	Plan a defense in sector at company/troop level	0.7497
55	Direct a tactical road march at company level	0.7300
56	Direct a hasty breach at company level	0.7287
57	Draft and edit military correspondence using the Army Writing Program	0.7237
58	Plan battle handover/passage of lines	0.7186
59	Plan a tactical road march at company level	0.7110
60	Plan a hasty breach at company level	0.7075
61	Prepare a unit training schedule	0.6985
62	Plan assembly area activities at company level	0.6798
63	Conduct individual training	0.6617
64	Supervise scheduled services	0.6467
65	Direct assembly area activities at company level	0.6385
66	Develop a training and evaluation plan	0.6380
67	Recommend enlisted personnel for promotion to sergeant	0.6095
68	Determine effects of NBC attack on unit personnel	0.5694
69	Plan for reconstitution operation	0.5148
70	Plan a delay at company level	0.5139
71	Write a staff paper	0.5018
72	Prepare unit obstacle plan	0.4778
73	Plan company maintenance program for unit equipment	0.4761
74	Develop ARTEP evaluation plan	0.4674
75	Supervise unit responses to nuclear attack and/or radiological hazard	0.4664
76	Direct delay operations at company level	0.4600
77	Direct company maintenance program for unit equipment	0.4551
78	Review property adjustment documents	0.4473
79	Request immediate close air support	0.4430
80	Plan a bypass at company level	0.4395
81	Plan a withdrawal at company level	0.4255
82	Direct a withdrawal at company level	0.4176
83	Direct a bypass at company/troop level	0.4129
84	Schedule use of local training areas	0.4125
85	Plan combat service support operations at company/troop level	0.4058
86	Use the KTC-1400 to authenticate transmissions and encrypt/decrypt messages	0.4045
87	Administer nonjudicial punishment	0.4006
88	Direct mandated training programs	0.3968
89	Authorize searches, inspections, and inventories	0.3746

Table A.1—continued

Rank	Title	Factor Score
90	Encode and decode messages using KTC 600 tactical operations code	0.3715
91	Prepare paragraphs 1, 2, 3, 4, and 5 of the battalion/squadron OPORD	0.3677
92	Plan a relief in place at company level	0.3633
93	Conduct a search and seize evidence/contraband	0.3589
94	Develop skill qualification training (SQT) training program	0.3547
95	Inspect DA Form 2408-4 (Weapons Record Data) for accuracy	0.3516
96	Direct strongpoint defense at company level	0.3482
97	Manage a COFT training program	0.3472
98	Plan a strongpoint defense at company level	0.3441
99	Determine field service support requirements	0.3408
100	Direct a relief in place at company level	0.3360
101	Design a short-range training plan	0.3351
102	Request attack helicopter support	0.3165
103	Supervise organization and operation of unit motor pool	0.3096
104	Direct combat service support operations at company/troop level	0.2896
105	Interview a witness or suspect	0.2824
106	Plan for the conduct of selected tactical tables	0.2714
107	Supervise unit maintenance operations	0.2659
108	Conduct combat operations according to the law of war	0.2635
109	Prepare and issue a FRAGO at battalion/squadron level	0.2512
110	Conduct preliminary inquiry concerning suspected offenses	0.2447
111	Establish unit maintenance safety program	0.2111
112	Direct ARTEP evaluation	0.2106
113	Conduct property document adjustments	0.1813
114	Attain a sustainment level of proficiency on COFT	0.1679
115	Direct unit TEWT	0.1610
116	Direct field training exercise	0.1566
117	Review a request and authority for leave form (DA Form 31)	0.1209
118	Develop a plan for command training inspections and tests	0.0959
119	Supervise AOAP (Army Oil Analysis Program)	0.0847
120	Direct use of local training areas	0.0771
121	Safeguard and make disposition of evidence/contraband	0.0652
122	Conduct unit reenlistment program	0.0580
123	Describe nuclear weapons effects	0.0510
124	Plan for rear area operations	0.0416
125	Monitor manual or automated property accounting procedures	0.0356
126	Initiate/remove a report for suspension of favorable person	0.0307
127	Implement methods to extend range of radio communications	0.0279
128	Apprehend a suspected law or regulation violator and conduct a search	0.0098
129	Detect and identify targets	0.0068
130	Direct maintenance of training publications, files, and records	0.0009
131	Administer the unit alcohol and drug abuse program	-0.0032
132	Determine status of maintenance publications in unit	-0.0195
133	Plan for medical operations at unit level	-0.0228
134	Develop a unit readiness exercise	-0.0497
135	Prepare a materiel condition status report	-0.0607
136	Direct main gun engagements on an M1/M1A1 tank	-0.0661
137	Review the unit manning report	-0.0701

Table A.1—continued

Rank	Title	Factor Score
138	Review a personnel action form (DA Form 4187)	–0.0706
139	Plan a screen operation at troop level	–0.0744
140	Perform tank commander's prepare-to-fire checks and services	–0.0821
141	Inspect ammunition for compliance with storage, safety, and security regulations	–0.0856
142	Direct a route reconnaissance at troop level	–0.0962
143	Direct an area reconnaissance at troop level	–0.0983
144	Plan an area/zone reconnaissance at troop level	–0.1040
145	Plan a route reconnaissance at troop level	–0.1062
146	Direct a zone reconnaissance at troop level	–0.1098
147	Supervise the establishment/displacement of the tactical	–0.1136
148	Conduct electronic counter-countermeasures	–0.1502
149	Conduct/prepare a staff study	–0.1544
150	Direct a MOUT operation at company level	–0.1563
151	Direct storage of repair parts/maintenance supplies	–0.1662
152	Impose restraint pending disposition of an offense	–0.1716
153	Plan for the collection of combat intelligence to support tactical operations at company level	–0.1721
154	Direct arms room security	–0.1850
155	Supervise dispatching of platoon vehicles	–0.1945
156	Plan a MOUT operation at company level	–0.1950
157	Direct the creation and neutralization of obstacles	–0.1961
158	Plan the intelligence preparation of the battlefield	–0.1982
159	Engage targets with the main gun from the commander's weapon	–0.2171
160	Develop a plan for the administrative movement of troops	–0.2397
161	Determine range to a target using the immediate and deliberate methods	–0.2413
162	Construct field expedient antennas	–0.2967
163	Direct screen operation at troop level	–0.3113
164	Plan a defense in sector at battalion/squadron level	–0.3135
165	Plan a tactical road march at battalion/squadron level	–0.3169
166	Plan combat service support operations at battalion/squadron level	–0.3215
167	Direct unit bulk petroleum (fuel) operations	–0.3250
168	Direct the use of unit tools and test equipment	–0.3435
169	Plan battalion maintenance program for unit equipment	–0.3444
170	Zero a caliber .50 M2 HB machine gun on an M1/M1A1 tank	–0.3514
171	Recommend procedures for controlling surface traffic	–0.3523
172	Develop OPSEC plan	–0.3615
173	Prepare a report of completion of laying a minefield	–0.3683
174	Plan a hasty defense at battalion level	–0.3767
175	Administer unit physical security program	–0.4025
176	Plan a movement to contact at battalion level	–0.4265
177	Plan occupation/defense of a battle position at battalion level	–0.4281
178	Plan a deliberate attack at battalion level	–0.4371
179	Plan a hasty attack at battalion level	–0.4376
180	Prepare a report of intention to lay a minefield	–0.4415
181	Plan a counterattack at battalion level	–0.4534
182	Prepare a report of initiation of laying a minefield	–0.4604
183	Administer unit crime prevention program	–0.4819
184	Direct the battalion maintenance program for unit equipment	–0.4867

Table A.1—continued

Rank	Title	Factor Score
185	Supervise the search recovery reporting and evacuation	–0.4895
186	Establish controls to preclude obligations in excess of available funds	–0.4924
187	Plan assembly area activities at battalion level	–0.5052
188	Direct combat service support operations at battalion/squadron level	–0.5227
189	Direct command post exercise	–0.5247
190	Plan a delay at battalion level	–0.5566
191	Direct storage/distribution of supplies/equipment	–0.6038
192	Plan a hasty breach at battalion level	–0.6119
193	Plan for movement by air and surface mode at battalion level	–0.6185
194	Direct defense in sector at battalion/squadron level	–0.6395
195	Direct TOC operations at battalion level	–0.6421
196	Direct a hasty defense at battalion level	–0.6762
197	Engage targets with the M240 coax machine gun from the commander's position	–0.6790
198	Direct defense of a battle position at battalion level	–0.6830
199	Direct collection/disposition of excess/salvage supplies	–0.6963
200	Direct economy of force missions	–0.7117
201	Direct battle handover/passage of lines at battalion/squadron level	–0.7152
202	Plan a strongpoint defense at battalion level	–0.7213
203	Plan a relief in place at battalion level	–0.7224
204	Direct cover operations	–0.7509
205	Direct a movement to contact at battalion level	–0.7603
206	Direct occupation of a battle position at battalion level	–0.7626
207	Plan withdrawal at battalion level	–0.7631
208	Plan a raid	–0.7639
209	Direct a deliberate attack at battalion level	–0.7912
210	Plan a pursuit at battalion level	–0.7947
211	Identify the fundamentals of field medical support at the unit and division levels	–0.7962
212	Direct a tactical road march at battalion/squadron level	–0.8171
213	Install/remove an M240 machine gun in the commander's weapon station	–0.8269
214	Direct a counterattack at battalion level	–0.8343
215	Direct a hasty attack at battalion level	–0.8363
216	Plan to locate assets within the brigade support area	–0.8636
217	Direct a hasty breach at battalion level	–0.8689
218	Direct delay operations at battalion level	–0.8760
219	Plan a zone/area reconnaissance at squadron level	–0.8894
220	Direct assembly area activities at battalion level	–0.8933
221	Establish silent watch from M1/M1A1 tank	–0.9030
222	Plan a screen at squadron level	–0.9071
223	Engage targets with the M240 machine gun in the commander's position	–0.9144
224	Direct a relief in place at battalion level	–0.9155
225	Direct a strongpoint defense at battalion level	–0.9488
226	Plan guard operations at squadron level	–0.9784

