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THE DEVELOPMENT AND FIELD TRIAL OF A SYSTEM FOR EVALUATING THE EFFECTIVENESS AND EFFICIENCY OF A TRAINING PROGRAM

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A unique system designed to assist training managers or evaluators in increasing the effectiveness of training programs has been developed, tested, and refined. The Training Program Evaluation (TPE) system offers advantages over traditional approaches of assessing program effectiveness. TPE involves the direct observation of training and testing and does not rely on second-hand accounts of training given by trainers or trainees. Neither does TPE require the construction and administration of specially designed tests to evaluate soldier performance, but utilizes instead the tests routinely given after each block of instruction.

20. (continued)

During its development, TPE has undergone frequent field testing to determine its utility to the Army. The major test of TPE came during the M1 tank OT-III, where TPE was used to evaluate the effectiveness of the M1 transition training program and to suggest program improvements. The utility of TPE was clearly demonstrated during the M1 OT-III, where several agencies used TPE to gather training effectiveness information that was used to improve the training program. This report describes the development of TPE and its field trial during the M1 tank OT-III.

Lessons learned during the field testing of TPE have been incorporated into the TPE system, resulting in a highly useful product. TPE procedures and forms are described in four job aids; ARI Research Products 81-15, 81-16, 81-17, and 81-18.

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Education and Training

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FOREWORD

The Fort Knox Field Unit has been highly successful in applying psychological principles and educational technology in solving Army training problems. The training evaluation/feedback team of this unit performs research and develop ment aimed at providing the Army with practical methods for assessing and improving the effectiveness of its training programs and materials.

In the past the Army has not had an effective method for evaluating and improving their training programs. Previous attempts to evaluate training have either relied heavily on the perceptions of the trainers and the soldiers being trained, or have depended on the use of hands-on testing as the sole source of evaluation data. Neither of these methods has been entirely satisfactory. Perceptions of the training by trainers or trainees seldom provide the kinds of information necessary to identify and correct specific training problems. And while hands-on testing may identify the tasks for which training is deficient, hands-on tests usually do not provide any information about the probable cause of poor task performance. Without information about probable causes, specific action cannot be taken to eliminate the training deficiencies.

Over a three year period, the training evaluation/feedback team has developed a unique system for evaluating training programs that enables the evaluator to identify and correct the most probable causes of poor task performance. Detailed guidance in using this new system is provided in a set of easy-to-use job aids designed specifically for evaluating Army training programs. The Training Program Evaluation (TPE) methodology described in these job aids was developed by progressively refining prototype data collection procedures and formats through a series of field trials in which TPE was tested with typical users against typical Army training. This report traces the development and field trial of the TPE system from its inception to the completed TPE job aids. The information provided in this report on the field trial of the TPE system and its associated job aids may prove valuable to anyone tasked with conducting a large scale training program evaluation, particularly against a new system during the operational testing phases of the Life Cycle Systems Management Model.

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PREFACE

This report traces the development and field trial of a system for evaluating training programs. Although the report includes considerable information on the evaluation system itself, no attempt has been made to fully describe the system or to demonstrate how it is used. That information is amply documented elsewhere (Witmer, Note 5; Kristiansen, Note 6; Kristiansen and Witmer, Note 7; and Kristiansen and Witmer, Note 8). Similarly, though much is said about the M1 OT-III in connection with the field trial of the training evaluation system, this report makes no attempt to provide a complete account of all the events associated with the M1 OT-III. Background information on the M1 OT-III is presented only insofar as it relates to the development and field trial of the Training Program Evaluation (TPE) job aids and procedures.

The purpose of this report is twofold: (1) To trace the development of the TPE system from its inception, through the M1 OT-III field trial, to the developed system as described in the revised TPE job aids, and (2) To explain how ARI's experiences in using the TPE system, particularly during the M1 OT-III, led to changes in the TPE system.

BRIEF

REQUIREMENT

In April 1978, the Army Training Study Group (ARTS) asked ARI to develop job aids and methodological guides for assessing the effectiveness and efficiency of Army training programs. ARTS further requested that the M1 tank system be used as a test bed to test the adequacy of any materials or methodologies developed. This report documents the process by which ARI developed and field tested the requested job aids and methodologies.

PROCEDURE

A system for assessing the effectiveness and efficiency of training programs, henceforth referred to as Training Program Evaluation (TPE), was developed by alternately designing, trying out, and revising data collection formats and procedures. ARI's initial response to the ARTS request, which was to develop a Training Observation Form and a Training Opinion Questionnaire for evaluating training during the M1 OT-II indicated the need for additional development of training evaluation materials. TPE used as its starting point the procedures and data collection formats developed for ARI by Harless Performance Guild, Inc. These procedures and formats, known as the Harless Guidelines, were tested against several courses routinely conducted at the Armor Center with encouraging results. The early trials of the Harless Guidelines at the Armor Center, while encouraging, indicated that additional work was required to develop TPE to the point that it could be used routinel by Army personnel to effectively evaluate training.

After further modifications by ARI, the TPE system was ready to undergo the major test of its usefulness as a method for evaluating training programs. TPE was to be used to evaluate the effectiveness and efficiency of the training designed to transition soldiers from the M60A1 tank to the M1 tank during the M1 OT-III. An ARI researcher was present on site during the OT to analyze the TPE data and assess the usefulness of TPE in evaluating the M1 transition training program. Based on lessons learned from the OT-III experience, ARI further revised the TPE materials.

FINDINGS

The information provided by the TPE system during the M1 OT-III was found useful by all of the agencies involved in the evaluation of the M1 transition training program. The data provided by the TPE system were used to recommend changes in the transition training program. Many of the recommended changes were adopted by the trainers, with resulting increases in soldier proficiency on the end-of-block tests. Some of the NCO's collecting the TPE data during the field trial failed to make the necessary observations required by the TPE system, opting instead to record their subjective impressions of the training. To remedy this situation, the TPE materials were revised following the field trial in a way that encourage. data collectors to record only what they observe rather than record their opinions about the training. The revised TPE system is documented in a set of four user-oriented job aids (ARI Research Products 81-15, 81-16, 81-17, and 81-18).

UTILIZATION

The information provided in this report may be useful to military managers who are given the responsibility to evaluate existing training programs. The report traces the development and field trial of the TPE system leading to the finished product -- the revised TPE job aids. It points out the advantages of TPE as an evaluation method, and identifies common pitfalls to avoid when applying an evaluation system such as TPE. The lessons learned during the field trial of the TPE system may help military managers avoid costly mistakes in conducting their own training program evaluations.

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SECTION I

GENESIS OF THE TPE SYSTEM

Introduction

The Army recognizes the need to evaluate its training programs. Due, however, to the unavailability of personnel, resources, and expertise in evaluation methodology, formal evaluation programs for use in training course improvement are not a standard feature of the Army training system. In 1976, a survey of training program evaluation activities in the military services indicated that, in the Army, individual schools did little to assess the effectiveness of the courses they conducted (Hall, Lam & Bellamy, 1976). In 1981 the Comptroller General of the United States, in a report to the Congress, said, "Because the Army does not have an effective Army-wide management system to oversee the skill training program, it is difficult to identify where improvements are needed. An effective monitoring and evaluation system is needed to provide Army commanders at all levels the program evaluation data and other management information needed for informed decision making." (GAO Report FPCD-81-29, 1981.)

The training program evaluation (TPE) system discussed in this report can be used by Army personnel to evaluate the effectiveness and efficiency of Army training programs. The TPE system identifies specific training program deficiencies, allowing the program evaluator to identify the most likely causes of poor soldier performance. The TPE system also assists training managers in correcting training program problems by recommending courses of actions to be taken by the training manager in the event that particular deficiencies are discovered. The TPE system is unique in that it does not rely on the perceptions of the soldiers being trained or trainers for its data. Neither does it require the administration of special post-tests to assess the effectiveness of training. TPE examines the training program directly, comparing the training program as it is documented in the lesson plan and delivered by the instructor to characteristics that according to educational technologists are indicative of a good training program. The TPE system requires that an observer be present on site during the delivery of training and during the conduct of the end-of-block tests to collect information about the instructional procedures used in training and testing the soldiers. The information obtained during this observation phase is used in conjunction with information from the lesson plans and soldier performance data as measured by end-of-block tests to identify training program deficiencies and their probable causes. By identifying causes of training program deficiencies, TPE allows the Army to eliminate program deficiencies by removing the causes of those deficiencies. TPE fulfills the Army's need for an effective means of monitoring and evaluating training programs. Complete information about the TPE system and how it is used is documented in a series of job aids (Witmer, Note 5; Kristiansen, Note 6; Kristiansen and Witmer, Note 7; and Kristiansen and Witmer, Note 8).

The evaluation methodology incorporated in the TPE system was developed in response to the Army's need to evaluate the effectiveness and efficiency of training programs for new weapons systems. Army planners realized that a large

number of new weapons systems were under development and would be fielded in the near future. Planners such as the Army Training Study Group (ARTS) foresaw that the introduction of the new weapons systems would involve large-scale training programs designed to train soldiers to operate and maintain the weapons systems. ARTS knew that the overall effectiveness of the weapons systems was linked inalterably to the effectiveness of the training programs developed for them. This was a source of concern for ARTS because adequate guidelines for evaluating Army training programs did not exist at the time.

The M1 OT-II Training Evaluation

In April 1978, the Army Research Institute (ARI) received a mid-year request from ARTS to develop job aids and methodological guides for assessing the effectiveness and efficiency of Army training programs. ARTS further requested that the M1 Tank system be used as a test bed. The M1 was a major weapon system that was already well into the Operational Testing (OT) Cycle. The individual training phase of the M1 OT-II was about to begin. In order to take advantage of the opportunity presented by the M1 OT-II, ARI quickly assembled two data collection instruments to be used in evaluating the individual in-turret portion of the training package for transitioning soldiers from the M60A1 tank to the M1 tank. A Training Observation Form (Appendix A) was prepared to structure the observation of training. In response to a request from the US Army Armor Center (USAARMC), a Training Opinion Questionnaire (Appendix B) was developed to assess the opinions and attitudes of the OT-II player personnel regarding the training during different phases of the OT.

The Training Observation Form and the Training Opinion Questionnaire were piloted against the M1 OT-II transition training on site at Fort Bliss, Texas, by a team of ARI researchers. Following the OT, the data collected using these evaluation instruments were analyzed in an attempt to determine which of the data collected were useful and which were not. The findings regarding the usefulness of the evaluation data were shared with USAARMC and ARTS.

The data collected during the OT-II was not adequate for evaluation purposes, due in part to the unavailability of individual soldier performance data. Few conclusions could be drawn on the basis of the training observation and training opinion data alone. Detailed analysis of the training opinion data indicated that it was virtually useless as a measure of training effectiveness. Because of the limited usefulness of the evaluation instruments developed for the M1 OT-II, ARI and ARTS decided that an extensive developmental effort aimed at producing a systematic method for conducting training program evaluations was needed.

Contracting for the Development of TPE Materials

Toward the end of FY 78, ARTS requested that ARI write a statement of work for a contract to develop TPE materials. The contract, to be let sole source to Harless Performance Guild, Inc., was to be funded by monies secured by ARTS from TRADOC, monitored jointly by the ARI Field Unit at Fort Knox and the USAARMC Directorate of Training Developments (DTD) and let by the Fort Knox Procurement Division of the Directorate of Industrial Operations. The statement of work was written and the contract to develop TPE materials was let.

Under the terms of the contract, Harless was required to develop guidelines and job aids for evaluating the effectiveness of training designed for the operational testing of the M1 tank. Using lessons learned during the OT-II, the guides and job aids were to be designed so that they could be used by ARI researchers to evaluate training during the M1 OT-III. The guides and job aids were to include their own training materials so that formal training in their use would not be necessary. Although specifically designed for ARI researchers to use in evaluating M1 transition training, it was understood that the methodology developed should be generalizable to any training program associated with the introduction of a new weapons system into the Army.

