

①

Technical Report 815

AD-A207 258

A Review and Annotated Bibliography of Training Performance Measurement and Assessment Literature

Betty Mohs and Warren R. MacDiarmid
HAY Systems, Inc.

Dee H. Andrews
Army Research Institute

October 1988

DTIC
ELECTE
APR 24 1989
S Q H D



United States Army Research Institute
for the Behavioral and Social Sciences

Approved for public release; distribution is unlimited

U.S. ARMY RESEARCH INSTITUTE FOR THE BEHAVIORAL AND SOCIAL SCIENCES

A Field Operating Agency Under the Jurisdiction
of the Deputy Chief of Staff for Personnel

EDGAR M. JOHNSON
Technical Director

JON W. BLADES
COL, IN
Commanding

Research accomplished under contract
for the Department of the Army

HAY Systems, Inc.

Technical review by

J. Peter Kincaid
Robert Solick

NOTICES

DISTRIBUTION Primary distribution of this report has been made by ARI. Please address correspondence concerning distribution of reports to: U.S. Army Research Institute for the Behavioral and Social Sciences, ATTN: PERI-POX, 5001 Eisenhower Ave., Alexandria, Virginia 22334-5600

FINALDISPOSITION: This report may be destroyed when it is no longer needed. Please do not return it to the U.S. Army Research Institute for the Behavioral and Social Sciences.

NOTE: The findings in this report are not to be construed as an official Department of the Army position, unless so designated by other authorized documents.

AD H 20 2 2 2

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1a. REPORT SECURITY CLASSIFICATION Unclassified		1b. RESTRICTIVE MARKINGS --	
2a. SECURITY CLASSIFICATION AUTHORITY --		3. DISTRIBUTION / AVAILABILITY OF REPORT Approved for public release; distribution unlimited.	
2b. DECLASSIFICATION / DOWNGRADING SCHEDULE --		4. PERFORMING ORGANIZATION REPORT NUMBER(S) --	
4. PERFORMING ORGANIZATION REPORT NUMBER(S) --		5. MONITORING ORGANIZATION REPORT NUMBER(S) ARI Technical Report 815	
6a. NAME OF PERFORMING ORGANIZATION HAY Systems, Inc.	6b. OFFICE SYMBOL (if applicable) --	7a. NAME OF MONITORING ORGANIZATION U.S. Army Research Institute for the Behavioral and Social Sciences	
6c. ADDRESS (City, State, and ZIP Code) 12424 Research Parkway Suite 250 Orlando, FL 32826		7b. ADDRESS (City, State, and ZIP Code) 5001 Eisenhower Avenue Alexandria, VA 22333-5600	
8a. NAME OF FUNDING / SPONSORING ORGANIZATION Project Manager for Training Devices (continued)	8b. OFFICE SYMBOL (if applicable) --	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER F33657-84-D-2320	
8c. ADDRESS (City, State, and ZIP Code) Chief, ARI Orlando Field Unit (ATTN: PM TRADE/ARI), 12350 Research Parkway Orlando, FL 32826-3276 (continued)		10. SOURCE OF FUNDING NUMBERS	
		PROGRAM ELEMENT NO. 6.3.7.43	TASK NO. 4.3.2
		PROJECT NO. A794	WORK UNIT ACCESSION NO. C.1
11. TITLE (Include Security Classification) A Review and Annotated Bibliography of Training Performance Measurement and Assessment Literature			
12. PERSONAL AUTHOR(S) Mohs, Betty; MacDiarmid, Warren D. (HAY Systems, Inc.) and Andrews, Dee H. (ARI)			
13a. TYPE OF REPORT Final	13b. TIME COVERED FROM 85-9 TO 87-2	14. DATE OF REPORT (Year, Month, Day) 1988, October	15. PAGE COUNT 100
16. SUPPLEMENTARY NOTATION Bruce W. Knerr is the point of contact for the report. Dee H. Andrews was formerly the Contracting Officer's Representative.			
17. COSATI CODES		18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)	
FIELD	GROUP	SUB-GROUP	Survey methods
			Training performance measurement
			Training performance assessment
			Military training
19. ABSTRACT (Continue on reverse if necessary and identify by block number) The objective of this report is to provide a foundation for technical training performance measurement and assessment (PMA) research. This review was performed to support a specific research project that surveyed current methods of PMA in schools and units for six Military Occupational Specialities (MOS). The authors reviewed research efforts that address training PMA concerns. Of the many documents reviewed, 173 are presented in annotated format as an appendix to this report. The review reveals the lack of an integrated system for measuring and assessing training performance. Several specific problems were indicated by the review. There is an over-reliance on subjective measures of performance, and a shortage of valid, reliable quantitative performance measures of training strategies and training effectiveness. Researchers should investigate means for developing more empirical data, better analytic methods, and standardized measurement. Increased emphasis should be placed on the application of learning principles such as knowledge of results and retention of learning in designing PMA systems. <i>Keywords: Military training</i>			
20. DISTRIBUTION / AVAILABILITY OF ABSTRACT <input checked="" type="checkbox"/> UNCLASSIFIED/UNLIMITED <input type="checkbox"/> SAME AS RPT. <input type="checkbox"/> DTIC USERS		21. ABSTRACT SECURITY CLASSIFICATION Unclassified <i>Performance</i>	
22a. NAME OF RESPONSIBLE INDIVIDUAL Bruce W. Knerr		22b. TELEPHONE (Include Area Code) AV 960-8193	22c. OFFICE SYMBOL PERI-IF <i>300</i>

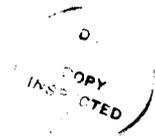
ARI Technical Report 815

8a. NAME OF FUNDING/SPONSORING ORGANIZATION (Continued)

DoD Training & Performance Data Center

8c. ADDRESS (City, State, and Zip Code) (Continued)

Training & Performance Data Center (TPDC)
3280 Progress Drive
Orlando, FL 32826



Accession For	
NTIS GRA&I	<input checked="" type="checkbox"/>
DTIC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification	
By _____	
Distribution/	
Availability Codes	
Dist	Avail and/or Special
A-1	

Technical Report 815

**A Review and Annotated Bibliography of
Training Performance Measurement and
Assessment Literature**

Betty Mohs and Warren R. MacDiarmid
HAY Systems, Inc.

Dee H. Andrews
Army Research Institute

Field Unit at Orlando, Florida
Halim Ozkaptan, Chief

Training Research Laboratory
Jack H. Hiller, Director

U.S. Army Research Institute for the Behavioral and Social Sciences
5001 Eisenhower Avenue, Alexandria, Virginia 22333-5600

Office, Deputy Chief of Staff for Personnel
Department of the Army

October 1988

Army Project Number
2Q263743A794

Education and Training

Approved for public release; distribution is unlimited.

FOREWORD

The Army Research Institute for the Behavioral and Social Sciences (ARI) performs research and development in areas that include training performance measurement and assessment (PMA) throughout the Army. Of special interest is how the data that are generated as a result of training PMA are used to improve the training that takes place in the Army.

In order to perform detailed research for PMA in technical training, it was first necessary to thoroughly examine the existing literature base. By adequately reviewing past and current attempts at measuring and assessing training performance, we can better support research efforts to improve the Army's PMA system. Such improvement is necessary to address the Army Science Board's Summer Study. The study concluded that the Army's system of training PMA is often not providing adequate feedback to the developers of training systems.

This project was performed under the research task called "Methods for Evaluating Training System Effectiveness." The project supports the Orlando Field Unit's mission of developing methods for the optimization of simulation-based training systems, training performance measurement being a key part of any training system. It supports the Training Research Laboratory's research program by examining the current conduct of training performance measurement and assessment activities in Army schools and operational units. There were two sponsors of this research. One sponsor was the Army's Project Manager for Training Devices (PM TRADE) under a Memorandum of Understanding dated 18 May 1983 and entitled "Establishment of Technical Coordination between the ARI and PM TRADE." The other sponsor was the Department of Defense's Training and Performance Data Center (TPDC) under a Memorandum of Agreement entitled "Army Research Institute Coordination with TPDC" and dated 24 April 1985. The Commanding Officer of PM TRADE and the Director of TPDC were briefed on the project results in September of 1987. The proponents (sponsors) expect to make use of the project's findings in the future design of their training system (PM TRADE) and in the future collection of data (TPDC).



EDGAR M. JOHNSON
Technical Director

ACKNOWLEDGMENT

The authors gratefully acknowledge the contribution of a number of personnel who provided invaluable assistance in the design of this research effort, the collection of data, and the preparation and review of the draft and final reports. It can truly be said that without their cooperation, this effort would have been immeasurably more difficult, if not impossible.

Dr. Halim Ozkaptan, Chief of the Orlando Field Unit of ARI; Dr. G. Thomas Sicilia, Director of the Defense Training and Performance Data Center (TPDC); and Dr. Ronald Hofer of the Army's Project Manager for Training Devices (PM TRADE) helped to guide the design of the effort and kept the authors focused on objectives meaningful to the Army. The experience and expertise they provided are most appreciated.

Major (P) Ronald Tarr and Dr. Stephen C. Skiles of TPDC made a significant contribution to this effort with their painstaking, thorough, and professional review of the draft and final reports.

Finally, the authors extend their thanks to Ms. Cathy Smith, Ms. Carla French, and Ms. Susan Porter of HAY Systems, Inc., for the professionalism they displayed in helping to sort and arrange data and prepare and format the report.

A REVIEW AND ANNOTATED BIBLIOGRAPHY OF TRAINING PERFORMANCE MEASUREMENT AND ASSESSMENT LITERATURE

EXECUTIVE SUMMARY

Requirement:

The objective of the report is to provide a foundation for technical training performance measurement and assessment (PMA) research within the military. This review was performed to support a specific research project, the results of which appear in a separate report entitled "Measuring and Assessing Technical Training Performance in the Army's Schools and Units: A Survey of Current Methods."

Procedure:

A literature review was made of recent and current research efforts that address training PMA concerns. To initiate the search, computer-assisted and manual searches were employed. The following data bases were accessed: Defense Technical Information Center; Educational Resources Information Center; PSYCH INFO, American Psychological Association; and the Conference Papers Index. In addition, listings of Army Research Institute Publications dating from 1940 to 1986 were reviewed for pertinence. Of the documents reviewed, 173 are presented in annotated format in Appendix A of the report.

Findings:

A review of PMA literature has revealed that the services, including the Army, have not succeeded in developing an integrated system for measuring and assessing training performance. Several specific problems were indicated by the review. There is still an over reliance on subjective measures of performance and a shortage of valid, reliable quantitative performance measures of training objectives, training strategies, and training effectiveness. Research efforts should be pursued to resolve these problems. Researchers should investigate means for developing more empirical data, better analytic methods, and standardized measurement. The military should assess the accuracy of subjective feedback and develop better methods for managing and utilizing feedback information. Increased emphasis should be placed on the application of learning principles such as knowledge of results and retention of learning in designing PMA systems.

Utilization of Findings:

In order to adequately address the critical findings of the 1985 Army Science Board's Summer Study concerning PMA in the Army, it will be necessary to conduct research to identify PMA solutions. This report lays a literature-based foundation for such a program. In addition, the developers of PMA systems should be able to glean ideas for improving their designs from this report.

**A REVIEW AND ANNOTATED BIBLIOGRAPHY OF TRAINING PERFORMANCE
MEASUREMENT AND ASSESSMENT LITERATURE**

CONTENTS

	Page
OVERVIEW	1
Operational Problem	1
Research Objectives	1
Scope	1
BACKGROUND	2
Methodology	2
Results/Findings	3
PRESENT PERFORMANCE MEASUREMENT SYSTEM	4
Measurement in Institutions	4
Measurement in Units	6
Other Performance Measurement Systems	11
RECOMMENDED PERFORMANCE MEASUREMENT SYSTEMS	12
The Criterion Problem	12
The Job Sample Approach	14
Validity and Reliability	14
Quantitative Measures	15
Automation	15
Simulation	16
DISCUSSION	17
REFERENCES	19
ACRONYMS	24
GLOSSARY	25
APPENDIX A. ANNOTATED BIBLIOGRAPHY	A-1
Key Word List	A-2
Acronyms	A-5

LIST OF TABLES

Table 1. Studies on institutional training	5
---	---

A REVIEW AND ANNOTATED BIBLIOGRAPHY OF TRAINING PERFORMANCE MEASUREMENT AND ASSESSMENT LITERATURE

OVERVIEW

Operational Problem

In order for the Army's training system to be as responsive to the needs of the Army as possible, it is imperative that there be a means to measure the performance of soldiers and units after training. Performance measurement has been defined as the scoring of trainee proficiency either subjectively (e.g., instructor opinion) or objectively (e.g., automatic computer measurement). (MIL-HDBK-220B.) Performance assessment involves the synthesis of all performance measurement information to assess trainee performance. (MIL-HDBK-220B.) This training performance measurement and assessment has a very important goal--it provides the Army's chain of command with information as to the state of readiness of the Army, as well as indications as to possible causes of performance that is less than acceptable. Recent studies such as that of the 1982 Defense Science Board (DSB) and the Summer Study of the 1985 Army Science Board (ASB) suggest that there is a lack of valid and reliable training performance information to help guide these decisions. This is further supported by research conducted in the area of training PMA.

Research Objectives

The objective of this literature review was to lay a foundation for programmatic training performance measurement and assessment (PMA) research. The review directly supported a PMA research project, the results of which appear in "Measuring and Assessing Technical Training Performance in the Army's Schools and Units: A survey of Current Methods."

Scope

In order to accomplish the research objectives, the Army Research Institute (ARI) Orlando Field Unit initiated a study effort to 1) determine how the Army measures performance, 2) determine how the resulting data and information are used to improve Army training, 3) investigate the cost effectiveness of the methodologies used to measure performance, and 4) assess the contribution that training devices and simulators make to the effectiveness of the training PMA system. The literature review to support tasks one and two is contained in this report.

BACKGROUND

The Defense Science Board's Summer Study of 1982, as well as the Army Science Board's 1985 Summer Study, were critical of the methodologies used by the Armed Services (in the case of the DSB) and the Army (in the case of the ASB). Specific criticisms pointed to the lack of objective standards to measure human performance and the lack of quantifiable measures of performance as two of the most serious of the shortcomings. Other studies (to be described later in this report) that looked at training PMA in both the individual and collective training environments also found fault with some of the procedures used within the Army to measure performance in order to assess training. Many of these research efforts produced findings that echoed the DSB and ASB Summer Studies. A recurrent theme in many of these studies has been the questionable validity and reliability of the training PMA methodologies used by the Army. The Army Research Institute (ARI) designed the current effort to explore more fully the problems that had been cited, and to provide a basis for suggesting ways by which training PMA in the Army might be improved.

Methodology

As a first step in addressing the concerns cited above, a literature search was conducted. To initiate the literature search, computer-assisted and manual searches were employed. The computer-assisted literature search accessed dialog across the following data bases: Educational Resources Information Center (ERIC); PSYCH INFO, American Psychological Association; and the Conference Papers Index. The search was run in the data base on key words to include "performance measurement," "training effectiveness," "training measurement," "decision making," etc. Results from this initial search suggested modifications in the number of data bases to access. Ninety-three citations were obtained and only 31 citations were selected for review. Concomitantly, the Defense Technical Information Center (DTIC) was accessed. This search proved to be more relevant; out of 797 citations, 65 were selected for further review. Additionally, listings of ARI publications dating from 1940-1986 were reviewed for pertinence. Out of 3,500, 173 were selected for analysis. As these reports were reviewed, pertinent data (to include the title, author, publication data, summary, relevant points, and relevant subtask) were gathered and entered into the data base. An annotated bibliography containing these data is presented in Appendix A.

Results/Findings

Although many sources were accessed, the source that proved to be the most comprehensive was DTIC, the DoD's repository for technical reports from Government, academia, and industry. Although there apparently has been a great deal of discussion of training PMA in all sectors, the research which is most applicable to the current effort seems to have been conducted in the military arena. As clearly stated by Vreuls and Woolridge (1977), "In order to increase efficiency and maintain (or improve) current system effectiveness, we must improve measurement. Responsiveness to this need can be seen in the ongoing training performance measurement programs in the Navy, Air Force, and Army." In the Army, an increased interest in its training performance measurement system is evident. Witness the 1985 Army Science Board Summer Study (Army Science Board, 1985) which concluded that the Army has several needs:

- 'Quantitative' measures (of performance) relating to training objectives, training strategies and training effectiveness.
- 'Quantifiable' tasks whose successful performance to standards leads to mission accomplishment.
- Evolution of measurement programs to a 'quantifiable' basis.
- Identification of task data needed to measure effectiveness of training.
- Knowledge of skills retention/learning rates to support unit sustainment training.

The Air Force has expended considerable effort toward the development of aircrew training PMA systems (Waag and Knoop, 1977), particularly through research conducted by the Air Force Human Resources Laboratory (AFHRL). The Navy has proposed the use of an integrated approach to training PMA (Pettit and Magruder, 1985) and has stressed the need for quantitative and qualitative performance measures which are systematically developed.

The state-of-the-art in training PMA in the Army is most germane to this report. Thus, the first part of this section addresses the following:

- How does the Army measure performance of its soldiers?
- How effective are these methodologies?

- What research has already been done to investigate the methodologies and their effectiveness?

The literature review also provided an insight into ongoing training PMA programs (in the Army, Navy, and Air Force) that postulate solutions to the training PMA problem. In view of this, the second part of this section addresses the following questions:

- What recommendations are made to improve training PMA?
- What ongoing training PMA programs are most relevant to this study?

The various literature that was reviewed as part of the literature search is enclosed at Appendix A in annotated bibliography form.

PRESENT PERFORMANCE MEASUREMENT SYSTEM

Measurement in Institutions

Results of the literature search and review provided no reports specifically addressing how individual and collective performance is currently being measured in the TRADOC schools and centers. However, some of the literature provided by the Training Effectiveness Analysis (TEA) Division in TRASANA is relevant to this issue. The TEA Division in TRASANA is responsible for managing the TEA process in support of the TRADOC schools and centers. To date, the division has conducted numerous TEA studies, covering a wide range of areas: training, training devices, soldier hardware interface, and MOS selection criteria (Miller and Southard, 1982). Table 1 presents a list of studies with the type of training and MOS Number for institutional training, as presented by Miller and Southard.

Table 1
Studies on Institutional Training

<u>STUDY</u>	<u>TYPE OF INSTITUTIONAL TRAINING</u>	<u>MOS NO.</u>
Basic Rifle Marksmanship Cost and Training Effectiveness Analysis (CTEA)	Basic Combat Training	N/A
REDEYE Weapon Systems Training Effectiveness Study	Advanced Individual Training	16P
REDEYE Weapon Systems Army Training Study (ARTS)	Advanced Individual Training	16P
VULCAN Weapons System Training Subsystem Effectiveness Analysis	Advanced Individual Training	16P
CHAPARRAL/REDEYE Training System Effectiveness Analysis	Advanced Individual Training	16P
Training Attrition Problem, Institute for Military Assistance Training System in Effectiveness Analysis	Special Qualification Course Advanced Individual Training	15E

The literature review was not intended to reveal specific training performance measures (e.g., tasks, simulated performance, actual performance) used in the units and institutions. However, specific measures were identified in a detailed survey of six MOS. That survey, which was part of this research project, is reported in a separate report "Measuring and Assessing Technical Training Performance in the Army's Schools and Units: A Survey of Current Methods." This literature review was aimed more at the difficulties which the military has had in establishing whole PMA systems.