Table A.1—continued

Rank	Title	Factor Score
227	Direct withdrawal at battalion level	–0.9819
228	Plan a MOUT operation at battalion level	–1.0085
229	Select mortar firing positions	–1.0197
230	Plan for the collection of combat intelligence to support tactical operations at battalion level	–1.0814
231	Direct guard operations at squadron level	–1.1160
232	Direct a screen at squadron level	–1.1430
233	Direct an area reconnaissance at squadron level	–1.1815
234	Direct a zone reconnaissance at squadron level	–1.1974
235	Control movement of mortar section/squad	–1.2231
236	Plan to locate the brigade main and rear TAC CPs (tactical command posts)	–1.2306
237	Direct a MOUT operation at battalion level	–1.2631
238	Plan combat service support operations at brigade level	–1.3756
239	Plan a movement to contact at brigade level	–1.4322
240	Plan a delay at brigade level	–1.4888
241	Plan a withdrawal at brigade level	–1.4901
242	Plan a relief in place at brigade level	–1.5168
243	Plan a deliberate attack at brigade level	–1.5303
244	Plan a defense in sector at brigade level	–1.5402
245	Plan an exploitation at brigade level	–1.5840
246	Plan a pursuit at brigade level	–1.5863
247	Plan assembly area activities at brigade level	–1.5967
248	Manifest personnel involved in airborne operation	–1.8575
249	Develop airborne assault plan	–1.8938
250	Direct airborne assault	–2.0200
251	Direct assembly of tactical unit after jump	–2.0837

Table A.2

Tasks Ranked on Factor 2: Frequent Procedural Tasks

Rank	Title	Factor Score
1	Direct guard operations at squadron level	0.6362
2	Direct airborne assault	0.6362
3	Plan guard operations at squadron level	0.6288
4	Plan a zone/area reconnaissance at squadron level	0.6288
5	Direct a zone reconnaissance at squadron level	0.6288
6	Direct assembly of tactical unit after jump	0.6288
7	Engage targets with the M240 machine gun in the commander's position	0.6215
8	Plan a route reconnaissance at troop level	0.6215
9	Plan a screen at squadron level	0.6215
10	Develop airborne assault plan	0.6215
11	Direct cover operations	0.6215
12	Plan a withdrawal at brigade level	0.6141
13	Plan an area/zone reconnaissance at troop level	0.6141
14	Direct an area reconnaissance at squadron level	0.6141
15	Manifest personnel involved in airborne operation	0.6141
16	Engage targets with the M240 coax machine gun from the commander's position	0.6067
17	Direct an area reconnaissance at troop level	0.6067
18	Direct a zone reconnaissance at troop level	0.6067
19	Plan a deliberate attack at brigade level	0.6067
20	Plan a relief in place at brigade level	0.6067
21	Control movement of mortar section/squad	0.5993
22	Select mortar firing positions	0.5993
23	Plan a delay at brigade level	0.5993
24	Plan assembly area activities at brigade level	0.5919
25	Plan a pursuit at brigade level	0.5846
26	Plan an exploitation at brigade level	0.5772
27	Direct economy of force missions	0.5772
28	Plan a movement to contact at brigade level	0.5698
29	Direct defense in sector at battalion/squadron level	0.5698
30	Plan a screen operation at troop level	0.5698
31	Direct a route reconnaissance at troop level	0.5624
32	Direct screen operation at troop level	0.5624
33	Plan for rear area operations	0.5624
34	Plan a strongpoint defense at battalion level	0.5550
35	Direct a strongpoint defense at battalion level	0.5477
36	Request immediate close air support	0.5403
37	Plan to locate assets within the brigade support area	0.5403
38	Plan battle handover/passage of lines	0.5403
39	Plan combat service support operations at brigade level	0.5403
40	Plan for medical operations at unit level	0.5403
41	Conduct combat operations according to the law of war	0.5255
42	Plan for the collection of combat intelligence to support tactical operations at company level	0.5255

Table A.2—continued

Rank	Title	Factor Score
43	Direct unit TEWT	0.5255
44	Determine range to a target using the immediate and deliberate methods	0.5181
45	Plan a hasty defense at battalion level	0.5108
46	Plan a tactical road march at battalion/squadron level	0.5034
47	Detect and identify targets	0.4960
48	Assign fields of fire	0.4960
49	Plan a deliberate attack at battalion level	0.4960
50	Direct a movement to contact at company level	0.4960
51	Plan a counterattack at battalion level	0.4960
52	Call for/adjust indirect fire	0.4886
53	Request attack helicopter support	0.4886
54	Prepare unit obstacle plan	0.4886
55	Plan withdrawal at battalion level	0.4886
56	Plan a movement to contact at company level	0.4886
57	Plan a movement to contact at battalion level	0.4886
58	Plan a hasty attack at company/troop level	0.4886
59	Plan occupation/defense of a battle position at battalion level	0.4886
60	Direct actions on contact at company/troop level	0.4886
61	Direct battle handover/passage of lines at company level	0.4886
62	Plan a bypass at company level	0.4886
63	Direct command post exercise	0.4886
64	Direct a deliberate attack at company level	0.4812
65	Plan a hasty attack at battalion level	0.4812
66	Plan a delay at company level	0.4812
67	Plan a delay at battalion level	0.4812
68	Plan a relief in place at battalion level	0.4812
69	Plan for the conduct of selected tactical tables	0.4812
70	Plan a deliberate attack at company level	0.4739
71	Plan a defense in sector at battalion/squadron level	0.4739
72	Direct a counterattack at company level	0.4739
73	Direct a hasty breach at company level	0.4739
74	Direct a bypass at company/troop level	0.4739
75	Direct a screen at squadron level	0.4739
76	Direct a tactical road march at company level	0.4739
77	Plan assembly area activities at battalion level	0.4739
78	Supervise the search recovery reporting and evacuation of casualties	0.4739
79	Direct field training exercise	0.4739
80	Direct use of local training areas	0.4739
81	Identify the fundamentals of field medical support at the unit and division levels	0.4665
82	Designate positions for key weapons systems	0.4665
83	Direct a hasty attack at company/troop level	0.4665
84	Direct a hasty defense at battalion level	0.4665
85	Plan a withdrawal at company level	0.4665
86	Direct a withdrawal at company level	0.4665
87	Plan the intelligence preparation of the battlefield	0.4665
88	Plan for reconstitution operation	0.4665
89	Collect/report information (SALUTE)	0.4591

Table A.2—continued

Rank	Title	Factor Score
90	Direct main gun engagements on an M1/M1A1 tank	0.4591
91	Direct delay operations at company level	0.4591
92	Plan a pursuit at battalion level	0.4591
93	Plan a hasty breach at battalion level	0.4591
94	Plan a tactical road march at company level	0.4591
95	Control techniques of movement	0.4517
96	Plan a hasty defense at company level	0.4517
97	Develop SQT training program	0.4517
98	Implement mission-oriented protective posture (MOPP)	0.4443
99	Direct a deliberate attack at battalion level	0.4443
100	Plan a hasty breach at company level	0.4443
101	Direct battle handover/passage of lines at battalion/squadron level	0.4443
102	Direct defense of a battle position at company level	0.4443
103	Plan a counterattack at company level	0.4370
104	Direct strongpoint defense at company level	0.4370
105	Direct a relief in place at company level	0.4370
106	Direct a movement to contact at battalion level	0.4370
107	Direct a hasty defense at company level	0.4370
108	Plan a defense in sector at company/troop level	0.4370
109	Plan occupation/defense of a battle position at company/troop level	0.4370
110	Direct a counterattack at battalion level	0.4370
111	Plan assembly area activities at company level	0.4370
112	Direct assembly area activities at company level	0.4370
113	Coordinate with adjacent units	0.4296
114	Plan a strongpoint defense at company level	0.4296
115	Direct occupation of a battle position at company/troop level	0.4296
116	Direct defense in sector at company/troop level	0.4222
117	Supervise the establishment/displacement of the tactical operations center	0.4222
118	Direct a hasty attack at battalion level	0.4222
119	Plan a MOUT operation at battalion level	0.4222
120	Prepare a battalion situation report	0.4074
121	Direct occupation of a battle position at battalion level	0.4074
122	Direct defense of a battle position at battalion level	0.4074
123	Plan a relief in place at company level	0.4001
124	Develop a unit readiness exercise	0.4001
125	Recognize threat tactics and battlefield organization	0.3927
126	Prepare and issue a company/troop OPORD	0.3927
127	Plan a raid	0.3927
128	Direct ARTEP evaluation	0.3853
129	Direct delay operations at battalion level	0.3779
130	Direct a hasty breach at battalion level	0.3779
131	Direct a tactical road march at battalion/squadron level	0.3779
132	Attain a sustainment level of proficiency on COFT	0.3779
133	Direct combat service support operations at company/troop level	0.3779
134	Prepare and issue a FRAGO at battalion/squadron level	0.3705
135	Direct withdrawal at battalion level	0.3632
136	Prepare paragraphs 1, 2, 3, 4, and 5 of the battalion/squadron OPORD	0.3632
137	Direct assembly area activities at battalion level	0.3632

