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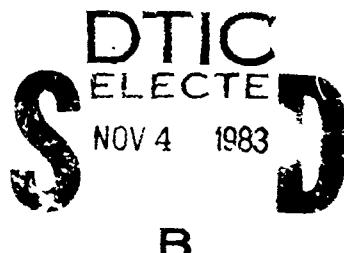
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FIELD PERFORMANCE FEEDBACK: A PROBLEM REVIEW

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U. S. Army

Research Institute for the Behavioral and Social Sciences

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**FIELD PERFORMANCE FEEDBACK:
A PROBLEM REVIEW**

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FOREWORD

The Fort Knox Field Unit has a broad concern for the effectiveness and efficiency of both training programs in institutional and field settings and training guidance materials for initial and sustainment training. One specific concern is with the adequacy of the information exchange between operating units in the field and Centers/Schools.

The feedback to Army Centers/Schools is currently somewhat disorganized and largely based upon subjective data. There is a need for an integration of methods since no method is sufficient by itself and no existing records provide useful task-specific feedback data.

This report is a review of current practices regarding the feedback of soldier performance data from operating units to Centers/Schools. Research was conducted to define these information requirements and to develop procedures for generating the necessary data, feeding it back from operating units to Centers/Schools, managing the resulting data base, and drawing implications from the data base to aid in making decisions regarding training program or training guidance modifications.

The results of this program will be useful to training developers and evaluators for implementing an integrated task-specific feedback system based, as much as possible, upon objective data. Data from such a system will be used to revise training programs and materials to meet the needs of the field.

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FIELD PERFORMANCE FEEDBACK - A PROBLEM REVIEW

BRIEF

Requirement:

In order to assess the quality of their products, including both graduates and training materials, Army Centers/Schools need meaningful feedback from field units. In this report six methods of gathering field performance feedback are reviewed, the general aspects of an integrated feedback system are discussed, and recommendations for future research are developed.

Procedure and Findings:

The six feedback methods are discussed using data from three sources: a review of the relevant literature, results of previous research, and structured interviews of seven battalion commanders. The general findings are that feedback to Army Centers/Schools is currently somewhat disorganized and largely based upon subjective data, there is need for an integration of methods since no method is sufficient by itself, and no existing records provide useful task-specific feedback data, except perhaps SQT results. Future research directions identified include the integration of feedback data collection with unit activities, such as crew and platoon drills, an assessment of the accuracy of subjective feedback data, and the development of methods for managing and utilizing feedback information.

Utilization of Findings:

The findings of this report will be used to guide a field performance feedback research program in the directions outlined above. The results of this program will be useful to training developers and evaluators for implementing an integrated task-specific feedback system based as much as possible upon objective data. Data from such a system will be used to revise training programs and materials to meet the needs of the field.

FIELD PERFORMANCE FEEDBACK - A PROBLEM REVIEW

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FIELD PERFORMANCE FEEDBACK - A PROBLEM REVIEW

INTRODUCTION

In order to assess the effectiveness of their training, programs, and materials, Army schools need meaningful feedback from the field on the quality of their products. These products include both graduates and training doctrine, guidance, or materials. The military services have perceived the need for feedback from the field and have approached gathering it in various ways, ranging from receipt of informal comments from field commanders to development of formal reporting systems (see Hall, Lam, and Bellomy (1976) for an overview of approaches in the various services). A variety of approaches have also been utilized within Army schools, and they have typically been applied by Directorates of Evaluation or, in some cases, by specific offices formed to gather training effectiveness data from institutional and field units (e.g., the Office of Armor Force Management and Standardization (OAFMS) at Fort Knox). The fact that a variety of feedback approaches are in use suggests that none of them has been completely satisfactory, especially in the light of the numerous training problems which still exist in the Army. The purpose of the present paper is to review the various feedback approaches which have been or could be utilized in the Army, to assess their strengths and weaknesses, and to propose integrated approaches which can optimize the utility of field performance feedback. Put more simply, the purpose is to review the status of feedback systems and suggest ways to improve them. The feedback systems addressed will primarily be external ones, involving the flow of information from field units to Army Centers/Schools. Of course, the flow of information from Centers/Schools to field units must also be addressed to some extent, since feedback is a two-way street. The flow of internal feedback within a Center/School will not be a focus of the present paper.