SECTION II

DEVELOPMENT AND TRIAL OF THE ORIGINAL TPE JOB AIDS

The Harless Guidelines

The primary product to come out of the contract with Harless Performance Guild, Inc. was ARI Working Paper, FKFU 80-1, "Guidelines for Conducting a Training Program Evaluation." This document, completed in November 1979 went a long way towards fulfilling the Army's need for a systematic method for evaluating training programs for new weapon systems. The "Guidelines for Conducting a Training Program Evaluation" (Harless, Note 1) henceforth to be referred to as the Harless guidelines, divided training program evaluation into five phases. In Phase 1, plans are made for conducting the TPE. During this phase, all the background information, training materials, evaluation instruments, and task documentation needed to perform the TPE are assembled and a plan for the conduct of the TPE is prepared. Data for determining the effectiveness of the training program is collected during Phase 2. Data are collected to describe the actual training process, testing process, training environment, trainee characteristics, instructor characteristics, and instructor and trainee reactions to the training. Phase 3 consists of summarizing and analyzing the in-course test data collected in Phase 2. An analysis of the test data collected in Phase 3 identifies the tasks on which test performance is deficient and those tasks which require further investigation. In Phase 4, training modules which warrant further investigation are examined to determine if the evidence collected during the previous phases suggests that the performance deficiencies are due to training or derive from other causes. The findings of the TPE are documented in Phase 5. In this phase, a report outlining the steps followed during the TPE and the conclusions reached is written for the sponsor of the evaluation. For Phases 1-4, the Harless guidelines provide detailed worksheets for recording the required information. Step-by-step directions for completing the worksheets are also provided.

Using the Harless Guidelines

ARI, Fort Knox had worked closely with Harless during the development of the Harless guidelines and was aware of the potential utility of the TPE approach described in the guidelines. ARI researchers initially tested the usefulness of some of the observation worksheets on institutional training that is routinely conducted at the Armor Center. The guidelines were piloted against Armor Officer Basic (AOB) courses in supply management and forward observer procedures, and courses in platoon sergeants' motivation, M60A1 track removal/installment, and mechanical training for two different machineguns. From these early trials of the Harless guidelines, it was clear that the worksheets used for the observation phase were a valuable aid in identifying training and testing problems. It was also clear that the methodology described in the guidelines could be applied to almost any performance-based training and need not be confined to evaluating transition training for new weapon systems.

From ARI's early experiences with the Harless guidelines, it became apparent that a certain amount of skill is required to complete the various worksheets in sufficient detail, and that this skill improves with practice. After using the worksheets in several different Armor Center courses, ARI researchers found that they became more proficient in making the necessary observations and in recording their observations on the worksheets. To ensure that persons and organizations wishing to use the Harless guidelines received familiarization with and practice in using the worksheets prior to conducting any formal evaluations, ARI instituted the procedure of conducting a short workshop on TPE methodology for potential users.

In the workshop, the purpose of TPE and the approach described in the guidelines is explained. The user is then stepped through the worksheets, item-by-item. When the user is thoroughly familiar with the worksheets and method, he/she then practices using the worksheets in evaluating an operational three- or four-hour block of instruction. Upon completion of the practice exercise, the user shares observations with those of other workshop participants and receives feedback from the workshop leader.

User Acceptance of the Harless Guidelines

The Harless guidelines were well received by the Army and the need for the methodology described in the guidelines was reaffirmed by the many requests that ARI received for copies of the guidelines and to conduct workshops in their use. Workshops have been conducted for the USAARMC Staff and Faculty Training Division and Directorate of Training Developments (DTD), the Office of Armor Force Management and Standardization (OAFMS), and the US Army Armor and Engineer Board. Other organizations receiving workshops prior to the M1 OT-III were the Directorate of Evaluation at Fort Benjamin Harrison, TRADOC Combined Arms Test Activity (TCATA) at Fort Hood, and ARI researchers and civilian contractors at Fort Bliss in connection with the proposed evaluation of new equipment training (NET) for developing Air Defense Weapon Systems. Of these, the most frequent user of the Harless guidelines has been OAFMS. OAFMS has the mission of evaluating the state of training in the Armor force and has used the guidelines to help satisfy its role as the Directorate of Evaluation at Fort Knox. In addition, the USAARMC DTD used the Harless guidelines to certify the NET program and prepare Operational Test Readiness Statements (OTRS) on the Cavalry Fighting Vehicle (CFV) OT-II NET player personnel.

Lessons Learned in Using the Harless Guidelines

Several lessons were learned from conducting the workshops for the various organizations and in providing assistance to OAFMS during the evaluation of the CFV and Advanced NCO Course training. The first lesson learned was that some individuals are much more proficient in using the Harless Guidelines to objectively evaluate training than are others. Some observers tend to use the Harless worksheets to record their subjective impressions of the training or trainer, rather than perform the more demanding task of making the specific observations called for by the Harless Guidelines. Other observers, viewing the same training, utilize the worksheets correctly, identifying important training problems. This suggests that, whenever possible, prospective data

collectors should be screened in order to eliminate those who for one reason or another do not use the Harless worksheets correctly. The practice exercise during the TPE workshop provides an excellent opportunity to identify individuals who do or do not make good training observers. A second lesson learned was that while the guidelines and accompanying workshop were usually effective in teaching potential users to plan the TPE, collect the data and identify possible causes of performance deficiencies, it was somewhat less effective in training users to draw conclusions and make recommendations for training program changes based on the data collected. The difficulties that potential users experienced in drawing conclusions and making recommendations suggested the need for additional guidance in the analysis and conclusion phases (Phases 3, 4, and 5) of the Harless guidelines.

A Job Aid for Correcting Training Program Deficiencies

ARI was not surprised that early users of the Harless guidelines experienced difficulties in drawing conclusions and making recommendations based on their observations of training. ARI had already discovered that the procedures outlined in Phase 4 of the Harless guidelines did not lead typical military users to a clear identification of the causes of a given performance deficiency. Additionally, the guidance provided in Phase 5 was insufficient for an uninitiated user. Furthermore, Harless had not been tasked to include guidance to the user on how to recommend program changes based on performance deficiencies; the tasking had only been to provide a method for identifying those deficiencies and their possible causes. Procedures for correcting performance deficiencies was to be the subject of a second developmental effort.

In the last quarter of FY 79, a contract was let to Seville Research Corporation to develop guidelines for specifying modifications to training on the basis of training problems discovered during the evaluation of training. The final product, entitled "Methodology for Correcting Deficiencies in Training Programs," was completed by Seville Research Corporation in April 1980 (Spears, Maxey and Roush, Note 2).

Like the Harless guidelines the Seville product was designed to be used by ARI researchers to evaluate transition training during the M1 OT-III. The Harless guidelines were to be used to observe training and testing in order to determine the causes of performance deficiencies. The Seville product would complete the evaluation process by specifying fixes for the problems identified by the Harless guidelines. Although the contract with Seville called for a document compatible with the Harless guidelines, the Seville product did not interface well with the Harless guidelines. Further work was required to generate a methodology for correcting deficiencies that would be compatible with the TPE methodology described in the Harless guidelines.

SECTION III

PLANNING THE M1 OT-III TRAINING EVALUATION

Defining the Scope and Range of Evaluation Activities

Planning for the M1 OT-III began early. The OT-III was to focus on resolving the training and maintenance issues unanswered by M1 OT-II. Just how this was to be accomplished was decided in a series of meetings among the participating organizations: the TRADOC Combined Arms Test Activity (TCATA), the Operational Test and Evaluation Agency (OTEA), the Armor Center Directorate of Training Developments (DTD), the Office of Armor Force Management and Standardization (OAFMS), the TRADOC Systems Analysis Activity (TRASANA), and ARI.

In the early meetings of the above mentioned organizations few decisions were reached. The meetings served primarily as a forum for each organization to state its views and data needs to the other participants. For example, in the 29 March 1979 meeting, OTEA stated its preference for obtaining user performance data as the measure of training effectiveness, while TCATA argued for a more direct measure of training effectiveness. OTEA suggested that the OAFMS/TRASANA/DTD/ARI training effectiveness analysis be accepted by TCATA, but TCATA insisted that it preferred to conduct its own TEA. Among the other issues discussed during the 29 March meeting was whether the OT-III should be conducted at Fort Knox or Fort Hood.[1]

In June 1979, OTEA drafted a test plan outlining the scope of the M1 OT-III. The OT-III was to be a three-phased test conducted by TCATA from June 1980 through April 1981. M1 tanks were to be delivered incrementally, beginning with three in June and continuing until a total of 55 had been issued by the end of November 1980. During Phase I (transition training), a tank battalion would be transitioned company by company from the M60 series tank to the M1 tank. Transition training, to be conducted at Fort Hood by the M1 New Equipment Training Team (NETT), would consist of an orientation for staff personnel, individual and collective tank crew skill training, and organizational maintenance personnel training. Training for DS/GS maintenance personnel was to be given at the US Army Ordnance School at APG, MD. Phase II, consisting of a live firing exercise under simulated combat conditions integrated with maneuver exercises, would be used to determine the mission and system reliability for the test. Phase III would involve up to a tank battalion task force engaged in non-firing exercises against an aggressor force (up to a brigade size). Data would be collected over a series of field training exercises to include offensive, defensive and retrograde operations and would address the issues of logistical supportability, force effectiveness training, and fightability.

The scope of the OT-III was further defined in a memorandum from the TRADOC Systems Manager for the M1 to OAFMS, DTD, ARI, Directorate of Armor Doctrine and the Directorate of Combat Developments. With regard to training effectiveness, the memo stated that the M1 NET team would conduct individual

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[1] Fort Hood was later chosen as the site for the OT-III.

training for MOS 19K/L tank crewmen, collective training for M1 crews through platoon gunnery qualification, and organizational level training for MOS 45E and MOS 63E mechanics. Tactical training would be conducted by the unit. The effectiveness of the proposed programs for individual and collective training, to include tactical training were to be evaluated. Effectiveness of the program of instruction (POI), training aids, training devices and training literature would be assessed. Criterion-referenced performance testing conducted at the end of each block of instruction during the training and at selected points during the test were to be used to determine the effectiveness of the training program.

ARI wrote a memorandum in response to the memorandum from the M1 TRADOC Systems Manager. ARI pointed out that the data collected on the adequacy of the POI, training aids, training literature, etc. must be detailed to be useful, but that TCATA had not yet allocated the resources to collect detailed training data. ARI stressed that end-of-block performance data alone is not an adequate measure of performance since only a small subset of tasks trained are actually tested on the end-of-block tests. It was suggested that the resources to conduct a detailed evaluation be put at the disposal of DTD.

Between 6 and 10 August 1979, a series of meetings was held between TCATA, DTD, the M1 NET team and ARI. The primary topic of discussion was "what data should be collected for the test battalion, who would collect the data, and who would be allowed access to the data. DTD had been tasked by the CG, USAARMC to develop diagnostic tests for determining the readiness posture of the test battalion on the M60A1 tank prior to the beginning of transition training on the M1 tank. It was decided that USAARMC would administer the diagnostic tests and score them. TCATA agreed to collect demographic data on the players and to collect hit/miss and engagement time data for the firing exercises. The issue of what agencies should be allowed access to the data generated during the OT-III was raised but was not resolved during the meeting.

Outlining Data Requirements for the Evaluation

Subsequent OT-III planning meetings in which ARI took part were concerned solely with training evaluation. The first such meetings took place during the period 27-30 November 1979 and involved representatives of TCATA, ARI, TRASANA, and DTD. The primary topics of discussion were the role of each agency in the evaluation, data collection requirements and methods, and data reduction. It was agreed that TCATA would coordinate, monitor and control the data collection effort for M1 OT-III. Each of the participating organizations outlined their data collection requirements for the test. ARI surfaced the need to observe training and testing directly in order to collect observations about the training and testing process, and the requirement to obtain individual soldier performance data on the tests administered after each block of instruction. ARI's data collection requirements (which were limited to data on the TPE process; not on the evaluation of the M1 tank system) were included in USAARMC's data collection plan, which was drafted unchanged into the TCATA Training and Human Factors Data Requirements. TRASANA stated that it would need the following pre- and post-diagnostic tests in order to justify its participation in the OT-III evaluation: 1) an SQT type test of all M60A1 crewmen and mechanics who

would be undergoing transition training, 2) an SQT type test given to all mechanics and crewmen on the M1 at the completion of transition training, and 3) an SQT type test as described in 2) above but given at the end of Phase III.

Planning the Data Collection

During the November meetings, the group reviewed the roster of scheduled events for Phases I, II, and III to determine when and how the data could be collected. It was decided that every training event should be monitored by a data collector. For this to occur, the presence of one data collector per tank would be required during each training event. Though the bulk of the training data would be collected by these tank data collectors, Test Team Evaluation/ Supervision personnel from OAFMS, DTD, or ARI would supervise the data collection, collect data as needed, and analyze the data provided by the tank data collectors.