Table A.2—continued

Rank	Title	Factor Score
138	Plan combat service support operations at company/troop level	0.3632
139	Develop ARTEP evaluation plan	0.3484
140	Plan a MOUT operation at company level	0.3410
141	Determine field service support requirements	0.3410
142	Plan to locate the brigade TAC main and rear CPs	0.3189
143	Plan combat service support operations at battalion/squadron level	0.3189
144	Prepare and issue a FRAGO at company/troop level	0.3041
145	Direct TOC operations at battalion level	0.3041
146	Direct a relief in place at battalion level	0.2820
147	Direct a MOUT operation at company level	0.2820
148	Use a map overlay	0.2746
149	Plan a defense in sector at brigade level	0.2746
150	Direct a MOUT operation at battalion level	0.2451
151	Plan for the collection of combat intelligence to support tactical operations	0.2451
152	Direct combat service support operations at battalion/squadron level	0.1344
153	Conduct a search and seize evidence/contraband	0.0138
154	Authorize searches, inspections, and inventories	–0.0083
155	Manage a COFT training program	–0.0280
156	Supervise unit movement operations	–0.0452
157	Conduct preliminary inquiry concerning suspected offenses	–0.0452
158	Plan for movement by air and surface mode at battalion level	–0.0674
159	Develop a plan for command training inspections and tests	–0.0674
160	Apprehend a suspected law or regulation violator and conduct a search	–0.0748
161	Prepare the officer evaluation report (DA Form 67-8)	–0.0748
162	Schedule use of local training areas	–0.0748
163	Determine effects of NBC attack on unit personnel	–0.0821
164	Design a short-range training plan	–0.0821
165	Prepare a report of initiation of laying a minefield	–0.0878
166	Prepare a report of intention to lay a minefield	–0.0951
167	Prepare a report of completion of laying a minefield	–0.0951
168	Conduct an After Action Report	–0.0969
169	Conduct/prepare a staff study	–0.1043
170	Establish silent watch from M1/M1A1 tank	–0.1075
171	Encode and decode messages using KTC-600 tactical operations code	–0.1099
172	Develop operations security (OPSEC) plan	–0.1223
173	Construct field expedient antennas	–0.1444
174	Zero a caliber .50 M2 HB machine gun on an M1/M1A1 tank	–0.1468
175	Conduct electronic counter-countermeasures (ECCM)	–0.1518
176	Perform tank commander's prepare-to-fire checks and services	–0.1616
177	Analyze terrain	–0.1707
178	Impose restraint pending disposition of an offense	–0.1813
179	Perform map reconnaissance	–0.2076
180	Orient a map to the ground by map-terrain association	–0.2150
181	Determine a location on the ground by terrain association	–0.2297
182	Direct mandated training programs	–0.2297
183	Plan company maintenance program for unit equipment	–0.2297

Table A.2—continued

Rank	Title	Factor Score
184	Develop a plan for the administrative movement of troops	–0.2297
185	Engage targets with the main gun from the commander's weapon	–0.2354
186	Direct the creation and neutralization of obstacles	–0.2404
187	Direct unit bulk petroleum (fuel) operations	–0.2593
188	Adjust indirect fire through FIST (fire support team)	–0.2846
189	Direct company maintenance program for unit equipment	–0.3035
190	Write a staff paper	–0.3331
191	Prepare/operate communications security equipment TSEC/KY-57	–0.3534
192	Establish unit maintenance safety program	–0.3552
193	Conduct collective training	–0.3921
194	Prepare a unit training schedule	–0.4069
195	Provide input concerning the status of training	–0.4142
196	Conduct a training meeting	–0.4142
197	Transmit/receive messages on platoon/company radios	–0.4568
198	Direct the use of unit tools and test equipment	–0.5249
199	Conduct individual training	–0.5471
200	Direct collection/disposition of excess/salvage supplies	–0.5527
201	Evaluate the conduct of training	–0.5545
202	Select missions for training	–0.5987
203	Prepare to conduct training	–0.6061
204	Safeguard and make disposition of evidence/contraband	–0.6659
205	Prioritize and resource tasks for training	–0.6725
206	Interview a witness or suspect	–0.7152
207	Supervise unit maintenance operations	–0.7242
208	Prepare an officer evaluation support form	–0.7299
209	Inspect DA Form 2408-4 (Weapons Record Data) for accuracy	–0.7323
210	Recommend procedures for controlling surface traffic	–0.7521
211	Direct the battalion maintenance program for unit equipment	–0.7537
212	Supervise unit responses to nuclear attack and/or radiological hazard	–0.7595
213	Conduct unit reenlistment program	–0.7643
214	Install/remove an M240 machine gun in the commander's weapon station	–0.7651
215	Implement methods to extend range of radio communications	–0.7668
216	Determine status of maintenance publications in unit	–0.8430
217	Supervise organization and operation of unit motor pool	–0.8497
218	Administer nonjudicial punishment	–0.8554
219	Prepare/review an enlisted evaluation report	–0.8628
220	Review property adjustment documents	–0.8725
221	Conduct property document adjustments	–0.8725
222	Plan battalion maintenance program for unit equipment	–0.8792
223	Direct maintenance of training publications, files, and records	–0.8873
224	Describe nuclear weapons effects	–0.8979
225	Recommend enlisted personnel for promotion to sergeant	–0.8997
226	Use the KTC-1400 to authenticate transmissions and encrypt/decrypt messages	–0.9127
227	Measure distance on a map	–0.9242
228	Establish controls to preclude obligations in excess of available funds	–0.9292

Table A.2—continued

Rank	Title	Factor Score
229	Direct storage/distribution of supplies/equipment	-0.9512
230	Develop a training and evaluation plan	-0.9661
231	Initiate/remove a report for suspension of favorable person	-1.0104
232	Identify terrain features on a map	-1.0275
233	Supervise scheduled services	-1.0939
234	Monitor preventive maintenance checks and services (PMCS)	-1.1530
235	Supervise dispatching of platoon vehicles	-1.2046
236	Review the unit manning report	-1.2096
237	Establish accountability of TOE equipment	-1.3375
238	Inspect ammunition for compliance with storage, safety, and security regulations	-1.4391
239	Conduct inventories of supplies, weapons, and equipment	-1.5794
240	Supervise AOAP (Army Oil Analysis Program)	-1.6679
241	Administer the unit alcohol and drug abuse program	-1.8377
242	Direct storage of repair parts/maintenance supplies	-1.9115
243	Administer unit physical security program	-1.9557
244	Monitor manual or automated property accounting procedures	-2.0148
245	Administer unit crime prevention program	-2.0517
246	Prepare a materiel condition status report	-2.1050
247	Review a request and authority for leave form (DA Form 31)	-2.1107
248	Direct arms room security	-2.1402
249	Maintain accountability of TOE equipment	-2.3912
250	Review a personnel action form (DA Form 4187)	-2.4502
251	Draft and edit military correspondence using the Army Writing Program	-2.5823

Table A.3

Tasks Ranked on Factor 3: Interactive Leadership Tasks

Rank	Title	Factor Score
1	Direct a MOUT operation at company level	1.1102
2	Plan combat service support operations at battalion/squadron level	1.0831
3	Direct the battalion maintenance program for unit equipment	1.0290
4	Direct defense of a battle position at company level	0.9852
5	Plan a MOUT operation at company level	0.9609
6	Direct combat service support operations at battalion/squadron level	0.9539
7	Direct a counterattack at company level	0.9399
8	Direct delay operations at company level	0.9388
9	Direct occupation of a battle position at company/troop level	0.9376
10	Direct a deliberate attack at company level	0.9355
11	Direct actions on contact at company/troop level	0.9219
12	Direct a movement to contact at company level	0.9200
13	Direct a withdrawal at company level	0.9198
14	Direct a hasty breach at company level	0.9172
15	Direct strongpoint defense at company level	0.9034
16	Direct a hasty attack at company/troop level	0.9016
17	Direct a bypass at company/troop level	0.8988
18	Plan battalion maintenance program for unit equipment	0.8937
19	Plan a deliberate attack at company level	0.8906
20	Plan a delay at company level	0.8754
21	Plan a hasty attack at company/troop level	0.8707
22	Plan a bypass at company level	0.8673
23	Plan a withdrawal at company level	0.8672
24	Direct a relief in place at company level	0.8668
25	Plan a movement to contact at company level	0.8581
26	Plan occupation/defense of a battle position at company/troop level	0.8478
27	Plan a relief in place at company level	0.8395
28	Direct assembly area activities at company level	0.8258
29	Plan a counterattack at company level	0.8247
30	Plan a strongpoint defense at company level	0.8224
31	Supervise the establishment/displacement of the tactical operations center	0.8111
32	Direct a tactical road march at company level	0.8104
33	Direct an area reconnaissance at troop level	0.8060
34	Plan a screen operation at troop level	0.7985
35	Plan a tactical road march at battalion/squadron level	0.7967
36	Direct a hasty defense at company level	0.7922
37	Plan an area/zone reconnaissance at troop level	0.7913
38	Direct a zone reconnaissance at troop level	0.7849
39	Plan a hasty breach at company level	0.7834
40	Plan a relief in place at battalion level	0.7830
41	Direct a route reconnaissance at troop level	0.7822
42	Plan a route reconnaissance at troop level	0.7813
43	Plan a delay at battalion level	0.7678
44	Plan withdrawal at battalion level	0.7624
45	Direct defense in sector at company/troop level	0.7543