Several characteristics of an ideal field performance feedback system can be identified. The data gathered by such a system should be as objective as possible and should have high validity, so that they represent reality. The data should also be task-specific rather than general in nature, so that specific training needs can be identified. The data collection and analysis approach should operate quickly enough to provide a true picture of current field performance. Personnel turnover and skill retention loss rates are so high in today's Army that the performance of field units can change rapidly. The collection of field performance feedback data should not be a detractor to training, but should be integrated into the normal training cycle as much as possible. A truly integrated feedback system should apply to all levels of Army training, from initial-entry training to the US Army War College, and should also apply to all specialties, both officer and enlisted. The feedback approaches developed must be doable within available resources, or specified in a stepwise fashion that is tailorable to the resources available. But the approaches must allow collection of data from a large enough sample of units to determine overall trends and problems which are not unique to specific units. The feedback system should also include ways to ensure that it has an impact; i.e., it should include criteria for making decisions based upon the

data gathered and methods for implementing them. Approaches for collating data to reach proper decisions and for integrating collective and individual task data should also be specified. From another perspective, a field performance feedback system should specify what data are to be collected, where and when they should be collected, procedures for collating data, appropriate decision criteria, and methods for communicating decisions to appropriate action agencies. All these parameters will be addressed in the present paper, although complete specification of them will obviously have to await the results of further research.

Approaches to field performance feedback will be discussed in the present paper in the light of a review of the literature, interactions with OAFMS personnel, and data gathered from three sources: the Army Training Study (ARTS), the application of living systems theory (LST) to analysis of battalions' processes, and interviews of battalion commanders and staffs. One facet of the ARTS (1978) involved the administration of written and hands-on performance tests to personnel in Armor units in order to assess their retention of institutional training. These performance data and related survey and experience data gathered in the same project are relevant to particular aspects of field performance feedback. Also, during the past two years the US Army Training and Doctrine Command (TRADOC) has sponsored a program of research to assess the utility of LST for evaluating the quality of information and materiel/resources processing in various types of battalions (especially Armor). The specifics of the application of LST are not of interest here (see Ruscoe, Giguet, Brown, Burnside, and Cary, 1979), but the use of a general systems theory led to collection of a large amount of data which are relevant here. Almost all the major types of data traditionally maintained at battalion level were gathered during this research, as well as various types of survey and interview data. As a further source of data for the present paper, structured interviews were conducted with the commanders and/or S3's (operations officers) of seven battalions of various types (infantry, armor, artillery, maintenance, support, and engineer) at Fort Knox, KY during May 1981. These interviews addressed areas such as feedback between battalions and the appropriate Centers/Schools on the proficiency of graduates and the usefulness of training guidance/materials, the availability and utility of various types of existing records for feedback purposes, and other information relating to individual soldier proficiency at the task level. Through these interviews an update was obtained on the current status of feedback between battalions and Centers/Schools, and the information base was extended beyond Armor units.

In the remaining sections of this paper approaches to obtaining field performance feedback will be categorized and discussed, using data gathered in the research projects and structured interviews briefly described above as examples. The desired characteristics of a feedback system will then be further discussed, followed by development of initial research proposals for obtaining task-specific feedback from a large enough sample of field units to allow discernment of meaningful trends and patterns. The conclusions developed are preliminary ones based upon a total sample of 21 battalions, most of which were Armor units. But the approaches suggested should provide a logical start toward improvement of feedback between field units and Army Centers/Schools.