Having made some determination about what data to collect and when and how it might be collected, the various agencies divided up the responsibility for the design and development of the data collection forms. ARI agreed to work with USAARMC in preparing data collection forms for the observation of training and testing. TRASANA agreed to provide demographic data collection forms, and DTD, USAARMC accepted responsibility for designing interview and questionnaire data collection instruments. TCATA agreed to provide some special forms for recording collective training data. It was agreed that the data collection instruments developed by the various agencies would be debugged during the five-tank Low Rate Initial Production RAM test to be conducted at Fort Knox prior to the beginning of the OT-III.

The next series of meetings occurred during the period of 7-11 January 1980. The participants were the same as in the previous meeting, except that a representative from OAFMS was also present. The issues covered reflected the topics of the previous meeting. The meeting began with a review of each agency's data requirements to ensure that each data element was required by at least one of the participating agencies. From this review a final list was prepared consisting of the combined data requirements of the agencies participating in the evaluation. Work continued on the development of specific data collection forms to be used during the OT-III training evaluation. Each agency had brought the forms to the meeting that they thought they would need to collect the required data. Under the guidance of ARI-Fort Knox, the number of forms being proposed was reduced considerably. All agencies agreed to use the ARI-Fort Knox forms (closely resembling Worksheets A2, A4, B4, B5, and B6 in the Harless guidelines) for the observation of training. Having reached some agreement on the forms that would be used to collect the data, the five agencies involved began outlining specific plans for the organization and control of the OT-III data collection effort. The duties and responsibilities of each agency were outlined. ARI's responsibility was limited to collection and analysis of training effectiveness data for the MOS 19 K/L tank crewmen training.

Management of the Data Flow

In March 1980, ARI went to Fort Hood to conduct a two-day workshop in ARI TPE methodology for TCATA's M1 OT-III primary data collection managers. In a

meeting following the workshop, ARI and TCATA devised a data flow network, file, and retrieval system to be used for data handling during the OT-III. It was decided that the data collection forms containing the raw data would be reproduced and distributed on the basis of need-to-know to the appropriate persons and agencies. Some of the forms would go to the data management team for entry into the computer data base. Others would circulate through one or more of the involved agencies and end up in a central paper file.

During the March meeting the data collection forms to be used during the OT-III were finalized.[2] The complete set of forms used during the M1 OT-III, consisting of eleven different data collection instruments appears in Appendices C and D. The forms in Appendix C (Forms 39, 40, 41) were designed by ARI for the purpose of identifying training deficiencies. The remaining forms (Appendix D) were to be used by other agencies for their own purposes.

Diagnostic Tests

Members of the TCATA Fightability Team visited Fort Knox on 28 April 1980 and met with representatives of USAARMC, ARI, OAFMS, and TRASANA. Among the topics discussed were pre/post diagnostic tests, the NETT training schedule and POI, data collection forms, the pilot test scheduled at Fort Knox prior to the OT-III, control of the OT-III data collection, and resource and range requirements associated with the operational test (OT). Authorization had been obtained by TRASANA to administer pre-diagnostic tests on the M60A1 prior to transition training and post-diagnostic tests on the M1 following transition training. During the April meeting, a list of tasks to be tested on the pre-diagnostic test and a separate list to be tested on the post-diagnostic test were compiled and approved by the participating agencies. It was decided that diagnostic tests would be administered and scored by instructors from the NETT.

Scheduling

Much time was devoted to constructing a revised training schedule for the OT-III. This schedule established starting and finishing dates by company and MOS for individual and collective training on the M1, and for pre- and post-diagnostic testing. The schedule called for the pre-diagnostic for MOS 45E turret mechanics in Company #1 to be given 8-12 September 1980 to be followed by the 45E transition training and the 45E post-diagnostic. The diagnostics and transition training for the MOS 63E track vehicle mechanics would follow closely on the heels of the 45E training. Training for the 19L M1 drivers was scheduled to start 13 November and for the 19K gunner/loader/tank commander 19 November. A total of four companies were to be trained and tested in this way, with the last company finishing their post-diagnostic in mid-April 1981.[3] The training and testing schedule was arranged at this time because of TCATA's requirements to schedule ranges well in advance and to finalize the Detailed Test Plan.

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[2] Although minor changes would be made in some of the forms subsequent to the March meeting, the forms settled upon in this meeting were for all practical purposes the forms used during the OT-III.

[3] The four company plan was later dropped in favor of a three company plan due to a slower than expected delivery schedule of the M1 tank.

Further Plans

Plans on how to organize the data collection effort were further focused. Plans called for the majority of the data to be collected by TCATA data collectors, with OAFMS personnel functioning as quality control monitors. Personnel from DTD, ARI-Fort Knox, TRASANA and OAFMS would function as data analysts and as data collectors on an as needed basis. Plans were also made to have a data assignment roster for all training events so that each person collecting data would know which event he/she was to observe, what forms to use, and where the event would occur, at least 24 hours prior to the event.

Pilot Test of the OT-III Data Collection Forms

At the 28 April meeting, the upcoming M1 RAM test to be conducted 19-23 May 1980 was also discussed. It was decided that this test should definitely be used as a vehicle for piloting all training data collection forms to be used during the OT-III.

As planned, data collection forms to be used during the OT-III were piloted in conjunction with the M1 RAM test conducted at Fort Knox in May 1980. OAFMS scheduled and controlled the data collection activities. OAFMS was assisted in collecting data by DTD, TCATA, and ARI-Fort Knox. Completed forms were returned by all agencies to OAFMS. No problems were encountered in using the data collection forms during the pilot test; therefore no significant changes were made in the forms as a result of the pilot test.

TCATA's Detailed Test Plan

In an August 1980 meeting at Fort Hood, ARI got its first look at TCATA's Detailed Test Plan for the M1 OT-III. The Detailed Test Plan specified what data would be collected, who would collect it, and how the data would be distributed once it was collected. The Detailed Test Plan provided for collecting training data and test data for each event occurring during transition training. The kinds of training data to be collected can best be seen by referring to the data collection forms in Appendices C and D. Each of the training data collection forms was assigned a number for ease of reference. Two kinds of test data were collected -- individual performance data on end-of-block tests and diagnostic test data.

A data collection team, composed of a Company Team Chief Data Collector, three Platoon Team Chief Data Collectors, and one Tank Data Collector per tank, was to collect the MOS 45E, MOS 63E and MOS 19K/L training data for each company. The tank data collector would complete Form 38a (Personnel Status Report) and Form 40 (Observation of Test Events). The platoon data collector would complete Form 37 (Training Aids Data Sheet), Form 39 (Observation of Training), Form 41 (Training Environment), Form 42 (Student Questionnaire), and Form 44 (Instructor Questionnaire). The company chief data collector would supervise the other data collectors, review and consolidate Forms 37, 38a, 39, 40, 41, 42 and 44, and return these to Data Control at the Field Test Center. At Data Control, the forms would be reproduced and copies distributed to appropriate agencies (e.g., ARI, OAFMS) for analysis. The original of each

form would go to TCATA's Data Reduction Branch where the data would be entered into TCATA's computer for additional analysis and the original raw data would be placed in a master file for future reference. Score sheets indicating end-of-block test performance of each individual soldier for each block of instruction would be completed by NET team instructors. Completed score sheets would be given to the Company Team Chief Data Collector, who would forward them to Data Control for reproduction and distribution to the various agencies. In addition to end-of-block tests, diagnostic tests measuring individual performance levels just prior to and following individual training on the M1 tank were to be administered to 100% of the tank crewmen and mechanics participating in the operational test. Pre-diagnostic and post-diagnostic test data were to be handled in the same way as the end-of-block scoresheets. NETT instructors were to collect the data. The diagnostic test data would then be passed along to the Company Team Chief Data Collector, who would forward the data to Data Control for reproduction and distribution to participating agencies.

SECTION IV

EVALUATING THE M1 TRANSITION TRAINING LESSON PLANS

Obtaining the Lesson Plans

As part of the evaluation of the transition training program given by the NETT during the OT-III, ARI was to evaluate the NET program as detailed in the lesson plans. The lesson plans were also needed to prepare some of the observation forms to be used during the evaluation. In a memorandum dated 20 Feb 79, ARI formally requested that the NETT provide ARI with copies of any MOS 19K/L training materials developed for use during the M1 OT-III. ARI obtained a set of the MOS 19K/L lesson plans from OAFMS.

The original transition training materials did not provide useful training prescriptions and contained omissions. Some of the tasks to be trained during the M1 OT-III were not covered by the lesson plans. Though there were shortcomings in the original version of the M1 OT-III transition training lesson plans, the NETT indicated that a revised set of lesson plans would be forthcoming shortly.

Review and Initial Evaluation of Lesson Plans

The second version of the MOS 19K/L lesson plans was obtained from OAFMS in April 1980. OAFMS had reviewed these lesson plans and had suggested changes, some of which were incorporated into the lesson plans by the NETT and some of which were not. A cursory review of the lesson plans by ARI indicated that many of the problems noted by ARI in the original version had not been addressed. In discussing these problems with OAFMS, ARI decided that a thorough review of the lesson plans was called for. Each lesson plan needed to be evaluated to ensure that it contained the necessary information and was internally consistent. In general a lesson plan should include detailed information on what is to be taught and tested and how it is to be taught and tested. With these ideas in mind, ARI proceeded to evaluate each lesson plan, in turn, noting any problems that might require corrective action.

The evaluation quickly bogged down because of the tedious nature of the task. Each lesson plan seemed to come with its own unique set of problems, and each separate problem seemed to require a different corrective action. This made it difficult to discern where the evaluation for a particular lesson plan should begin and where it should end. It soon became clear that a more systematic approach to the task was needed.

A Systematic Approach to Lesson Plan Evaluation

A set of criteria for evaluating lesson plans was developed and applied to the MOS 19 K/L lesson plans. The use of these criteria greatly simplified the task of evaluating the lesson plans. By using the criteria, the evaluator was able to focus on one aspect of the lesson plan at a time, while ensuring that all important aspects of the lesson plan were evaluated. The criteria developed for evaluating the MOS 19 K/L lesson plans are listed in Appendix E. Criteria are listed for evaluating training objectives, training procedures, and end-of-block tests.

The evaluation of the MOS 19 K/L lesson plans produced 43 pages of comments and suggestions regarding lesson plan deficiencies. ARI's comments and suggestions concerning the lesson plans were attached to a memorandum dated 1 August 1980 and sent to the Director of Training Developments (DTD). Follow-up contacts with DTD indicated that DTD had received the lesson plan evaluation, but that the evaluation had not filtered down to the personnel who developed the lesson plans and who were responsible for making any changes in the lesson plans. It was not clear whether any of ARI's comments or suggestions had been acted upon.

Revised Lesson Plans

In September 1980, DTD released the MOS 19 K/L lesson plans that were to be used in training the first company during the M1 OT-III. ARI obtained copies from the NETT after learning from OAFMS that the lesson plans had been completed. This version of the MOS 19 K/L lesson plans was more complete than previous versions and had eliminated many of the inconsistencies identified during ARI's evaluation.[4] However many of the problems identified in the evaluation still remained. Many of the training objectives did not accurately specify what the soldiers would be trained to do. Much of the guidance provided to the instructors on how the training was to be conducted was vague, and many of the tests designed to measure the soldier's ability to perform the tasks in the training objectives did not mirror the requirements of those objectives.

[4]It is not at all clear whether the elimination of the inconsistencies resulted from ARI's evaluation of the lesson plans or were the result of DTD's own internal review process.

SECTION V

DESIGNING THE TPE WORKSHOPS AND JOB AIDS FOR THE M1 OT-III EVALUATION

The August 1980 meeting was the final planning meeting prior to the beginning of the M1 OT-III. At this point most of the details of the operational test had been worked out. The training schedule was firm given that tanks were delivered on time, ranges had been reserved for the test, the detailed plan for collecting the data had been developed, responsibilities of the various participating agencies had been established, the data collection forms had been finalized, and personnel for collecting and analyzing the data had been committed to the task. Workshops had also been scheduled for training the M1 OT-III data collectors.

All data collectors participating in the M1 OT-III were required to complete a workshop in order to be trained on data collecting procedures and to become familiar with the training evaluation forms. In contrast to previous workshops, very little time would be spent on the planning and analysis aspects of training program evaluation. Planning the TPE and analyzing the data collected would only be discussed briefly in order to help the data collectors understand the reasons for collecting the data. Instead of the 18 worksheets from the Harless Guidelines covered in earlier workshops, only three data collection forms (39, 40, & 41) would be covered.[5] Whereas the Harless Guidelines were used as both a training aid and a job aid in earlier workshops, the Guidelines were not appropriate to use in the OT-III workshops. Not only did the Harless Guidelines provide far more information than was needed, but the Guidelines were written for a user having some familiarity with educational technology. The soldiers who would collect the OT-III data were naive with regard to educational technology.