Some of the relevant problems encountered across most TEA studies related to training subsystems at the institutions are: (1) insufficient hands-on training, (2) insufficient testing within a POI, (3) inconsistencies between POI's and Soldier Manual (SM) task lists, (4) too much emphasis on "irrelevant training," (5) failure to adhere to the requirements of a training program, and (6) standards and objectives of various tests which are inconsistent and sometimes conflicting with each other.

At the institutional level, training is conducted on tasks contained in the Soldiers Manual (SM) prepared for the specific MOS and skill level. By Army doctrine, the SM is the central document around which skill training revolves. However, the SM has not been as effective as it could be. As stated by Simpson et al. (1984), SMs have not been entirely effective for a number of reasons:

- The list of tasks they contain is incomplete.
- Many tasks are left out because they are not critical for the MOS.
- Even with their omissions, SMs contain an enormous number of tasks, and these are listed without priorities assigned to them.

Measurement in Units

The Army's policy changes of the mid 1970s to transfer a large part of training responsibilities from formal schools to operational units places new burdens on unit personnel (Simpson, McCallum, McIntyre, Casey, and Fuller, 1984). As stated in TRADOC Reg 350-7, "The Army training system is an integration of individual and collective training conducted both in the institutions and in the units. Although TRADOC has the mission to provide individual and collective training for Army personnel, most of the training is conducted in the units." In the units, the SM is the central document around which skill training revolves. Individual units are required to develop their training plans, interpret the SM, and select tasks with their respective priorities. Feedback on how individuals and units are doing is obtained through routine performance assessments during the course of evaluations conducted by the unit (e.g., Army Training and Evaluation Program (ARTEP), Skill Qualification Test, and TRADOC field visits. Unit needs are derived from a delta between performance required to accomplish their missions and actual performance achieved.

The need for methods of measuring team and unit proficiency and the lack of knowledge in this area are widely recognized. As stated by Knerr, Root, and Word (1979), difficulties in measuring team performance are fundamental problems of training evaluation. Existing unit training PMA techniques depend largely on judgmental data and often do not evaluate the unit's ability in the field (Hayes and Wallis, 1979). This is further reiterated by the 1982 Defense Science Board's Summer Study which noted that performance is measured "subjectively and poorly" (Defense Science Board, 1982) and by the Army Science Board Summer Study which concluded that the Army needs improvements in its training PMA system (Army Science Board, 1985).

Army training and evaluation program. At the unit level, the literature review addresses training of individuals and collective training. In particular, the Skills Qualification Test (SQT) and Army Training and Evaluation Plan (ARTEP) are addressed. The ARTEP is utilized to conduct unit training of collective skills and to evaluate performance of these tasks. The ARTEPs basic goal is "performance-oriented training" (Havron, Albert, and

McCullough, 1978). It encompasses mission/task oriented training, concurrent multiechelon training and evaluation, training to correct deficiencies, and decentralized training and evaluation (Havron and Wanschura, 1979).

Although there is not supposed to be any deviation from the tasks, conditions, and standards specified in the ARTEP, Havron et al. (1978 and 1979) found this to be frequently the case. A study by Gray, Clovis, Gray, Muller and Cunningham (1981) indicates that officers sometimes modify the ARTEP to include additional subtasks required by their unit. Thus ARTEPs are frequently used to develop training exercises for formal evaluation, not to develop training to overcome weaknesses identified in the evaluation. Attachment to this formal unit evaluation status has been found to hinder the usefulness of the ARTEP as part of the training program since emphasis is placed on passing the tests, rather than on discovering and correcting deficiencies. Mirabella (1978) summarizes this by stating that the ARTEP does not adequately differentiate between evaluation for training diagnosis and evaluation for accountability. Ultimately, this degrades the validity and reliability of the ARTEP as a training PMA instrument.

Of equal concern is the extent to which ARTEPs do not provide for objective measures of performance. Numerous study efforts (Shaket, Saleh, and Freedy, 1981; Medlin, 1979; Allen, Johnson, Wheaton, Knerr, and Boycan, 1982; Hayes and Wallis, 1979; Havron and McFarling, 1979; and Havron and Wanschura, 1979) have suggested that this is the biggest shortcoming of the ARTEPs. Medlin (1979) points out a lack of standardized or scientific procedures for determining the tasks, subtasks, and standards in the Training and Evaluation Outlines (T&EOs) of the ARTEP manuals. Furthermore, the field exercises are often unrealistic and do not provide objective data for the evaluation team. As a result, the ARTEP is dominated by unsystematized and unaided human judgments (Medlin, 1979) and a lack of objective data to determine terminal mission outcome (Shaket et al., 1981).

The use of subjective measurement techniques often results in inaccurate data (Burnside, 1982) which frequently arise when human judgments are involved (e.g., halo, leniency, and central tendency errors). Subjective appraisals can provide accurate data if provisions are taken to avoid these errors (e.g., adequate evaluator training). However, in the Army there is a lack of appreciation for the role evaluators can and must play in evaluating performance (Havron et al., 1979). Little time is devoted to evaluator training and when it is provided, this training is often inadequate (Shaket et al., 1981). Medlin and Thompson (1980) conducted a study to determine the major dimensions that military judges use in subjectively appraising ARTEP performance. A complex multi-dimensional analysis of ratings

indicated that military judges used only three dimensions and that the dominant dimension was the quality of overall performance. Thus their assessment was not based on a careful objective analysis of tasks. Ultimately, the lack of objective data and an explicit data base make it difficult to interpret the results of an evaluation, or to compare the same unit at different times or locations.

While the inclusion of subjective standards has been one of the most serious drawbacks of the ARTEPs published to date, it is not the only problem identified by the literature. Shelnutt, Smillie, and Bercos (1978) and Wheaton and Boycan (1982) concluded that the standards of performance are often inaccurate, too general, and vague. Moreover, the T&EOs often demonstrate a lack of correspondence between task, conditions, and standards (Havron et al., 1978).

Philosophically, the ARTEP is intended for use in training, evaluation, and development of training to correct deficiencies (Havron et al., 1978). Most units do use the results of ARTEP evaluations to ascertain areas in which additional training is needed. However, this is done in a relatively imprecise way due to the structure of the ARTEP. Although ARTEP results are often not available, when available they are usually in a general format and do not provide task-specific feedback on how to correct deficiencies. (Burnside, 1981). The T&EOs are not designed to recapture specific errors (Havron et al., 1979). Therefore, it is almost impossible to track specific errors and integrate ratings for diagnosis. Burnside also points out that ratings are usually provided for each company on performance of a major mission (e.g., movement to contact), but that there is no listing of specific individual or crew level tasks which need further training. As a result, commanders at the end of ARTEP do not get a list of deficiencies or discriminatory performance data (Hill and Sticht, 1981). The feedback provided is a go or no-go for each task evaluated.

This feedback is too general and as stated by various commanders in charge of ARTEP evaluation, "you have to have more detail than 'sat' and 'unsat'" (Gray, et al., 1981). The problem is further aggravated by the inadequate training provided to the evaluators and the lack of procedural guidelines and ratings across standard items, missions, and unit echelons (Shaket et al., 1981). The ARTEP manuals provide little or no guidance to evaluators on how to design exercises, measure unit performance, determine training proficiencies/deficiencies, or evaluate the observed performance (Medlin, 1979). Although these problems are evident in today's Army units, ARTEP results are still being utilized for diagnostic purposes.

To the extent that units view the ARTEP evaluation as the culmination of training, as opposed to the first step in the training program, the efficacy of the diagnosis is seriously degraded. (Gray et al., 1981; Havron et al., 1979; Mirabella, 1978; Shelnutt et al., 1978) found that such is the case in many units. Among operational units, emphasis is placed on passing the tests, rather than discovering and correcting deficiencies (Shelnutt et al., 1978). Leaders are willing to cover up errors and to do the tactically safe thing if they believe their performance is being evaluated.

As described by Mirabella (1978), other ARTEP applications in the area of training PMA are often limited by the lack of quantitative data. He states:

One of the philosophical problems with the ARTEP is that it does not adequately distinguish between evaluation for training diagnosis and evaluation for accountability. A result has been that many commanders regard ARTEP as a report in spite of guidance to the contrary from TRADOC. (p. 2)

Quantitative data can provide a means to adequately diagnose performance (Shaket et al., 1981). Furthermore, quantitative measures can provide information related to training objectives, training strategies, and training effectiveness.

Hawley and Dawdy (1981), found that the maintenance of a high level of combat readiness requires frequent evaluations of individual and unit training along with a means of quickly diagnosing and remediating performance problems. Moreover, timely and accurate feedback is necessary to agencies external to the units, especially those involved in the design and development of the publications that guide the conduct of training in units. A number of research efforts have cited problems concerning the feedback of performance measurement data from the units to the institutions. Burnside (1981); Ryan and Yates (1977); Scott and Ekstrom (1983); and Witmer and Burnside (1982) all point to a need for better feedback loop. Although the feedback is either subjective or a mix of objective and subjective data, Burnside (1981) found that subjective feedback (informal comments, surveys/questionnaires, and interviews) is used most often. More objective feedback (e.g., observation of field performance, analysis of existing performance, and operational field performance testing) is limited due to numerous constraints (e.g., availability and cost). The general findings are that feedback to the Army centers/schools is somewhat disorganized and largely based on subjectively-derived data; there is a lack of integrated data collection with unit activities; and that ARTEP results are not always available and are not definitive enough to provide

adequate field performance feedback (Burnside, 1981; Scott et al., 1983).

In a study conducted by Witmer and Burnside (1982), training developers indicated that the feedback they receive from the field via training evaluators does not satisfy all their training needs. Feedback was found to be lacking in specificity and objectivity; its validity was perceived to be questionable. Training developers also pointed to a lack of interaction among the divisions of the DTD and between DTD and DOES. These findings are reiterated in the Key Decision Makers (KDM) survey discussed later in this report.

Skill qualification test. The SQT is designed to be a validated performance-oriented test of soldier ability to perform critical tasks required by his Army job (Hill et al., 1981). As stated by the US General Accounting Office (GAO) in 1982, "it is the Army's only diagnostic tool for measuring individual soldier proficiency in critical tasks." The soldier is trained to specified standards (stated in the SM) and is tested against those standards to determine proficiency. The SQT consists of three components: on-the-job testing, hands-on testing, and written testing.

In 1977 Spencer, Klemp, and Cullen reported that the reliability and validity of SQTs was "very good" since it was a practical, hands-on test of specific unit performance. Five years later, the US GAO reported that the SQTs ability to meet the Army's needs was "questionable" (US GAO, 1982). This was confirmed by Simpson et al. (1984). To a large extent this is due to the fact that SQTs are becoming less and less performance-oriented (hands-on) and more reliant on written pencil-and-paper tests. Although O'Brien, Harris, and Osborn (1979) suggest that this trend tends to improve the validity and reliability of the tests themselves, other research (Burnside, 1981; Harman, Steinheiser and Snyder, 1978; US GAO, 1982) suggest that there may be a concurrent decrease in the relevance to actual task performance in the job environment by the soldier. Furthermore, Harman has indicated that problems have been most frequently found with the written components. In fact, soldiers have a history of a high level of success on the two other components. In spite of this, SQT's are becoming less and less performance-oriented.

The US GAO (1982) reported that soldiers were not trained in all critical job tasks. Since only a selected number of tasks are tested, test results do not accurately indicate the soldier's ability to perform critical job tasks. The study also reported that most individual training programs within Army units emphasize only about 30 critical individual tasks per year at the sacrifice of as many as 150 other tasks which are just as critical.

There is a recurring perception that SQTs are a once-a-year-event rather than the culmination of training. At best, they indicate how well a soldier, at a given time, can perform specific soldier manual tasks. Hill and Sticht (1981) conducted an interview of commanders at the battalion level to find out how SQTs were utilized at this level. The commanders pointed out that a cycle of SQT training exclusively designed to pass the test was common. Furthermore, when asked how often in the last year they had received individual training in SM tasks, 23% (of 781) E1-E4s, responded that they only received this kind of training in the period between SQT notices and actual tests. Few soldiers indicated they had received remedial training after the test (US GAO, 1982).

Although most unit training is test-directed (i.e., occurs in preparation for some evaluation exercise), subjective, and no-fail testing, there is a less obvious form of evaluation that is used by those managing training on an almost daily basis. It entails talking to people and finding out how they are getting along, problems they have encountered, etc. (Hill and Sticht, 1981).

Other Performance Measurement Systems

The literature also points to other training PMA systems. Although they are not directly applicable to this effort, three training PMA systems are presented in this section of the report since many of the encountered problems are similar to those found with SQTs and ARTEPs.

Stoffer (1981) investigated the Navy's Tactical Aircrew training and found limitations with its air-to-air combat mission training PMA system. Some of these limitations are: a lack of specific training objectives, a lack of trend data, certain important measures were unmeasured, inadequate debrief data formatting, and a lack of quality control over raw performance data.

Allen et al. (1982) investigated the Platoon Table IX battle run which is administered primarily for the purpose of documenting platoon competence in small unit tank gunnery. The battle run consists of a set of tactical scenarios that portray both offensive and defensive platoon missions. Although it presents representative and challenging situations and evaluation is based on a variety of measures and scoring procedures, the battle run employs only two (2) objective measures. It lacks procedures for collecting objective performance data in the field and procedures for processing and interpreting obtained performance. Thus, its validity and reliability are reported as being questionable or nonexistent.

In the Air Force, the greatest need in aircrew performance assessment appears to be the development of valid performance criteria (Vreuls and Woolridge, 1977). Although great technological advances have been made, there is a lack of objective and quantitative standards of crew performance. Many variables are involved and often they are too difficult and costly to measure. Thus, quantitative performance criteria have been defined for very few operational tasks.

As clearly stated by Pettit and Magruder (1985), "the goal of a training PMA system is to objectively measure, evaluate, provide feedback, and manage personnel performance against operational requirements" (p. 408). The studies we have previously presented support the contention that this is not the case within the military. However, the literature postulates solutions to the training PMA problem. These are presented in the following section.

RECOMMENDED PERFORMANCE MEASUREMENT SYSTEMS

Numerous studies (Allen et al., 1982; Bialek and Brennan, 1979; Biers and Sauer, 1983; Breidenbach and Britton, 1981; Cormier, 1984; Fuller, Waag, and Martin, 1980; Gibson, 1978; Havron et al., 1978; Havron and McFarling, 1979; Havron, Hawley, and Dawdy, 1981; Kavanagh, Borman, and Hedge, 1986; Mirabella, 1978; Mode and Buletza, 1985; Nieva, Fleishman, and Rieck, 1985; Obermeyer and Vreuls, 1974; Richardson, 1983; Simpson, Gutman, and Jarosz, 1984; Shaket et al., 1981; US General Accounting Office, 1982; Vreuls and Woolridge, 1977; Waag and Knoop, 1977) provide an insight into how to improve training PMA. The following is a review of major issues brought forth by such studies and of present systems, particularly in the training device/simulator arena, that demonstrate attempts to provide improved measurement systems.

The Criterion Problem

The training process, particularly within the military, is often characterized as having, early in the process, extensive measurement and relatively well-developed criteria. However, as one gets closer to the operational missions of units, there is less measurement, and performance criteria become more complex and harder to measure. This is particularly applicable to performance tests where one or more individuals are required to accomplish a job-related task under controlled conditions. The more the problem of defining performance criteria is unresolved or overlooked, the less valid are the measures, criteria, and decisions. (Vreuls and Woolridge, 1977).

The literature presents some attempts to resolve this "criterion problem." Burroughs (1985) provides criterion

performance measures for reliable tests of nonprocedural M1 tank driver skills; Steinheiser and Snyder (1986) pointed out issues related to criterion-performance testing which should be considered when developing individual and weapon crew tests; Fuller et al. (1980) describe the Advanced Simulator for Pilot Training (APM) system, one of the first attempts to develop a comprehensive, real-time measurement capability for a research simulator; and Mirabella (1978) proposes the development of an adequate criterion-referenced system of evaluation which shifts away from a go/no go evaluation to one which obtains detailed descriptions of behavior involved in two-sided combat simulation. A common thread seems to guide the development of these criterion-referenced systems to develop performance criteria that are: more objective, empirically derived, performance-oriented rather than process-oriented, and supported by an analytical model. This is further supported by a model which Medlin (1979) developed to evaluate unit tactical performance. The Combat Operations Training Effectiveness Model (COTEAM), as it is called, was developed using the ARTEP evaluation system as a starting point. It modifies the current ARTEP manual and provides: 1) a realistic simulated combat environment in which units perform technical operations and from which objective performance data can be obtained, 2) procedures for defining standards against which unit performance can be compared, and 3) techniques by which training deficiencies and training level combat readiness can be assessed.

The Air Force community has also shown concern for the need to develop criterion-referenced measures. Hedge, Ballantine, and Gould (cited in Blackburst and Baker, 1983) points to the Air Force Human Resources Laboratory's (AFHRL's) attempt to overcome the criterion problem by employing a variety of measuring techniques: (1) a task rating form where specific task data are collected, (2) a dimensional rating form where task dimensions are rated, (3) a global rating form developed to collect rater overall impressions of first-term proficiency, and (4) an Air Force-wide rating form developed to be representative of all specialties in the Air Force. Finally, Kavanagh et al. (1986) also focus on criterion-development. They propose a model that looks at input variables (e.g., individual characteristics), process variables (e.g., cognitive process) and outcome variables (e.g., performance measurement quality).

The Job Sample Approach

It is not practical, cost efficient, nor necessary to measure all relevant variables for all tasks. Therefore, it is important to be able to sample critical tasks and measures. A solution to this issue is provided by the job sample approach (Biers and Sauer, 1983; Vreuls and Woolridge, 1977). The job sample approach allows for a reduction of all possible measures to a smaller, representative set of measurement candidates. If done in a systematic and empirical manner, it can be a valid measure of performance. For example, Biers and Sauer (1983) developed job sample tests for armor crewmen and conducted a study which indicated that the linear combinations of job sample test measures accounted for a very high proportion of variability in past armor crewmen success at Annual Qualifications.

Validity and Reliability

Reliable and valid measures of performance are necessary to determine if trainees have acquired the skills intended and to estimate the cost effectiveness of the training system (Breidenbach, Ciavarelli, Sievers, and Lilienthal, 1986). However, the literature review shows only isolated instances where measurement's validity and reliability have been determined.

If a test is reliable, it is consistent and stable between measurements in a series. Inconsistencies in measurement can often be attributed to variations in test content or test situation, subject response variation, variations in test administration, and variations in the observation process. Studies have been conducted which point to a low degree of agreement between raters of Army job performance tests (Pickering and Anderson, 1976). Some of the factors that are considered to be the main source of this disagreement are: some performance measures appeared to be interpreted differently as a function of specific unit Standard Operating Procedures (SOPs); the evaluation of several performance measures was dependent on the examinee's verbal report, which might lead to a situation of low reliability; and some performance measures were ambiguous statements which were open to the interpretation and bias of the individual examiner.

Validity indicates the degree to which the test is capable of achieving certain aims. Tests are used for different purposes, each requiring a different type of investigation to establish validity. Content validity (does the content of the test sample the kinds of things about which conclusions are to be drawn?); criterion-related validity (does the test compare well with external variables considered to be direct measures of the characteristic or behavior in question?); construct validity (to what extent do

certain explanatory concepts account for performance on the test?) or face validity (does the instrument, or the face of it, appear to measure what it claims to measure?) can be determined via measurement validation. Measurement validation requires substantial empirical data collection and analysis, which is time consuming and costly (Vreuls and Obermeyer, 1985) and as indicated by Breidenbach, et. al. (1986), "a critical review of the literature shows that there are far too many instances in which training PMA systems have been hastily developed and applied" (p. 281). Thus measurement validation is seldom performed.