FEEDBACK METHODS

A review of the literature indicates that there are at least six methods for gathering field performance feedback. These are: (1) the receipt of unsolicited informal comments from personnel in field units; (2) the analysis of existing records traditionally maintained by field units; (3) the administration of surveys or questionnaires to field personnel; (4) the conduct of structured or unstructured interviews with field personnel, either at their field sites or while they are attending courses at the Center/School; (5) the observation and recording of performance in the field; and, (6) the testing of graduates in the field using paper-and-pencil and/or hands-on tests. Each of these methods is discussed in detail below, using examples from data sources described above. Other methods could be suggested, but they are not considered feasible for present purposes. For example, Dyer, Ryan, and Mew (1975) have suggested that graduates could provide feedback to Centers/Schools by maintaining diaries of their field performance successes and failures. This approach is not feasible, given the limited writing abilities and time of many of today's soldiers. However, a related approach that may be feasible, the maintenance of job books, will be discussed below.

Unsolicited Informal Comments. A good deal of information flow in the military travels through informal channels. Military personnel communicate information and comments to acquaintances at Centers/Schools or in other staff positions through telephone calls and chance face-to-face meetings while in travel status. This is sometimes referred to as the "old boy" network. Use of such a network was addressed in the interviews of seven battalion commanders described earlier; they were asked to describe any unsolicited informal comments they may have communicated to a Center/School in the previous year regarding the proficiency of its graduates or the usefulness of its training materials. The reported amount of such interaction varied from almost none to almost continuous, depending largely upon the attitude of the battalion commander. Some commanders have many informal contacts at the Center/School and feel free to communicate with them frequently, while others feel that they should work with what they get and not give the appearance of complaining. Five of seven battalion commanders reported that they had sent unsolicited comments to a Center/School on the proficiency of its graduates, and four of seven had sent comments on the usefulness of training materials. On the average, commanders reported transmitting three or four comments per year in each area, usually through phone calls or meetings at conferences. The comments dealt with such areas as suggested revisions in tasks to be trained at Centers/Schools, changes or clarifications of training doctrine, revisions of tactics, and suggested changes in use of new equipment. Those commanders who frequently sent informal comments felt that the Center/School was usually responsive to their suggestions.

The receipt of unsolicited informal comments is obviously not an adequate method for obtaining field performance feedback. This approach depends too much upon the attitude of the field commander and the number of informal contacts he has established at the appropriate Center/School. Information gathered in this approach may over-represent particular units and under-represent others, thus failing to provide an accurate picture of the overall situation in the field. The data provided may be sporadic, not objective,

general rather than task-specific, and difficult to pull together. On the other hand, this approach has the advantages of requiring few resources and not detracting from training. Informal communications between field units and Centers/Schools are going to occur, and they should be encouraged and utilized to best advantage, as long as they are by no means considered an adequate or complete basis for field performance feedback in and of themselves..

One way in which informal feedback can be encouraged is through the medium of regular Command Letters. The Commanding Generals of the Infantry, Armor, and other Centers/Schools send information letters to field commanders on a regular basis. Feedback on current issues is sometimes encouraged or requested in these letters, and this approach could be expanded in the future to request feedback on more specific topics. Another important informal feedback medium is attendance at conferences given by Centers/Schools; commanders interviewed who had attended such conferences indicated that the meetings provided opportunities for communicating feedback and establishing personal contacts. Participation in workshops and informal visits to Centers/Schools were also reported as very useful by battalion commanders interviewed. Field commanders should be encouraged to visit the appropriate Center/School as time and resources allow, especially in light of the fact that the length of command tours is increasing. Another way in which informal feedback can be encouraged is through the use of "hot lines," which have been established by many Centers/Schools. Such direct lines should be widely publicized and their use strongly encouraged. A final way in which the occurrence of informal feedback might be increased would be the development of specific formats for it. One must move cautiously in this direction, since the specification of rigid formats would destroy the very nature of informal feedback. But some degree of formalization could be accomplished. For example, the US Air Force has utilized a Training Quality Report on which field personnel can report the overtraining or under-training of newly arriving personnel directly to the Air Training Command (the report is described by Hall, Lam, and Bellomy, 1976). The availability of such a report format in the Army might increase the amount, speed, and specificity of informal feedback. In summary, use of methods such as those described above might optimize the small but important role of unsolicited informal comments in a field performance feedback system.