What was needed was a job aid designed specifically for individuals unsophisticated in educational technology whose job it was to collect training evaluation data. In response to this need, ARI developed an observer's job aid (Witmer, Note 3). The observer's job aid borrowed much from the Harless Guidelines, but the language used was simplified with many technical terms being eliminated, and the scope was narrowed to focus on those activities performed by the data collector. Like the Harless Guidelines, data collection forms were included in the job aid. The job aid described how the forms should be completed, including an explanation of each item on the forms.

The forms described in the observer's job aid were to be used to collect information about the M1 transition training program. Data would be collected on the training environment, the training process and the testing process. This data would be used in conjunction with the performance results on the

[5] A fourth form for determining if the training given conforms to the training planned as described in the lesson plans was scheduled to be covered in the workshops, but because the first group of data collectors to use the form did not find it useful, the form was not covered in subsequent workshops.

tests given at the end of each block of instruction to identify training-caused performance deficiencies in the M1 transition training program. The training analyst (an ARI researcher) would identify the training deficiencies and make recommendations to the NETT on how the training program should be modified to eliminate the deficiencies. To assist the training analyst in making modifications to the training program based on the deficiencies identified, ARI developed a job aid for modifying ineffective or inefficient training (Kristiansen, Note 4). This training modifications job aid was designed to be used with the observer's job aid in evaluating the M1 transition training program.[6]

[6] The sections on practice and feedback were based on similar sections in the Seville product mentioned earlier in this paper.

SECTION VI

FIELD TRIAL OF THE TPE SYSTEM

Scope and Purpose of Field Trial

ARI's purpose in evaluating the M1 OT-III transition training program was to field test the job aids and data collection forms developed by ARI for evaluating training programs. The objective was not just to determine if the TPE methodology worked, but to demonstrate that it can be used by Army personnel to evaluate the training program for a major developing weapon system. In order to accomplish this objective mid-level noncommissioned officers were trained to be data collectors. TPE workshops were held to train turret mechanic (45E), track and vehicle mechanic (63E) and tank crew (19K/L) data collectors. Separate workshops were conducted to train each of three sets of tank crew data collectors for each of the three companies undergoing transition training. The workshops were conducted for each set of data collectors just prior to their participation in the operational test. Table 1 lists the TPE training sessions conducted for the M1 OT-III data collectors. During the workshop each data collector received a copy of the observer's job aid for use in the workshop and on the job.

The data collection team, consisting of a company data collector, three platoon data collectors, and one tank data collector per tank, was supervised by the TCATA Fightability Team (a designator for that group in TCATA responsible for evaluating the NET program). The day-to-day activities of the tank data collectors were controlled by the company chief data collector. The TCATA Fightability Team had little interaction with the tank data collectors. Their main contact with the data collection team was through the company data collector and came only when the data forms reaching data control were improperly completed. In addition to the military chain of command supervision and the job aids, data collectors were periodically contacted by the ARI data analyst or by OAFMS personnel to assist them with any problems they might be having in completing the evaluation forms.

TABLE 1. TPE Training Sessions Conducted for M1 OT-III Data Collectors

Workshop Training Dates	Workshop Participant's Specialty	Number of Soldiers Trained
16-18 Sep 80	turret mechanic	6
8-10 Oct 80	track vehicle or turret mechanic	15
21-23 Oct 80	tank crewman	20
14 Nov 80	tank crewman	5
1-3 Dec 80	tank crewman	17
23-26 Jan 81	tank crewman	17

For purposes of field testing the TPE methodology and job aids, ARI was concerned only with phase 1 (transition training) of the M1 OT-III. Phase I began with the administration of the prediagnostic test. The prediagnostic test was designed to determine if the soldiers to be trained on the M1

possessed all of the prerequisite skills on the M60A1 prior to undergoing transition training. Following the prediagnostic, soldiers were given individual training on the M1 tank. After individual training, mechanics were given a post-diagnostic test. For tank crewmen, individual training was followed by collective training which in turn was followed by the post-diagnostic test. The post-diagnostic test consisted of the same tasks on the M1 that were tested on the M60A1 during the prediagnostic test plus some additional tasks selected from the transition training program. The tank turret mechanics (MOS 45E) were the first to be given the prediagnostic and to undergo transition training. Individual training for the turret mechanics began in late September 1980. Next to be trained on the M1 tank were the track/vehicle mechanics (MOS 63E); individual training for these mechanics began in mid-October. Three tank companies received individual and collective tank crew training in successive presentations of the MOS 19K/L transition training program. Changes were made following each successive presentation of the transition training so that the training received by the second company was not identical to that received by the first company. And the third company's training differed from both of the companies preceding it. Changes were not extensive, however, and did not involve changes in time or resource allocation. The training schedule for each of the three tank companies is listed in Table 2.

TABLE 2. Phase 1, M1 OT-III MOS 19K/L Training Dates

Event	Dates		
	Co #1	Co #2	Co #3
Individual Training Begins	12 Nov 80	5 Jan 81	10 Feb 81
Individual Training Ends	3 Dec 80	22 Jan 81	27 Feb 81
Collective Training Begins	4 Dec 80	23 Jan 81	28 Feb 81
Collective Training Ends	20 Dec 80	6 Feb 81	12 Mar 81

ARI-trained data collectors completed TPE data collection forms during the training of 45E and 63E mechanics, as well as during 19K/L tank crewman training for each of three companies. During the 19K/L training, an ARI researcher was present on site to analyze the 19K/L data as they were collected. Because ARI's time on site was limited and because the data available from the 19K/L training were considered adequate for testing the usefulness of TPE, ARI chose not to analyze the 45E and 63E data. In accordance with an agreement made by ARI with OAFMS and TCATA prior to the beginning of the operational test, OAFMS and TCATA utilized the 45E and 63E data in satisfying their respective missions. Examination of completed TPE data collection forms from the mechanics training courses and feedback from OAFMS and TCATA indicated that the completed TPE data collection forms provided considerable information regarding mechanics training.

As input to the analysis of the effectiveness of the 19K/L training, ARI used TPE Forms 39, 40, and 41 (see Appendix C) completed by the tank data collectors, the 19K/L lesson plans and the scoresheets from each 19K/L block of

instruction. Additional input to the analysis came from ARI's own observation of some of the 19K/L transition training and through observations made by representatives of some of the other agencies involved in the M1 operational test. Neither data on mechanics (45E, 63E) training nor diagnostic test results were used as input to the TPE analysis.

Conducting the Field Trial

The field test of the TPE materials was performed in conjunction with providing feedback to the NET team on the effectiveness of the M1 transition training. The method used for the field test basically consisted of collecting training and performance data, summarizing and analyzing that data, making recommendations for changing the training based on the analysis, and determining the effects of the changes made. The procedural steps used in field testing the TPE materials are outlined below. The steps outlined were repeated for each lesson or block of instruction in the individual training portion of the MOS 19K/L transition training program.

Data on the training environment (Form 41), training process (Form 39), and testing process (Form 40) were collected by ARI-trained NCO tank data collectors.[7] Completed forms were checked by the company chief data collector for omissions or inconsistencies and then returned to the Field Test Center for copying and distribution. Data on end-of-block individual test performance were recorded on score sheets by NETT instructors and given to the company chief data collector. The company chief data collector forwarded the original score sheets to the Field Test Center for reproduction and distribution.

At the Field Test Center the ARI training analyst received copies of completed Forms 39, 40, and 41 and the score sheets as they came back to the Field Test Center. For training conducted on the tank, the ARI analyst received data collection Forms 39, 40, and 41 from each of the 13 tanks (the number of tanks in each company and, hence, the number of training sites, or stations, per company). For classroom training, fewer forms were received for each block of instruction.

For each block of instruction, the analyst summarized the data appearing on the data collection forms. All the data recorded on Form 39 for a given block of instruction were combined on a single summary data worksheet. Similarly the training analyst prepared summary data worksheets for Forms 40 and 41. The scoresheets for each block of instruction were reviewed to obtain the percentage of soldiers receiving NO-GO's for each task and subtask. Tasks or subtasks for which 20% or more of the soldiers tested received a NO-GO on their first trial were considered to represent performance deficiencies (the standard provided by USAARMC). Possible causes of these deficiencies were identified from the training and testing data recorded on Forms 39, 40, and 41. From these causes, the analyst, with the help of the modifications job aid, suggested changes to the block of instruction for eliminating the performance deficiencies.

[7] This departure from the procedure that was planned has the advantage of providing training data from each training station (i.e., each tank).

For some blocks of instruction, review of the scoresheets did not turn up any performance deficiencies. Nevertheless the testing observation form (Form 40) was reviewed to determine if there were any irregularities in the testing procedures. If any problems were observed in the testing process that could affect the validity of the test results, changes were suggested to the testing process based on guidance provided in the modifications job aid.

The training analyst summarized his findings separately for each block of instruction in a memorandum to DTD. The memorandum identified the tasks and subtasks for which performance deficiencies were found and specified changes to the training program to correct the deficiencies. The memorandum also identified problems with the testing procedures and suggested changes as appropriate. Memoranda were usually forwarded to DTD within one day of the data becoming available for analysis.

Changes in the transition training program made by the NETT were subject to the approval of DTD. Some of the changes were generated by the NETT itself and others were suggested by DTD and OAFMS. Changes suggested by ARI were incorporated into the transition training program through DTD since ARI was not allowed, by agreement with DTD, to interface directly with the NETT. ARI was informed about changes made by the NET team in the transition training POI by DTD.

Field Trial Assessment of the TPE System

To determine if changes made in the transition training POI had an effect on the quality of training and test performance, the data obtained before changes were made were compared to the data obtained subsequent to the changes being made. For the M1 OT-III this entailed comparing the data obtained for each successive iteration of training (i.e., Company 1 data were compared to Company 2, and Company 2 data were compared to Company 3). Two kinds of data were compared. The NO-GO rates for performance on the test given after each block of instruction were compared for each task. Data collected during training and testing using Forms 39, 40, and 41 were compared to determine if the changes made in the transition training were reflected in the data recorded on the evaluation forms. Specifically, the number of comments made for each item on the forms were compared from one company to the next.[8]

The field trial was conducted in order to answer a number of questions regarding the usefulness and effectiveness of the TPE system. Among the questions to be answered were the following:

> Can the TPE methodology be used by the Army to evaluate the training program developed for a major weapons system?

[8] Comments recorded on the evaluation forms generally refer to training or testing problems and thus may serve as a useful index of training effectiveness. The number and quality of comments also serves as a rough measure of data collector proficiency.

- Can mid-level NCO's be trained to collect evaluation data given only a short workshop in TPE methodology and the guidance provided by the observer's job aid?

- Can a training analyst familiar with the TPE methodology identify training program deficiencies and their causes from the data recorded on the TPE forms by NCO's?

- Can the training analyst make recommendations for modifying the training program from the deficiencies identified that are both convincing and in a form that can be used by the training developer? Is the modifications job aid useful in specifying these recommendations?

- When changes are made in the training program, is the TPE methodology sensitive enough to detect these changes?

- Do changes suggested through the TPE process reduce the NO-GO rate on the tests given at the end of each block of instruction?

- How should the TPE system, including the data collection forms and job aids, be altered in order to increase the usefulness and effectiveness of the system as an evaluation tool?

The procedures used in collecting data pertaining to each question will be described. The data collected will be reported and the conclusions drawn from the data will be discussed. It should be noted that the types of data that could be collected during the field test were often limited by externally imposed constraints, forcing ARI to rely to some extent on indirect evidence. Because evidence was lacking in some cases, not all the questions posed were answered conclusively.

The ability of the Army to use the TPE system in evaluating the training program for a major weapons system was the central issue to be resolved during the M1 OT-III. The Army's need for an evaluation methodology such as the TPE system had been established previously as evidenced by the interest that many organizations had shown in using the system. With ARI's assistance these organizations had used the TPE data collection forms in evaluating training programs with some success. However, the programs to which the TPE system was applied prior to the M1 OT-III were much narrower in scope, and because the purposes of these earlier evaluations were limited, the TPE system was not fully exercised. The first opportunity to assess applicability of the TPE system to the training program for a major weapons system using Army personnel came during the M1 OT-III.