Overall, the literature concludes that validity and reliability can be raised by an improved test development process (Kavanagh et al., 1986; Mirabella, 1978; US GAO, 1982; Vreuls and Woolridge, 1977;), a planned program of measurement testing (Breidenbach et. al., 1986), and provision of additional rater training (Fuller et al., 1980; Havron and McFarling, 1979). Some examples of systems developed to meet the need for a reliable and valid measurement system are: (1) the Advanced Simulator for Pilot Training (one of the first attempts to develop a comprehensive, real-time measurement capability for a research simulator) (Fuller et al., 1980); and (2) the Tactical Aircrew Training System, which employs an air-to air combat mission training PMA system (Allen et al., 1982).

Quantitative Measures

As postulated by the Army Science Board's Summer Study of 1985 and Mirabella (1978), quantitative data can provide accurate assessment of training effectiveness or efficiency. Quantitative data may also be easier to communicate and utilize when providing feedback. This has been identified as one of DoD's needs when training PMA feedback is involved (Witmer and Burnside, 1982). It can also allow for improved data collection and interpretation of performance data for qualification and diagnosis (Allen et al., 1982). The authors are aware of efforts to improve the collection of performance data for later interpretation to support diagnostic appraisals of training. The development of the electronic clipboard, for example, will enhance the collection, transmittal and use of more quantitative performance measurement data.

Automation

As stated by Roscoe (cited in Vreuls and Woolridge, 1977), training PMA does not have to be automated to be objective, reliable, and valid. However, the advantages of automated data collection (Crawford and Brock, 1977; Mode and Bulezta, 1985; Simpson, Gutman and Jarosz, 1984; Vreuls and Woolridge, 1977), automated performance measures (Breidenbach and Britson, 1981; Hawley and Dawdy, 1981; Obermeyer and

Vreuls, 1974), and automated feedback to personnel in charge of training (Simpson et al. 1984; Witmer and Burnside, 1982) have been widely recognized. Automation can also result in increased precision and reliability (Briggs, 1984). Therefore, many systems have incorporated some type of automation in their training PMA, data collection, and feedback. Artificial Intelligence (AI) has been proposed as a means to assess maintenance tasks (Richardson, 1983) by incorporating a task analytic approach to develop, specify, and sample specific and concrete training PMA. Shaket et al. (1981) have proposed a rule-based, event-driven computer model for the representation of small-unit combat engagements and for subsequent evaluation.

Additional recommendations are provided based on the problems encountered with SQTs and ARTEPs. The GAO (1985) postulated among other things the need to use SQT assessments as a diagnostic aid to improve training and that specific tests should not be announced in advance. In order to overcome major ARTEP weaknesses, Shaket et al. (1981) recommend an evaluation system based on the ARTEP system that is tutorial, portable, modular, and incrementally modifiable and integrated. (One effort that holds the promise of improving on the current ARTEP, and overcoming the weaknesses cited by Shaket et al, is the Computerized ARTEP Production System (CAPS). The conceptual framework of CAPS has been formulated and, as this report is published, the Army is preparing to implement the developmental phase of CAPS.) Furthermore, Havron et al., present recommendations to integrate new technologies into the ARTEP evaluation component (e.g., engagement simulation, battalion simulation, etc.).

A commonality is found in the recommendations and alternatives presented in the literature. All stress how important it is to define measurement concepts, data processing concepts, and data interpretation concepts. Havron and McFarling (1979) summarize this by indicating a need for an integrated system of measures and criteria; the allocation of functions for observation, judgment, and data collection; the development of data analysis procedures; and the development of procedures for feedback formulation and utilization of results.

Simulation

A proposed solution to the problem of conducting more frequent readiness evaluations in the face of many resource constraints is the use of training devices instead of actual equipment (Hopkins, 1975). Although Semple, Cotton and Sullivan (cited in Vreuls and Obermayer, 1985) indicate that, "Most existing automated human-system training PMA subsystems are so poorly designed that they are useless," simulators can provide benefits to training PMA. The use of simulators for

training and for evaluating can result in increased precision and increased reliability (Briggs, 1984), and provide advantageous training features (Crawford and Brock, 1977). Some of these features are: timely correction and guidance of learners behaviors, instructional procedures which may be modified as results indicate their effectiveness, early awareness of the attainment of desired achievement levels, and determination of skill acquisition rates (Briggs, 1984). Unfortunately, subjective evaluation techniques and unstandardized testing situations are common (Vreuls and Obermayer, 1985). Briggs examined the Navy Stock Lists of Training Devices and selected training devices which could provide most valuable proficiency-related information. Following this, interviews were held with training personnel to find out what provisions existed for measuring performance in the simulators. Overall, it was discovered that instructors often did not know how to evaluate performance, good performance tests were not available, and equipment used for recording and evaluating performance was usually inoperable.

DISCUSSION

Despite ongoing efforts to resolve the problems that exist within the Army with regard to the measurement and assessment of performance, the problems noted during the Army Science Board's 1985 Summer Study prevail. This study has captured research supporting that the Army has achieved little, if any success at developing an integrated system for measuring training performance and using the results to improve the training of its individual and units.

Several specific problems were revealed during the effort. There is still a great deal of reliance on subjective measures of performance. Evaluators frequently measure performance against standards which require the evaluator to make judgments on the adequacy of performance. There is a lack of quantitative performance management data relating to training objectives, training strategies, and training effectiveness. Performance measurement is process-oriented rather than product- or performance-oriented.

The validity and reliability of the training PMA system is likely questionable. The training process, particularly in the Army, is characterized by a heavy emphasis on performance measurement and relatively well-developed criteria early in its development. However, as one gets closer to the operational environment, there is less measurement, and performance criteria becomes more complex and harder to measure. Since the ultimate goal is to predict operational performance, the more this problem is unresolved, the less valid the measures are. Moreover, the lack of an effective feedback loop between the units in the fields and the proponent school perpetuates the training PMA problem.

Future research efforts should be pursued to resolve the problems mentioned above. As presented in this study, many ongoing problems in the Army, Navy, and Air Force attempt to resolve this lingering problem. Future research directions should investigate means to more empirical data, better analytic methods, and measurement standardization; assess the accuracy of subjective feedback; and develop methods for managing and utilizing feedback information. Emphasis should be placed on the application of learning principles such as knowledge of results and retention of learning (retention/learning rates) to training PMA. Consideration of such basic principles can result in both increased precision and increased reliability.

REFERENCES

- Allen, T., Johnson, E., Wheaton, G., Knerr, C., & Boycan, G. (1982). Methods of evaluating tank platoon battle run performance: Design guidelines (ARI Technical Report 569; ADA 131969). Alexandria, VA: Army Research Institute.
- Army Science Board (1985). Final Report of the 1985 Summer Study on Training and Training Technology. Applications for Airland Battle and Future Concepts. Prepared for Department of the Army Assistant Secretary of the Army Research Development and Acquisition, Washington, D.C. 20310-0103.
- Bialek, H., & Brennan, M. (1979). Development and implementation of a performance based training and evaluation system for the combat arms (ARI Technical Report 79-84; ADA075431). Alexandria, VA: Army Research Institute.
- Biers, D., & Sauer, D. (1983). Job sample tests as predictors of M1 gunnery performance: Appendixes A-E (ARI Research Note 82-32; ADA135879). Alexandria, VA: Army Research Institute.
- Breidenbach, S., & Bricton, C. (1981). Development of the automated performance assessment and remedial training system (APARTS): A landing signal officer training aid (NTEC-79-D-0105-1; ADA 106224). Orlando, FL: Naval Training Equipment Center.
- Breidenbach, S., Ciavarelli, A., Sievers, R., & Lilienthal, M. (1986). Performance assessment in training systems: Methods and application. Proceedings of the Human Factors Society 30th Annual Meeting. Dayton, OH.
- Briggs, L. (1984). Study of training and performance evaluation techniques (NTEC 1449-1; AD609605). Orlando, FL: Naval Training Equipment Center.
- Burnside, B. (1982). Subjective appraisal as a feedback tool (ARI Technical Report 604; ADA138873). Alexandria, VA: Army Research Institute.
- Burnside, B. (1981). Field performance feedback: A problem review (ARI Research Report 1323; ADA134388). Alexandria, VA: Army Research Institute.
- Burroughs, S. (1985). Criterion performance measures for M1 tank driver tests (ARI Research Report 1396; ADA156793). Alexandria, VA: Army Research Institute.
- Cormier, S. (1984). Transfer of training: An interpretative review (ARI Technical Report 608). Alexandria, VA: Army Research Institute. (AD A146 236)

Crawford, A., & Brock, J. (1977). Using simulators for performance measurement. Proceedings of the Symposium on Productivity Enhancement: Personnel Assessment in Navy Systems. San Diego, CA.

Defense Science Board (1982). Defense Science Board Summer Briefing Report for Training and Training Technology. United States Air Force Academy: Colorado Springs, CO.

Fuller, J., Waag, W., & Martin, E. (1980). Advanced simulator for pilot training and design of automated performance measurement system (AFHRL-TR-79-57; ADA088855). Brooks AFB, TX: Air Force Human Resources Laboratory.

Gibson, L. (1978). A method to determine divisional engineer battalions training measures of effectiveness (Masters Thesis). Monterey, CA: Naval Postgraduate School.

Gray, C., Clovis, E., Gray, T. Muller, T., & Cunningham, R. (1981). Field survey of current practices and problems in Army unit training with implications for fielding and training with MILES (ARI Technical Report 524; ADA128479). Alexandria, VA: Army Research Institute.

Harman (NO DATE). Success and failure in skill qualifications testing: Troop views (ADA001401).

Havron, M., Albert, D., & McCullough, J. (1978). Improved Army Training and Evaluation Program (ARTEP) methods for unit evaluation. Vol 1: Executive summary; study, design and field research (ARI Technical Report 78-A26; ADA064271). Alexandria, VA: Army Research Institute.

Havron, M., & McFarling, L. (1979). Improved ARTEP methods for unit evaluation. Volume VI: Conventional ARTEP missions and engage (NPRDC Technical Report 86-8; ADA162931). San Diego: Navy Personnel Research and Development Center.

Havron, M., & Wanschura, R. (1979). Improved Army Training and Evaluation Program (ARTEP) methods for unit evaluation. Volume VII Executive summary (ARI Technical Report 79-A25; ADA076957). Alexandria, VA: Army Research Institute.

Hawley, J., & Dawdy, E. (1981). Training device operational readiness assessment capability (DORAC): Feasibility and utility (ARI Technical Report 529; ADA128369). Alexandria, VA: Army Research Institute.

Hayes, J., Matthew R. (1979). Initial ARTEP validation results: 1974-75 (ARI Research Note 79-22; ADA077177). Alexandria, VA: Army Research Institute.

- Hedge, J., Ballantine, R., & Gould, B. (No Date). Examining the link between training evaluation and job performance criterion development. Brooks AFB, TX: Air Force Human Resources Laboratory.
- Hill, H., & Sticht, T. (1981). Perspectives on battalion training management (ARI Research Note 81-27; ADA127057). Alexandria, VA: Army Research Institute.
- Kavanagh, M., Borman, W., & Hedge, J. (1986). Job performance measurement classification scheme for validation research in the military (AFHRL-TP-85-51; ADA164837). Brooks AFB, TX: Air Force Human Resources Laboratory.
- Knerr, M., Root, R., & Word, L. (1979). An application of tactical engagement simulation for unit proficiency measurement (ARI Technical Paper 381; ADA075410). Alexandria, VA: Army Research Institute.
- Medlin, M., & Thompson, P. (1980). Evaluation rating of unit performance in field exercises: A multi dimensional scaling analysis (ARI Technical Report 738; ADA089264). Alexandria, VA: Army Research Institute.
- Medlin, S. (1979). Combat operations training analysis effectiveness model. 1979 perspective (ARI Technical Report 393; ADA077839). Alexandria, VA: Army Research Institute.
- Miller, C., & Southard, L. (1982). Training effectiveness analysis - a process in evolution (TRASANA Technical Report 49-82). New Mexico: U.S. Army TRADOC Systems Analysis Activity.
- Mirabella, A. (1978). Criterion-referenced system approach to evaluation of combat units (ARI Research Memorandum 78-21; ADA077968). Alexandria, VA: Army Research Institute.
- Mode, W., & Buletza, P. (1985). Development of a computer-managed readiness assessment system (NPRDC Technical Report 86-8; ADA162931). San Diego: Navy Personnel Research and Development Center.
- Nieva, V., Fleishman, E., & Rieck, A. (1985). Team dimensions: Their identity, their measurement and their relationships (ARI Research Note; ADA149662). Alexandria, VA: Army Research Institute.
- Obermeyer, R., & Vreuls, D. (1974). Combat-ready crew performance measurement system: Phase IIIC design studies (AFHRL Technical Report 74-108 (VI); ADB005521). Brooks AFB TX: Air Force Human Resources Laboratory.

- O'Brien, R., Harris, J., & Osborn, W. (1979). Tank crewman (M60AD) readiness tests (ARI Research Product 79-13; ADA082569). Alexandria, VA: Army Research Institute.
- Pettit, R., & Magruder, P. (1985). A performance measurement system for training system development. Proceedings of the 7th Interservice/Industry Training Equipment Conference and Exhibition, 1, 407-412.
- Pickering, E., & Anderson, A. (1976). Measurement of job performance capabilities (NPRDC Technical Report 77-6). San Diego: Navy Personnel Research and Development Center.
- Richardson, J. (1983). Artificial intelligence: An analysis of potential applications to training performance measurement and job performance aiding (AFHRL Technical Paper 83-28; ADA133592). Brooks AFB, TX: Air Force Human Resources Laboratory.
- Ryan, T., & Yates, L. (1977). Report of exercise observations: Operational readiness training tests (ORTT) (ARI Research Memorandum 77-7; ADA077927). Alexandria, VA: Army Research Institute.
- Scott, T., & Ekstrom A. (1983). Implications for development of the collective training information system (TIS) (ARI Research Note 83-34; ADA136601). Alexandria, VA: Army Research Institute.
- Semple, C., Cotton, J., & Sullivan, D. (1981). Aircrew training devices: Instructional support features (AFHRL Technical Report 80-58). Brooks AFB, TX: Air Force Human Resources Laboratory.
- Shaket, E., Saleh, J., & Freedy, A. (1981). Application of rule-based computer models to the evaluation of combat training (ARI Research Note 81-13; ADA127050). Alexandria, VA: Army Research Institute.
- Shelnutt, J., Smillie, R., & Bercos, J. (1978). A consideration of Army training device proficiency assessment capabilities (ARI Technical Report 78-A20; AD056191). Alexandria, VA: Army Research Institute.
- Simpson, H., Gutman, J., & Jarosz, C. (1984). Maintenance performance system (organizational) information and evaluation (I&ES) design considerations (ARI Research Note 84-2; ADA137571). Alexandria, VA: Army Research Institute.
- Simpson, H., McCallum M., McIntyre, S., Casey, S., & Fuller, R. (1984). Armor training in combat units: Final report. Volume II: Training Products (ARI Research Note 84-84; ADA142534). Alexandria, VA: Army Research Institute.

- Spencer, L., Klemp, G., & Cullen, B. (1972). Work environment questionnaires and Army unit effectiveness and satisfaction measures (ARI Technical Report 491; ADA135450). Alexandria, VA: Army Research Institute.
- Steinheiser, F., & Snyder, C. (1978). Score quality issues related to individual and weapon crew criterion-referenced performance tests (ARI Research Memorandum 78-12; ADA077961). Alexandria, VA: Army Research Institute.
- Stoffer, G. (1981). Performance measurement and the Navy's tactical aircrew training system (TACTS). Orlando, FL: Human Factors Laboratory
- U.S. General Accounting Office. (1982). Army needs to modify its system for measuring individual soldier performance (PB 82-188772). Washington, DC.
- Vreuls, D., & Obermeyer, R. (1985). Human-system performance measurement in training simulators. Human Factors, 27(3), 241-250.
- Vreuls, D., & Woolridge, L. (1977). Aircrew performance measurement. In L. T. Pope and D. Meister (Eds.). Symposium Proceedings: Productivity Enhancement & Personnel Assessment in Navy Systems. San Diego, CA: Navy Personnel Research and Development Center.
- Waag, W., & Knoop, P. (1977). Planning for aircrew performance measurement R&D. In L. T. Pope and D. Meister (Eds.). Symposium Proceedings: Productivity Enhancement & Personnel Assessment in Navy Systems. San Diego, CA: Navy Personnel Research and Development Center.
- Wheaton, G., & Boycan, G. (1982). Methods of evaluating tank platoon battle run performance: A perspective (ARI Technical Report 574; ADA135486). Alexandria, VA: Army Research Institute.
- Witmer, B., & Burnside, L. (1982). Feedback needs of training developers and evaluators (ARI Research Report 1351; ADA138335). Alexandria, VA: Army Research Institute.

ACRONYMS

AFHRL	Air Force Human Resource Laboratory
AI	Artificial Intelligence
APM	Advanced Simulator for Pilot Training
ARI	Army Research Institute for the Behavioral Sciences
ARTEP	Army Training and Evaluation Plan
ASB-1985	Army Science Board 1985 Summer Study on Training and Training Technology
CAPS	Computerized ARTEP Production System
COTEAM	Combat Operations Training Effectiveness Model
DOES	Department of Evaluation and Standardization
DOTD	Directorate of Training Doctrine
DTD	Directorate of Training Development
DTIC	Defense Technical Information Center
ERIC	Educational Resources Information Center
GAO	General Accounting Office
KDM	Key Decision Maker
MOS	Military Occupational Specialty
PMA	Performance Measurement and Assessment
PM TRADE	Project Manager for Training Devices
SM	Soldier's Manual
SMCT	Soldier Manual-Common Tasks
SQT	Skill Qualification Test
TO&E	Table of Organization and Equipment
TRADOC	US Army Training and Doctrine Command
TPDC	Training and Performance Data Center
TRASANA	TRADOC Systems Analysis Agency
TEA	Training Effectiveness Analysis

GLOSSARY

TERM

DEFINITION

Collective Training
TRADOC Cir 350-3

Training, either in institutions or units that prepares a group of individuals (crews, teams, squads, platoons, etc.) to accomplish tasks required of the group as an entity.

Criterion Referenced Test
TRADOC Cir 350-3

A test which measures what an individual must be able to do or must know, in order to successfully perform a task. An individuals' test performance is compared to an external criterion/prespecified performance standard which is derived from an analysis of what is required to do a particular task.

Individual Training
TRADOC Cir 350-3

Training which the individual officer, NCO, or enlisted person receives in institutions, units or by extension self-study, that prepares the individual to perform specified duties and tasks related to the assigned MOS and duty position.

Institutional Training
TRADOC Cir 350-3

Training, either individual or collective, conducted in schools (Army, service school, USAR school, NCO Academy, unit school) or Army Training Centers.

Objectivity
TRADOC Cir 350-3

In testing, the degree to which a test is scored the same by two or more scorers acting independently.

Performance Assessment
MIL-HDBK-220B

The instructor synthesizes all performance measurement information to assess trainee performance. The performance measures may be objective (e.g., machine generated information such as number of target hits) or subjective (e.g., information gathered through the instructor senses as proper communication format used).

Performance Measurement
MIL-HDBK-220B

The scoring of trainee proficiency either subjectively (e.g., instructor opinion) or objectively (e.g., automatic computer measurement).

Process Task
TRADOC Cir 350-3

A task which consists of a series of steps resulting in the soldier obtaining a single discrete result. The task is evaluated by observing the process and by scoring each step or element as it is performed in terms of sequence, completeness, accuracy, or speed. Examples are "put on the protective mask" and "take oral temperature."