Analysis of Existing Records. One could argue that there is no need to generate new data for a field performance feedback system, since sufficient data are already collected and maintained at battalion level. These data and records will be reviewed in this section in order to show that this argument is generally not a sound one. The types of existing records available at battalion level include Army Training and Evaluation Program (ARTEP) results, results of inspections, qualification results, data recorded in job books, Skill Qualification Test (SQT) results, training and maintenance records, and data recorded on Unit Status Reports (USR's). Each of these types of records will be discussed below using information gathered during LST research and interviews with battalion commanders. During a portion of the LST research, most of the data traditionally maintained at battalion level was gathered from 14 Armor battalions. During interviews with battalion commanders, the format, availability, and degree of specificity of these types of records were addressed.

ARTEP results provide an indication of a unit's effectiveness or readiness, but experience has shown that they are not always available and are not definitive enough to provide adequate field performance feedback. In collecting data from Armor units during LST research, it was found that ARTEP results were not available from over half the battalions visited. Two of seven battalion commanders interviewed at Fort Knox reported that their battalion had never participated in an ARTEP. In some cases a nonstandard ARTEP had been conducted during the past year, and in others detailed results had not been provided to the battalion commander (this was done so that the results would not be used as evaluations of company/battery commanders). Regardless of the reasons, the general lesson learned is that ARTEP results are not always available at battalion level. When ARTEP results are available, they are usually in a general format listing strengths and weaknesses for the major elements of a battalion. Various factors may not be observed or evaluated consistently for all battalions or elements thereof. For example, during LST research it was found that as many as 50% of the standard evaluation factors were not observed in some companies. It is difficult to develop a quantitative objective measure from such results to allow summaries across battalions. The strengths and weaknesses listed are often very general (e.g., "staff was not fully integrated in the planning process" or "supplemental missions were generally weak") and do not provide any task-specific feedback on how to correct problems. Ratings are usually provided for each company on performance of major missions (e.g., "movement to contact" or "defense"), but there is no listing of specific individual or crew-level tasks which need further training. Only one of seven battalion commanders interviewed indicated that individual task-specific performance feedback could be derived from ARTEP results. The general perception was that the relationships of ARTEP and individual tasks are becoming clearer in new ARTEP manuals, but are still not completely specified. A final area in which the utility of ARTEP results as feedback can be questioned relates to their objectivity. ARTEP results are based upon observations made by personnel from a unit similar to the one being evaluated, and such observations are not as detailed or objective as needed for purposes of training feedback. Since ARTEP results are not consistently available, are not recorded in task-specific detail, are not completely objective, and are difficult to summarize across battalions, the appropriate conclusion is that they have limited utility as feedback to Centers/Schools. ARTEP's are important training exercises, but as presently conducted they should not be viewed as useful elements of field performance feedback. Their feedback utility may be increased in the future by making the evaluations more consistent and objective (i.e., by standardizing recording, reporting, and analysis of ARTEP results) and by further specifying the relationships of ARTEP and individual tasks.

With regard to results of inspections, the primary type available in field units is results of the Annual General Inspection (AGI). The AGI primarily addresses administrative and managerial procedures, thus providing a general evaluation of the operations of a battalion and its major elements. But little or no task-specific evaluation of training is provided. Problems identified in AGI results are typically general in nature (e.g., "management procedures were inadequate" or "preventive maintenance services were not being performed in a timely manner"), and it is difficult to relate them to specific revisions needed in institutional training. It is also difficult to reduce

AGI results to a quantitative measure which can be summarized across units. During LST research, the measure derived was the percentage of rated areas which were given a satisfactory rating. This is not an adequate measure, since the number and type of areas rated vary greatly from unit to unit. The number of areas rated varied from 14 to 99 in battalions included in LST research, and the types of areas rated included repair parts, tactical support vehicles, sanitation, safety, crime prevention, personnel data cards, and billets. It is difficult to develop meaningful training feedback from such a variety of evaluations. The battalion commanders interviewed agreed with this conclusion, since all seven indicated that little or no task-specific training feedback could be derived from AGI results. Another type of inspection mentioned frequently by these commanders was Logistical Assistance and Assessment Team (LAAT) and Training Assistance and Assessment Team (TAAT) visits, but again the general perception was that results would have little utility as feedback to Centers/Schools. Commanders were also asked whether their unit conducts training inspections, and six of seven indicated that they do. These inspections are conducted by the battalion commander, S3, company commanders, or senior NCO's, and it was estimated that an average of 20% of unit training is inspected. A general, one-page format is used for this, and records are not maintained permanently, so these results are also not very useful as field performance feedback. In conclusion, results of inspections are generally not appropriate or useful for feedback purposes, and they will not be in the future unless they are made more objective, standardized, and task-specific.