Information was drawn from several sources in assessing the Army's ability to apply the TPE system to the evaluation of the OT-III transition training program. One source of information was ARI's observations regarding the planning process that preceded the M1 OT-III. As described before, the scope of the OT required extensive coordinated planning by several organizations including ARI. ARI's role in the planning process was to ensure that the TPE system was incorporated into the overall test plan in such a manner as to fully utilize

its potential as an evaluation instrument given only those Army personnel and resources that could be made available for the evaluation of the training program. TCATA, who controlled the data collection effort, was able to procure the personnel and resources required to utilize the TPE system, and the TPE system was incorporated into the detailed test plan in a way that was acceptable to ARI and all of the other agencies involved in the program evaluation. This demonstrated that the Army could incorporate the TPE system in an overall test plan for evaluating the training program for a major weapons system without compromising the TPE system or the overall test of which it is a part.

A second source of information regarding the Army's ability to use the TPE system was the Army implementation of the TPE system during the OT. Among the important factors in the implementation were: the Army's capability to follow their own plans in using the system; the timeliness with which the evaluation data were collected, forwarded to the training analyst, and acted upon in accordance with the analyst's recommendations; the quantity and quality of the data collected by the NCO's using the TPE worksheets; and the extent to which the data were used by the various organizations.

The manner in which the TPE system was used was in accordance with the detailed test plan with two notable exceptions. The task of collecting the TPE data was not shared by the platoon and tank data collectors as planned. Rather the tank data collectors were required to shoulder almost all of the data collection task, including certain data collection requirements that were added after the OT-III began. Some evidence suggests that the performance of the tank data collectors was adversely affected by the large number of data collection forms they were required to complete. Independent observation of some blocks of instruction by the ARI analyst and evaluators from other organizations indicate that the quantity and quality of the data collected by some of the data collectors was less than might reasonably be expected. Informal conversations with some of the data collectors also suggested that the number of data collection instruments to be completed had a negative impact on the motivation of the soldiers to conscientiously record their observations on the TPE data collection forms. The problem was exacerbated by the conditions under which the data collectors were forced to work. Data collectors frequently were required to collect data all day in wet or cold and windy weather. Often they were called upon to collect data right through (and long after) normal meal hours. Many of the "creature comforts" provided to the participating units were not given to the data collectors, and they were treated as unnecessary by the NETT and by the units being trained. A second deviation from the detailed test plan that adversely affected the evaluation effort was that changes to the training program were not made on a day-to-day basis as planned. Plans called for recommendations for changes in the training program to be received by the persons responsible for making those changes within 24 hours of the time that the class being evaluated was conducted. Because of problems unique to the M1 OT-III at Fort Hood ARI did not receive the data collection forms in a timely manner and the persons responsible for making the changes did not receive ARI's recommendations for changes until weeks after the training had occurred. Upon receipt of ARI's recommendations, the NETT made some of the changes suggested by ARI and did not make others. Unfortunately, the NETT did not document those changes that were made in the training program, thereby leaving some question as to the extent of the changes made.

Despite some difficulties in using the TPE system, all of the Army agencies involved in the evaluation of the M1 training program used the data generated by the TPE system for their respective purposes. The primary users were OAFMS, TCATA, and ARI. OAFMS used the data for certifying the readiness of the OT-III players as M1 qualified crewmen and mechanics. OAFMS also used the data in certifying the effectiveness of the M1 transition training package. TCATA kept detailed records of all the TPE training data and used the data and memoranda generated by ARI as input for their own independent training effectiveness analysis. DTD and TRASANA also used the data in conducting a Cost and Training Effectiveness Analysis (CTEA) on the M1 transition training program, although TRASANA relied heavily on pre- and post-diagnostic test data in its analysis. Many of DTD's directives to the NETT to modify the training program were based on changes first recommended by ARI. All of the organizations involved in evaluating the effectiveness of M1 transition training seemed to find the data useful. This is not surprising in that the TPE system provided the largest pool of objective training data that was available during the M1 OT-III.

The TPE system was designed to be used by soldiers who were not sophisticated in educational technology and who had no previous experience in collecting or analyzing training data. The NCO's who served as the tank data collectors and their supervisors, having neither methodological sophistication nor previous experience, were an ideal group for testing whether typical Army personnel could collect evaluation data given a short workshop in using the TPE data collection forms and the observer's job aid. The TPE workshops conducted by the training analyst provided the first opportunity for determining the ability of the data collectors to use the TPE system. As a whole, the group responded well to the training given in the workshops. Questions asked during training, performance during the practice session, and comments made during the discussion following practice indicated a high level of understanding for the majority of the soldiers being trained. While some of the soldiers' questions indicated misunderstanding of a few of the TPE terms used (e.g., isolated practice, level of reality), the preponderance of the soldiers' responses suggested the soldiers could use the TPE data collection forms to make objective observations.

The quality and quantity of the observations recorded on the forms during the transition training, however, were not what might be expected on the basis of the performance demonstrated during the workshop. Many of data collectors were not using the forms as they were designed to be used. The forms listed specific items (see Appendix C) which required the data collectors to observe training to determine if it met specific criteria described in the observer's job aid and discussed in the TPE workshop. When these criteria were not met, the data collectors were encouraged to record a comment describing what went wrong. But as the data began to come in, it became apparent that many of the data collectors were treating the TPE data collection forms as simple checklists, responding to the items subjectively based on their general impressions of the items rather than using the objective criteria specified in the observer's job aid (Witmer, Note 3). Furthermore the number of comments recorded on the forms were far fewer than might be expected based on independent observations

of the training by the TPE analyst and others. Fortunately, sufficient data were obtained, through the efforts of a handful of data collectors, to allow the transition training program to be evaluated as planned.

An ARI researcher analyzed the data provided by the team of data collectors. Some of the procedures used by the analyst were designed specifically for evaluating training during the M1 OT-III and were undergoing their first real test during the OT. There was a question as to whether the training analyst could identify training program deficiencies and their causes given only the data recorded by the NCO data collectors on the data collection forms. For the most part, the analyst was able to identify performance deficiencies and their causes from the data recorded on the data collection forms. In a few cases the analyst was aided in identifying causes by his own independent observations of the training and by data from other sources. There was at least one class for which the data recorded on the TPE forms provided no clues regarding the causes of the performance deficiencies observed. In this particular case, it was necessary for the analyst to review some additional data collected by TCATA and to question some of the persons who had observed the class about how the class was conducted in order to identify the cause of the deficiency. It should be stressed, however, that the analyst was forced to resort to search for the necessary information only because the data collectors did not record the necessary information on the TPE forms, and was not due to the design of the forms themselves.

Having identified training deficiencies and their causes, the analyst was in the position to recommend changes to the transition training to correct the deficiencies. The analyst derived recommendations for changing the training program from the modifications job aid (Kristiansen, Note 4). The modifications job aid was used by the analyst to specify what the NETT should do to correct each of the performance deficiencies observed. The NETT was told in simple language what actions to take to correct the deficiencies. The NETT, however, was reluctant to make changes in the training program; therefore the usefulness to the NETT of the changes derived from the modifications job aid was not fully determined. Some of the recommendations made by ARI were implemented by the NETT after the Director of DTD issued a memorandum reiterating certain of ARI's recommendations and directing the NETT to incorporate the recommendations into the transition training program. This demonstrated the potential usefulness of the modifications job aid as a source of information for specifying alterations to training programs on the basis of observed performance deficiencies. The use of the modifications job aid greatly simplified the process of deriving program changes from program deficiencies and thus made the analyst's job much easier.

In response to recommendations made by ARI and reinforced by DTD, the NETT added demonstrations to some lessons where there had previously been none and required instructors to adhere more closely to the lesson plans. These changes were instituted prior to administering the transition training for the second and third companies. Evidence that these changes were indeed made came from the comments recorded by the data collectors and were verified by informal contacts with the data collectors, NETT, and OAFMS. The number of comments recorded indicating that tasks were not demonstrated or that lesson plans were

not followed dropped sharply from the first to the second company and remained low for the third company. The number of comments concerning demonstrations was 81, 11, and 13 for the first, second, and third companies, respectively. The number of comments concerning adherence to lesson plans was 27, 9, and 8 for the first, second, and third companies, respectively. The sharp decline in the number of comments concerning demonstrations and adherence to lesson plans from the first to the second and third companies parallels known changes in the training process, and thus demonstrates the sensitivity of the TPE methodology for detecting changes in the training process.

Additional indicators of the sensitivity of the TPE methodology to program changes were not available because some of the changes made were not documented, making it difficult for the analyst to verify that the changes had actually been made. The analyst was not informed when changes were made in the training program, and the lesson plans were not revised to include many of the changes that were instituted. This reduced the ability of the training analyst to assess the effects of the various changes made during the transition training program.

It was expected that as changes generated by ARI's analysis of the training program were implemented by the NETT that the percentage of tasks for which soldiers received first-time GO's would increase. Such an increase would suggest that the changes made in the training program as the result of the TPE analysis were increasing training effectiveness. The predicted increase in performance over the three companies was obtained. The proportion of tasks for which 100 percent of the soldiers tested received first-time GO's increased from 24 percent for the first company, to 34 percent and 53 percent for the second and third companies, respectively. While such increases may be due in part to other factors (e.g., reduction of standards for some tasks and elimination of some task requirements), the trend toward higher first-time GO rates constitutes indirect evidence that the changes made in the training program from one company to the next increased training effectiveness and thus supports the usefulness of the TPE methodology responsible for these changes.

SECTION VII

REVISING THE TPE SYSTEM ON THE BASIS OF PROBLEMS IDENTIFIED DURING THE FIELD TRIAL

The field trial of the TPE system during the M1 OT-III indicated that the system could be used by Army personnel to identify training program deficiencies and their associated causes and to make recommendations for changes in the training program that when implemented reduce the number of performance deficiencies observed. But the field trial also identified problems in using the TPE system to evaluate large scale training programs such as the M1 OT-III transition training program. In the paragraphs that follow, solutions to some of the problems encountered in using the TPE system during the M1 OT-III will be proposed and changes made to the data collection forms and job aids will be described and discussed.

Motivation of the Data Collectors

Many of the problems encountered by ARI during the M1 OT-III arose because some of the essential elements of the training evaluation were not controlled by the training analyst. The data collectors are a case in point. The data collection team was trained by ARI but was controlled by TCATA during data collection activities. The training analyst visited the training site periodically and talked with the data collectors in an effort to determine if the observers were having any difficulties in completing the data collection forms. During these visits to the field, the analyst noticed that many of the data collectors seemed to lack the motivation to perform the data collection task well. The analyst also observed some of the factors that were contributing to this lack of motivation, such as too many forms, poor working conditions, and being treated as unnecessary by the NETT and the unit. However, ARI had little control over these factors during the OT and thus was unable to change these factors. In subsequent applications of the TPE methodology, the following steps should be taken in order to ensure that the data collectors are properly motivated. In the TPE workshops the importance of the data collection task to the overall evaluation and what evaluation can accomplish should be stressed. Data collectors should be forewarned that they are likely to be treated as adversaries by the instructors who deliver the training, but they should be assured that their job is as important as that of the instructors and that they will be fully supported in their efforts. If possible, the data collectors should work directly for the analyst. In this way the analyst can exert control over the data collection activities, ensuring that the number of forms to be completed by any one data collector and the number of hours spent completing these forms are limited to a reasonable level. Likewise the analyst can ensure that the data collectors are supplied with the necessary creature comforts.

Data Flow Problems and Suggested Solutions

One of the problems encountered during the M1 OT-III was that information was not received in a timely manner by those who most needed it. The analyst sometimes did not receive the evaluation data until several days after they were collected, and the NETT did not receive the analyst's recommendations until

several weeks after the recommendations had been made. In order to ensure the timely flow of data from the data collector to the analyst and from the analyst to the persons responsible for instituting changes in the training program, a direct line of communications should be established from the analyst in both directions. In order to speed the flow of data to the analyst, the originals of completed data forms should go directly from the data collector to the training analyst. The analyst would then analyze the data and the results of this analysis would be made available to other organizations. If other persons or organizations needed the raw data, they would have to obtain copies through the TPE analyst. The analyst's recommendations for changing the training program would be forwarded directly to a member of the program staff responsible for making changes in the training program. This person would check into the possibility of making each of the changes suggested by the analyst and would inform the analyst which changes were made and which were not.