Product Task
TRADOC Cir 350-3

A task which terminates in a discrete product or outcome which is observable and measurable. The task is evaluated by looking at the product or outcome in terms of completeness, accuracy, tolerance, clarity, error or quantity. "Repair the carburetor" could also be an example of a product task.

Qualitative

A term describing a performance measurement standard that relies on objective ratings or word descriptions to determine adequacy of performance.

Quantitative

A term describing a performance measurement standard that relies on numbers to determine adequacy of performance.

Reliability
TRADOC Cir 350-3

The degree to which a test instrument can be relied upon to yield the same result upon repeated administrations to the same population.

Soldier's Manual
TRADOC Cir 350-3

A manual that lists for the soldier those critical tasks needed to perform satisfactorily at his present skill level. In addition, the SM tells the soldier how to perform the tasks, the expected conditions under which they will be performed, and the standards which must be met. The SM is the basis for the tasks used in the SQT.

Unit Training
BTMSRC 83-1
Validity

Training, individual or collective, conducted in a unit. The degree to which a test measures what it purports to measure (Handbook in Research and Evaluation).

APPENDIX A

ANNOTATED BIBLIOGRAPHY

The following is an annotated bibliography of the literature reviewed. It includes journal articles, books, and technical reports, notes, and publications from various government/DOD agencies and other organizations.

The information contained in each abstract includes the sequence number, document ID number, date, title, author, corporate author, a summary, and key points. The Sequence Number refers to the location of the abstract in the overall list. The literature citations are in alphabetical order by title. The Identification Number contains the Army Research Institute (or other applicable agency) technical report, note, or publication reference number, if applicable, and the Defense Technical Information Center (DTIC) number for accessing the publication. The Date is the publication date of the reference. The Author is, generally, the writer of the publication, while the Corporate Author is the organization, agency, or journal with which the author is affiliated. The summary is a brief description of the literature. The key points are issues addressed by the publication which are germane to this report. A list of key words and acronyms is provided on the next three pages of this bibliography section. These key words are presented to provide a cross-reference to related reports within the annotated bibliography.

KEY WORD LIST

REPORT SEQUENCE NUMBERS

ARTER

32, 34, 37, 46, 96, 97, 98, 99, 100, 101, 102, 103, 106, 123, 132, 144, 167

ASSESSMENT VICE MEASUREMENT

13, 14, 21, 22, 61, 78, 79, 114, 130

AUTOMATION

01, 02, 08, 11, 23, 35, 40, 51, 54, 61, 63, 84, 88, 89, 145, 158, 172

CAI

112, 140, 144

COLLECTIVE TASKS

06, 15, 16, 26, 42, 51, 52, 55, 69, 70, 87, 96, 120, 122, 123, 131, 132, 143, 146, 153, 161, 162, 164, 165

COST EFFECTIVENESS

07, 16, 17, 18, 19, 21, 22, 39, 40, 53, 58, 71, 88, 108, 129, 157, 173

CRITERION-REFERENCED

02, 13, 14, 34, 43, 44, 45, 47, 48, 49, 77, 89, 95, 107, 111, 145, 149, 164

DECISION MAKING

01, 09, 15, 16, 35, 50, 80, 82, 83, 109, 117, 119, 124, 147, 148, 152

EVALUATION

03, 04, 21, 22, 24, 30, 33, 34, 37, 38, 43, 76, 78, 79, 81, 85, 86, 95, 97, 98, 99, 100, 101, 102, 103, 105, 106, 110, 111, 113, 114, 115, 116, 118, 119, 120, 121, 122, 123, 125, 129, 130, 131, 132, 133, 149, 154, 155, 156, 157, 158, 161, 162, 163, 165

EVALUATOR RATING

13, 14, 75, 76, 84, 98, 102, 103, 106, 114, 128, 132, 158, 161, 162, 165

KEY WORD LIST (Continued)

FEEDBACK

10, 19, 45, 62, 68, 78, 79, 84, 86, 87, 96, 116, 128, 132, 158, 161, 162, 165

INDIVIDUAL TASKS

49, 52, 54, 57, 59, 69

INSTITUTIONAL ENVIRONMENT

38, 134, 135, 136, 137, 138, 139, 159, 167, 170

INSTRUCTOR JUDGEMENT

12, 13, 14, 27, 29, 30, 44, 76, 103, 106, 149

NORMATIVE

04

PERFORMANCE ANALYSIS

02, 03, 05, 11, 12, 13, 14, 23, 24, 26, 27, 31, 33, 34, 43, 52, 59, 64, 67, 68, 78, 79, 81, 85, 89, 90, 94, 101, 112, 114, 115, 116, 120, 123, 125, 126, 131, 142, 146, 149, 151, 153, 158

FMA METHODOLOGIES

06, 08, 09, 10, 12, 21, 22, 23, 24, 25, 26, 27, 28, 29, 31, 33, 34, 46, 51, 52, 53, 54, 55, 57, 60, 63, 66, 71, 77, 78, 79, 85, 91, 93, 95, 96, 97, 98, 99, 101, 111, 112, 113, 115, 116, 118, 120, 121, 122, 123, 125, 129, 130, 131, 133, 144, 144, 150, 158, 160, 163

POLICY MAKING AND CAPTURING

29, 65, 80, 82, 83, 109, 117, 119, 124, 147, 148, 152

PROCESS

44, 78, 79

PRODUCT

44, 78, 79

RELIABILITY

25, 43, 48, 94, 95, 112, 142, 165

KEY WORD LIST (Continued)

REMEDIATION

39, 54, 58, 154, 155, 156

SOT

21, 22, 32, 37, 45, 57, 91, 123, 132, 160

TRAINING DEVICES

01, 07, 11, 12, 17, 18, 19, 20, 25, 26, 37, 39, 54, 55, 56, 58, 69, 71, 72, 73, 74, 88, 89, 90, 92, 95, 108, 141, 145, 150, 151, 158, 166, 168, 169, 170

TRAINING EFFECTIVENESS

05, 07, 08, 09, 17, 18, 19, 20, 36, 40, 58, 60, 72, 73, 74, 88, 89, 90, 95, 104, 107, 108, 110, 118, 125, 127, 134, 135, 136, 137, 138, 139, 140, 141, 145, 150, 151, 153, 157, 166, 167, 168, 169, 170, 171, 173

TRAINING TRANSFER

17, 18, 19, 36, 47, 62, 66, 69, 71, 72, 73, 74, 88, 89, 90, 172

UNIT ENVIRONMENT

06, 11, 12, 41, 56, 64, 67, 78, 79, 85, 86, 87, 91, 95, 97, 98, 99, 100, 101, 102, 103, 105, 106, 121, 143, 144, 153, 154, 155, 156, 159, 160, 163, 167, 170, 173

VALIDITY

25, 48, 49, 75, 94, 106, 117, 133

ACRONYMS

AFB	Air Force Base
AFHRL	Air Force Human Resources Laboratory
AGO	Adjutant General's Office
AIR	American Institute for Research
BARS	Behaviorally Anchored Rating Scales
BESRL	Behavioral Sciences Research Laboratory
CFV	Cavalry Fighting Vehicle
C&GSC	Command and General Staff College
CIEA	Cost and Training Effectiveness Analysis
GAO	General Accounting Office
HUMRRO	Human Resource Research Organization
I/ITEC	Interservice/Industry Training and Equipment Conference
ISD	Instructional Systems Development
KOR	Knowledge of Results
MILES	Multiple Integrated Laser Engagement System
PM TRADE	Project Manager for Training Devices
ROI	Return on Investment
SL	Skill Level
TEC	Training Extension Course
TRADOC	Training and Doctrine Command
USAREUR	United States Army Europe
USMC	United States Marine Corps

SYNOPSIS

Seq: 01
ID Number: NTEC 72-C-0053-1; AD-A922 929
Date: Nov 1973
Title: Advanced Officer Tactics Training Device Needs and Performance Measurement Technique
Author: Hassell, T., Gasteyer, C., & Pasch, A.
Corporate Author: General Dynamics
Summary: Attempts to determine advanced tactics training device needs for submarine officers and to develop a technique for the measurement of tactical training performance.
Key Points: Recommends computer-assisted performance measurement techniques based on mathematical weapons system effectiveness (WSE) model.

Seq: 02
ID Number: AFHRL-TR-79-57; AD-A066 655
Date: Aug 1980
Title: Advanced Simulator for Pilot Training: Design of Automated Performance Measurement System
Author: Fuller, J., Haag, W., & Martin, E.
Corporate Author: Operations Training Division - AFHRL
Summary: Describes current status of the automated performance measurement system (APM) in the Advanced Simulator for Pilot Training (ASPT). APM was developed to meet the need for an objective pilot measurement system.
Key Points: APM system represents one of the first attempts to develop a comprehensive, real-time measurement capability for a research simulator. Takes criterion-referenced approach to measurement definition.

Seq: 03
ID Number: Not Available
Date: Oct 1977
Title: Aircrew Performance Measurement (paper presented at Productivity Enhancement: Personnel Performance Assessment in Navy Systems Symposium, San Diego, CA)
Author: Ureals, D., & Woolridge, L.
Corporate Author: Canyon Research Group, Inc.
Summary: Looks at Aircrew performance measurement in terms of: aircrew environment, an approach to measurement development, and future research needs.
Key Points: Detailed account of aircrew performance measurement.

SYNOPSIS

Seq: 04
ID Number: ARI-AM-57-6; AD-8951 224
Date: Apr 1957
Title: Analysis of Efficiency Ratings Based on 30-59 Days of Observation in a Combat Zone and in the Zone of Interior
Author: Not Applicable
Corporate Author: AD Office
Summary: Compares short-term efficiency reports with long term efficiency reports to determine if an increase in the number of evaluations increases the number of officers with overall Efficiency Indexes.
Key Points: Recommends more frequent evaluation.

Seq: 05
ID Number: ARI-AM-65-3; AD-A150 149
Date: Jan 1965
Title: Analysis of TOW Gunnery Training
Author: Maxey, J. L.
Corporate Author: Helionics Systems Development
Summary: Presents description of current TOW gunnery training and discusses the implications of an analysis of this training for identifying improvements and alternatives. Report presents an attempt to evaluate training materials (lesson plans, POI's).
Key Points: Recommends analysis of training materials (POI's and lesson plans) and interviews and observation of training.

Seq: 06
ID Number: ARI-AM-77-21; AD-A077 939
Date: Sep 1977
Title: Analytic Approach to Estimating the Generalizability of Tank Crew Performance
Author: Boycan, G. G., & Rose, R. M.
Corporate Author: ARI
Summary: Attempts to improve generalizability of gunnery tables (training or testing exercises which define Army programs for gunnery training and tank crew evaluation). Performs cluster analysis of performance objectives to establish commonality and generalizability.
Key Points:

SYNOPSIS

Seq: 07
ID Number: ARI-AM-77-19; AD-A077 937
Date: Nov 1977
Title: Analytic Training Effectiveness Analysis for a CTEA Update
Author: Finley, D. L., & Tremble, T. A.
Corporate Author: ARI
Summary: Looks at two alternative training concepts to developing organizational and operator maintenance training devices. Derives relative training effectiveness values. Relative Worth (RW) = Relative Effectiveness (RE)/Relative Cost (RC); RE = Effect of Alternative/Effect of Base Case; RC = Cost of Alternative/Cost of Base Case.

Seq: 08
ID Number: ARI-AM-81-17; AD-A128 070
Date: May 1981
Title: Analytical Model for Developing Objective Measures of AirCrew Proficiency with Multivariate Time Sequenced Data. Volume I
Author: Connelly, E., Johnson, P., & Shipley, B. Jr.
Corporate Author: Performance Measurement Associates
Summary: Presents theoretical investigation of analytical methods for deriving differential weighting functions from pre-selected samples to multivariate, time sequenced observations of aircrew performance. Model output is a set of weightings.
Key Points: To improve NOE aircrew training programs, need better quality data in the evaluation of aircrew proficiency. Recommends use of fully instrumented training with greater levels of detail in performance measurement. Purports use of automated model.

Seq: 09
ID Number: AD-A138 000
Date: Jan 1984
Title: Analytical Model of Learning and Performance of Aircrew Procedures
Author: Sticha, P. & Edwards, T.
Corporate Author: Decisions and Designs, Inc.
Summary: Documents development and features of a model to investigate issues regarding the acquisition and retention of complex military skills.
Key Points: Decisions regarding the management of training are most effective when supported by information about the effectiveness of different training options. However, this process is generally expensive and full of serious methodological and practical problems.

SYNOPSIS

Seq: 10
ID Number: ARI-RH-84-52; AD-A138 222
Date: Feb 1984
Title: Antecedents and Consequences of Performance Feedback in an Organizational Setting
Author: Ilgen, D., Fisher, C., Dugoni, B., Mattes, W. & Taylor, S.
Corporate Author: Purdue University
Summary: Major focus on critical role played by feedback in work environments. Research consisting of literature review on performance feedback, development of instrument to measure feedback, and research of supervisors' willingness to provide feedback.
Key Points: Emphasizes role of feedback in the motivational process, individual differences, and different roles that supervisors play.

Seq: 11
ID Number: ARI-RH-81-13; AD-A127 050
Date: Jul 1981
Title: Application of Rule-based Computer Model to the Evaluation of Combat Training: A Feasibility Study
Author: Shakel, E., Saleh, J. & Freedy, R.
Corporate Author: Perceptronics
Summary: Examines the feasibility of a rule-based, event driven, computer model for the representation of small unit combat engagements and for subsequent performance evaluation.
Key Points: Major ARTEP weakness: no objective way to determine terminal mission outcomes. Several trng systems overcome this deficiency (SCOPES, REALTRAIN and MILES). Evaluation system should be tutorial, portable, modular, incrementally modifiable, & integrated.

Seq: 12
ID Number: ARI-TP-381; AD-A075 410
Date: Jul 1979
Title: Application of Tactical Engagement Simulation for Unit Proficiency Measurement
Author: Knerr, C. M., Root, R. T., & Word, L. E.
Corporate Author: ARI
Summary: Reviews application of a tactical training system called Tactical Engagement Simulation (ES). ES uses objective accurate assessment techniques and provides realistic tactical training.
Key Points: Points out need to measure team and unit proficiency, the lack of knowledge in this area, and existing Army combat unit performance measurement techniques which depend largely on judgmental data. Presents relevant literature.

SYNOPSIS

Seq: 13
ID Number: STP 17-19E-JB
Date: May 1984
Title: Armor Cresson Job Book MOS 19E10/20
Author: Not Applicable
Corporate Author: US Army Armor School
Summary: Used as an NCO training management tool to record demonstrated proficiency on soldier's manual (all common and MOS-specific) tasks for which the SL 1 or 2 soldier is responsible. Provides space for supervisor to record go or no-go and date.
Key Points: Basic idea is good, but doubtful that it is utilized with any degree of effectiveness.

Seq: 14
ID Number: STP 17-19K-JB
Date: Sep 1984
Title: Armor Cresson Job Book, MOS 19K10/20
Author: Not Applicable
Corporate Author: US Army Armor School
Summary: Used as an NCO training management tool to record demonstrated proficiency on soldier's manual (all common and MOS-specific) tasks for which the SL 1 or 2 soldier is responsible. Provides space for supervisor to record go or no and date.
Key Points: Basic idea is good, but doubtful that it is utilized with any degree of effectiveness.

Seq: 15
ID Number: ARI-AN-84-84; AD-A142 534
Date: Jun 1984
Title: Armor Training in Combat Units. Final Report Volume II: Training Products
Author: Simpson, H., McCollum, M., & Fuller, R.
Corporate Author: Anacapa Sciences, Inc
Summary: Methods developed to select and prioritize armor crew tasks, and to define the scope, content, and methods to employ in armor crew individual training.
Key Points: Points out Army unit problems and recommends solutions.

SYNOPSIS

Seq: 16
ID Number: ARI-PA-1218; AD-A075 354
Date: Jul 1979
Title: Arsor/Anti-Arsor Team Tactical Performance
Author: Scott, T. D., Maliza, L. L., & Hardy, G. D.
Corporate Author: ARI
Summary: Successful units (reinf tank plts) as opposed to unsuccessful units, are characterized by sound tactical performance in planning the attack, initial deployment, use of cover and concealment, surveillance and use of firepower. Efficiency (economical training) may result by concentrating on missions requiring satisfactory execution of widest variety of common skills.

Key Points:

Seq: 17
ID Number: ARI-TR-642; AD-A159 454
Date: Jul 1984
Title: Army Maintenance Training and Evaluation Simulation System (AMTESS) Device Evaluation: Vol 1. Overview of Study Effort
Author: Unger, K., Sezey, R., Hays, R. & Mirabella, R.
Corporate Author: SRI
Summary: Overview of AMTESS program; This report is vol 1 of 3 volume series. Summarizes quantitative (transfer of training) and qualitative (user opinion) data about 2 prototype devices. Objective of AMTESS: provide cost and training effective maintenance simulators that can be easily adapted to a variety of maintenance tasks across a number of MOSs.

Key Points:

Seq: 18
ID Number: ARI-PA-643; AD-A159 516
Date: Jul 1984
Title: Army Maintenance Training and Evaluation Simulation System (AMTESS) Device Evaluation: Vol II. Transfer of Training Assess. of 2 Prototype Devices
Author: Unger, K., Sezey, R., Hays, R. & Mirabella, R.
Corporate Author: SRI
Summary: Transfer of training study: students from several MOSs were trained on conventional method or 1 of 2 AMTESS devices and subsequently tested on operational equipment. Comparison between conventionally trained students and device trained students indicated statistically superior performance by 30% of conventionally trained students. Transfer of training Index (E/C ratio) indicated high level of transfer in all cases.

Key Points:

SYNOPSIS

Seq: 19
ID Number: ARI-TR-589; AD-A146 237
Date: Oct 1983
Title: Army Maintenance Training and Evaluation System (AMTESS) Device Development and Features
Author: Crissell, E., Unger, K., Sezey, R. & Hays, R.
Corporate Author: SAI
Summary: Overview of the development and testing of AMTESS devices. Based on AMTESS documentation and data gathered in structured interviews of AMTESS project participants' opinions on specific features.
Key Points: One of investigated features = performance feedback. Most interviewees felt feedback given to student on student CRT was good. Greatest problem with both devices (Gruman and Seville/Burtek) was dependability. Down-time plagued device evaluation.

Seq: 20
ID Number: ARI-TR-644; AD-A159 517
Date: Jul 1984
Title: Army Maintenance Training and Evaluation System (AMTESS) Device Evaluation
Author: Unger, K., Sezey, R., Hays, R. & Mirabella, A.
Corporate Author: SAI
Summary: Students from several MOSs were trained to perform maintenance tasks by using one of 2 prototype trng dev. Opinion data was collected on the adequacy and effectiveness of the devices.
Key Points: Interviewees pointed out features they liked: request help feature, feedback, absence of instructor, and proceduralized self-paced lessons. Both devices were composed of 4 major components: student station, instructor station, and 2 30 modules.

Seq: 21
ID Number: PB-82-189772
Date: March 1982
Title: Army Needs to Modify its System for Measuring Individual Soldier Performances
Author: General Accounting Office
Corporate Author: U.S. General Accounting Office
Summary: Report summarizes General Accounting Office's (GAO) concern on the extent to which the Army's SQTs measure soldier proficiency and identify individual training needs.
Key Points: Cost Effectiveness of SQT development and administration is questionable. SQT program (in its design and implementation) does not meet Army's need to measure individual proficiency in order to identify trng needs.