There are various levels of qualification results which could be considered as candidates for training feedback. In Armor units Table VIII (crew qualification on firing of main gun) results provide an indicator of crew performance and thus a measure of training effectiveness at this level. Table IX (platoon qualification on firing and movement) results provide a similar indicator for platoon performance. Based upon data gathered in previous research, these results are not as useful for training feedback purposes as one would hope, since information on individual task performance is not maintained. Scoring problems and subjective evaluations inherent in such qualification exercises permit, at best, only collective task performance estimates. Targets are often obscured by dust and smoke and the determination of hits and misses is sometimes difficult (see Eaton and Whalen, 1980). Control of fire and movement techniques are examples of areas which are to some extent evaluated subjectively. Another possible problem is differences in the way gunnery qualifications are conducted in different locations, due to limits on range availability and other local constraints (Kalergis, 1977). A data collector cannot through the mail or in person simply request gunnery qualification results and expect to get comparable data across units. He or she must also collect information on how gunnery qualification was conducted and scored. During LST research, a broad request for gunnery qualification data resulted in provision of results from various types of Table VIII, Table IX, and undetermined exercises. In one iteration of this research, three of eight battalions provided gunnery qualification data that were questionable and were apparently not from Table VIII (they were from Table IX or an experimental Table). These data were not usable due to a lack of comparability across units. Another problem with gunnery qualification results alluded to earlier is that they are generally not task-specific or definitive enough to allow

identification of specific training problems or needs. Such results are generally maintained in terms of number or percentage of crews or platoons qualified or point totals for each crew or platoon. Specific problems or reasons for failure to qualify can only be determined by examining original scorecards or interviewing unit personnel. Additional task-specific feedback might be obtained from scorecards for gunnery exercises preliminary to Tables VIII and IX, but such data are not standardly maintained across units. The utility of gunnery results as training feedback could be increased by collecting and maintaining them in task-specific detail throughout and following the entire gunnery cycle. Previous experience has indicated that detailed results are discarded shortly after overall qualification scores are determined. Simple standardized data collection and feedback forms could easily be designed to increase the availability of such data. In summary, gunnery results are not generally adequate for training feedback purposes because of inter-unit differences in conducting gunnery tables and because task-specific results are either not available or require considerable effort to obtain. Two Armor battalion commanders interviewed at Fort Knox agreed with this conclusion by stating that only limited individual task performance data could be derived from gunnery results. Other commanders interviewed indicated that there are presently no collective qualification results available in other types of units which provide field performance feedback at the individual task level.

Various individual qualification results are gathered periodically in field units, and the results are more task-specific in nature than are the gunnery data discussed above. Examples of these sorts of data are individual weapons qualifications, results of physical fitness tests, and records of mandatory training. Such results are important for the maintenance of unit readiness, and previous data collection experience and interviews of commanders indicate that they are generally readily available. But they are not anticipated to be particularly useful elements of field performance feedback for a variety of reasons. The tasks included in such qualification data are mostly basic ones which are not of primary interest to specific Centers/Schools. Qualification test conduct and data maintenance may not be standard from unit to unit. In many cases, an overall test result may be recorded without task-specific detail. So individual qualification test results are readily available, but they should be considered as only a minor element of a performance feedback system.