Table A.3—continued

Rank	Title	Factor Score
46	Plan for the collection of combat intelligence to support tactical operations	0.7528
47	Direct collection/disposition of excess/salvage supplies	0.7516
48	Plan a defense in sector at battalion/squadron level	0.7473
49	Direct storage/distribution of supplies/equipment	0.7441
50	Plan a hasty attack at battalion level	0.7297
51	Plan for movement by air and surface mode at battalion level	0.7264
52	Direct battle handover/passage of lines at company level	0.7242
53	Plan a movement to contact at battalion level	0.7169
54	Plan for the collection of combat intelligence to support tactical operations	0.7164
55	Plan to locate the brigade TAC main and rear CPs	0.7061
56	Plan a deliberate attack at battalion level	0.6989
57	Direct TOC operations at battalion level	0.6972
58	Plan a pursuit at battalion level	0.6945
59	Plan a MOUT operation at battalion level	0.6891
60	Direct screen operation at troop level	0.6887
61	Plan assembly area activities at battalion level	0.6856
62	Plan a hasty breach at battalion level	0.6790
63	Plan a hasty defense at company level	0.6766
64	Plan assembly area activities at company level	0.6714
65	Plan a counterattack at battalion level	0.6651
66	Plan the intelligence preparation of the battlefield	0.6592
67	Plan a defense in sector at company/troop level	0.6588
68	Plan occupation/defense of a battle position at battalion level	0.6288
69	Plan a strongpoint defense at battalion level	0.6232
70	Plan a hasty defense at battalion level	0.6086
71	Direct unit TEWT	0.5976
72	Direct delay operations at battalion level	0.5929
73	Plan to locate assets within the brigade support area	0.5902
74	Direct a MOUT operation at battalion level	0.5855
75	Direct assembly area activities at battalion level	0.5600
76	Direct a relief in place at battalion level	0.5549
77	Direct a hasty breach at battalion level	0.5516
78	Prepare paragraphs 1, 2, 3, 4, and 5 of the battalion/squadron OPORD	0.5475
79	Direct a strongpoint defense at battalion level	0.5266
80	Develop a plan for the administrative movement of troops	0.5266
81	Plan a zone/area reconnaissance at squadron level	0.5109
82	Direct defense of a battle position at battalion level	0.5086
83	Prepare and issue a FRAGO at battalion/squadron level	0.5049
84	Direct a movement to contact at battalion level	0.5030
85	Direct a tactical road march at battalion/squadron level	0.5011
86	Plan guard operations at squadron level	0.4934
87	Plan combat service support operations at brigade level	0.4929
88	Direct withdrawal at battalion level	0.4800
89	Direct a zone reconnaissance at squadron level	0.4790
90	Direct an area reconnaissance at squadron level	0.4785
91	Direct guard operations at squadron level	0.4732

Table A.3—continued

Rank	Title	Factor Score
92	Direct a deliberate attack at battalion level	0.4651
93	Direct a counterattack at battalion level	0.4649
94	Direct a screen at squadron level	0.4530
95	Prepare and issue a company/troop OPORD	0.4496
96	Direct defense in sector at battalion/squadron level	0.4455
97	Plan a raid	0.4414
98	Direct a hasty defense at battalion level	0.4374
99	Direct command post exercise	0.4331
100	Plan a screen at squadron level	0.4228
101	Direct occupation of a battle position at battalion level	0.4007
102	Plan a defense in sector at brigade level	0.3923
103	Direct battle handover/passage of lines at battalion/squadron level	0.3911
104	Direct a hasty attack at battalion level	0.3638
105	Direct economy of force missions	0.3543
106	Plan a withdrawal at brigade level	0.3528
107	Conduct unit reenlistment program	0.3522
108	Plan assembly area activities at brigade level	0.3498
109	Plan a pursuit at brigade level	0.3318
110	Direct combat service support operations at company/troop level	0.3259
111	Direct airborne assault	0.3234
112	Plan a deliberate attack at brigade level	0.3218
113	Plan an exploitation at brigade level	0.3218
114	Plan battle handover/passage of lines	0.3197
115	Prepare and issue a FRAGO at company/troop level	0.3138
116	Develop a unit readiness exercise	0.3123
117	Plan a relief in place at brigade level	0.3107
118	Manifest personnel involved in airborne operation	0.2984
119	Plan combat service support operations at company/troop level	0.2922
120	Prepare unit obstacle plan	0.2908
121	Direct ARTEP evaluation	0.2867
122	Plan a movement to contact at brigade level	0.2858
123	Plan for rear area operations	0.2841
124	Plan a delay at brigade level	0.2796
125	Direct assembly of tactical unit after jump	0.2779
126	Manage a COFT training program	0.2590
127	Conduct an After Action Review	0.2565
128	Develop airborne assault plan	0.2489
129	Direct field training exercise	0.2449
130	Develop a plan for command training inspections and tests	0.2082
131	Plan company maintenance program for unit equipment	0.2061
132	Direct use of local training areas	0.2060
133	Develop OPSEC plan	0.2047
134	Administer nonjudicial punishment	
135	Plan for medical operations at unit level	0.1965
136	Direct company maintenance program for unit equipment	0.1937
137	Plan for the conduct of selected tactical tables	0.1918
138	Direct cover operations	0.1789
139	Administer the unit alcohol and drug abuse program	0.1648
140	Apprehend a suspected law or regulation violator and conduct a search	0.1207

Table A.3—continued

Rank	Title	Factor Score
141	Control movement of mortar section/squad	0.1188
142	Direct unit bulk petroleum (fuel) operations	0.1137
143	Select mortar firing position	0.0969
144	Conduct a training meeting	0.0562
145	Recommend procedures for controlling surface traffic	0.0490
146	Administer unit crime prevention program	0.0018
147	Direct the creation and neutralization of obstacles	-0.0099
148	Safeguard and make disposition of evidence/contraband	-0.0343
149	Direct arms room security	-0.0397
150	Administer unit physical security program	-0.0493
151	Determine field service support requirements	-0.0832
152	Supervise organization and operation of unit motor pool	-0.0944
153	Plan a tactical road march at company level	-0.1045
154	Supervise the search recovery reporting and evacuation of casualties	-0.1115
155	Schedule use of local training areas	-0.1307
156	Direct maintenance of training publications, files, and records	-0.1335
157	Develop skill qualification training	-0.1372
158	Engage targets with the M240 machine gun in the commander's position	-0.2031
159	Conduct electronic counter-countermeasures	-0.2149
160	Attain a sustainment level of proficiency on COFT	-0.2290
161	Direct storage of repair part and maintenance supplies	-0.2433
162	Conduct combat operations according to the law of war	-0.2645
163	Establish unit maintenance safety program	-0.2648
164	Plan for reconstitution operation	-0.2674
165	Engage targets with the M240 coax machine gun from the commander's position	-0.2981
166	Establish silent watch from M1/M1A1 tank	-0.3028
167	Direct main gun engagements on an M1/M1A1 tank	0.3264
168	Engage targets with the main gun from the commander's weapon	-0.3288
169	Supervise unit responses to nuclear attack and/or radiological hazard	-0.3364
170	Adjust indirect fire through FIST (fire support team)	-0.3596
171	Evaluate the conduct of training	-0.3619
172	Develop ARTEP evaluation plan	-0.3700
173	Conduct a search and seize evidence/contraband	-0.3793
174	Construct field expedient antennas	-0.3814
175	Supervise unit movement operations	-0.3972
176	Implement methods to extend range of radio communications	-0.3998
177	Design a short-range training plan	-0.4213
178	Conduct/prepare a staff study	-0.4507
179	Describe nuclear weapons effects	-0.4530
180	Establish controls to preclude obligations in excess of available funds	-0.4948
181	Initiate/remove a report for suspension of favorable personnel actions	-0.4986
182	Establish accountability of TOE equipment	-0.5064
183	Control techniques of movement	-0.5266
184	Impose restraint pending disposition of an offense	-0.5379
185	Review the unit manning report	-0.5651

Table A.3—continued

Rank	Title	Factor Score
186	Supervise AOAP (Army Oil Analysis Program)	–0.5689
187	Identify the fundamentals of field medical support	–0.6008
188	Determine effects of NBC attack on unit personnel	–0.6065
189	Coordinate with adjacent units	–0.6272
190	Provide input concerning the status of training	–0.6343
191	Prepare a report of initiation of laying a minefield	–0.6428
192	Select missions for training	–0.6550
193	Maintain accountability of TOE equipment	–0.6603
194	Authorize searches, inspection, and inventories	–0.6642
195	Prepare a report of intention to lay a minefield	–0.6716
196	Prepare a report of completion of laying a minefield	–0.6718
197	Monitor preventive maintenance checks and services (PMCS)	–0.6724
198	Request attack helicopter support	–0.6850
199	Prioritize and resource tasks for training	–0.6904
200	Direct mandated training programs	–0.7532
201	Request immediate close air support	–0.7638
202	Call for/adjust indirect fire	–0.7791
203	Supervise dispatching of platoon vehicles	–0.7813
204	Review a personnel action form (DA Form 4187)	–0.7974
205	Designate positions for key weapons systems	–0.7974
206	Supervise scheduled services	–0.8023
207	Conduct collective training	–0.8175
208	Monitor manual or automated property accounting procedures	–0.8291
209	Develop a training and evaluation plan	–0.8347
210	Prepare to conduct training	–0.8381
211	Prepare the officer evaluation report (DA Form 67-8)	–0.8494
212	Conduct individual training	–0.8520
213	Assign fields of fire	–0.8556
214	Conduct inventories of supplies, weapons, and equipment	–0.8732
215	Transmit/receive messages on platoon/company radios	–0.8954
216	Supervise unit maintenance operations	–0.9025
217	Conduct preliminary inquiry concerning suspected offenses	–0.9340
218	Prepare a materiel condition status report	–0.9440
219	Write a staff paper	–0.9645
220	Conduct property document adjustments	–0.9730
221	Implement mission-oriented protective posture (MOPP)	–1.0327
222	Collect/report information (SALUTE)	–1.0680
223	Direct the use of unit tools and test equipment	–1.0685
224	Prepare a battalion situation report	–1.0816
225	Install/remove an M240 machine gun in the commander's weapon station	–1.0898
226	Inspect ammunition for compliance with storage, safety, and security regulations	–1.1149
227	Prepare a unit training schedule	–1.1228
228	Determine range to a target using the immediate and deliberate methods	–1.1400
229	Determine status of maintenance publications in unit	–1.1419
230	Zero a caliber .50 M2 HB machine gun on an M1/M1A1 tank	–1.1629
231	Detect and identify targets	–1.1650
232	Perform tank commander's prepare-to-fire checks and services	–1.1805