SYNOPSIS

Seq: 22
ID Number: AD-A118 850
Date: Sep 1982
Title: Army's Initiative to Improve the Skill Qualification Test Program May Not Achieve Promised Changes
Author: General Accounting Office
Corporate Author: U.S. GAO
Summary: Follow-on to "Army Needs to Modify Its Systems for Measuring Individual Soldier Proficiency". Complaint: nothing has been done to follow recommendations of original report.
Key Points: Worth finding out how much has been done or changed since the original report was written.

Seq: 23
ID Number: AFHRL-TP-83-28; AD-A133 592
Date: Sept 1983
Title: Artificial Intelligence: An Analysis of Potential Applications to Training, Performance Measurement and Job Performance Aiding
Author: Richardson, J. J.
Corporate Author: Denver Research Institute
Summary: Points out to how AI could be used in the area of Performance Measurement.
Key Points: Presents definition of perf. meas. roles. Use of job task proficiency tests can cut down on maintenance training costs. Nature of tasks could facilitate use of AI in performance measurement.

Seq: 24
ID Number: ARI-AR-1195; AD-A060 563
Date: Aug 1978
Title: Assessment of the Navigation Performance of Army Aviators Under Map-of-The Earth Conditions
Author: Fineberg, M. L., Maister, D., & Farrell, J. P.
Corporate Author: ARI
Summary: Obtained empirical data on how the NOE navigational skill level of Army evaluators is affected by pilot experience and different levels of training. Defines baseline on pilot navigation proficiency and a methodology to measure NOE flight performance.
Key Points: Concludes that all pilots need more NOE training. Recommended training should emphasize practical exercises rather than standard lecture techniques.

SYNOPSIS

Seq: 25
ID Number: Not Available
Date: Not Available
Title: Basic Flight Training: Introductory Training by Means of a Simulator
Author: Fahler, F.
Corporate Author: Psychology Unit, Gerson Army School
Summary: Study conducted to set up a screening program to distinguish between fast and slow learners. Concentrates on the job sample approach (JSA). JSA used with UH-1D simulator at Army Aviation School.
Key Points: Points out that current aviator training methodologies are very traditional although tasks are becoming more complex due to high tech dev. Methodologies concentrate on basic maneuvers which are not very predictive of final outcomes.

Seq: 26
ID Number: ARI-TP-353; AD-A070 089
Date: Mar 1979
Title: Battalion Command Group Performance in Simulated Combat
Author: Kaplan, I., & Barber, H.
Corporate Author: ARI
Summary: Describes the application of the ARTEP command group module to measurement of command group performance in the Combined Arms Tactical Training Simulator (CATTSS).
Key Points: Measurement techniques developed in this project used to provide feedback to command groups trained in CATTSS and to investigate training effectiveness of battle simulations. Paragraph and figures on ARTEP - what it's all about.

Seq: 27
ID Number: Not Available
Date: 1985
Title: Behavioral Analysis and Measurement Methods
Author: Meister, D.
Corporate Author: Not Available
Summary: Good compendium of methods used to study work performance, ranging from analytic methods used in system development to observation, ratings, surveys, field measurement, self reports, and interviews.
Key Points: Good source of info on Delphi, Policy Capturing, and Performance Measurement.

SYNOPSIS

Seq: 28
ID Number: BESRL-AS-69-7; AD-A077 741
Date: May 1969
Title: BESRL's Field Laboratory Studies in Human Performance Experimentation.
Author: Hyman, A., Sternberg, J. J., & Banks, J. H.
Corporate Author: BESRL
Summary: Summarizes progress in human performance experimentation in two on-going work units within the Combat Research Division: Human Performance Experimentation in night operations and Dependable Performance in Monitor Jobs.
Key Points: Attempts to discover general principles which, when applied operationally, will enhance the performance of individuals within the system.

Seq: 29
ID Number: Not Available
Date: 1974
Title: Capturing Judgment Policies: A Field Study of Performance Appraisal
Author: Taylor, A., & Hilsted, W.
Corporate Author: Not Available
Summary: Compares mathematical models of judgment policy by evaluating 625 performance reports during a single rating scale.
Key Points: Field study of performance appraisal policy of cadet rating at U.S. Force Academy. Discusses policy capturing applications.

Seq: 30
ID Number: AFHRL-TR-74-108 (U1)
Date: 1977
Title: Capturing Rater Policies for Processing Evaluation Data
Author: Zedeck, S. & Kafey, D.
Corporate Author: Organizational Behavior & Human Perform.
Summary: Investigates rater's strategy or policy for assessing information on nine criterion elements for a rater. Utilizes Judgment Analysis (JAN) procedure.
Key Points: Utilized JAN technique. Hypothetical behavioral descriptions of nurses were presented to 67 nursing personnel (raters).

SYNOPSIS

Seq: 31
ID Number: AD-8005 521
Date: Dec 1974
Title: Combat-Ready Crew Performance Measurement System: Phase IIIC Design Studies.
Author: Obermayer, R., & Ureuls, D.
Corporate Author: Manned Systems Sciences, Inc.
Summary: Attempts to improve training performance information by providing a definition of information and developing methods for measurement. Report deals with ways to determine features of system that meets research needs previously reported.
Key Points: How to improve training performance information. Based on extensive research.

Seq: 32
ID Number: AD-A101 993
Date: Jul 1979
Title: Combat Effective Training Management Study
Author: Rosenblum, D. E.
Corporate Author:
Summary: Examines military training as a total system composed of four major subsystems: recruiting and AFES, recruit training, specialized skill training, and unit training.
Key Points: Overview of Navy, Army, Marine Corps, and Air Force training. Presents information on use of SQT and ARTEP.

Seq: 33
ID Number: ARI-AM-54-42; AD-8951 314
Date: Dec 1954
Title: Combat Efficiency Ratings based on 30-59 Days of Observation
Author: King, S. H.
Corporate Author: AG Office
Summary: Attempts to determine the degree of similarity between short term (30-59 days) observation reports of combat performance and those based on 60 days or more.
Key Points: Found no significant difference between 30-59 observation and longer period.

SYNOPSIS

Seq: 34
ID Number: ARI-TR-393; AD-A077 839
Date: Jul 1979
Title: Combat Operations Training Effectiveness Analysis Model:
1979 Perspective
Author: Madlin, S. M.
Corporate Author: ARI
Summary: Developed a model for a criterion referenced system for
evaluation of unit tactical performance. Uses ARTEP
evaluation system as a starting point.
Key Points: Model provides: realistic simulated combat environment in
which objective performance data can be obtained, procedures
for defining standards, and techniques by which tng
deficiencies and tng/combat readiness can be assessed.
Presents ARTEP weaknesses.

Seq: 35
ID Number: AD-A164 798
Date: 7 June 1985
Title: Command Information Requirements of the Airland Battlefield
(Master's Thesis for US Army CGSC)
Author: Schaefer, J. A.
Corporate Author: USACGSC
Summary: Analysis of the critical information requirements needed by
the Force Commander to execute Airland Battle doctrine.
Key Points: Review results of past efforts to identify decision maker
key information needs. Points out that automation is the
answer to providing timely and accurate information to
commanders. Looks at 85 key elements of information.

Seq: 36
ID Number: Not Available
Date: Not Available
Title: Comparison of Training Transfer and Effectiveness Models
Author: Knerr, C. M. & Nadler, L.
Corporate Author: ARI
Summary: Analyzes and compares training transfer and effectiveness
models on objectives, components, units of analysis,
metrics, and development.
Key Points: Most of the models are prescriptive, rather than predictive
of effectiveness.

SYNOPSIS

Seq: 37
ID Number: ARI-TR-78-A20; AD-056 791
Date: June 1978
Title: Consideration of Army Training Device Proficiency Assessment Capabilities
Author: Shelnett, J., Sallie, R., & Barcos, J.
Corporate Author: Litton Malionics
Summary: Looks at selected Navy, Air Force & Coast Guard programs to illustrate general trends in the use of simulators for evaluation.
Key Points: Describes the Army Training and Evaluation System. Although it may be outdated, it provides a good description of what SQTs and ARTEPs are all about.

Seq: 38
ID Number: ARI-AM-57-30; AD-8951 508
Date: 1957
Title: Construction of Achievement and Performance Tests
Author: Berkhouse, R., Bornstein, H., Brown, E., & Dubin, S.
Corporate Author: AG Office
Summary: Manual provides instructions for development and use of achievement tests.
Key Points: Prepared for military instructors in Army schools and training centers. Test developer is taken step by step through process of developing a test.

Seq: 39
ID Number: ARI-TR-528; AD-A127 943
Date: Feb 1981
Title: Cost and Information Effectiveness Analysis (CIEA): A Methodology for Evaluating a Training Device Operational Readiness Assessment Capability
Author: Hawley, J., & Dandy, E.
Corporate Author: Applied Science Associates, Inc.
Summary: Presents problems encountered in the development of DORAC
Key Points: Application to training devices, i.e. deciding between design options. To maintain high level of combat readiness there must be frequent evaluations of indiv. and unit proficiency and a means of quickly diagnosing and remediating performance problems.

SYNOPSIS

Seq: 40
ID Number: ARI-AP-81-1; AD-A101 985
Date: July 1980
Title: Cost and Training Effectiveness Analysis (CTEA) Performance Guide
Author: Matlick, R., Berger, D., & Rosen, M.
Corporate Author: Litton Malions
Summary: Provides procedural guidance to Cost and Training Effectiveness Analysis (CTEA).
Key Points: Method for measuring and assessing cost/effectiveness of Army trng systems. Provides detailed review of TEEM (Trng Efficiency Estimation Model), DIARD Gun, Analogous Task Method, and TRAINVICE PH TRADE.

Seq: 41
ID Number: AD-AD17 722
Date: Sep 1975
Title: Course Outline: Instruction for Unit Trainers in How to Conduct Performance Training
Author: Osborn, W. C., Ford, J. P., & Moon, H. L.
Corporate Author: HUMPRO
Summary: Detailed outline for a ten-hour block of instruction designed to teach officers and NCOs how to manage and conduct performance-oriented training in their units.
Key Points: Emphasis on performance-oriented training.

Seq: 42
ID Number: ARI-AN-82-21; AD-A127 921
Date: Jan 1982
Title: Crew Performance Requirements for Emerging Armor Weapon Systems: Studies of Crew Size and Methods of Forecasting Human Factors
Author: Campbell, R., Taylor, E., & Campbell, C.
Corporate Author: HUMPRO
Summary: Emphasizes Army's major goals: readiness, modernization, and sustainability. Reports two studies pertaining to manpower required to operate light weight armor combat vehicles and methods of forecasting performance requirements.
Key Points: Lack of good performance data weakened the research and led to a reliance on questionnaire data. Presents Operational Sequence Analysis (OSA).

SYNOPSIS

Seq: 43
ID Number: ARI-AR-1206; AD-A156 702
Date: Jan 1985
Title: Criterion Performance Measures for M1 Tank Driver Tests
Author: Burroughs, S. L.
Corporate Author: ARI
Summary: Provides criterion performance measures for reliable tests of non-procedural M1 tank driver skills that could serve as stds for tank driver simulator training. Study compares performance scores of M1 tank drivers to novice drivers performance scores.

Key Points: Based on results, concludes that criterion-based tests are potentially reliable quantitative instruments for measuring performance.

Seq: 44
ID Number: ARI-AR-75-9; AD-A076 787
Date: Aug 1975
Title: Criterion Performance Measures of Leadership and Unit Effectiveness in Small Combat Units.
Author: Downey, R. G., Duffy, P. J., & Shiflett, S.
Corporate Author: ARI
Summary: Gathers evaluative data on the processes and outcomes of field training exercises from detachment members and three sources external to the detachment.

Key Points: Factor analysis indicated major difference was that the external sources viewed performance as multi-dimensional and the detachment members viewed performance as uni-dimensional.

Seq: 45
ID Number: ARI-AR-1193; AD-A055 664
Date: Feb 1978
Title: Criterion-Referenced Job Proficiency Testing: A Large Scale Application
Author: Maier, M. H., & Hirshfeld, S. F.
Corporate Author: ARI
Summary: SQTs content must be based on systematic analysis of job requirements. Feedback loop must be made to training managers, personnel managers and research personnel.

Key Points: Discusses the SQT program, its principles of test construction, and the benefits expected in its utilization.

SYNOPSIS

Seq: 46
ID Number: ARI-AM-87-21; AD-A077 968
Date: Sep 1978
Title: Criterion-Referenced System Approach to Evaluation of Combat Units
Author: Mirabella, A.
Corporate Author: ARI
Summary: Proposes development of adequate system of evaluation that looks like the engagement simulation test bed. Stresses importance of defining measurement concepts, data processing concepts, and data interpretation concepts.
Key Points: One of the philosophical problems of ARTEP is that it does not adequately distinguish between evaluation for training diagnosis and evaluation for accountability.

Seq: 47
ID Number: ARI-TP-306; AD-A061 569
Date: Aug 1978
Title: Criterion-Referenced Testing: A Critical Analysis of Selected Models
Author: Steinheiser, F. H., & Epstein, K. I.
Corporate Author: Maryland Univ
Summary: Reviews following models: Block, Crehan, Earick, Dayton & Macready, Kriesall & Millman (binomial), Novick (Bayesian), Rasch (logistic), and classical regression.
Key Points: Problems: 1) congruence between CRT performance and real-world requirements 2) statistical inferences applied to observed scores.

Seq: 48
ID Number: ARI-AM-75-11; AD-A076 789
Date: Dec 1975
Title: Criterion-Referenced Testing: A Discussion of Theory and Practice in the Army
Author: Seazey, R. W., Pearlstein A. B., & Ton, W. H.
Corporate Author: ARI
Summary: Reviews literature on criterion-referenced testing (CRT) and the status of criterion-referenced test construction and application. Presents manual for developing CRTs.
Key Points: Discusses appropriateness and controversy of empirical estimations of CRT reliability and validity. Presents detailed review of CRT theory and applications.

SYNOPSIS

Seq: 49
ID Number: ARI-TR-447; AD-A095 662
Date: Jan 1980
Title: Cross-Validation of Predictor Equations for Armer Crewman Performance
Author: Maitland, A., Eaton, H., & Neff, J.
Corporate Author: ARI
Summary: Cross-validation of armer crewman performance predictor equations. Use ASVAB subtest scores as predictor measures. Attempt to determine if these predictors could cross-validate to a new, larger sample of armer trainees.
Key Points: Predictors were found to be valid for driver and gunner/loader performance at end of training and successful in most portions of the criterion measures for former trainees who were retested. Mixed results were obtained with experienced crewmen.

Seq: 50
ID Number: AD-A111 381
Date: Nov 1981
Title: Decision Making: An Interdisciplinary Inquiry
Author: Ungson, G.
Corporate Author: Organizational Effectiveness Research
Summary: Contains all papers and commentaries presented at conference of decision making held in March 1981.
Key Points: Presents some relevant papers on decision making. Focuses on decision making theories.

Seq: 51
ID Number: ARI-AR-1324; AD-A113 793
Date: April 1981
Title: Description of the ARI Crew Performance Model
Author: Seals, R., Crumley, L., & Coke, J.
Corporate Author: ARI
Summary: Computer-based model to simulate the speed of performance of crews varying in size and/or task assignments. Performance measurements used to evaluate the speed and relative efficiency of crews varying in size or structure.
Key Points: Computer-based performance model.

SYNOPSIS

Seq: 52
ID Number: ARI-AN-81-11; AD-A125 895
Date: Sep 1980
Title: Design and Development of Diagnostic Measures for Aircraft Crewman Performance - XM1
Author: Campbell, R. C.
Corporate Author: HUMPRO
Summary: Develop diagnostic measures of individual and crew drills required in performance of XM1 gunnery.
Key Points: Presents examples of applications of system performance measure concept. Provides individual and crew evaluation package.

Seq: 53
ID Number: ARI-AN-82-13; AD-A127 082
Date: April 1981
Title: Develop and Evaluate New Training and Performance Systems for Maintenance Job Evaluation: Findings, Plans, and Examples
Author: Harper, W., & Gutsan, J.
Corporate Author: AFACAPA Sciences
Summary: Describes final year of a three-year project to develop, implement, and evaluate an Army Maintenance Performance System (MPS).
Key Points: Provides specific maintenance related performance measures. Presents Return on Investment (ROI) \$ figure and results of new training and performance system.

Seq: 54
ID Number: NTEC-79-D-0105-1; AD-A106 224
Date: June 1981
Title: Development of the Automated Performance Assessment and Remedial Training System (APARTS): A Landing Signal Officer Training Aid.
Author: Breidenbach, S., & Britson, C.
Corporate Author: Dunlap and Associates
Summary: Describes development of APARTS, an automated training aid designed to assist the Landing Signal Officer (LSO) in training pilots on carrier landing tasks.
Key Points: Attempt to optimize simulator utilization based on performance measurement. Applies automated and integrated training approach to improve night carrier landing through more effective utilization of training devices.

SYNOPSIS

Seq: 55
ID Number: ARI-AN-84-143; AD-A150 089
Date: Dec 1984
Title: Developing a Field Artillery Training System Based on Devices and Simulations: Definition of the Gunnery Team Trainer
Author: Bishop, E. W., Bloca, R. F., & Hamilton, J. W.
Corporate Author: Dunlap and Associates East, Inc.
Summary: Development of a concept and functional description of the Gunnery Team Trainer (GTT)
Key Points: Review of Field Arty trng devices indicated they were designed to provide practice but with little, if any, definition of the task to be learned or of how to measure trng success. GTT provides this. Meant to be used as a readiness measuring device.

Seq: 56
ID Number: ARI-AN-84-137; AD-A150 365
Date: Dec 1984
Title: Developing a Field Artillery Training System Based on Devices and Simulations: Evaluation of Training Devices & Simulations
Author: Bishop, E. W., Bloca, R., & Hamilton, J.
Corporate Author: Dunlap & Assoc. East, Inc.
Summary: Program to develop the description of a system for unit level training in the field artillery. Special consideration given to the use of training devices and simulations.
Key Points: Looks at existing and planned FA training technology, e.g. firing battery trainer (FBT), battery computer system interface training simulator, MILES, and FIST/FO interactive video disk trainer.

Seq: 57
ID Number: ARI-AN-82-22; AD-A127 077
Date: May 1980
Title: Development and Evaluation of a Generalizable Job Proficiency Matrix (GJPM)
Author: Hanson, T., Beha, A., Johnson, C, Hishfield, J, & Vestalg, R.
Corporate Author: Personnel Decisions Research Institute
Summary: GJPM identifies commonalities among tasks within and across MOSs based on behavioral content. It is used to develop prioritized task lists, identify performance measures for critical tasks, and identify common behavioral elements across tasks.
Key Points: Can be applied to and facilitate the development of SQTs.

SYNOPSIS

Seq: 58
ID Number: AD-A133 160
Date: March 1982
Title: Development and Field Trial of a System for Evaluating the Effectiveness and Efficiency of a Training Program
Author: Hiteer, B., & Kristiansen, D.
Corporate Author: ARI, Fort Knox Field Unit
Summary: Describes the development and field trial of the Training Plan Evaluation which identifies specific training program deficiencies and recommends courses of action. Report assesses the use of the TPE in evaluating transition training from M60 to M1.
Key Points: Assesses use of TPE in evaluating transition from M60 to M1 during OT-III. Presents process (foras) used in training effectiveness study.

Seq: 59
ID Number: ARI-TR-79-04; AD-A075 431
Date: May 1979
Title: Development and Implementation of a Performance Based Training Evaluation System for the Combat Area
Author: Bialek, H. M., & Brenna, M.
Corporate Author: ARI
Summary: Describes 3rd year effort of a three year project to develop a system for providing individual skill training in an Infantry unit.
Key Points: Employs 6 design principles: trng is performance-oriented; individualized; decentralized; records kept by immediate supervisor; plt and sqd ldrs identify and recommend trng; requires formal quality control.