Another type of existing records which might appear to be useful for feedback purposes is recordings in job books. Supervisors observe and informally test their personnel and record "GO's," "NO GO's," dates, and comments in each individual's job book. These data are recorded for specific tasks, and training needs or problems are frequently addressed in comments. Job book data were considered but not collected during LST research, primarily because of the extensive resources required to do so. Interviews of battalion commanders indicated that job book recordings are generally not consolidated at battalion level; only one of seven battalions had made any effort in this direction. Collecting job book data throughout a battalion and consolidating them by task would thus require considerable time and effort. A sample of such data could be gathered within a battalion, but great care should be exercised in assuring the sample to be a representative one. Another problem with job

book data is the fact that they may not be completely accurate or reliable. During the turmoil of daily activities, supervisors do not have time to make a job book entry every time they observe one of their personnel performing or failing a task. Entries are typically made from memory at the end of the day or week. It is possible that some entries are never made until required by an external agent, and job books may not be kept up-to-date in many units. If job book data were to be gathered on a certain date, many entries might hurriedly be made the night before, resulting in inaccuracies. The seven battalion commanders interviewed supported these concerns by reporting that the accuracy and completeness of job book entries are highly variable, depending largely upon the attitudes and writing abilities of supervisors. Commanders in general questioned the usefulness of job books; one stated that they would be useful only if individual training could be conducted on a daily basis, since most skills undergo rapid retention loss. The appropriate conclusion is thus that job book data are not available or accurate enough to be a useful element of field performance feedback.

SQT results are one type of existing record which can provide useful task-specific feedback. In the current system, individuals are provided feedback on their results and battalions are provided unit summaries by task. All battalion commanders interviewed indicated that they receive such reports, and most reported that they use them to manage training. For example, a task showing a high failure rate on the SQT may be emphasized in unit training for a few weeks. Some commanders indicated that the turnaround time for receiving SQT results is a problem; if it takes 60 days to receive feedback on results (as it reportedly sometimes does), the currently high personnel turnover and forgetting rates may make the results unrepresentative of the current training status of unit personnel. Turnaround time is apparently improving, though. Commanders also expressed a need for feedback on SQT results across broader levels (e.g., brigade), in order to provide a baseline to compare their units against. Discussions with SQT managers have indicated that quarterly reports on SQT results are provided at brigade, Center/School, and major command (MACOM) levels. The extent to which such reports are currently used to revise training is not known, but this is an important element of a field performance feedback system, since results are provided by task. One problem with SQT data that was noted in interviews and previous research is that results are not yet available for all MOS's. During LST research in Armor battalions, SQT results were available for various low-density MOS's, but were not always available for high-density MOS's, such as the 19 series. In eight Armor battalions visited during the summer of 1980, three had conducted no SQT's for Armor MOS's during the past year, and an average of only about 70 personnel having an Armor MOS had completed an SQT in each battalion during that time-frame. Also, approximately 40% of the SQT data available represented low-density MOS's. SQT's are still being developed and revised for some MOS's, so stable long-term results are not yet available. In addition, it is likely that the reliability of SQT results has not been adequately addressed, at least for some MOS's (see Nieva, Myers, and Glickman (1979) for discussion of scoring and other problems). But, under the assumption that the availability and reliability of SQT results will be increased, these data should be included in any feedback system developed, especially since a method already exists for providing them to Centers/Schools. Training programs could be revised to

increase the amount of training or improve training materials for tasks showing high SQT failure rates. Future research should address how SQT results can be integrated within a field performance feedback system and how they can best be utilized.

During structured interviews battalion commanders were asked whether any other unit training records, in addition to those discussed above, would be useful as feedback to Centers/Schools. The general response was that unit training records are minimized in the current environment, and are thus not available for feedback. Records are kept of results of exercises such as mini-SQT's and platoon-level ARTEP's in some cases, but they are not consistently maintained and are highly perishable. The interview responses and previous data collection experience during ARTS and LST research support the conclusion that no other unit training records are useful for feedback purposes. Battalion commanders were also asked about the utility of maintenance records for feedback. They generally responded that while records such as vehicle logbooks are maintained, they tend to be fragmented, not permanent, and difficult to interpret. That is, if a particular maintenance problem continues to crop up, it is difficult to attribute it to a problem with equipment or a problem in the training of mechanics. It is therefore concluded that maintenance records will not provide a useful element of a field performance feedback system. Several commanders interviewed stated that interviews with maintenance supervisors would provide the most useful information in this area. Interview methodology is discussed in a later section of this paper.