Other than speeding up the flow of information between the analyst and the person(s) responsible for making training program changes, other advantages may accrue from a direct line of communications between the analyst and the program staff. The chances for the analyst to convince the program staff to make the recommended changes are increased through direct contact, as are the opportunities for determining why some of the recommendations were not adopted. Additionally, personal contact on a regular basis between the analyst and the program staff may reduce the animosity that tends to develop between the evaluator and those whose program is being evaluated.

Problems in Using the Data Collection Forms

Perhaps the most critical problem surfacing during the M1 OT-III was the tendency of many of the data collectors to treat the data collection forms as simple checklists, forming general impressions about the training, and responding to the TPE items on the basis of these impressions rather than upon the objective criteria provided. This led many data collectors to mark an item OK and record no comment when the item should have been marked Not OK and a comment recorded. The NCO data collectors exhibited a general reluctance to record their observations in a written comment, even when they judged some aspect of training to be Not OK. In an attempt to correct this problem, the TPE data collection forms and the observer's job aid were modified considerably.

Revision of the Data Collection Forms

The three data collection forms - a training observation form, a testing observation form, and a training environment data collection form - used during the M1 OT-III were retained, but the formats were changed, new items were added, and many of the old items were revised. The training observation and training environment forms used during the OT required the data collectors to make OK-Not OK judgments for each aspect of the training environment or training process that they were being asked to observe. Requiring OK-Not OK judgments encouraged data collectors to rely on general impressions rather than

on objective data. Therefore, OK-Not OK judgments were eliminated from the revised data collection forms. All of the items on the revised forms are phrased in question format so that the observer can address each item with a "Yes" or "No" response. The wording of the items on the revised forms is quite specific, leaving little room for interpretation. The increased specificity of the items encourages the observers to attend more closely to the training and also reduces the need for the observers to clarify their responses with comments. The need for comments was further reduced by the addition of a number of new items. Several specific new items replaced one or two less specific old items, thereby reducing the need to clarify responses with comments. The addition of the new items increased the power of the TPE system to obtain specific information regarding such critical training events as demonstrations, practice, and feedback. The wording of some items was revised, not just to increase specificity, but also to make the item more easily understood. Items using such specialized terms as need-to-know, nice-to-know, performance-based, subject-matter based, level of reality, and isolated practice were revised. The specialized terms were eliminated and more widely understood terms were substituted in their place. Two items were eliminated because they were ambiguous and produced no useful data during the OT-III. Overall ratings of the training and test by data collectors during the M1 OT-III provided no useful information and thus were not included in the revised data collection forms. The rating scales tended not to be useful because of an extreme leniency bias on the part of the data collectors and a general reluctance to use the rating scales as they were designed to be used. A question concerning the approximate number of soldiers receiving No-Go's provided little additional information during the OT and was thus eliminated when the forms were revised.

A fourth data collection form - a Training Plan Description/Training Events form - had been designed for determining if training is conducted as specified in the training plan. The form, listing the major training events and other pertinent information abstracted from the lesson plans, was to be used by data collectors during the M1 OT-III to record if the major training events were conducted as planned. However, the lesson plans developed for M1 transition training included little detail, and the data collectors could see no clear advantage in using information abstracted from the lesson plan over using the lesson plan itself. Because the form was not perceived as being useful by the data collectors and because the analyst felt that the additional data provided by using the form would be outweighed by the additional data collection burden placed upon the data collectors, a decision was made not to use the form during the M1 OT-III.

The decision not to use the Training Plan Description/Training Events form during the OT-III was based on factors unique to the OT and is therefore not indicative of the general usefulness of the form as an evaluation instrument. To encourage subsequent use, the form was revised to make it easier to use and more objective. On the revised form, the training events were listed more concisely, making it easier for the data collector to record which of the training events occurred and which did not. As with the other TPE forms, the revised form did not call for OK-Not OK judgments, but merely required the data collector to record whether or not a particular event occurred.

The Revised Job Aids

The revised data collection forms and the items comprising them are described in a revised version of the observer's job aid (Witmer, Note 5). The earlier version of the job aid (Witmer, Note 3) was designed specifically for use by the data collectors during the M1 OT-III. The revised job aid was written so that it could be used by anyone who was given the responsibility to observe training and testing for the purpose of collecting evaluation data. The revised job aid was changed considerably from the earlier version. Besides the changes to some items, the addition of other items, and the deletion of OK-Not OK judgments, changes were made in the basic organization of the job aid. Whereas the earlier job aid had specified the format of each worksheet and the items appearing on that worksheet, the revised job aid provides a suggested format and lists items that might be selected for inclusion on that worksheet. This allows the training analyst the option of using the suggested format or developing an alternative format. It also offers the analyst an opportunity to select the items appearing on each worksheet. To assist the analyst in selecting the items and to make the job aid easier to understand, items relating to the same type of training activity were grouped together. For example, all items related to practice were grouped under the "Practice" heading, and all items relating to feedback were listed under "Feedback." To further aid the analyst in selecting items, items were dichotomized according to level of difficulty. An asterisk was used to identify items that require more skillful observation. This enables the analyst to tailor the worksheets to the skills of the observers who will be using them.

The modifications job aid was also revised (Kristiansen, Note 6) to make it compatible with the revised observer's job aid and easier to use. For each of the items for identifying training problems listed in the observer's job aid, the modifications job aid proposes possible solutions to the problems. As in the observer's job aid, the modifications job aid lists solutions by worksheet and groups solutions relating to the same type of training activity together. The table of contents has been expanded to allow the analyst to quickly locate the suggested solution for each training problem identified on the observer's worksheets. The revised modifications job aid has been greatly expanded over the earlier version and provides much more detail on how to modify training programs on the basis of deficiencies identified during training.

As mentioned earlier a set of criteria that could be used in evaluating lesson plans was developed and used in evaluating the M1 transition training lesson plans. In conjunction with the development of these evaluation criteria a first cut was made at producing a job aid for the evaluation of lesson plans. This preliminary job aid for evaluating lesson plans relied heavily on the use of examples from the M1 transition training lesson plans to illustrate the types of problems that generally occur in the design of lesson plans. Following the M1 OT-III, the lesson plan evaluation job aid was rewritten (Kristiansen and Witmer, Note 7) omitting the examples from the M1 transition training and including more general guidelines for the evaluation of lesson plans.

The job aids described above provide guidance on how to evaluate lesson plans (Kristiansen and Witmer, Note 7), how to observe training and testing to identify training program deficiencies (Witmer, Note 5), and how to modify training in response to deficiencies discovered during training (Kristiansen, Note 6). These job aids alone do not provide sufficient guidance to the training analyst for conducting a complete training program evaluation. For example, the job aids do not provide guidance on planning the program evaluation, selecting, training, and supervising data collectors, interacting with the program staff and other participating agencies, or procedures for interpreting and reporting the data. To provide guidance to the training analyst on these and other facets of training program evaluations not covered in the previously described job aids, an analyst's job aid was developed (Kristiansen and Witmer, Note 8).

These four job aids taken together provide methods and materials that can be used by Army personnel in evaluating training programs. The guidance provided in these job aids is much more detailed than that provided by the Harless Guidelines which the job aids replace. Providing separate job aids for lesson plan evaluation, training observation, and training program modification simplified the evaluation task by making it easy to locate information concerning a particular evaluation activity. Further simplification was obtained by reducing the number of worksheets to be completed by the training observer and training analyst. The Harless Guidelines included eighteen different worksheets - a worksheet for almost every possible training evaluation activity. The sheer number of worksheets to be completed made the evaluation task appear quite formidable. ARI's experience during the M1 OT-III showed that many of these worksheets were not necessary for conducting a training program evaluation. Further examination of the Harless worksheets following the M1 OT-III indicated that much of the information called for by the various worksheets was redundant and that the kinds and amount of information provided by some worksheets did not justify their existence. The revised job aids include only four worksheets or data collection forms.

These data collection forms provide the necessary guidance to the training observer to ensure that the training data needed by the analyst are collected during training and testing. Although the training analyst may wish to develop additional forms for collecting some of the information needed to evaluate a particular training program, no other forms are required by the TPE system.

SECTION VIII

CONCLUDING REMARKS

The TPE system for evaluating the effectiveness and efficiency of training programs as described in the revised job aids offers substantial advantages over other methodologies used in evaluating training. Like evaluation methods that employ specially constructed post-tests, TPE provides an objective means of determining training program effectiveness. But unlike post-tests, TPE does not require substantial amounts of the soldiers time over and above what would normally be spent in training. And while post-tests may merely indicate that a given program of instruction (POI) is effective or ineffective, TPE is capable of diagnosing specific problems in the POI. Like questionnaire methods of evaluating training, TPE seeks to identify the source of training problems by gathering extensive information about the conduct of the training program. But unlike questionnaire methods, the information is obtained through direct observation, rather than from second-hand, post-facto accounts of the training program by the program participants.

The TPE system described in the revised job aid is the product of many months of developing prototype data collection instruments and job aids and testing those materials in the field with typical user input against typical Army training. Through field testing the prototype materials, many valuable lessons were learned, which were incorporated into revisions of the TPE system. In revising the TPE system, the job aids were refined to make them easier to use and comprehensive enough to provide detailed guidance for the training observer and training analyst. The revised job aids (Witmer, Note 5; Kristiansen, Note 6; Kristiansen and Witmer, Note 7; Kristiansen and Witmer, Note 8) provide a wealth of information for anyone who is involved in the evaluation of training programs, and are particularly useful for persons responsible for evaluating training programs in the Army.

SECTION IX

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SECTION X

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APPENDIX A

TRAINING OBSERVATION FORM

Date_____ Time (from) _____ (to) _____

Place_____ Nr Trainees_____ Nr AIs _____

Observer_____ Subject _____

Instructor_____

LESSON PLAN

Do we have a copy?	Y	N
If so, was it followed?	Y	N
Was the lesson plan changed as a result of this instruction?	Y	N

CONTENT

Were objectives stated in performance terms?	Y	N
What were they?	Y	N

HANDS-ON TRAINING

Did lesson involve hands-on practice?	Y	N
If yes, were all trainees given hands-on experience?	Y	N
If not all, what percentage?	_____	
Did hands-on supervision appear adequate?	Y	N
Did hands-on time per trainee appear adequate?	Y	N

LECTURE/DEMONSTRATION

Did lesson involve lecturing? Y N Demonstration?	Y	N
Did lecture appear adequate? If no, what observations did you make that led you to this opinion? (List below)	Y	N
Did demonstration appear adequate? If no, what observations did you make that led you to this opinion? (List below)		
Did instructor ask for feedback from trainees?	Y	N
Did he get feedback?	Y	N
Did he handle it adequately?	Y	N

MISCELLANEOUS

In your opinion, was the total time adequate/excessive/ inadequate for this lesson?		
In your opinion, were the trainees trained to criterion during this block of instruction?	Y	N
If no, what observations did you make that led you to this opinion?		

US Army Research Institute
Field Unit - Ft Knox
Ft Knox, KY 40121

APPENDIX B

TRAINING OPINION QUESTIONNAIRE

To quality control future XM1 training program development efforts, we need your opinion regarding the training you have just completed. Attached is a list of tasks (numbered 1 thru _____). Please respond to each task as follows.

1. Circle YES or NO opposite each task to indicate whether the task was taught as part of your training.

2. If the task was taught (YES), answer the remaining questions for that task by circling the number that best reflects your opinion of the training.

1 = Very effective
2 = Effective
3 = Borderline
4 = Ineffective
5 = Very ineffective

3. If the task was not taught (NO), go to the next task listed and repeat the procedure.

After you have rated each task according to the above procedure, complete the questionnaire by answering the last two questions. Be completely frank in making your responses and comments.