Seq: 60
ID Number: ARI-AN-82-30; AD-A130 246
Date: Jun 1982
Title: Development of a Methodology for Conducting Training Effectiveness Evaluation of Air Defense Training, and Abstract of TEE Related Literature
Author: Fishburne, A., Roinick, S., & Larsen, J.
Corporate Author: Calspan Corp.
Summary: Describes development of a system for conducting TEE on Army AD training and abstracts of TEE related literature.
Key Points: Literature review points out some relevant articles.

SYNOPSIS

Seq: 61
ID Number: NPRDC-TR-85-8; AD-A162 931
Date: Dec 1985
Title: Development of a computer-managed readiness assessment system
Author: Thode, W., & Buletza, P.
Corporate Author: NPRDC
Summary: Effort conducted to develop a readiness training assessment system for fleet air recon squadron two (UQ-2) to provide accurate, timely, and efficient assessments of the operational readiness of aircree personnel.
Key Points: Presents readiness training systems consisting of: 1) matrix of all events that affect readiness, 2) computer-managed system to enter, process, store, and produce readiness reports, and 3) readiness training manual.

Seq: 62
ID Number: ARI-AR-81-28; AD-A126 143
Date: Dec 1981
Title: Development of a User's Guidebook for TRAINVICE II
Author: Sezey, R., & Evans, R.
Corporate Author: SRI
Summary: Documents effort to develop user's guidebook for the application of a transfer of training model (TRAINVICE II). Model designed to provide a framework for estimating the effectiveness of training devices.
Key Points: Training devices can be specifically designed to provide instructional benefits such as immediate feedback, reinforcement for correct responses, measurement of achievement and other positive features in complex skill learning environment.

Seq: 63
ID Number: ARI-AR-1284; AD-A115 893
Date: June 1976
Title: Development of CRI Performance Measures: Tacfire Tactical Data System
Author: Hoyt, W. G., Butler, R. K., & Leung, P.
Corporate Author: ARI
Summary: Summarizes development of CRI performance measures in the area of TACFIRE tactical data system. Proposed courseware consists of independent modular blocks of instruction and 10 performance based module pre- and post-tests.
Key Points: Attempt to implement CRI performance measures.

SYNOPSIS

Seq: 64
ID Number: ARI-RN-79-10; AD-AD69 242
Date: May 1979
Title: Development of Unit Training and Evaluation Techniques for Combat-Ready Helicopter Pilots
Author: Long, G. E., Riley, C. D., & Hockenberger, R. L.
Corporate Author: Canyon Research Group Inc
Summary: T&E procedures must: be adaptable to critical tng reqts. at a specific time; be flexible; have wide applicability; require min. of support; provide tng of opns/tasks unique to particular combat envlr.; relate to ultimate determinants of mission success.
Key Points: Requires 'self-contained' modules; need not be standardized; must provide guidance; address only combat reqts.; may serve as partial solution; stress critical tasks w/ greatest commonality.

Seq: 65
ID Number: Not Available
Date: May 1980
Title: Educational Evaluation in the Public Policy Setting
Author: Pincus, J., Barryman, S., Glennan, T., Hill, P., & McLaughlin, M.
Corporate Author: RAND Corporation
Summary: Essays recommending methods that address policymaker's immediate concerns. Also provides views on the current state of program evaluation in the federal education system.
Key Points: Predecessor to Delphi technique.

Seq: 66
ID Number: Not Available
Date: Not Available
Title: Effectiveness of the C-130 Weapon System Trainer for Tactical Aircraf Training
Author: Mullsayer, R., & Rockway, M.
Corporate Author: Not Available
Summary: Transfer of training study from C-130 MST to aircraft during FOT & E
Key Points: Addresses C-130 Weapon System Trainer's performance measures.

SYNOPSIS

Seq: 67
ID Number: ARI-AN-80-22; AD-A128 345
Date: Oct 1979
Title: Effects of Leader Transition on Unit Performance: An Evaluation of the CONTRAIN Transition Guide
Author: Miller, R. L.
Corporate Author: HUMPRO
Summary: Examines effectiveness of a program of structured interviews (CONTRAIN) with battalion resource personnel in facilitating transition in command at the company level.
Key Points: No differences found between commanders who received CONTRAIN program and those who did not.

Seq: 68
ID Number: ARI-AN-84-99; AD-A138 264
Date: Feb 1984
Title: Effects of Performance Feedback in Organizational Setting
Author: Ilgen, D., Dugon, B., Mattee, H., Fisher, C., & Taylor, S.
Corporate Author: Purdue University
Summary: Investigates model of performance feedback which describes the effects of various dimensions of feedback on psychological processes and behavior.
Key Points: Points out relationship between actual feedback and perceptions of feedback.

Seq: 69
ID Number: ARI-TR-485; AD-A100 974
Date: Aug 1980
Title: Effects of Repeated Engagement Simulation Exercises on Individual and Collective Performance.
Author: Sulzen, R. H.
Corporate Author: ARI
Summary: Research conducted to measure individual and tactical performance in a series of simulation exercises.
Key Points: Results indicate that collective tactical performance is improved by repeated engagement simulation exercises.

SYNOPSIS

Seq: 70
ID Number: ARI-AR-1312; AD-A109 706
Date: Jun 1981
Title: Exploding, Firing, and March Ordering on M109A1 Howitzer:
Task and Task Times
Author: Coke, J. S., Crumley, L. M., & Schmale, R. C.
Corporate Author: ARI
Summary: Based on research conducted to determine the effects of continuous operations on the performance of crews as they operate weapon systems. Looks at CB model developed to simulate the effects on performance of crew size task assignment and fatigue.
Key Points: Purpose of research: to develop a library of tasks performed by M109A1 howitzer crews.

Seq: 71
ID Number: Not Available
Date: Not Available
Title: Evaluating Training Systems
Author: Rose, A. M.
Corporate Author: AIA
Summary: Looks at training device (TD) effectiveness. Points out that too much emphasis is placed on transfer of trng. Advocates looking at total training time cost and effort. Suggests that TDs cannot be fully evaluated unless entire program is evaluated. Must consider what criterion of effectiveness will be and how to measure it. Also must consider content of forecasting method (what variables influence effectiveness).

Seq: 72
ID Number: ARI-AR-76-6; AD-A076 809
Date: July 1976
Title: Evaluation of the Effectiveness of Training Devices:
Literature Review and Preliminary Model
Author: Wheaton, G., Rose, A., & Fingerson, P.
Corporate Author: AIA
Summary: Presents a preliminary model for the prediction of transfer of training. Presents extensive and detailed survey of training effectiveness models and methods.
Key Points: Extensive review of training device effectiveness studies.

SYNOPSIS

Seq: 73
ID Number: ARI-AM-67-16; AD-A076 818
Date: July 1976
Title: Evaluation of the Effectiveness of Training Devices:
Elaboration and Application of the Predictive Model
Author: Wheaton, G. R., Fingerson, P., Rose, A., & Leonard, R.
Corporate Author: AIR
Summary: Presents preliminary work in developing and evaluating a model which can be used to predict and evaluate the effectiveness of training devices. Emphasis placed on transfer of training as standard of effectiveness.
Key Points: Presents predictive model which adheres to certain principles based on type of task to be trained. Looks at stimulus, response, and feedback. Suggested feedback: KDR, reinforcement, automatic system performance feedback, etc.

Seq: 74
ID Number: ARI-TR-76-A2; AD-A040 911
Date: Oct 1976
Title: Evaluation of the Effectiveness of Training Devices:
Validation of a Predictive Model
Author: Wheaton, G. R., Rose, A. M., & Fingerson, P. W.
Corporate Author: American Institutes for Research
Summary: Describes effort to develop and validate a transfer of training model used to predict effectiveness of Army training devices.
Key Points: Preliminary transfer of training model which deals with 3 major classes of variables: appropriateness (e.g., similarity, criticality, commonality); efficiency (learning deficit and training principles and techniques); and effectiveness.

Seq: 75
ID Number: ARI-APA-79-4; AD-A076 635
Date: Mar 1979
Title: Evaluator Attitudes Toward T-TOE and H-TOE Unit Structures in the Maneuver Battalion Phase of the Restructuring of the Heavy Division Test
Author: Seutz, E. R., & Atkinson, T. R.
Corporate Author: ARI
Summary: Determine extent to which pretest (pre-trial) attitudes of evaluators affected their ratings of the normal TOE (table of organization and equipment) structures which were tested in the Maneuver Phase of the test.
Key Points: Aid to determine validity of evaluator ratings.

SYNOPSIS

Seq: 76
ID Number: ARI-TR-438; AD-A089 264
Date: Apr 1980
Title: Evaluator Rating of Unit Performance in Field Exercises: A Multidimensional scaling analysis
Author: Medlin, S. M., & Thompson, P.
Corporate Author: ARI
Summary: Applies statistical analysis techniques to expert judgments to explore systematic methods to incorporate expert military opinion into evaluation procedures.
Key Points: Used multi-dimensional scaling techniques to determine how many dimensions the judges used to evaluate unit performance. Results indicated judges use only three dimensions and dominant dimension is quality of overall performance.

Seq: 77
ID Number: Not Available
Date: Not Available
Title: Examining the Link Between Training Evaluation and Job Performance Criterion Development
Author: Hedge, J., Ballantine, R., & Gould, B.
Corporate Author: AFHRL MEP Division
Summary: Points out that most research is focused on predictor development - not on criterion development. Air Force community needs to spend more time in developing and utilizing criterion measures. Looks at AFHRLs attempt to overcome this.
Key Points: Attempts to overcome lack of criterion measures by employing a variety of measurement techniques: Walkthrough Performance Testing, task ratings, dimensional ratings, global ratings, and Air Force wide ratings.

Seq: 78
ID Number: ARI-AM-77-8; AD-A077 925
Date: Dec 77
Title: Expert Infantryman Squad and Platoon Evaluation (EISPE) I Concept: Evaluation and Observations
Author: Strasel, H. C., Ryan, T. G., & Hord, L.
Corporate Author: ARI
Summary: 8th Inf Div's attempt to change focus from memory of sequential processes to realistic performance. Feedback and post-test training period should be incorporated.
Key Points: Evaluation checklists should be aimed at objective terminal performance not just evaluations of process leading to that performance.

SYNOPSIS

Seq: 79
ID Number: ARI-AM-77-8; AD-A077 928
Date: Sep 1977
Title: Expert Infantryman Squad and Platoon Evaluation (EISPE) II
Concept, Report of Exercise Observations
Author: Ryan, T. G.
Corporate Author: ARI
Summary: Tactical realism enhances adequacy of test.
Key Points: To enhance use as training vehicle, there should be a repeat
of portions not performed satisfactorily first time through.

Seq: 80
ID Number: Not Available
Date: Not Available
Title: Facilitating and Hindering Factors in Implementing
Managerial Technology: A Socio-Technical System Process
Author: Salas, E.
Corporate Author: Not Available
Summary: Study designed to discover through examination of
decision-making processes of managers what factors
facilitate or hinder the implementation of human resources
management technologies.
Key Points: Application of policy capturing techniques.

Seq: 81
ID Number: NAMI-1050; AD-A661 794
Date: Oct 1968
Title: Factor Analysis of Aviation Training Measures and Post
Training Performance Evaluations
Author: Booth, R. F., & Berkshire, J. A.
Corporate Author: Naval Aerospace Medical Institute
Summary: Study conducted to determine whether factors (previously
identified in "factor structure" of naval air training
variables) are represented in training records of another
pilot sample. Also relates factors to performance after
graduation from training.
Key Points: Application of factor analysis to performance evaluations.

SYNOPSIS

Seq: 82
ID Number: Not Available
Date: Feb 1978
Title: Factors Affecting Overseas Success in Industry (Paper presented at Society of Intercultural Education, Training, and Research)
Author: Russel, P. Jr., & Dickinson, T.
Corporate Author: Not Available
Summary: Describes decision making procedure that can be used in cross-cultural selection.
Key Points: Utilizes policy capturing to identify important dimensions of overseas success.

Seq: 83
ID Number: Not Available
Date: Not Available
Title: Factors Affecting the Selection of American Managers for Overseas Assignment
Author: Russel, P. & Dickinson, T.
Corporate Author: Not Available
Summary: Described and applied a six-step approach to model and study strategies in making overseas selection decisions.
Key Points: Utilizes policy capturing to understand decision making strategies.

Seq: 84
ID Number: ARI-AA-1351; AD-A138 335
Date: Aug 1982
Title: Feedback Needs of Training Developers and Evaluators
Author: Witzer, B. G., & Burnside, B. L.
Corporate Author: ARI Fort Knox Field Unit
Summary: Report suggests feedback presently available to training developers is lacking in both specificity and objectivity.
Key Points: Need : better coordination between DTD and DOES, more DTD contacts with field, more emphasis on hands-on and objective testing, and of developing computer-based data analysis and techniques to handle feedback. Presents list of available feedback.

SYNOPSIS

Seq: 65
ID Number: ARI-TR-76-65; AD-A056 339
Date: Feb 1978
Title: Field Measurement and Data Collection System for Engagement Simulation Field Exercises.
Author: O'Heeron, M. K., Hosell, W. Y., & Frazier, T. W.
Corporate Author: Behavioral Technology Consultants, Inc
Summary: Describes six systems for locating vehicle positions, in terms of requirements for engagement simulation data analysis and in terms of usefulness.
Key Points: Engagement simulation techniques now being used to train Army combat units require better instrumentation and methods to gather accurate data for unit evaluation.

Seq: 66
ID Number: ARI-AR-1323; AD-A134 368
Date: Aug 1981
Title: Field Performance Feedback: A Problem Review
Author: Burnside, B. L.
Corporate Author: ARI
Summary: Mainly addresses external feedback system (flow of information from field units to Army Centers/Schools). Points to existing records available at battalion level. Looks at feedback loop from units to Army Centers/Schools. Looks at ARTEP and SQT. Makes recommendations on what type of feedback should be provided.

Seq: 67
ID Number: ARI-TR-524; AD-A128 479
Date: May 1981
Title: Field Survey of Current Practices and Problems in Army Unit Training with Implications for Fielding and Training with MILES
Author: Gray, C., Clovis, E., Muller, T. & Cunningham, R.
Corporate Author: Perceptronics
Summary: Survey of CONUS active infantry and armor divisions conducted to 1) determine how they manage, prepare, and conduct unit tactical training and 2) find out why REALTRAIN/SCOPEs has not been more widely used.
Key Points: Interviews and questionnaires on: acceptance of REALTRAIN/SCOPEs training methods, expectations and concerns re: MILES, practices and problems in unit training management, etc. Info has served as input to planning Army-wide MILES implementation.

SYNOPSIS

Seq: 88
ID Number: ARI-TR-680; AD-A159 576
Date: Jun 1985
Title: Forecasting Device Effectiveness: Vol 1. Issues
Author: Rose, A., Wheaton, G., & Yates, L.
Corporate Author: American Institute for Research
Summary: Discusses a number of issues that bear on the development of formal analytic methods for predicting the potential effectiveness of alternative training devices.
Key Points: Discussion covers theoretical, practical and methodological issues uncovered during review of the literature.

Seq: 89
ID Number: ARI-AP-85-25
Date: June 1985
Title: Forecasting Device Effectiveness: Volume II. Procedures
Author: Rose, A., Wheaton, G., & Yates, L.
Corporate Author: Not Available
Summary: Presents interactive menu-driven, computer-based model which device designer can use to determine alternative designs. Looks at four criterion constructs of device effect.: trng problem, acquisition effectiveness, transfer problem, trng efficiency.
Key Points: Training problem construct: look at what type of proficiency is required, proficiency KSA's of typical soldiers before using the device, and how difficult for trainee to acquire required proficiency.

Seq: 90
ID Number: ARI-RN-81-29; AD-A126 197
Date: Dec 1981
Title: Guidebook for Users of TRAINVICE II
Author: Seezey, R., & Evans, R.
Corporate Author: ARI
Summary: Documents transfer of training model. Main purpose of TRAINVICE II: provide method for assessing training devices or training device concepts in early design phases.
Key Points: Six components are combined to derive index of training device effectiveness: coverage requirement anal., coverage anal., training proficiency anal., learning difficulty anal., physical characteristics anal., functional characteristics anal.

SYNOPSIS

Seq: 91
ID Number: ARI-P-77-5; AD-A055 632
Date: Nov 1977
Title: Handbook for the Development of Skill Qualification Tests
Author: Osborn, W., Campbell, R., & Ford, J.
Corporate Author: HUMPRO
Summary: Covers both technical and administrative procedures to follow when preparing a field tested SQT.
Key Points: How SQT tests are developed.

Seq: 92
ID Number: ARI-AR-1305; AD-A128 086
Date: Dec 1980
Title: Human Factors Evaluation of Selected STAND Devices Employed in a Mechanized Infantry Platoon
Author: Seotz, E. R.
Corporate Author: ARI
Summary: Human Factors Evaluation of four Surveillance, Target Acquisition, and Night Observation devices.
Key Points: Results used to refine tactical doctrine at the school and to assist in determining the design of future training devices.

Seq: 93
ID Number: Not Available
Date: Oct 1972
Title: Human Performance Effectiveness and the Systems Measurement Bed (Article in Journal of Applied Psychology, vol 56, nr. 3.
Author: Uhlaner, J. E.
Corporate Author: Journal of Applied Psychology Vol 56
Summary: Discusses the Concept of Systems Measurement Bed.
Key Points: Stresses that aptitudes, job demands, and surrounding conditions coalesce to yield varying levels of performance. Looks at cognitive and non-cognitive variables affecting performance

SYNOPSIS

Seq: 94
ID Number: BESRL-TRN-223; AD-713 463
Date: Jun 1970
Title: Human Performance Experimentation in Night Operations:
Technology & Instrumentation for Field Research
Author: Hyman, A., & Sternberg, J. J.
Corporate Author: Army Behavior and Systems Research Lab
Summary: Provides a description and evaluation of instrumentation
system which includes training, testing, and control methods
and procedures as well as special experimental techniques
and instrumentation.
Key Points: Instrumentation system found to aid greatly in the
collection of reliable and valid experimentation data.

Seq: 95
ID Number: ARI-AM-79-40; AD-AD79 371
Date: Sep 1979
Title: Implementation and Evaluation of the Tank Crew Training
Program for USAREUR units
Author: Kress, G., & McGuire, W. J.
Corporate Author: HAFAD
Summary: Compares previously developed tank crew gunnery training
program (performance oriented and simulation based) against
conventional program.
Key Points: Training program effectiveness assessed for both groups
based on their crew gunnery performance on Table VI. Study
stresses need to develop reliable tank gunnery criterion
performance standards and measurement techniques.

Seq: 96
ID Number: ARI-AM-83-84; AD-A136 601
Date: Sep 1983
Title: Implications for Development of Collective Training
Information System (CTIS)
Author: Scott, T., & Ekstrom, A.
Corporate Author: ARI
Summary: Presents results of information needs assessment to
determine components of a collective training information
system.
Key Points: Interviews revealed definite need for feedback from field
users of ARTEP documents to the developers pertaining to the
quality and utility of the product.