Another type of existing record which should be briefly considered here is the Unit Status Report (USR). This document, as prescribed by AR 220-1, provides input to a system for reporting the readiness of Active and Reserve Component units. Several items on this document relate directly to the training readiness of the reporting unit, including an estimate of the number of weeks required to attain a fully trained status, estimates of the impacts of various constraining factors on training, and an overall training rating on a four-point scale. At least three factors limit the usefulness of USR data for training feedback purposes: confidentiality, generality, and subjectivity. When USR data are identified with a specific unit and timeframe, they are classified Confidential. In order to avoid working with classified data, units and timeframes must not be identified, and this is often difficult. As should be obvious from the description above, training data on the USR are very general, in terms of the overall unit rather than specific elements or tasks. The effects of available funds, leaders, fuel, time, and similar factors on training are rated, but nothing more specific is addressed. Most of the USR training data are provided using rating scales, so they represent subjective estimates on the part of the commander, within the guidelines of AR 220-1. These guidelines are fairly precise, but it is doubtful that USR data are completely unbiased. Consideration of all the above factors leads to the conclusion that USR data should not be included in field performance feedback. The problems of dealing with classified data outweigh the utility of information available from the USR.

In summary, existing unit records have generally been found to be inappropriate or inadequate as elements of field performance feedback. Many of these

records are not task-specific, not always available, not collected and maintained in a standard form, and not totally objective or reliable. Most of them are maintained for reasons other than feedback to a Center/School, and such a use of them might lessen their utility to field units and result in distortion of data already having questionable reliability. These records may also not be timely as feedback and are difficult to combine with other data; these issues will be further addressed in a later section of this paper. The only existing record which currently appears to be a useful feedback element is SQT results. Such results should be incorporated in an integrated feedback system, and they will be further discussed in later sections on testing and overall system design. ARTEP results also offer some promise as feedback elements in the future, once collective and individual tasks are clearly interrelated. The derivation of individual task results from collective exercises will also be further discussed later in this paper. But aside from SQT and perhaps ARTEP results, existing records are not useful elements of field performance feedback.

Surveys/Questionnaires. Probably the most popular method of gathering field performance feedback in the past has been through the administration of surveys to field personnel. Interviews with battalion commanders revealed that this is the predominant method used by Centers/Schools to solicit feedback. During the past year, five of seven commanders had completed a survey on the quality of graduates and three had completed one on the usefulness of training materials. In addition, personnel throughout battalions frequently respond to surveys on the quality of training they have received in various courses or on the training received by personnel they supervise. It appears that almost every Center/School in the Army sends surveys to the field, and that field personnel are sometimes swamped by them. It is interesting to note that TRADOC Regulation 350-6 does not require surveys or prescribe procedures for administering them, although draft versions of this regulation did. Since feedback surveys are so widespread, appropriate regulatory guidance for their use should be developed. In the case of Armor, extensive surveys are utilized by OAFMS in conjunction with interviews to gather feedback from the field. In ARTS, LST, and other research projects, general surveys have typically been used as a method of assessing the state of training in field units. Surveys are also widely used in services other than the Army; for example, Dyer, Mew, and Ryan (1975) have developed an extensive procedures manual for utilization of questionnaires in training feedback within the US Navy. But the wide use of surveys does not signify that they are the perfect solution to the problem of obtaining training feedback. There are many positive and negative aspects of survey usage which should be considered.

With respect to the format of surveys, a primary issue is whether or not they are task-specific. Responses are typically obtained in terms of five or six-point rating scales, and questions can vary in scope from very broad to very specific. In research such as ARTS and the application of LST, questions have typically been very broad, such as "What is the present state of training in your battalion?" or "How clear are your training missions?" Questions on surveys from Centers/Schools are sometimes also very broad, such as "How well trained are personnel when they arrive at your unit?" On the other hand, survey questions can be very specific. For example, questionnaires used by