Table A.3—continued

Rank	Title	Factor Score
233	Review property adjustment documents	–1.2156
234	Review a request and authority for leave form (DA Form 31)	–1.2191
235	Interview a witness or suspect	–1.2218
236	Draft and edit military correspondence using the Army Writing Program	–1.4062
237	Inspect DA Form 2408-4 (Weapons Record Data) for accuracy	–1.4073
238	Encode and decode messages using KTC 600 tactical operations code	–1.4509
239	Use the KTC-1400 to authenticate transmissions and encrypt/decrypt messages	–1.4867
240	Recommend enlisted personnel for promotion to sergeant	–1.5217
241	Prepare/operate communication security equipment TSEC/KY-57	–1.5681
242	Prepare/review an enlisted evaluation report	–1.7393
243	Prepare an officer evaluation support form	–1.7668
244	Recognize threat tactics and battlefield organization	–1.9343
245	Measure distance on a map	–1.9498
246	Identify terrain features on a map	–1.9877
247	Analyze terrain	–1.9921
248	Determine a location on the ground by terrain association	–1.9949
249	Use a map overlay	–2.0005
250	Orient a map to the ground by map-terrain association	–2.0031
251	Perform map reconnaissance	–2.0232

Table A.4

Tasks Ranked on Factor 4: Urgent Field Command Tasks

Rank	Title	Factor Score
1	Implement mission-oriented protective posture (MOPP)	1.2551
2	Engage targets with the M240 coax machine gun from the commander's position	1.2551
3	Engage targets with the main gun from the commander's weapon station	1.2551
4	Direct main gun engagements on an M1/M1A1 tank	1.2551
5	Conduct electronic counter-countermeasures (ECCM)	1.2551
6	Conduct combat operations according to the law of war	1.2551
7	Direct unit bulk petroleum (fuel) operations	1.2551
8	Direct a route reconnaissance at troop level	1.2551
9	Direct an area reconnaissance at troop level	1.2551
10	Direct a zone reconnaissance at troop level	1.2551
11	Direct screen operation at troop level	1.2551
12	Direct guard operations at squadron level	1.2551
13	Direct delay operations at company level	1.2551
14	Direct defense in sector at company/troop level	1.2551
15	Direct strongpoint defense at company level	1.2551
16	Direct withdrawal at battalion level	1.2551
17	Direct a relief in place at company level	1.2551
18	Direct a hasty attack at company/troop level	1.2551
19	Supervise the establishment/displacement of the tactical operations center	1.2551
20	Direct a deliberate attack at company level	1.2551
21	Direct a deliberate attack at battalion level	1.2551
22	Direct a movement to contact at company level	1.2551
23	Direct a movement to contact at battalion level	1.2551
24	Direct a hasty attack at battalion level	1.2551
25	Direct a strongpoint defense at battalion level	1.2551
26	Direct a hasty defense at company level	1.2551
27	Direct a hasty defense at battalion level	1.2551
28	Direct defense in sector at battalion/squadron level	1.2551
29	Direct actions on contact at company/troop level	1.2551
30	Direct battle handover/passage of lines at company level	1.2551
31	Direct battle handover/passage of lines at battalion/squadron level	1.2551
32	Direct a counterattack at company level	1.2551
33	Direct a counterattack at battalion level	1.2551
34	Direct occupation of a battle position at company/troop level	1.2551
35	Direct occupation of a battle position at battalion level	1.2551
36	Direct defense of a battle position at company level	1.2551
37	Direct defense of a battle position at battalion level	1.2551
38	Direct delay operations at battalion level	1.2551
39	Direct a hasty breach at company level	1.2551
40	Direct a hasty breach at battalion level	1.2551
41	Direct a relief in place at battalion level	1.2551
42	Direct a bypass at company/troop level	1.2551
43	Direct a MOUT operation at company level	1.2551
44	Direct a MOUT operation at battalion level	1.2551

Table A.4—continued

Rank	Title	Factor Score
45	Direct a withdrawal at company level	1.2551
46	Direct an area reconnaissance at squadron level	1.2551
47	Direct a zone reconnaissance at squadron level	1.2551
48	Direct a screen at squadron level	1.2551
49	Direct economy of force missions	1.2551
50	Direct a tactical road march at company level	1.2551
51	Direct a tactical road march at battalion/squadron level	1.2551
52	Direct assembly area activities at company level	1.2551
53	Direct assembly area activities at battalion level	1.2551
54	Direct Tactical Operations Center (TOC) operations at battalion level	1.2551
55	Direct combat service support operations at company/troop level	1.2551
56	Direct combat service support operations at battalion/squadron level	1.2551
57	Direct airborne assault	1.2551
58	Direct assembly of tactical unit after jump	1.2551
59	Supervise the search recovery reporting and evacuation of casualties	1.2551
60	Direct cover operations	1.2551
61	Direct field training exercise	1.2551
62	Direct command post exercise	1.2551
63	Direct unit TEWT	1.2551
64	Direct the creation and neutralization of obstacles	0.5694
65	Supervise unit responses to nuclear attack and/or radiological hazard	0.5694
66	Supervise unit movement operations	0.5694
67	Establish silent watch from M1/M1A1 tank	0.5694
68	Control movement of mortar section/squad	0.5694
69	Direct ARTEP evaluation	0.5694
70	Direct use of local training areas	0.5694
71	Construct field expedient antennas	0.5639
72	Orient a map to the ground by map-terrain association	0.5639
73	Determine a location on the ground by terrain association	0.5639
74	Call for/adjust indirect fire	0.5639
75	Adjust indirect fire through FIST (fire support team)	0.5639
76	Control techniques of movement	0.5639
77	Collect/report information (SALUTE)	0.5639
78	Engage targets with the M240 machine gun in the commander's position	0.5639
79	Request immediate close air support	0.5639
80	Determine effects of NBC attack on unit personnel	0.5639
81	Determine range to a target using the immediate and deliberate methods	0.5639
82	Detect and identify targets	0.5639
83	Coordinate with adjacent units	0.5639
84	Designate positions for key weapons systems	0.5639
85	Assign fields of fire	0.5639
86	Conduct collective training	0.0571
87	Supervise unit maintenance operations	0.0571
88	Maintain accountability of TOE equipment	0.0571
89	Establish accountability of TOE equipment	0.0571
90	Direct mandated training programs	0.0571
91	Direct the use of unit tools and test equipment	0.0571

Table A.4—continued

Rank	Title	Factor Score
92	Supervise scheduled services	0.0571
93	Supervise dispatching of platoon vehicles	0.0571
94	Conduct a training meeting	0.0571
95	Conduct an After Action Report	0.0571
96	Direct the battalion maintenance program for unit equipment	0.0571
97	Direct company maintenance program for unit equipment	0.0571
98	Monitor preventive maintenance checks and services (PMCS)	0.0571
99	Direct storage/distribution of supplies/equipment	0.0571
100	Direct collection/disposition of excess/salvage supplies	0.0571
101	Encode and decode messages using KTC 600 tactical operations code	0.0516
102	Prepare/operate communications security equipment TSEC/KY-57	0.0516
103	Identify terrain features on a map	0.0516
104	Measure distance on a map	0.0516
105	Use a map overlay	0.0516
106	Request attack helicopter support	0.0516
107	Transmit/receive messages on platoon/company radios	0.0516
108	Use the KTC-1400 to authenticate transmissions and encrypt/decrypt messages	0.0516
109	Perform map reconnaissance	0.0516
110	Recognize threat tactics and battlefield organization	0.0516
111	Apprehend a suspected law or regulation violator and conduct a search	0.0516
112	Conduct a search and seize evidence/contraband	0.0516
113	Interview a witness or suspect	0.0516
114	Authorize searches, inspections, and inventories	0.0516
115	Prepare and issue a FRAGO at company/troop level	0.0516
116	Prepare and issue a FRAGO at battalion/squadron level	0.0516
117	Impose restraint pending disposition of an offense	0.0516
118	Analyze terrain	–0.1217
119	Zero a caliber .50 M2 HB machine gun on an M1/M1A1 tank	–0.1217
120	Select mortar firing positions	–0.1217
121	Prepare a report of intention to lay a minefield	–0.1217
122	Prepare a report of initiation of laying a minefield	–0.1217
123	Prepare a report of completion of laying a minefield	–0.1217
124	Supervise AOAP (Army Oil Analysis Program)	–0.4552
125	Supervise organization and operation of unit motor pool	–0.4552
126	Manage a COFT training program	–0.4552
127	Attain a sustainment level of proficiency on COFT	–0.4552
128	Direct storage of repair parts/maintenance supplies	–0.4552
129	Direct arms room security	–0.4552
130	Administer unit crime prevention program	–0.4552
131	Direct maintenance of training publications, files, and records	–0.4552
132	Safeguard and make disposition of evidence/contraband	–0.4607
133	Inspect DA Form 2408-4 (Weapons Record Data) for accuracy	–0.6340
134	Perform tank commander's prepare-to-fire checks and services	–0.6340
135	Install/remove an M240 machine gun in the commander's weapon station	–0.6340
136	Implement methods to extend range of radio communications	–0.6340
137	Prepare unit obstacle plan	–0.6340
138	Conduct inventories of supplies, weapons, and equipment	–0.6340