SYNOPSIS

Seq: 97
ID Number: ARI-TR-78-A26; AD-A064 271
Date: Nov 1978
Title: Improved Army Training and Evaluation Program (ARTEP) Methods for Unit Evaluation, Vol I: Executive Summary; Study Design and Field Research
Author: Havron, M. D., Albert, D. D., & McCullough, T. J.
Corporate Author: Human Sciences Research, Inc
Summary: Analyzes existing methods of implementing ARTEP for a tank/each Infantry Task Force. Objective: identify problems in conduct of ARTEP for field units, develop remedies, and incorporate them into a practical field guide.
Key Points: Study conducted when ARTEP system was in early stages of development. Various technical problems inherent in training and evaluation outline (T&EO) are presented.

Seq: 98
ID Number: ARI-TR-78-A27; AD-A066 763
Date: Nov 1978
Title: Improved Army Training and Evaluation Program (ARTEP) Methods for Unit Evaluation, vol II: Analysis
Author: Havron, M. D., Albert, D. D., & McCullough, T. J.
Corporate Author: Human Sciences Research, Inc
Summary: Provides data analysis and recommendations for refining current ARTEP implementation.
Key Points: Significant emphasis must be placed on adequate training for evaluator/controller. Presents recommendations for follow-on research, e.g. integration of new technology into ARTEP's evaluation component (engagement simulation, battle simulation, etc.).

Seq: 99
ID Number: ARI-TR-78-A28; AD-A064 272
Date: Nov 1978
Title: Improved Army Training and Evaluation Program (ARTEP) Methods for Unit Evaluation, Vol III: Field Guidance
Author: Havron, M. D., Albert, D. D., & McCullough, T. J.
Corporate Author: Human Sciences Research, Inc
Summary: Prototype guide for battalion level ARTEP. Based on recommendations presented in vol II.
Key Points: Stresses ARTEP principles and applications. Points out that basic principle is performance oriented training.

SYNOPSIS

Seq: 100
ID Number: ARI-TR-79-A23; AD-A075 465
Date: Apr 1979
Title: Improved Army Training and Evaluation Program (ARTEP) Methods for Unit Evaluation, Vol V: Analysis of Alternative Training Strategies
Author: Havron, M. D., McFarling, L. H., & Hill, H.
Corporate Author: Human Sciences Research, Inc
Summary: Analyzes alternative training settings available to Bn training managers for the conduct of training within ARTEP. Settings include conventional field exercise, engagement simulation field exercise, etc.
Key Points: Describes capability for performance measurement/diagnosis for each setting.

Seq: 101
ID Number: ARI-TR-79-A24; AD-A075 663
Date: Apr 1979
Title: Improved Army Training and Evaluation Program (ARTEP) Methods for Unit Evaluation, Vol VI: Conventional ARTEP Missions and Engagement Simulations:
Author: Havron, M. D., & McFarling, L. H.
Corporate Author: Human Sciences Research, Inc
Summary: Examines 4 issues: development of accurate, comprehensive criteria and measures of unit performance; structure & functions of evaluator/controller team; reduction/integration of eng sim data and ARTEP data; use of data to establish trng objectives.
Key Points: Points out 4 main issues that bear on conduct of unit proficiency assessment.

Seq: 102
ID Number: ARI-TR-79-A25; AD-A075 957
Date: Apr 1979
Title: Improved Army Training and Evaluation Program (ARTEP) Methods for Unit Evaluation, Vol VII: Executive Summary
Author: Havron, M. D., & Manschura, R. G.
Corporate Author: Human Sciences Research, Inc
Summary: Summarizes previous 6 volumes.
Key Points: Major ARTEP problems: little time for evaluator training; poor integration of ratings for diagnosis and tracking of errors; administration incompatible with established principles of training; T&EO forecast not able to identify specific errors.

SYNOPSIS

Seq: 103
ID Number: ARI-AP-79-7; AD-A075 470
Date: Apr 1979
Title: Improved Army Training and Evaluation Program (ARTEP) Methods for Unit Evaluation: Guidance for Planning and Conducting Company-level Field Exercises
Author: Mauron, M. D., McCullough, T. J., McFarling, L. & Manschura, R.
Corporate Author: Human Sciences Research
Summary: Attempt to satisfy needs documented in the first study phase. Presents a training program on the conduct of an evaluator/controller school.
Key Points: Persistent problem in Army: institutionalized lack of appreciation for the role evaluators can and must play in evaluating field performance and in acting as trainers.

Seq: 104
ID Number: Not Available
Date: March 1985
Title: Improving the Training Approach
Author: Duncan, C. S., & Hartjen, R. C.
Corporate Author: HQ TRADOC / Armor Magazine
Summary: Army must: 1) modify current analysis approach (collective requirements to drive indiv skill training); 2) adopt proactive training approach; 3) train for success on battlefield; 4) bond soldiers to quality leaders in cohesive units.
Key Points: Philosophically, TRADOC understands what to do - the question is whether TRADOC leadership can influence the schools.

Seq: 105
ID Number: AD-A164 758
Date: Dec 1985
Title: In Search of Combat Readiness in the USMC
Author: Stahl, P.
Corporate Author: Naval Postgraduate School
Summary: Analysis of the factors that make a USMC unit combat ready. Presents results of a survey of 46 USMC officers based on a readiness model.
Key Points: Survey data analyzed using bootstrap methodology, whereby quantitative values are derived from qualitative value judgments.

SYNOPSIS

Seq: 106
ID Number: ARI-RN-79-22; AD-A077 177
Date: Nov 1979
Title: Initial ARTEP Validation Results: 1974 - 1975
Author: Hayes, J. F., & Wallis, M. A.
Corporate Author: American Institutes for Research
Summary: Standards too subjective; evaluator performance too erratic, doubtful that typical evaluator personnel could be adequately trained to meet standardization requirements; no guidelines for adjusting standards to account for varying test conditions.
Key Points: Situational artificiality often required to achieve standardization; has negative impact on validity as a trng guide; ARTEP evaluation represents CULMINATION of training, which should not be the case.

Seq: 107
ID Number: ARI-RN-85-5; AD-A150 302
Date: Jan 1985
Title: Instructional Approaches for Individualizing Basic Rifle Marksmanship Training
Author: Maxey, J. L., & Seezey, R. W.
Corporate Author: Litton Mellionics Systems Dev.
Summary: Presents literature review of educational and training research on individualized training.
Key Points: Points to study by Rosen and Behringer who found: skills taught to meet current stds but not in the best way, criteria do not meet current req'd combat characteristics, gap between current stds & conditions and those required.

Seq: 108
ID Number: AD-A149 417
Date: Dec 1984
Title: Interactive Graphics Simulator: Design, Development, and Effectiveness/Cost Evaluation
Author: Richardson, J., Harmon, K., & Keller, R.
Corporate Author: Essex Corporation
Summary: Design, development, and implementation of Interactive Graphics Simulator (IGS).
Key Points: Methodology to determine training and cost effectiveness.

SYNOPSIS

Seq: 109
ID Number: Not Available
Date: 1968
Title: JAM: A Technique for Analyzing Group Judgment (Article appearing in Journal of Experimental Education, Vol. 4)
Author: Christal, R. E.
Corporate Author: Journal of Experimental Psychology
Summary: Utilizes Judgment Analysis (JAM) to identify and describe the rating policies within a board of judges.
Key Points: Application of JAM technique.

Seq: 110
ID Number: ARI-AP-81-17; AD-A120 774
Date: Sep 1981
Title: Job Aid for Modifying Ineffective or Inefficient Training Programs
Author: Kristiansen, D.
Corporate Author: ARI
Summary: Job aid which addresses the problem of how to modify training when one has conducted a Trng Program Evaluation and found that certain changes are needed.
Key Points: Points out the problems that often result from inefficient training e.g., unnecessary instruction on skills and knowledges the soldier already has or when practice time is cut in the name of efficiency.

Seq: 111
ID Number: AFHRL-TP-85-51; AD-A164 837
Date: Feb 1986
Title: Job Performance Measurement Classification Scheme for Validation Research in the Military
Author: Kavanagh, M., Borsan, M., Hedge, J. & Gould, R.
Corporate Author: McFann-Gray Associates, Inc
Summary: Outlines the development of a performance measurement classification. Focus on job performance criterion development.
Key Points: Model looks at input variables (individual characteristics, measurement method) process variables (cognitive processes) and outcome variables (performance measurement quality). Performance measurement criteria to be considered are suggested.

SYNOPSIS

Seq: 112
ID Number: ARI-AN-83-32; AD-A135 879
Date: Sep 1983
Title: Job Sample Tests as Predictors of M1 Gunnery Performance: Appendixes A-E
Author: Biers, D., & Sauer, D.
Corporate Author: Systems Research Laboratories
Summary: Used aptitude measurement meth. to design job sample tests for armor crewman. Developed seven job sample tests to include: three computer based and four H-O tests.
Key Points: Various job sample tests are presented. Results indicated that linear combinations of job sample test measures accounted for very high proportion of variability in crew past success at Annual Qualifications.

Seq: 113
ID Number: STP 9-63E-JB
Date: Apr 1985
Title: M1 Abrams Tank System Mechanic Job Book, MOS 63E10/20
Author: Not Applicable
Corporate Author: US Army Ordnance School
Summary: Used as an NCO training management tool to record demonstrated proficiency on soldier's annual (all common and MOS-specific) tasks for which the SL 1 or 2 soldier is responsible. Provides space for supervisor to record go or no-go and date.
Key Points: Basic idea is good, but doubtful that it is utilized with any degree of effectiveness.

Seq: 114
ID Number: ARI-P-78-2
Date: Feb 1978
Title: Maintenance of Performance Effectiveness
Author: Horabin, I., Katz, M., & Shields, J.
Corporate Author: ARI
Summary: Emphasis on supervisors' involvement and on dealing with performance problems at the specific problem level. De-emphasizes training and technological solutions.
Key Points: Points out need to deal with performance problems at specific level. Supervisors' performance crucial to maintenance of effectiveness. It is important to determine what the objectives are and how evaluation will be made.

SYNOPSIS

Seq: 115
ID Number: ARI-AM-84-5; AD-A137 171
Date: Jan 1984
Title: Maintenance Performance System (Organizational) Handbook for Certifying Mechanics in Division 86 Arsenal Units
Author: Spiker, A., Harper, W., & Motkyns, A.,
Corporate Author: Anacapa Sciences, Inc.
Summary: Effort to develop the Maintenance Performance System Organizational (MPS-O). MPS-O is an integrated system for measuring maintenance mechanics. Looks at Certification Programs in the Army, Navy, Air Force, and private industry.
Key Points: Presents effort to develop a system to measure maintenance certification performance.

Seq: 116
ID Number: ARI-AM-84-2; AD-A137 571
Date: Jan 1984
Title: Maintenance Performance System (Organizational) Information and Evaluation System Design (IES) Design Considerations
Author: Slapson, H., Gutsan, J., & Jarosz, C.
Corporate Author: Anacapa Sciences
Summary: Design considerations relating to the IES of the Maintenance Performance System-Organizational.
Key Points: Use as evaluation tool. Use as management information feedback system. Feedback provided to Army commanders, managers, trainers to allow them to review maintenance/training performance.

Seq: 117
ID Number: Not Available
Date: 1983
Title: Measures of Compensatory and Noncompensatory Models of Decision Behavior: Process Tracing versus Policy Capturing (Article appearing in Organizational Behavior and Human Performance, Vol. 31)
Author: Billings, R., & Marcus, S.
Corporate Author: Organization Behavior and Human Perf.
Summary: Examines the validity of policy capturing and process tracing measures of decision making.
Key Points: Application of ANOVA and information board technique (linear regression commonly used) to policy capturing technique.

SYNOPSIS

Seq: 118
ID Number: AD-A063 081
Date: Sept 1978
Title: Method to Determine Divisional Engineer Battalions Training Measures of Effectiveness (Master's thesis, Naval Postgraduate School)
Author: Gibson, L. P., Jr.
Corporate Author: Naval Postgraduate School
Summary: Presents methodology to determine the training measures of effectiveness for divisional engineer battalions.
Key Points: Looks at training measures of effectiveness.

Seq: 119
ID Number: Not Available
Date: Nov 1979
Title: Methodology to develop the Criteria and Criteria Weightings for Assessing Subunit Effectiveness in Organizations (Article appearing in Academy of Management Journal, vol 22)
Author: Hitt, M., & Middlemist, D.
Corporate Author: Academy of Management Journal
Summary: Study offers and tests an improved procedure for measuring organizational subunit effectiveness by isolating relevant criteria and determining criteria weights within a large complex organization.
Key Points: Use of policy capturing at a state health department.

Seq: 120
ID Number: ARI-TR-569; AD-A131 969
Date: March 1982
Title: Methods of Evaluating Tank Platoon Battle Run Performance: Design Guidelines
Author: Allen, T., Johnson, E., III, Knerr, M. & Boycan, G.
Corporate Author: ARI
Summary: Provides guidelines to assist local battalions in the tasks of planning, conducting, and evaluating the platoon Table IX battle run.
Key Points: Presents representative and challenging situations. Evaluation based on a variety of measures and scoring procedures.

SYNOPSIS

Seq: 121
ID Number: ARI-TR-457; AD-A096 369
Date: May 1980
Title: Methods of Evaluating Tank Platoon Battle Run Performance
Author: Wheaton, G. A., Allen, T. W., & Johnson, E.
Corporate Author: American Institutes for Research
Summary: Presents recommended tasks, conditions, constructs, measures and standard that increase objectivity while retaining diagnostic capability
Key Points: Many 'standards' are in fact subtasks. See Wheaton, Fingershan, Boycan. Score aggregation required such data from many iterations by same unit, clearly not feasible. Arbitrary standards are appealing. Tng Mgrs need aggregation for diagnosis.

=====

Seq: 122
ID Number: ARI-TR-574; AD-A135 486
Date: Mar 1982
Title: Methods of Evaluating Tank Platoon Battle Run Performance: A Perspective
Author: Wheaton, G., & Boycan, G.
Corporate Author: AIR
Summary: Examines and discusses major issues that have significant implication on: method of main gun firing, performance measurements, and purpose.
Key Points: Recommend use of additional and improved evaluation of tank platoon gunnery and tank skills. Presents three options for measuring platoon performance.

=====

Seq: 123
ID Number: Not Available
Date: 1980
Title: Military Research on Performance Criteria: A Change of Emphasis (Article appearing in Human Factors Journal, vol 22, nr. 2)
Author: Uhlaner, J. E., & Drucker, A.
Corporate Author: Not Available
Summary: Points out change of emphasis in Military research. Trend is away from school grades and subjective rating towards performance testing. Recommends use of situational performance testing (SQT, real train, etc.). Recommends Systems Measurement Bed.
Key Points: Need total evaluation of unit, team, or group performance. Must determine systems output criterion (i.e. ARTEP). Systems Measurement Bed deals with overall system's influence on individual's performance (Total Mission Effectiveness).

=====

SYNOPSIS

Seq: 124
ID Number: AD-A112 937
Date: Dec 1981
Title: Multi-Attribute Utility Theory to Assist Top-Level Acquisition Decision-Making (Master's Thesis from Naval Post Graduate School)
Author: Goren, R.
Corporate Author: Naval Post Graduate School
Summary: Search for decision-making technique that can best serve top-level acquisition decision making. Suggests use of Multi-Attribute Utility Theory.
Key Points: Presents methodology and effort to determine key decision maker information needs.

Seq: 125
ID Number: AD-P001 148
Date: Jan 1982
Title: New tools for assessing aircraft/pilot performance (Paper presented at AIAA workshop: Flight testing to identify pilot workload and pilot dynamics, Edwards AFB, CA)
Author: York, R., Montgomery, L., & Petro, J.
Corporate Author: SRI International
Summary: Report presented at AIAA workshop: flight testing to identify pilot workload and pilot dynamics. Attempts to assess all three areas of aircraft weapon system effectiveness (aircraft performance, pilot physiological response, and armament utilization).
Key Points: Recommends multi-dimensional approach to measure pilot workload, stress, and performance quantitatively. Presents description of tactical aircrew combat training system (TACTS) features.

Seq: 126
ID Number: RISO-M-2285
Date: June 1981
Title: Notes on Human Performance Analysis
Author: Hollnagel, E., Pendersen, O. M., & Rasmussen, J.
Corporate Author: Risoe National Lab
Summary: Framework for the integration and analysis of human performance in nuclear environments. Identifies four sources of data: special post incident, plant interviewees, training simulators, and research simulators.
Key Points: Provides an analysis scheme and discusses how the results from the different levels may be used for various purposes.

SYNOPSIS

Seq: 127
ID Number: Not Available
Date: Not Available
Title: Optimization of Training Systems
Author: Cronholz, J. M.
Corporate Author: PM TRADE
Summary: Looks at optimization of skill-defined task sequence as a means to training system optimization.
Key Points: Points to skill defined task sequence as a method to optimize training.

=====

Seq: 128
ID Number: ARI-AM-84-47; AD-A138 085
Date: Feb 1984
Title: Performance Feedback: A Review of its Psychological and Behavioral Effects
Author: Iigen, D., Fisher, C., & Taylor, M.
Corporate Author: Purdue University
Summary: Identifies characteristics of feedback which may lead to more effective use of feedback.
Key Points: Points out the importance of understanding what goes on between the administration of feedback and the subject's selection of a response.

=====

Seq: 129
ID Number: AD-A110 669
Date: Sept 1981
Title: Performance Measurement and the Navy's Tactical Aircrew Training System (TACTS)
Author: Stoffer, G.
Corporate Author: Human Factors Lab, NTEC
Summary: Describes development and use of Tactical Training System (TACTS) as a means for training advanced air combat skills. Indicates current limitations in Performance Measurement System.
Key Points: Cost Effectiveness Assessment results indicate TACTS/ACTM reduces training costs by more than \$100 million annually. Presents topics to consider when developing Performance Measurement System.

=====

SYNOPSIS

Seq: 130
ID Number: Not Available
Date: 1985
Title: Performance Measurement System for Training System Development (Paper presented at the 7th I/ITEC, Orlando, FL)
Author: Pettit, R., & Magruder, P.
Corporate Author: Not Available
Summary: Presents integrated approach for the development, integration, and management of performance measurement in training systems.
Key Points: Approach organizes and translates user requirements through front-end analyses into a set of qualitative and quantitative performance measures.

Seq: 131
ID Number: NAUMC 2694
Date: 1979
Title: Performance Objectives for Infantry Squad
Author: Not Applicable
Corporate Author: US Marine Corps
Summary: Provides performance objectives for infantry squads preparing for MC Combat Readiness Evaluation System (MCCRES). Identifies tasks, level (echelon), conditions and requirements (standards).
Key Points: Looks at measurement of squad performance in a variety of combat situations.

Seq: 132
ID Number: ARI-AM-81-27; AD-A127 057
Date: July 1981
Title: Perspectives on Battalion Training Management
Author: Hill, H., & Sticht, T.
Corporate Author: ARI
Summary: Four battalion commanders were interviewed to explore their philosophy and goals for training, training management practices, and training and evaluation techniques.
Key Points: Problems found with SQT testing and ARTEP and a less obvious form of evaluation that is often used by bn cdrs on a daily basis.

SYNOPSIS

Seq: 133
ID Number: Not Available
Date: Oct 1977
Title: Planning for Aircrew Performance Measurement R&D (Paper presented at the Productivity Enhancement: Personnel Performance Assessment in Navy Systems Symposium, San Diego, CA)
Author: Haag, W. & Knoop, P.
Corporate Author: Not Available
Summary: Summarizes AFHRL efforts of developing measures of aircrew proficiency which could be used in both ground-based and airborne environments. Points to unresolved problem of measurement system validation.
Key Points: Presents efforts of developing objective performance measurement which could lead to the development of operational airborne measurement systems.