NAME_____ POSITION_____

RANK_____ DATE_____

US Army Research Institute
Fort Knox Field Unit, Fort Knox, Kentucky

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TRAINING OPINION QUESTIONNAIRE

1 = Very Effective 2 = Effective 3 = Borderline 4 = Ineffective 5 = Very Ineffective

TASK	Was this task taught?		Instructor	Subject Matter	Methods of Instruction	Training Time	Hands-on Practice	Reference Materials	Training Aids	Review and Critique	How would you rate the overall training for this task?	How would you rate the effectiveness of this training in preparing you for your job?
1. Performing before operation checks and services	Yes	No	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
2. Boresighting the main gun	Yes	No	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
3. Zeroing the main gun	Yes	No	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
4. Performing prepare-to-fire checks and services	Yes	No	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
5. Detecting targets at high speed	Yes	No	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
6. Identifying targets at high speed	Yes	No	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
7. Tracking targets at high speed	Yes	No	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
8. Detecting targets at long range	Yes	No	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
9. Identifying targets at long range	Yes	No	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
10. Designating targets to gunner	Yes	No	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
11. Determining correct range (multiple return) to target	Yes	No	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
12. Engaging main gun targets using the thermal sight	Yes	No	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
13. Engaging targets while firing on the move	Yes	No	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
14. Sensing rounds while firing on the move	Yes	No	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
15. Engaging targets under degraded conditions	Yes	No	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
16. Engaging targets using indirect fire	Yes	No	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
17. Directing high speed evasive manuevers from TC's station	Yes	No	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
18. Adjusting battle range	Yes	No	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
19. Deploying smoke grenades	Yes	No	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
20. Performing after fire checks and services	Yes	No	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
21. Monitoring TC warning lights	Yes	No	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
22. Performing after operation checks and services	Yes	No	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
23. Performing TC maintenance functions	Yes	No	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

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Which of the task(s) rated do you feel require additional training time?

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

List any additional task(s) which you feel need to be included in the training program.

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

Comments: _____

_____

_____

_____

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APPENDIX C

TPE DATA COLLECTION FORMS USED DURING THE EVALUATION OF THE M1 OT-III TRANSITION TRAINING

OBSERVATION OF TRAINING EVENTS - PART I (Introduction/Overview/Prerequisites)

XM1 Tng 39

Class/Lesson Title_____ 19L 19K 45E 63E

Training Location/Environment_____ Date: _____

Class Start Time_____ Data Collector ID #_____

Class End Time_____ Instructor ID #_____

OBSERVATION	YES	NO	N/A	ASSESSMENT OK	ASSESSMENT NOT OK	COMMENTS (Continue Below if Necessary)
Were Students Told the Training Objectives?						
Was the Purpose of the Training Objective provided to the students?						
Relationship between the Training Objective and other events was explained?						
Positive or Negative Consequences for learning or not learning were provided?						
Was the outline of class activities and schedule provided the students?						
Was terminology which will be used in the instruction explained or clarified?						
Questions encouraged and answered?						

ADDITIONAL COMMENTS_____

OBSERVATION OF TRAINING EVENTS - PART II (Demonstration and Isolated Practice)
XM1 Tng 39

Class/Lesson Title_____ Date:_____

OBSERVATION	YES	NO	N/A	ASSESSMENT		COMMENTS
				OK	NOT OK	
Were Tasks Demonstrated?						
Was Demonstration conducted in small enough steps?						
Was the isolated practice at a high reality level?						
Isolated practice allowed for a range of examples?						
Students were provided feedback on their actions?						
Faulty performance was identified and corrected?						
Was sufficient repetition allowed?						
Were students encouraged to ask questions?						
Student questions were answered?						
Were Job Aids introduced as Part of the instruction?						
Level of reality progressed from Low to High?						

ADDITIONAL COMMENTS_____

OBSERVATION OF TRAINING EVENTS - PART III (General)
XM1 Tng 39

Class/Lesson Title_____ Date:_____

OBSERVATION	YES	NO	N/A	ASSESSMENT		COMMENTS
				OK	NOT OK	
Instructor followed lesson plan?						
AV called for was used?						
Training materials and handouts called for were used?						
Instruction was logically sequenced?						
Basic rules presented before exceptions?						
Learning Objectives smoothly transitioned from one to the other?						
Were Critical Discriminations emphasized?						
Need to Know was emphasized and nice to know minimized?						
Lessons were performance based and not subject matter based?						
Students actively participated?						
Instructor provided a summary?						
Sessions start and end on time?						
Was instructor attitude positive?						

ADDITIONAL COMMENTS_____

OBSERVATION OF TRAINING EVENTS - PART III (cont)

OVERALL RATING OF THE CLASS OR LESSON

☐ - EXCELLENT No performance problems predicted

☐ - GOOD Few performance problems predicted

☐ - FAIR Considerable performance problems predicted

☐ - POOR Widespread performance problems predicted

Summarize FAIR or POOR ratings _____

_____

_____

_____

OBSERVATION OF PRACTICE/TEST EVENTS

XM1 TNG 40
Page 1 of 2

Class/Lesson Title _____ 19L 19K 45E 63E

Class/Lesson # _____

Training Location/Environment _____ Date: _____

Test Start Time _____ Data Collector ID# _____

Test End Time _____ Instructor ID# _____

1. Test Basis? _____ Individual _____ Crew _____ Platoon
_____ Field Performance _____ Simulation

2. Is Test Being Scored? YES _____ NO _____ BY WHOM? _____

3. Is Criteria for PASS/FAIL Documented? YES _____ NO _____ WHERE _____

4. Have the Students been given the criteria? YES _____ NO _____

5. Do Guidelines for the Test Administration exist? YES _____ NO _____
WHERE _____

6. Is this remedial _____ or POI _____ Training?

OBSERVATION	YES	NO	UNK	N/A	COMMENTS
Did the test occur soon after the completion of training?					
Were Instructions Clear?					
Are PASS/FAIL Standards Clear?					
Are PASS/FAIL Standards Fair?					
Level of Reality is as close to real world as possible?					
Test sequence is the same as in real world?					
Are critical discriminations and responses called for?					
Test calls for integration of tasks that will be integrated in the real world?					
Were the specified tasks tested?					

FH FORM 2951-41
(OPT 6 Aug 80)

OBSERVATION	YES	NO	UNK	N/A	COMMENTS
Were the specified standards applied?					
Are scorers different personnel than instructors?					
Was performance contaminated?					
Were students given feedback on their performance after testing?					

Approximate Number of First-Time Overall NO GO's _____

OBSERVER'S OVERALL RATING OF THE TEST:

[] - EXCELLENT — No performance problems

[] - GOOD — Few Performance Problems

[] - FAIR — Considerable Performance Problems

[] - POOR — Widespread Performance Problems

Summarize FAIR or POOR ratings: _____

FH FORM 2951-41
(OT 6 Aug 80)

TRAINING ENVIRONMENT XM1-TNG-41

Class/Lesson Title _____ 19L 19K 45E 63E

Class/Lesson # _____

Training Location _____ Date: _____

Number of Students _____ Data Collector ID# _____

Number of Instructors/AI's _____ Instructor ID# _____

ENVIRONMENTAL FACTORS	OK	NOT OK	COMMENTS
Student-Instructor Ratio			
Student-Equipment Ratio			
Access to Instructor			
Access to Equipment			
Sufficient Training Materials			
Publications Utilized			
Training Aids			
No. of Students for Space			
Noise Distractions			
Observed Distractions			
Interruptions			
Lighting			
Temperature			
Length of Training Event			
Overall Rating			

APPENDIX D

OTHER FORMS USED DURING THE M1 OT-III FOR COLLECTING TRAINING EFFECTIVENESS INFORMATION

DEMOGRAPHIC PROFILE DATA SHEET/QUESTIONNAIRE

[illegible] INSTRUCTIONS: Fill in front side of form from data obtained from personnel records. [illegible] side of form during interview; also, during interview confirm data on front side [illegible]

Identification number: _____

NAME: _____
Last/First/MI

Today's Date: _____
Day/Month/Year

[illegible] Departed Unit: _____
Day/Month/Year

Rank: _____

Classification Battery Scores:

6a	CO_____	6f	CL_____
6b	FA_____	6g	GM_____
6c	ST_____	6h	SC_____
6d	EL_____	6i	MM_____
6e	GT_____	6j	Other_____

Height: (Enter exact height on appropriate line)

7a Below 5'0" _____
7b 5'0"-5'4" _____
7c 5'5"-5'9" _____
7d 5'10"-6'2" _____
7e over 6'2" _____

Weight: (Enter exact weight on appropriate line)

8a Below 125 lbs _____
8b 125-150 lbs _____
8c 151-175 lbs _____
8d 176-200 lbs _____
8e Over 200 lbs _____

Civilian Education: _____
Years/Months

10. MILITARY EDUCATION

Y	N	(BASIC)
Y	N	(AIT)
Y	N	(MOS SCH)
Y	N	(XM1 SCH)

11. Pay Grade: _____

12. Permanent MOS (PMOS): _____

13. CURRENT UNIT _____
(CO)
(PLT)

14. Other MOS (OMOS): _____

15. Basic Active Service Date: (Enter Day, Month, Year, on appropriate line)

15a Before 1960_____
15b 1960-1965_____
15c 1966-1971_____
15d 1972-1978_____
15e After 1978_____

16. Birthdate: _____
Day/Month/Year

17. Birthplace: (Enter state On appropriate line or check appropriate country)

17a North America _____
17b South/Central America _____
17c Carribbean _____
17d Europe _____
17e Pacific _____
17f Other _____

18. Physical Profile
What type _____

19. Total Military Service: _____
Years/Months

[illegible]

20. Eye Color: _____

21. Security Clearance:

21a ( ) Top Secret
21b ( ) Secret
21c ( ) Confidential
21d ( ) None

22. What is your present duty position?

22a ( ) Gunner
22b ( ) Loader
22c ( ) Driver
22d ( ) Tank Commander
22e ( ) 63E Mechanic
22f ( ) 45E Mechanic
22g ( ) 63H Mechanic
22h ( ) 63G Mechanic
22i ( ) 45k Mechanic
22j ( ) 34G Mechanic
22k ( ) Other; Explain: _____
22l ( ) 63C
22m ( ) 45N

23. What is your Marital Status?

23a ( ) Never Married
23b ( ) Married and wife is with
23c ( ) Married but wife is not with
23d ( ) Divorced or widowed
23e ( ) Legally Separated

24. How much longer do you expect to remain in the Army?

24a ( ) 5 or more years
24b ( ) 3 - 4 years
24c ( ) 2 - 3 years
24d ( ) 1 - 2 years
24e ( ) less than one year

25. How long have you held your current pay grade?

25a ( ) 5 or more years
25b ( ) 3 - 4 years
25c ( ) 2 - 3 years
25d ( ) 1 - 2 years
25e ( ) Less than one year

26. How long have you been in your present duty position (total experience, including other unit assignments)?

26a ( ) Six months or less
26b ( ) 7 - 12 months
26c ( ) More than 1 but less than 2
26d ( ) More than 2 but less than 3
26e ( ) 3 or more years

TH Form 2951-1
(OT 8 Apr 80)

27. How long have you been a member of your present crew, group or squad?

27a ( ) Less than 3 months
27b ( ) 3 - 6 months
27c ( ) 7 - 12 months
27d ( ) 13 - 18 months
27e ( ) More than 18 months

28. How long have you been in your present company, troop or battery?

28a ( ) Less than 3 months
28b ( ) 3 - 6 months
28c ( ) 7 - 12 months
28d ( ) 13 - 18 months
28e ( ) More than 18 months

29. How long have you been in this battalion or squadron?

29a ( ) Less than 3 months
29b ( ) 3 - 6 months
29c ( ) 7 - 12 months
29d ( ) 13 - 18 months
29e ( ) More than 18 months

30. What ancestry do you consider yourself?

30a ( ) Spanish descent
30b ( ) American Indian
30c ( ) Asian-American
30d ( ) Puerto Rican
30e ( ) Philippino
30f ( ) Mexican-American
30g ( ) Eskimo
30h ( ) Aleut
30i ( ) Cuban-American
30j ( ) Chinese
30k ( ) Japanese
30l ( ) Korean
30m ( ) Black
30n ( ) Other

31. Which hand do you use for doing careful work?

31a ( ) Left hand
31b ( ) Right hand
31c ( ) Either hand

FH Form 2951-1
(OT 8 Apr 80)

32. What kind of corrective lenses do you use to perform in your duty position?

32a ( ) Glasses sometimes
32b ( ) Glasses always
32c ( ) Contact lenses sometimes
32d ( ) Contact lenses always
32e ( ) Do not need correction

33. How many dependents (not counting yourself) do you have?

33a ( ) None
33b ( ) One
33c ( ) Two
33d ( ) Three
33e ( ) Four or more

34. What civilian jobs or trades have you worked at or had training?

34a ( ) Mechanic
34b ( ) Electrician
34c ( ) Construction
34d ( ) Machine Operator
34e ( ) Truck driver

35. What other MOS formal training do you have?

35a Where _____
35b What Unit _____
35c Duty Position _____
35d How many months _____

36. What primary MOS formal training do you have?

36a Where _____
36b What unit _____
36c Duty Position _____
36d How many months _____