Table A.4—continued

Rank	Title	Factor Score
139	Describe nuclear weapons effects	–0.6340
140	Prepare a battalion situation report	–0.6340
141	Develop OPSEC plan	–0.6340
142	Select missions for training	–0.6340
143	Prioritize and resource tasks for training	–0.6340
144	Prepare to conduct training	–0.6340
145	Evaluate the conduct of training	–0.6340
146	Develop a training and evaluation plan	–0.6340
147	Inspect ammunition for compliance with storage, safety, and security regulations	–0.6340
148	Conduct preliminary inquiry concerning suspected offenses	–0.6340
149	Provide input concerning the status of training	–0.6340
150	Identify the fundamentals of field medical support	–0.6340
151	Review property adjustment documents	–0.6340
152	Conduct property document adjustments	–0.6340
153	Conduct individual training	–0.6340
154	Plan to locate assets within the brigade support area	–0.6340
155	Plan a counterattack at company level	–0.6340
156	Plan withdrawal at battalion level	–0.6340
157	Plan a deliberate attack at battalion level	–0.6340
158	Plan a movement to contact at company level	–0.6340
159	Plan a pursuit at battalion level	–0.6340
160	Plan for rear area operations	–0.6340
161	Prepare paragraphs 1, 2, 3, 4, and 5 of the battalion/squadron OPORD	–0.6340
162	Plan a deliberate attack at company level	–0.6340
163	Plan a deliberate attack at brigade level	–0.6340
164	Plan a movement to contact at battalion level	–0.6340
165	Plan a movement to contact at brigade level	–0.6340
166	Plan a hasty attack at company/troop level	–0.6340
167	Plan a hasty attack at battalion level	–0.6340
168	Plan an exploitation at brigade level	–0.6340
169	Plan a pursuit at brigade level	–0.6340
170	Plan a strongpoint defense at company level	–0.6340
171	Plan a strongpoint defense at battalion level	–0.6340
172	Plan a hasty defense at company level	–0.6340
173	Plan a hasty defense at battalion level	–0.6340
174	Plan a defense in sector at company/troop level	–0.6340
175	Plan a defense in sector at battalion/squadron level	–0.6340
176	Plan a defense in sector at brigade level	–0.6340
177	Plan a counterattack at battalion level	–0.6340
178	Plan battle handover/passage of lines	–0.6340
179	Plan occupation/defense of a battle position at company/troop level	–0.6340
180	Plan occupation/defense of a battle position at battalion level	–0.6340
181	Plan a delay at company level	–0.6340
182	Plan a delay at battalion level	–0.6340
183	Plan a delay at brigade level	–0.6340
184	Plan a relief in place at company level	–0.6340

Table A.4—continued

Rank	Title	Factor Score
185	Plan a relief in place at battalion level	–0.6340
186	Plan a relief in place at brigade level	–0.6340
187	Plan a hasty breach at company level	–0.6340
188	Plan a hasty breach at battalion level	–0.6340
189	Prepare and issue a company/troop OPORD	–0.6340
190	Plan a bypass at company level	–0.6340
191	Plan a MOUT operation at company level	–0.6340
192	Plan a MOUT operation at battalion level	–0.6340
193	Plan a withdrawal at company level	–0.6340
194	Plan a withdrawal at brigade level	–0.6340
195	Plan a route reconnaissance at troop level	–0.6340
196	Plan an area/zone reconnaissance at troop level	–0.6340
197	Plan a screen operation at troop level	–0.6340
198	Plan guard operations at squadron level	–0.6340
199	Plan a zone/area reconnaissance at squadron level	–0.6340
200	Plan a screen at squadron level	–0.6340
201	Administer nonjudicial punishment	–0.6340
202	Plan a tactical road march at company level	–0.6340
203	Plan a tactical road march at battalion/squadron level	–0.6340
204	Plan assembly area activities at company level	–0.6340
205	Plan assembly area activities at battalion level	–0.6340
206	Plan assembly area activities at brigade level	–0.6340
207	Plan for the collection of combat intelligence to support tactical operations at company level	–0.6340
208	Plan for the collection of combat intelligence to support tactical operations at battalion level	–0.6340
209	Plan the intelligence preparation of the battlefield	–0.6340
210	Plan to locate the brigade TAC main and rear CPs	–0.6340
211	Develop ARTEP evaluation plan	–0.6340
212	Design a short-range training plan	–0.6340
213	Plan for the conduct of selected tactical tables	–0.6340
214	Prepare a materiel condition status report	–0.6340
215	Plan battalion maintenance program for unit equipment	–0.6340
216	Plan company maintenance program for unit equipment	–0.6340
217	Plan combat service support operations at company/troop level	–0.6340
218	Plan combat service support operations at battalion/squadron level	–0.6340
219	Plan combat service support operations at brigade level	–0.6340
220	Plan for medical operations at unit level	–0.6340
221	Develop airborne assault plan	–0.6340
222	Manifest personnel involved in airborne operation	–0.6340
223	Determine field service support requirements	–0.6340
224	Develop a plan for the administrative movement of troops	–0.6340
225	Plan a raid	–0.6340
226	Plan for reconstitution operation	–0.6340
227	Recommend enlisted personnel for promotion to sergeant	–0.6340
228	Recommend procedures for controlling surface traffic	–0.6340
229	Plan for movement by air and surface mode at battalion level	–0.6340

Table A.4—continued

Rank	Title	Factor Score
230	Develop a plan for command training inspections and tests	–0.6340
231	Develop a unit readiness exercise	–0.6340
232	Establish unit maintenance safety program	–0.6340
233	Draft and edit military correspondence using the Army Writing Program	–1.1463
234	Monitor manual or automated property accounting procedures	–1.1463
235	Prepare/review an enlisted evaluation report	–1.1463
236	Prepare an officer evaluation support form	–1.1463
237	Conduct/prepare a staff study	–1.1463
238	Write a staff paper	–1.1463
239	Administer the unit alcohol and drug abuse program	–1.1463
240	Prepare the officer evaluation report (DA Form 67-8)	–1.1463
241	Prepare a unit training schedule	–1.1463
242	Review a personnel action form (DA Form 4187)	–1.1463
243	Review a request and authority for leave form (DA Form 31)	–1.1463
244	Review the unit manning report	–1.1463
245	Establish controls to preclude obligations in excess of available funds	–1.1463
246	Conduct unit reenlistment program	–1.1463
247	Initiate/remove a report for suspension of favorable person	–1.1463
248	Administer unit physical security program	–1.1463
249	Develop skill qualification training training program	–1.1463
250	Schedule use of local training areas	–1.1463
251	Determine status of maintenance publications in unit	–1.1463

Table A.5

Tasks Ranked on Factor 5: Combined Arms Tasks

Rank	Title	Factor Score
1	Plan a deliberate attack at brigade level	1.2316
2	Plan a movement to contact at brigade level	1.2103
3	Plan an exploitation at brigade level	1.2103
4	Plan a pursuit at brigade level	1.2103
5	Plan a delay at brigade level	1.2103
6	Plan a relief in place at brigade level	1.2103
7	Plan a withdrawal at brigade level	1.1466
8	Plan assembly area activities at brigade level	1.1466
9	Direct a hasty attack at battalion level	1.1253
10	Plan a defense in sector at brigade level	1.1253
11	Direct occupation of a battle position at battalion level	1.0828
12	Direct a deliberate attack at battalion level	1.0616
13	Direct battle handover/passage of lines at battalion/squadron level	1.0616
14	Direct withdrawal at battalion level	1.0403
15	Direct a counterattack at battalion level	1.0403
16	Direct a hasty defense at battalion level	1.0191
17	Direct a movement to contact at battalion level	0.9978
18	Direct a tactical road march at battalion/squadron level	0.9978
19	Direct defense of a battle position at battalion level	0.9751
20	Direct a strongpoint defense at battalion level	0.9538
21	Direct defense in sector at battalion/squadron level	0.9538
22	Direct delay operations at battalion level	0.9538
23	Direct a hasty breach at battalion level	0.9538
24	Direct a relief in place at battalion level	0.9538
25	Direct a MOUT operation at battalion level	0.9538
26	Direct assembly area activities at battalion level	0.9326
27	Plan combat service support operations at brigade level	0.9326
28	Plan a pursuit at battalion level	0.8688
29	Plan a counterattack at battalion level	0.8476
30	Plan occupation/defense of a battle position at battalion level	0.8476
31	Plan a deliberate attack at battalion level	0.8263
32	Plan a hasty defense at battalion level	0.8263
33	Plan a hasty breach at battalion level	0.8263
34	Plan a MOUT operation at battalion level	0.8263
35	Plan a strongpoint defense at battalion level	0.8051
36	Direct an area reconnaissance at squadron level	0.8051
37	Direct a zone reconnaissance at squadron level	0.8051
38	Direct guard operations at squadron level	0.7838
39	Plan a hasty attack at battalion level	0.7838
40	Plan assembly area activities at battalion level	0.7838
41	Plan withdrawal at battalion level	0.7626
42	Plan a delay at battalion level	0.7626
43	Plan a relief in place at battalion level	0.7626
44	Plan guard operations at squadron level	0.7626
45	Direct a screen at squadron level	0.7626
46	Direct cover operations	0.7626
47	Plan a movement to contact at battalion level	0.7398