Seq: 134
ID Number: 19K10-08UT
Date: Jun 85
Title: POI, M1/M1A1 Abrams Armer Crewman (Draft)
Author: Not Applicable
Corporate Author: US Army Armer School
Summary: Outlines the course of instruction to train soldiers to function as SL1 crewman on an M1 Abrams tank. MOS trained, 19K10. Provides scope (tasks) of each period of instruction, and whether tasks are 'taught to standard'.
Key Points:

Seq: 135
ID Number: 19D10-08UT (M113)
Date: Mar 1985
Title: POI, M113 Cavalry Scout Armer
Author: Not Applicable
Corporate Author: US Army Armer School
Summary: Outlines the course of instruction to train soldiers to function as SL1 cavalry scouts on an M113. MOS trained, 19D10. Provides scope (tasks) of each period of instruction, and whether tasks are 'taught to standard'.
Key Points: Provides basis for analyzing course content.

SYNOPSIS

Seq: 136
ID Number: PO1 19D10-0SUT (M3)
Date: Apr 1985
Title: PO1, M3 Bradley/CFV Scout (Draft)
Author: Not Applicable
Corporate Author: US Army Armor School
Summary: Outlines the course of instruction to train soldiers to function as SL1 cavalry scouts on a CFV. MOS trained, 19D10. Provides scope (tasks) of each period of instruction, and whether tasks are 'taught to standard'.
Key Points: Provides basis for analyzing course content.

Seq: 137
ID Number: 19E10-0SUT
Date: Jun 1985
Title: PO1, M50A1 Armor Crewman (Draft)
Author: Not Applicable
Corporate Author: US Army Armor School
Summary: Outlines the course of instruction to train soldiers to function as SL1 tank crewman on an M50A1 tank. MOS trained, 19E10. Provides scope (tasks) of each period of instruction, and whether tasks are 'taught to standard'.
Key Points: Provides basis for analyzing course content.

Seq: 138
ID Number: 19E10-0SUT-AS1B8
Date: Jun 1985
Title: PO1, M50A3 Armor Crewman (Draft)
Author: Not Applicable
Corporate Author: US Army Armor School
Summary: Outlines the course of instruction to train soldiers to function as SL1 tank crewman on an M50A3 tank. MOS trained, 19E10; AS1B8 awarded to MOS 19E. Provides scope (tasks) of each period of instruction, and whether tasks are 'taught to standard'.
Key Points: Provides basis for analyzing course content.

SYNOPSIS

Seq: 139
ID Number: Not Available
Date: Nov 1980
Title: Policy Implications Analysis: A Method for Improving Policy Research and Evaluation (Appearing in Book Improving Educational Evaluation Methods: Impact on Policy - Editor: Carol B. Aslanians)
Author: Maday, D., & Stenner, A. J.
Corporate Author: NTS Research Corporation
Summary: Describes the development and application of Policy Implications Analysis; designed to help people who are planning or conducting evaluations to tailor their information so that it has optimal potential for being used and acted upon.
Key Points: Emphasizes need to start evaluation planning with a careful assessment of policy makers information needs. Builds upon Delphi Method and Scenario Writing.

Seq: 140
ID Number: NPADC-SA-82-18; AD-A113 491
Date: Mar 1982
Title: Potential Applications of Computer Assisted Instruction to P-3 Aircrew Trainer
Author: Marks, L. J., Hawkins, W. W., & Kribs, H. D.
Corporate Author: Instructional Science & Development
Summary: Examines P-3 aircrew training syllabus to find out how training effectiveness could increase by a shift to CAI. Presents analysis and comparison of various CAI systems and the current P-3 media mix to determine the most effective training approach.
Key Points: Identifies areas in curriculum where CAI might improve effectiveness of training. Methodology could be of interest.

Seq: 141
ID Number: ARI-TR-613
Date: April 1982
Title: Prediction of Training Device Effectiveness: A Review of Army Models
Author: Tufano, D. R., & Evans, R. A.
Corporate Author: Not Available
Summary: Looks at four training device effectiveness predictive models, known as TRAIN UICE.
Key Points: Looks at Training Effectiveness models.

SYNOPSIS

Seq: 142
ID Number: Not Available
Date: Not Available
Title: Reliable Measurement of Task Performance From Training to the Job
Author: Osborn, H.
Corporate Author: HUSARAD
Summary: Focuses on sources of unreliability in testing soldier performance at the completion of training and again after job assignment.
Key Points: Presents sources of test reliability.

Seq: 143
ID Number: ARI-AM-77-7; AD-A077 927
Date: Dec 1977
Title: Report of Exercise Observations: Operational Readiness Training Test (ORTT)
Author: Ryan, T. G., & Yates, L. G.
Corporate Author: ARI
Summary: Presents evaluation activity and recommendations of the ARI field unit USAREUR concerning battalion ORTT.
Key Points: Solicited perceptions and suggestions for improving the ORTT from unit personnel. Most relevant recommendation is the need for standardized performance feedback.

Seq: 144
ID Number: ARI-TR-78-A18; AD-A056 054
Date: Jun 1978
Title: Research on Training for Brigade Command Groups: Factors Contributing to Unit Combat Readiness
Author: Olmstead, J. A., Baranick, M. J., & Elder, B. L.
Corporate Author: System Development Corp
Summary: Examines relationship between brigade command group effectiveness and performance of ARTEP during Computer Assisted Man Maneuver Exercise (CAMMS).
Key Points: CAMMS is a two-sided battle simulation. Combat outcomes determined by computer which provides rapid calculation and feedback of engagement results between friendly and threat forces. Can provide end-of-exercise summary of status of both forces.

SYNOPSIS

Seq: 145
ID Number: NTEC 83-C-0015-1; AD-A154 409
Date: Mar 1985
Title: Results of the Part Task Ship Handling Trainer
Pre-prototype Training Effectiveness Evaluation (TEE)
Author: Hanley, M. L.
Corporate Author: Ship Analytics, Inc
Summary: Looks at PARTSHIP (part task trainer for ship handling).
Presents TEE which was conducted on two areas of ship
handling. Performs pretest-training-posttest on training
device and compares against full bridge simulator.
Key Points: Emphasizes problems in simulation training research due to
the unavailability of criterion measures of complex,
real-world performance.

Seq: 146
ID Number: ARI-AR-1329; AD-A130 971
Date: May 1981
Title: Review of Methodologies for Analysis of Collective Tasks
Author: Bauer, R.
Corporate Author: ARI
Summary: Presents state of the art methodologies for analysis of
collective tasks.
Key Points: Comparison of different methodologies indicated some common
technique but little agreement on basic concepts,
terminology, or even products of collective analysis.

Seq: 147
ID Number: AD-P002 317
Date: Not Available
Title: Risk Management in a Multiobjective Decision-making
Framework
Author: Haimes, Y. Y.
Corporate Author: Systems Engineering Department
Summary: Looks at risk assessment as an integral part of the
decision-making process.
Key Points: Effect of risk management on decision making.

SYNOPSIS

Seq: 148
ID Number: AD-8955 309L
Date: 1966
Title: Role of Operations Research in Military Decision-Making
Author: Anson, R. H.
Corporate Author: US Army CGSC
Summary: Provides military decision maker with insight into Opns Res to aid in objectively structuring problems.
Key Points: Provides means to improve quantitative procedures as justification to decision makers decisions and recommendations.

Seq: 149
ID Number: ARI-AM-78-12; AD-A077 961
Date: Apr 1978
Title: Score Quality Issues Related to Individual and Weapon Crew Criterion Reference Performance Tests
Author: Steinheiser, F., & Snyder, C. W.
Corporate Author: ARI
Summary: Presents issues related to criterion-performance testing which should be considered when developing individual and weapon crew tests.
Key Points: Pass/Fail decisions must be made from a fairly small sample of items, therefore errors are unavoidable.

Seq: 150
ID Number: NUREU/CR-3726
Date: May 1984
Title: Simulator Fidelity and Training Effectiveness: A Comprehensive Bibliography with Selected Annotations
Author: Bolton, P., Faigenblum, J., Hope, A. & Rankin, W.
Corporate Author: Not Available
Summary: Annotated bibliography of simulator fidelity and training effectiveness studies.
Key Points: Identifies several "performance measurement" articles (training device related).

SYNOPSIS

Seq: 151
ID Number: AFHPL-TR-80-63
Date: Jan 1982
Title: Simulator Training Requirements and Effectiveness Study (STRES): Executive Summary
Author: Seiple, C. A.
Corporate Author: Canyon Research Group, Inc.
Summary: One of 7 technical reports prepared for STRES. Summarizes contents of other six reports which address aircrew training device issues to include: fidelity, instructional support features, and utilization in aircrew training progress.
Key Points: Refers to : Instructional Features Volume , Chapter IV (Monitor and Evaluate Performance) for information on how performance is monitored and evaluated.

Seq: 152
ID Number: AD-A043 343
Date: June 1977
Title: Social Structure of Decision Making
Author: Uroos, U. H.
Corporate Author: Yale University
Summary: Overview of research conducted under the areas of : leadership styles, leadership development, training, etc.
Key Points: Effect of leadership styles, perceptions, and structure on decision making.

Seq: 153
ID Number: AD-A096 202
Date: Feb 1981
Title: Soldier Capability - Army Combat Effectiveness (SCACE) Volume II Selected Bibliography
Author: Toosepuu, J.
Corporate Author: USA Soldier Support Center
Summary: Study undertaken to quantify the relationship between the capability of soldiers and the combat effectiveness of weapons, units and forces. Presents selected bibliography.
Key Points: Literature review reiterates that soldier capabilities are a major determinant of combat effectiveness. Points out that variables used to determine capabilities are identifiable, measurable and useful for prediction.

SYNOPSIS

Seq: 154
ID Number: STP 9-63E35-SH-TG
Date: Apr 1985
Title: Soldier's Manual Trainer's Guide
Author: Not Applicable
Corporate Author: US Army Ordnance School
Summary: Contains standardized training objectives, in form of task summaries, used to train/evaluate on critical tasks which support unit missions during wartime.
Key Points: This pertains to skill level 3, 4, and 5, which is outside the ARI study effort.

Seq: 155
ID Number: STP 9-63E12-SH
Date: Apr 1985
Title: Soldier's Manual, M1 Abrams Tank System Mechanic
Author: Not Applicable
Corporate Author: US Army Ordnance School
Summary: Provides standardized training objectives in form of task summaries used to train/evaluate soldiers on critical tasks supporting unit missions during wartime.
Key Points: Provides basis for analyzing MOS-related job requirements.

Seq: 156
ID Number: STP 9-63H12-SH
Date: Nov 1985
Title: Soldier's Manual, M60A1/A3 Tank System Mechanic
Author: Not Applicable
Corporate Author: US Army Ordnance School
Summary: Provides standardized training objectives in form of task summaries used to train/evaluate soldiers on critical tasks supporting unit missions during wartime.
Key Points: Provides basis for analyzing MOS-related job requirements.

SYNOPSIS

Seq: 157
ID Number: ARI-AN-85-38; AD-A157 527
Date: Jan 1985
Title: Study of Effectiveness of Infantry Systems. Training Effectiveness Analysis, Cost Effectiveness Analysis, and Human Factors in Systems Development & Fldg.
Author: Evans, K. L., & Osborne, A. D.
Corporate Author: Litton Mellonics
Summary: Summarizes research conducted supporting ongoing ARI research programs relating to TER, CTER, etc. Applies following submodels: CTER for developing systems, ISD, training evaluation for non-systems training, training development study, etc.
Key Points: Points out that no methodology exists for Cost and Training Effectiveness that is generalizable to all US Army systems and non-systems, and goes beyond the acquisition phase of systems to include the analysis of fielded systems.

Seq: 158
ID Number: NTDC 1449-1; AD-609 605
Date: Not Available
Title: Study of Training Performance Evaluation Techniques
Author: Briggs, L. J.
Corporate Author: ARI
Summary: Discusses performance evaluation in the training environment, specifically in training situations involving the use of simulators.
Key Points: Illustrative application of automatic training/evaluation. Selected training devices which could provide valuable proficiency related info. Concludes that instructors do not know how to evaluate objectively and no good performance tests are available.

Seq: 159
ID Number: ARI-TR-604; AD-A138 873
Date: May 1982
Title: Subjective Appraisal as a Feedback Tool
Author: Burnside, B. L.
Corporate Author: ARI
Summary: Looks at feedback from field units to TRADOC Centers/Schools and makes suggestions as to how to improve loop.
Key Points: Recommends making subjective measures more objective by asking well-specified factual questions and by using BARS.

SYNOPSIS

Seq: 160
ID Number: AD-A001 401
Date: Not Available
Title: Success and Failure in Skill Qualification Testing & Troop Views
Author: Hanson, J.
Corporate Author: ARI
Summary: Explores reasons for success and failure in SQT testing. Uses enlisted soldiers who take SQTs as source of information.
Key Points: Results indicate that soldiers emphasize the importance of performing tasks as part of unit duty in order to be prepared to answer questions in the skill component portion of the SQT. Discusses SQT and its components.

Seq: 161
ID Number: ARI-AP-79-15; AD-A082 706
Date: Nov 1979
Title: Tank Crew (M60A1) Performance Exercise
Author: O'Brien, R., Harris, J., & Osburn, W.
Corporate Author: HUMPRO
Summary: Provides test exercises and administrative guidance for evaluating the readiness of M60A1 tank crews.
Key Points: Provides integrated train-up package for annual gunnery evaluation. Individual and team tasks are measured via rating sheets and scorecards (go/no go).

Seq: 162
ID Number: ARI-AP-79-13; AD-A082 569
Date: Nov 1979
Title: Tank Crewmen (M60A1) Readiness Tests
Author: O'Brien, R., Harris, J., & Osburn, W.
Corporate Author: HUMPRO
Summary: Provides tests and administrative guidance for evaluating M60A1 tank crewmen job readiness. Tests cover knowledge and skill aspects of those tasks that are most relevant to crew gunnery proficiency.
Key Points: Presents two types of readiness tests: written and hands on tests which provide commander with diagnostic tool for determining performance. Utilizes go/no go evaluation.

SYNOPSIS

Seq: 163
ID Number: ARI-AM-85-12; AD-A149 662
Date: Jan 1985
Title: Team Dimensions: their Identity, their Measurements, and their Relationships
Author: Nieva, V. F., Fleishman, E. A. & Rieck, R.
Corporate Author: Response Analysis Corporation
Summary: Presents initial phase of effort aimed at answering basic questions about the nature of team performance and factors affecting it. Proposes taxonomy of team performance dimensions.
Key Points: Methodologies are needed to evaluate teams along identified team performance dimension. Several have reached a stage of development which can be applied to group performance: binary decision flow diagrams, BARS, & profile analytic methods.

Seq: 164
ID Number: SBI-AD-E751-034; AD-B067 734L
Date: Jun 1982
Title: Training Aspect of Reserve Battalion Combat Readiness (Master's thesis)
Author: Ash, S. E.
Corporate Author: USArmy CGSC
Summary: Study of the training variable of the combat readiness equation as it concerns AC maneuver battalions.
Key Points: Study concludes that readiness determination is hampered by a lack of a well-defined, measurable definition of readiness.

Seq: 165
ID Number: ARI-TP-376; AD-A075 414
Date: Jun 1979
Title: Training Battalion Command Groups in Simulated Combat: Identification and Measurement of Critical Performances.
Author: Kaplan, I. T., & Barber, H. F.
Corporate Author: ARI
Summary: Investigates behavior of 23 battalion command groups in a simulated combat environment. Significant differences found among ratings of the same command group by several observers.
Key Points: Results indicate need to develop more objective measures of performance and identify those subtasks for which different raters' perspectives should produce valid differences in ratings.

SYNOPSIS

Seq: 166
ID Number: ARI-AR-1291; AD-A122 777
Date: Sep 1980
Title: Training Device Effectiveness: Formulation and Evaluation of a Methodology
Author: Bickley, W. R.
Corporate Author: ARI
Summary: Presents model to determine training device effectiveness. Model considers only antecedent simulator training.
Key Points: Model not concerned with fidelity and realism but directly addresses effectiveness of the simulator in decreasing required aircraft training time.

Seq: 167
ID Number: ARI-AR-13676; AD-A159 018
Date: Feb 1984
Title: Training Effectiveness Analysis: Status of Institutional and Unit Mortar Training
Author: Fusha, J., Penn, A., & Thompson, T.
Corporate Author: Litton
Summary: Looks at institutional and unit training programs, problems and deficiencies and provides recommendations for improvement. Extensive analysis of POI, unit training programs, ARTEP, and live fire exercises.
Key Points: Major problems identified were: no selection criteria for 11C mortar crews, no institutional training for SL 2, etc.

Seq: 168
ID Number: ARI-AR-82-27; AD-A140 997
Date: Aug 1982
Title: Training Effectiveness as a Function of Training Device Fidelity
Author: Baum, D. & Riedal, S.
Corporate Author: Honeywell Systems and Research Ctr
Summary: Study to determine the effects of reduced training device fidelity on learning and performance of a perceptual-motor maintenance task (bicycle wheel training).
Key Points: Looks at effect of training device fidelity on perceptual task performance.

SYNOPSIS

Seq: 169
ID Number: ARI-TR-142; AD-A126 193
Date: Feb 1983
Title: Training Effectiveness Evaluation (TEE) of the Advanced Fire Fighting Training System.
Author: Cordell, C., Nutter, R., & McDaniel, W.
Corporate Author: Training Analysis & Evaluation Group
Summary: Training Effectiveness Evaluation of the Navy Advanced Fire Fighting Training System. Found that fires are sufficiently realistic that positive training did occur. Looked at 5 components of training system: publications, Device 19F1, structure, supporting subsystems, and curriculum. Uses empirical noncooperative evaluation technique. Control group = course objectives.

Seq: 170
ID Number: TRASANA-TR-49-82; AD-A122 708
Date: Oct 1982
Title: Training Effectiveness Analysis - A Process In Evolution
Author: Miller, C., & Southard, L.
Corporate Author: USAR TRADOC Systems Anal. Activity
Summary: Provides brief history of Training Effectiveness Analysis (TEA) Division in TRASANA. Summarizes the cost analyses in TEAs.
Key Points: Summarizes TEA studies to include: Evaluation of training, training devices, soldier/hardware interface, and MDS selection criteria. Within evaluation of training looks at training of new equipment, institutional trng, and Unit trng.

Seq: 171
ID Number: ARI-RA-1188; AD-A160 632
Date: Jul 1985
Title: Training Extension Course Research: Review of the Literature on Cost and Training Effectiveness
Author: Sasone, P. G.
Corporate Author: Litton-Mellonics
Summary: Review of literature on cost and training effectiveness. Attempts to develop a CTER for the Army's TEC.
Key Points: Reports on military and non-military literature dealing with state of the art methods and techniques applicable to the performance of CTER.

SYNOPSIS

Seq: 172
ID Number: TR 608
Date: Jan 1984
Title: Transfer of Training: An Interpretive Review
Author: Corsier, S. M.
Corporate Author: ARI
Summary: Study looks at information processing and memory process as providing a basis for explaining and predicting transfer of training effects.
Key Points: Looks at automatized performance as an important factor to explain and predict transfer of training effects.

Seq: 173
ID Number: ARI-TR-491; AD-A135 450
Date: Sep 1972
Title: Work Environment Questionnaires and Army Unit Effectiveness and Satisfaction Measures
Author: Spencer, L., Klemp, G. & Cullen, B.
Corporate Author: Not Available
Summary: Reviews existing military and civilian work environments and organizational climate questionnaires. Identifies empirical measures of Army unit effectiveness.
Key Points: Looks at inspection reports, mission accomplishment results, efficiency measures, etc.