37. What duty MOS formal training do you have?

37a Where _____
37b What unit _____
37c Duty Position _____
37d How many months _____

38. What other MOS experience do you have?

38a Where _____
38b What unit _____
38c Duty Position _____
38d How many months _____

FH Form 2951-1
(OT 8 Apr 80)

39. What primary MOS experience do you have?

39a Where _____
39b What unit _____
39c Duty Position _____
39d How many months _____

40. What duty MOS experience do you have?

40a Where _____
40b What unit _____
40c Duty position _____
40d How many months _____

41. Are you an advanced individual training (AIT) or one station unit training (OSUT) graduate?

41a ( ) AIT
41b ( ) OSUT
41c When: _____
Inclusive Dates
41d Where: _____ _____

42. What ARTEP experience do you have?

42a Where _____
42b What unit _____
42c Duty Position _____
42d How many times _____

43. What Complete Tank Gunnery experience do you have?

43a Where _____
43b What unit _____
43c Duty position _____
43d How many times _____

44. What maintenance experience do you have?

44a Where _____
44b What unit _____
44c Duty position _____
44d How many months _____

45. ADDITIONAL COMMENTS: _____

_____

_____

DATA COLLECTORS NUMBER _____
DATA COLLECTORS NAME _____
LAST/FIRST/MI
DATA COLLECTORS RANK _____

FH Form 2951-1
(OT 8 Apr 80)

TRAINING AIDS DATA SHEET

Class/Lesson Title _____ 19L 19K 45E 63E

Class/Lesson # _____

Training Location/Environment _____ Date: _____

Test Start Time _____ Data Collector ID# _____

Test End Time _____ Instructor ID# _____

1. List training aids required by lesson plan.

_____

_____

_____

2. List training aids used during class.

_____

_____

_____

3. What recommendations do you have for more effective or additional training aids? _____

_____

_____

_____

4. How effective was the instructor's use of the training aid(s)? (Check one and explain)

a. ( ) Very effective _____

b. ( ) Somewhat effective _____

c. ( ) Somewhat ineffective _____

d. ( ) Very ineffective _____

FH Form 2951-37
(CT 4 Aug 80)

5. How effective was the training aid(s)? (Check one and explain)

   a. ( ) Very effective _____

   b. ( ) Somewhat effective _____

   c. ( ) Somewhat ineffective _____

   d. ( ) Very ineffective _____

6. Comments: _____

_____

_____

_____

PLATOON CHIEF DATA COLLECTORS FILL OUT FOR EACH CLASS. LESSON PLAN SHOULD BE COMPARED TO POI FOR ACCURACY OF DATA

14 OCT 80
14 OCT 80
XM1-TNG-38A

INDIVIDUAL TRAINING/PERSONNEL STATUS REPORT

CLASS TITLE_____

_____ACTUAL TIME (MIN) ___ ___ POI TIME (MIN) ___ ___ COLLECTOR ID#_____ DATE__/__/__
TNG TEST TNG TEST DD MM YY

ID#	POS	NAME	RANK	MOS	CO	PLT	ATTENDANCE (PRES/ABS)	TIME MISSED (MINUTES)	TEST SCORE (1-7)	REASON ABSENT

POS: A=GUNNER B=LOADER C=DRIVER
D=TANK CMDR
NUMBER OF RECORDS=00065NK CMDR

MECHANICS: E=63E F=45E G=63H H=63G I=45K J=34G L=63C M=45N K=OTHER
MECHANICS: E=63E F=45E G=63H H=63G I=45K J=34G L=63C M=45N K=OTHER

TANK CREW PERSONNEL STATUS REPORT

Class/Lesson Title _____ Date _____

Class/Lesson # _____ Data Collector ID # _____

Start Time _____ Instructor ID # _____

End Time _____ Crew ID # _____

Tank USA # _____

	Replacement (Check if Yes) YES
Tank Commander ID # _____	[ ]
Gunner ID # _____	[ ]
Loader ID # _____	[ ]
Driver ID # _____	[ ]

Reasons for regular crew members not being present for training.

ID#

_____ AWOL

_____ Hospital

_____ Emergency Leave

_____ Confinement

_____ Other (explain) _____

_____

_____

Performance Evaluation Score _____ (1-7)

Number of times exercise performed _____

FH FORM 2951-39
(OT 7 Nov 80)

STUDENT OPINION QUESTIONNAIRE

DATE _____ 19L 19K 45E 63E

Please tell us what you think about the class you just attended. Be Honest!

Below, in the space provided, list the title(s) of the class(es) you were taught today. In the columns provided, write the number that best shows what you think of the class.

1 ____ GOOD (No problems - everything was clear)

2 ____ OKAY (Few problems - almost everything was clear)

3 ____ BORDERLINE (Barely acceptable-an average class)

4 ____ BAD (A lot of problems-very little was clear)

5 ____ TERRIBLE (All problems-nothing was clear)

CLASS TITLE	TRAINING AIDS AND TOOLS	MANUALS AND WORKBOOKS	PRACTICE TIME	TRAINING METHOD	HOW WELL CAN YOU DO THIS TASK?

WHY? _____

FH FORM 2951-43
(OT 4 AUG 80)

CREW STATION TEMPERATURE ASSESSMENT
DATA COLLECTION FORM

DATE:_____ PERIOD: ___ DAY (0600-1800), ___ NIGHT (1800-0600) TANK NUMBER _____

CREWMAN ID # _____ CREW POSITION: C G L D (CIRCLE ONE) DATA COLLECTOR ID # _____

MAIN TANK MODES USED DURING THE PERIOD											COMFORT JUDGEMENT (CHECK ONE)				
HATCH		HEATER		BLOWER FAN		MOBILITY		MOPP MODE	TIME PERIOD		VERY COLD	COLD	COMFORTABLE	HOT	VERY HOT
OPEN	CLOSED	ON	OFF	ON	OFF	MOVING	NOT MOVING		FROM	TO					

FH FORM 2951-44
(OT 27 Oct 80)

INSTRUCTOR QUESTIONNAIRE

Class/Lesson Title _____ 19L 19K 45E 63E

Class/Lesson # _____ DATE: _____

INSTRUCTOR ID# _____

Please tell us what you think about the class you just taught. Be Honest!

1. Did you have instructor's material for each task you taught?

   _____ Yes

   _____ Did not for these tasks: _____

   _____

   _____

2. Do you understand the information in the instructor's materials?

   _____ Yes

   _____ Didn't understand it for these tasks: _____

   _____

   _____

3. Was enough information given to you?

   _____ Yes

   _____ Needed more info for these tasks: _____

   _____

   _____

4. Was the information in the instructor's materials technically accurate?

   _____ Yes

   _____ Inaccurate info for these tasks: _____

   _____

   _____

FII FORM 2951-45
(OF 4 AUG 80)

5. Did you have student material for each task you taught?

_____ Yes

_____ Didn't have material for these tasks: _____

_____

_____

6. What was the quality of the student material?

_____ Good

_____ OK

_____ Borderline

_____ Bad

_____ Terrible

7. Did the course design call for enough practice exercises?

_____ Yes

_____ More practice needed for these tasks: _____

_____

_____

8. Did the practice exercises called for by the course design incorporate enough realism?

_____ Yes

_____ More realism needed for these tasks: _____

_____

_____

9. Did you have standards for measuring the performance of students in the practice exercises?

_____ Yes

_____ Didn't have standard for these tasks: _____

_____

_____

10. What tasks, if any, did the student seem to find difficult to learn?

11. For the tasks you listed in 10, why do you think they were difficult to learn?

12. How would you change this course?

FII FORM 2951-45
(OT 4 AUG 80)

TANK CREW FIRING INTERVIEW

EVENT TITLE _____

EVENT # _____ DATE _____

CREW ID # _____ INSTRUCTOR ID # _____

COLLECTOR ID # _____

1. Did you experience problems with putting the computer into operation? If yes, explain:

( ) Yes ( ) No

_____

_____

_____

2. Did you experience any problems with the range finder during firing? If yes, explain:

( ) Yes ( ) No

_____

_____

_____

3. Were there any problems with continuous lead? If yes, explain:

( ) Yes ( ) No

_____

_____

_____

4. Were there any problems with the sights (TIS, GPS, GAS)? If yes, explain problem and crew action:

( ) Yes ( ) No

_____

_____

_____

FH FORM 2951-58
(OT 29 Aug 80)

What actions did the crew take with problems? (Ref Ques 1-4)

Corrected by Crew ____ Reported to Maint ____ Fired Anyway _____

6. Was there an indication of a fire control system failure displayed in the sight during firing? If yes, state what failed and what action was taken by the crew:

( ) Yes ( ) No

_____

_____

_____

7. Was the proper ammo indexed for each firing?

( ) Yes ( ) No ( ) N/A

8. Did the tank commander fire any main gun rounds from his override? If yes, why:

( ) Yes ( ) No

_____

_____

_____

9. Did continuous lead make it easier for the gunner to hit the moving target?

( ) Yes ( ) No

10. Was emergency power switch used during the firing?

( ) Yes ( ) No If yes, why? _____

_____

_____

11. Were there any main gun malfunctions during the course? If yes, what was the malfunction and what corrective action was taken?

( ) YES ( ) NO

_____

_____

FH FORM 2951-58
(CT 29 Aug 80)

12. During night operations, did the driver use his night vision viewer?

( ) Yes ( ) No

13. Were there any problems installing the driver's night vision viewer? If yes, what was the problem?

( ) Yes ( ) No

_____

_____

_____

14. Was the driver's hatch closed during firing?

( ) Yes ( ) No

15. What was the crew's impression of the computer? _____

_____

_____

_____

16. What is each crewman's overall impression of the XM1 fire control system?

	Superior	Good	Fair	Poor	Bad
Tank Commander	( )	( )	( )	( )	( )
Gunner	( )	( )	( )	( )	( )
Driver	( )	( )	( )	( )	( )
Loader	( )	( )	( )	( )	( )

FH FORM 2951-58
(OT 29 Aug 80)

APPENDIX E

LESSON PLAN EVALUATION CRITERIA

1. The training objective should specify what the student must do after having been trained.

2. Training objectives must not be confused with job requirements. Training objectives specify behaviors that students are expected to exhibit after training. These behaviors are not necessarily the same as the behaviors that are required on the job.

3. A training objective should specify the conditions under which the student must demonstrate task performance.

4. Conditions stated as part of the training objective must be clearly training related (rather than job related).

5. The training objective should specify the standards to which the student must perform. The standards should be clearly spelled out so that the student, the instructor, and the training evaluator can tell the difference between performance at or above standard from performance that is below standard.

6. The test items should derive directly from the training objectives.

7. Generally the test should require the student to perform the steps specified in the training objective.

8. The conditions specified for the test should be the same as those specified for the training in the training objectives.

9. The standards specified for the test should be the same as those specified in the training objective.

10. The instructions for administering the test should be written so as to ensure standardization of test administration procedures across instructors. The lesson plan should outline precisely how the test is to be administered. Included should be the placement of personnel and equipment and test administration procedures that specify the testing sequence and guide the evaluator in testing the students on each of the tasks to be performed.

11. Instructions to the students concerning how the test will be conducted and scored should be included in the lesson plan. These instructions should be clear and complete to ensure that testers do not have to add instructions of their own.

12. The lesson plan should call for the dissemination of enabling knowledge and specify what this enabling knowledge consists of. (Terminology or other subject matter that is designed to enhance students' understanding of the task to be learned is referred to as enabling knowledge.)

13. The lesson plan should call for the demonstration of the task (in its entirety).

14. When there are subtasks in a lesson, demonstrations should be required for each subtask, and an integrated demonstration should be required following subtask training.

15. The lesson plans should describe how to conduct the demonstrations.

16. Practice activities should be called for in the lesson plan.

17. The lesson plan should specify that each subtask and task be practiced.

18. The lesson plan should provide guidance to instructors that tells them what to look for during practice and how to correct faulty performance when it occurs. This guidance might include some or all of the following: (1) specification of aspects of the tasks that might be expected to cause problems for students, (2) common student errors on the task being practiced, (3) telling the instructor what to do when the student is unable to even start doing the task (e.g., demonstrate the task again), (4) telling the instructor to provide additional assistance when student progress toward the objective stops, and (5) directions to make feedback regarding student errors immediate, specific to the actions performed, and free from harshness or ridicule.

19. The lesson plan should specify that practice on each task/subtask be performed by each student to a specified standard (or to the standard specified in the training objective).