Table A.5—continued

Rank	Title	Factor Score
48	Plan a defense in sector at battalion/squadron level	0.7398
49	Plan a screen at squadron level	0.7398
50	Plan a zone/area reconnaissance at squadron level	0.6973
51	Plan a tactical road march at battalion/squadron level	0.6548
52	Plan to locate the brigade TAC main and rear CPs	0.6548
53	Plan a raid	0.6548
54	Prepare and issue a FRAGO at battalion/squadron level	0.5911
55	Direct TOC operations at battalion level	0.5911
56	Plan to locate assets within the brigade support area	0.5273
57	Prepare paragraphs 1, 2, 3, 4, and 5 of the battalion/squadron OPORD	0.4408
58	Plan battle handover/passage of lines	0.4196
59	Direct combat service support operations at battalion/squadron level	0.3983
60	Supervise the establishment/displacement of the tactical operations center	0.2921
61	Plan the intelligence preparation of the battlefield	0.2921
62	Plan for reconstitution operation	0.2921
63	Direct screen operation at troop level	0.2708
64	Plan combat service support operations at battalion/squadron level	0.2708
65	Identify the fundamentals of field medical support at the unit and division levels	0.2496
66	Plan for the conduct of selected tactical tables	0.2283
67	Direct delay operations at company level	0.2056
68	Direct battle handover/passage of lines at company level	0.2056
69	Design a short-range training plan	0.2056
70	Manage a COFT training program	0 2056
71	Plan a counterattack at company level	0.1843
72	Direct a relief in place at company level	0.1843
73	Plan for rear area operations	0.1843
74	Plan a MOUT operation at company level	0.1843
75	Evaluate the conduct of training	0.1631
76	Develop a training and evaluation plan	0.1631
77	Plan a relief in place at company level	0.1631
78	Direct a bypass at company/troop level	0.1631
79	Direct a withdrawal at company level	0.1631
80	Plan a tactical road march at company level	0.1631
81	Plan assembly area activities at company level	0.1631
82	Direct combat service support operations at company/troop level	0.1631
83	Prioritize and resource tasks for training	0.1418
84	Review property adjustment documents	0.1418
85	Plan a defense in sector at company/troop level	0.1418
86	Plan a hasty breach at company level	0.1418
87	Direct a hasty breach at company level	0.1418
88	Plan combat service support operations at company/troop level	0.1418
89	Prepare unit obstacle plan	0.1206
90	Monitor manual or automated property accounting procedures	0.1206
91	Apprehend a suspected law or regulation violator and conduct a search	0.1206
92	Safeguard and make disposition of evidence/contraband	0.1206
93	Supervise unit movement operations	0.1206

Table A.5—continued

Rank	Title	Factor Score
94	Conduct combat operations according to the law of war	0.1206
95	Direct unit bulk petroleum (fuel) operations	0.1206
96	Conduct preliminary inquiry concerning suspected offenses	0.1206
97	Authorize searches, inspections, and inventories	0.1206
98	Provide input concerning the status of training	0.1206
99	Administer the unit alcohol and drug abuse program	0.1206
100	Direct a hasty attack at company/troop level	0.1206
101	Plan a deliberate attack at company level	0.1206
102	Direct a deliberate attack at company level	0.1206
103	Plan a hasty attack at company/troop level	0.1206
104	Plan a delay at company level	0.1206
105	Direct a counterattack at company level	0.1206
106	Direct occupation of a battle position at company/troop level	0.1206
107	Plan a bypass at company level	0.1206
108	Direct a MOUT operation at company level	0.1206
109	Plan a withdrawal at company level	0.1206
110	Plan a route reconnaissance at troop level	0.1206
111	Plan an area/zone reconnaissance at troop level	0.1206
112	Plan a screen operation at troop level	0.1206
113	Administer nonjudicial punishment	0.1206
114	Direct a tactical road march at company level	0.1206
115	Direct assembly area activities at company level	0.1206
116	Monitor preventive maintenance checks and services (PMCS)	0.1206
117	Review a request and authority for leave form (DA Form 31)	0.1206
118	Conduct unit reenlistment program	0.1206
119	Determine field service support requirements	0.1206
120	Recommend enlisted personnel for promotion to sergeant	0.1206
121	Impose restraint pending disposition of an offense	0.1206
122	Administer unit physical security program	0.1206
123	Administer unit crime prevention program	0.1206
124	Implement mission-oriented protective posture (MOPP)	0.0993
125	Orient a map to the ground by map-terrain association	0.0993
126	Identify terrain features on a map	0.0993
127	Measure distance on a map	0.0993
128	Determine a location on the ground by terrain association	0.0993
129	Use a map overlay	0.0993
130	Call for/adjust indirect fire	0.0993
131	Analyze terrain	0.0993
132	Collect/report information (SALUTE)	0.0993
133	Draft and edit military correspondence using the Army Writing Program	0.0993
134	Use the KTC-1400 to authenticate transmissions and encrypt/decrypt messages	0.0993
135	Conduct electronic counter-countermeasures (ECCM)	0.0993
136	Direct the creation and neutralization of obstacles	0.0993
137	Conduct inventories of supplies, weapons, and equipment	0.0993
138	Supervise unit responses to nuclear attack and/or radiological hazards	0.0993
139	Describe nuclear weapons effects	0.0993
140	Perform map reconnaissance	0.0993

Table A.5—continued

Rank	Title	Factor Score
141	Prepare a battalion situation report	0.0993
142	Prepare/review an enlisted evaluation report	0.0993
143	Prepare an officer evaluation support form	0.0993
144	Conduct a search and seize evidence/contraband	0.0993
145	Prepare to conduct training	0.0993
146	Conduct collective training	0.0993
147	Supervise unit maintenance operations	0.0993
148	Supervise AOAP (Army Oil Analysis Program)	0.0993
149	Inspect ammunition for compliance with storage, safety, and security regulations	0.0993
150	Interview a witness or suspect	0.0993
151	Supervise scheduled services	0.0993
152	Conduct property document adjustments	0.0993
153	Conduct individual training	0.0993
154	Designate positions for key weapons systems	0.0993
155	Assign fields of fire	0.0993
156	Write a staff paper	0.0993
157	Direct a route reconnaissance at troop level	0.0993
158	Direct an area reconnaissance at troop level	0.0993
159	Direct a zone reconnaissance at troop level	0.0993
160	Direct defense in sector at company/troop level	0.0993
161	Direct strongpoint defense at company level	0.0993
162	Plan a movement to contact at company level	0.0993
163	Direct a movement to contact at company level	0.0993
164	Plan a strongpoint defense at company level	0.0993
165	Prepare and issue a FRAGO at company/troop level	0.0993
166	Plan a hasty defense at company level	0.0993
167	Direct a hasty defense at company level	0.0993
168	Plan occupation/defense of a battle position at company/troop level	0.0993
169	Direct actions on contact at company/troop level	0.0993
170	Direct defense of a battle position at company level	0.0993
171	Prepare and issue a company/troop OPORD	0.0993
172	Prepare a materiel condition status report	0.0993
173	Supervise the search recovery reporting and evacuation of casualties	0.0993
174	Direct economy of force missions	–0.0304
175	Plan for movement by air and surface mode at battalion level	–0.0516
176	Direct command post exercise	–0.0516
177	Plan for the collection of combat intelligence to support tactical operations	–0.1791
178	Develop a unit readiness exercise	–0.3294
179	Direct field training exercise	–0.3506
180	Recommend procedures for controlling surface traffic	–0.3931
181	Direct ARTEP evaluation	–0.3931
182	Develop a plan for command training inspections and tests	–0.4144
183	Develop ARTEP evaluation plan	–0.4356
184	Develop OPSEC plan	–0.4569
185	Establish controls to preclude obligations in excess of available funds	–0.4569
186	Direct the battalion maintenance program for unit equipment	–0.4781
187	Develop airborne assault plan	–0.4781

Table A.5—continued

Rank	Title	Factor Score
188	Direct unit TEWT	–0.4781
189	Direct use of local training areas	–0.4781
190	Plan for the collection of combat intelligence to support tactical operations	–0.5009
191	Conduct a training meeting	–0.5009
192	Conduct an After Action Report	–0.5009
193	Direct mandated training programs	–0.5221
194	Plan battalion maintenance program for unit equipment	–0.5221
195	Direct airborne assault	–0.5221
196	Direct assembly of tactical unit after jump	–0.5221
197	Schedule use of local training areas	–0.5221
198	Request attack helicopter support	–0.5434
199	Plan company maintenance program for unit equipment	–0.5434
200	Direct company maintenance program for unit equipment	–0.5434
201	Direct collection/disposition of excess/salvage supplies	–0.5434
202	Request immediate close air support	–0.5646
203	Select missions for training	–0.5646
204	Prepare the officer evaluation report (DA Form 67-8)	–0.5646
205	Prepare a report of intention to lay a minefield	–0.5646
206	Develop a plan for the administrative movement of troops	–0.5646
207	Direct storage/distribution of supplies/equipment	–0.5646
208	Direct maintenance of training publications, files, and records	–0.5646
209	Maintain accountability of TOE equipment	–0.5859
210	Establish accountability of TOE equipment	–0.5859
211	Conduct/prepare a staff study	–0.5859
212	Prepare a unit training schedule	–0.5859
213	Plan for medical operations at unit level	–0.5859
214	Review a personnel action form (DA Form 4187)	–0.5859
215	Review the unit manning report	–0.5859
216	Prepare a report of initiation of laying a minefield	–0.5859
217	Prepare a report of completion of laying a minefield	–0.5859
218	Initiate/remove a report for suspension of favorable person	–0.5859
219	Direct arms room security	–0.5859
220	Develop SQT training program	–0.5859
221	Inspect DA Form 2408-4 (Weapons Record Data) for accuracy	–0.6071
222	Encode and decode messages using KTC 600 tactical operations code	–0.6071
223	Adjust indirect fire through FIST (fire support team)	–0.6071
224	Control techniques of movement	–0.6071
225	Determine effects of NBC attack on unit personnel	–0.6071
226	Recognize threat tactics and battlefield organization	–0.6071
227	Detect and identify targets	–0.6071
228	Coordinate with adjacent units	–0.6071
229	Direct the use of unit tools and test equipment	–0.6071
230	Supervise organization and operation of unit motor pool	–0.6071
231	Supervise dispatching of platoon vehicles	–0.6071
232	Control movement of mortar section/squad	–0.6071
233	Select mortar firing positions	–0.6071
234	Direct storage of repair parts/maintenance supplies	–0.6071
235	Manifest personnel involved in airborne operation	–0.6071

Table A.5—continued

Rank	Title	Factor Score
236	Establish unit maintenance safety program	–0.6071
237	Determine status of maintenance publications in unit	–0.6071
238	Determine range to a target using the immediate and deliberate methods	–1.2984
239	Transmit/receive messages on platoon/company radios	–1.3196
240	Implement methods to extend range of radio communications	–1.3196
241	Attain a sustainment level of proficiency on COFT	–1.3196
242	Engage targets with the M240 coax machine gun from the commander's position	–2.0048
243	Engage targets with the M240 machine gun in the commander's position	–2.0048
244	Construct field expedient antennas	–2.0261
245	Prepare/operate communications security equipment TSEC/KY-57	–2.0261
246	Perform tank commander's prepare-to-fire checks and services	–2.0261
247	Engage targets with the main gun from the commander's weapon station	–2.0261
248	Zero a caliber .50 M2 HB machine gun on an M1/M1A1 tank	–2.0261
249	Direct main gun engagements on an M1/M1A1 tank	–2.0261
250	Install/remove an M240 machine gun in the commander's weapon station	–2.0261
251	Establish silent watch from M1/M1A1 tank	–2.0261

B. AOAC POI Options Analyzed

Table B.1 summarizes the alternative programs of instruction we analyzed for this case study.

The table covers the baseline (current) POI, the "trimmed" POI, and the distributed POI. The current AOAC training events found in the first column were the basis for the analysis. The second column is the total number of academic hours currently allocated to each event. The third column shows the hours we cut from the POI to get our "trimmed" POI. The fourth and fifth columns describe the distributed POI. The fourth column shows the number of hours retained in the resident course, while the fifth column shows the number of distributed hours for each training event.

Note that hours cut in the "trimmed" POI carry over to the distributed POI.

Table B.1

Alternative POIs Analyzed

Training Events	Total Hours	Eliminated Hours	Resident Hours	Distributed Hours
AOAC COURSE INTRODUCTION				
Brigade Fitness Center Familiarization/Certification	1.0		1.0	
Welcome/Protocol Briefing	1.0		1.0	
Directed Energy Weapons	1.0		0.0	1.0
Abrams Live Fire Briefing—Secret	1.0		1.0	
Armor Branch Officer Professional Management System Briefing	2.0		2.0	
SMALL GROUP INSTRUCTION				
Diagnostic Test	2.0		2.0	
Perryville Preparatory Study	2.0		2.0	
Army Writing Program—SGI Block	10.0	10.0		
Team Building	2.0		0.0	2.0
Small Group Leadership	3.0		1.0	2.0
Taking Command	4.0		2.0	2.0
Values and Ethics	3.0		1.0	2.0
Military Symbols and Terms	2.0		0.0	2.0
Intro to Tactical Operations	5.0		2.0	3.0
Intro to Offensive Operations	1.0		1.0	0.0
Troop Leading Procedures	8.0		4.0	4.0
Intelligence Preparation of Battlefield	16.0		9.0	7.0
The Operations Estimate	15.0		8.0	7.0
Making Tentative Plan for Brigade Delib. Attack	8.0		8.0	
Develop the Plan	8.0		8.0	
Integrate Combat Support (CS) and Combat Service Support (CSS)	24.0		12.0	12.0
Integrate Tactical Air Support and Army Aviation	3.0		3.0	
Test Point	10.0		10.0	
Battalion/Task Force Deliberate Attack Estimate	8.0		8.0	
Battalion/Task Force Maneuver Planning	8.0		8.0	
Plan Passage of Lines/Road March	8.0		8.0	
Battalion/Task Force Deliberate Attack Reconnaissance	6.0		6.0	
Battalion/Task Force CS & CSS Operations	12.0		12.0	
Battalion/Task Force CS Operations	4.0		4.0	
NBC Effects	7.0		3.0	4.0
NBC Brief—Secret	1.0		1.0	
Battalion Consolidation and Reorganization	8.0		8.0	
Battalion Deliberate Attack	16.0		16.0	
Battalion/Task Force Deliberate Attack	8.0		8.0	
Company/Team Hasty Breach and Tentative Plan	8.0		8.0	

Table B.1—continued

Training Events	Total Hours	Eliminated Hours	Resident Hours	Distributed Hours
Company/Team Recon Combat Trains Consolidation	8.0		4.0	4.0
Company/Team Consolidation and Reorganization Planning	8.0		8.0	
Finalize Plan for Deliberate Attack	5.0		5.0	
Company/Team OPORD Preparation and Issue	8.0		8.0	
Company/Team OPORD	6.0		6.0	
Direct Team Deliberate Attack (TEWT)	8.0		8.0	
Assembly Area Planning	6.0		6.0	
Test Point II	18.0		18.0	
Battalion/Brigade Movement to Contact	8.0		8.0	
Battalion/Task Force Movement to Contact Planning	8.0		8.0	
Company/Team Movement to Contact Planning	8.0		8.0	
Company/Team Movement to Contact	8.0		8.0	
Battalion/Company MOUT Planning	8.0		8.0	
Company Movement OPORD	3.0		3.0	
MOUT Exercise	5.0		5.0	
Exploitation and Pursuit	8.0		8.0	
Tactical Operations Center Operations	4.0		4.0	
Offense Command Post Exercise—Simulation	14.0		14.0	
Defensive Operations	7.0		7.0	
Test Point III	8.0		8.0	
Defensive Intelligence Prep. of the Battlefield	9.0		4.0	5.0
Develop a Tentative Plan for BN Defense in Sector	8.0		8.0	
Engineer Support and Counterattack Planning	8.0		6.0	2.0
Obstacle Planning and Defensive OPORD Preparation	4.0		4.0	
Battalion/Recon (TEWT)	4.0		4.0	
Defensive OPORD	8.0		8.0	
Battalion/Task Force Battle Position Planning	8.0		8.0	
Heavy/Light Defensive Operations	8.0		4.0	4.0
Company/Team Battle Position	8.0		8.0	
Defense CPX	16.0		16.0	
Company/Team Recon of a Battle Position (TEWT)	8.0		8.0	
Company/Team Sector Defense Planning	4.0		4.0	
Test Point IV	16.0		16.0	
Company/Team Sector Defense Field Command Exercise (FCX)—SIMNET	16.0		16.0	
Battalion/Task Force Strongpoint Planning	6.0		6.0	
Company/Team Stongpoint Planning	8.0		8.0	
Battalion/Brigade Delay Planning	6.0		6.0	
Capstone CPX (BASE)	16.0		16.0	
Perryville Staff Ride (TEWT)	8.0		8.0	
Company/Team Delay Planning	7.0		7.0	

Table B.1—continued

Training Events	Total Hours	Eliminated Hours	Resident Hours	Distributed Hours
Company/Team Delay (FCX)—Simulation	8.0		8.0	
Company/Team Withdrawal Planning	7.0		7.0	
Relief in Place Planning	9.0		9.0	
Company/Team Delay (TEWT)	8.0		8.0	
LARGE GROUP INSTRUCTION				
Decision Making	1.0		0.0	1.0
Brown Bag/Leadership Issues	1.0		1.0	
Army Training Program	10.0		0.0	10.0
Leadership Doctrine	1.0		0.0	1.0
Motivation	2.0		0.0	2.0
Time Management	1.0		0.0	1.0
Introduction to Military Justice	4.0		1.0	3.0
Evaluation Reports	2.0		0.0	2.0
Evolution of Combined Arms Warfare	2.0		0.0	2.0
Battlefield Stress	1.0		0.0	1.0
Combat Leadership	2.0		0.0	2.0
Laws of War	2.0		0.0	2.0
Cavalry Organizations and Missions	4.0		0.0	4.0
Army Aviation Orientation/Operation	2.0		0.0	2.0
Cavalry Reconnaissance	4.0		4.0	
Communications	6.0		6.0	
Battle Analysis	8.0		4.0	4.0
Australian Army	1.0		0.0	1.0
German Army	1.0		0.0	1.0
British Army	1.0		0.0	1.0
Italian Army	1.0		0.0	1.0
French Army	1.0		0.0	1.0
Canadian Army	1.0		0.0	1.0
Counter Reconnaissance	4.0		4.0	
Army Writing Program	6.0		0.0	6.0
Directorate of Combat Developments Briefing	4.0		4.0	
TECHNICAL INSTRUCTION—MAINTENANCE				
Battalion/Company Maintenance	24.0		8.0	16.0
Unit Status Report	4.0		4.0	
Material Condition Report	4.0		4.0	
Unit Supply Management	16.0		16.0	
TECHNICAL INSTRUCTION—WEAPONS				
Introduction to Weapons System Depart.	1.0		0.0	1.0
Short Range Training Plan	21.0		0.0	21.0
Conduct of Fire Trainer Sustainment Training	20.0	20.0		
Boresight and Armament Accuracy Checks and Procedures	4.0	4.0		
Leadership in Tank Gunnery	1.0		1.0	
Tank Gun Capabilities—Secret	2.0		2.0	
Tank Gun Error Budget	2.0		0.0	2.0
Anti-Armor Weapons	6.0	6.0	0.0	
TOTALS	768.0		576.0	152.0

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