OAFMS and the Navy (Dyer, Mew, and Ryan, 1975) ask respondents to rate the criticality, frequency, and performance of each task covered in the training base. Answers are given with respect to a specific graduate or the typical graduate; in either case, detailed task-specific data can be gathered via survey techniques. The question which thus arises concerns whether questions on feedback surveys should be general or task-specific in nature. Obviously, responses to task-specific questions are much more valuable as feedback, since they indicate much more precisely where problems lie that need to be addressed. Responses to general survey questions are often not very useful, since they do not indicate specific actions to be taken. But task-specific surveys often run the risk of being too lengthy and cumbersome. For example, some questionnaires utilized by OAFMS include over 100 tasks and require over 300 responses. This may be too many tasks for anyone in the field to observe and evaluate, and completing this long a questionnaire may be so exhausting as to influence the quality of responding. The solution to this dilemma would seem to be the reaching of a happy medium. Survey questions should be as task-specific as possible, but not all the tasks within a particular duty may need to be evaluated. Respondents could be presented with subsets of tasks to evaluate, or only tasks which have given some other indication of being a problem could be addressed. That is, tasks could be addressed by exception rather than in toto. Also, the rating scales used could probably be simplified to three-point scales without any loss of information, and issues such as frequency and criticality of task performance would not have to be rated at the same time as quality of performance. In conclusion, feedback surveys should be task-specific as long as they do not become too cumbersome. This point will be considered in feedback system design later in this paper.

The major advantage of using surveys in field performance feedback is that they are relatively fast and inexpensive. Even lengthy task-specific surveys can be completed in an hour or two, and the use of mailed surveys eliminates travel costs and minimizes resource expenditures. But there are several negative aspects to the use of surveys. Perhaps foremost among these is that the data gathered in surveys are subjective perceptions which may not reflect reality. Respondents are usually asked to evaluate how well they themselves or people working for them can perform certain tasks, and such estimates are by no means perfect, especially if a large number of infrequently performed tasks is being addressed. However, some senior military personnel will argue that perceptual data provide as valid an assessment of training effectiveness as any other available measure does. Whether this augurs well for perceptual data or poorly for other measures is a debatable point. The accuracy of survey estimates could be ascertained by administering hands-on tests for a sample of the tasks addressed; i.e., a combination of the survey approach and the testing approach to be discussed below might be an appropriate feedback method. Written (paper-and-pencil) tests could be used in lieu of hands-on tests for some tasks, and the relationship of survey estimates, written test performance, and hands-on performance could thus be determined for various tasks. Hall, Denton, and Zajkowski (1978) indirectly compared proficiency estimates from surveys and results of written tests and found no correlation between them, indicating that a further look should be taken at the accuracy of survey responses. More on this later, but for present purposes the important point is that survey responses should not be used as feedback without some means of checking their accuracy.

Other potential problems with the survey approach to feedback will only briefly be covered here. One of these is determining the appropriate sample to be surveyed. The sample chosen should be a representative one and should not include only the senior personnel in a unit, since they may not have an opportunity to observe task performance on a regular basis. Related to this is the problem of return rate. Dyer, Ryan, and Mew (1975) found that supervisors return mailed surveys at a rate of 60%, while trainees return only 30%. OAFMS has found similar results and thus administers surveys to lower-ranking personnel during visits to units and not through the mail. Hall, Denton, and Zajkowski (1978) found that satisfactory survey return rates could only be obtained by administering the surveys during visits to the field. Surveys can also be administered to senior NCO's and officers while they are attending courses at the Center/School, thus saving mail and/or travel costs. Of course, the data obtained by this method may not be as accurate as those gathered in the field, since they are based upon longer-term memory. Decisions must be made in all these areas depending upon the resources available and the return rate and amount of detail in responses needed. A final common problem with survey data is that averages of rating scale responses tend to cluster around the mid-point of the scale. Differences in average responses between units may thus be small, but they can be statistically significant if enough data are collected. One must consider the issue of practical significance in the design of a survey and selection of a sample, so that statistically significant differences are practically meaningful.

In conclusion, surveys have been a major part of field performance feedback and will continue to be so, because of their low cost. But they are not the ultimate solution to the feedback problem, due to the numerous problems inherent in survey administration (as suggested earlier, these problems could be reduced by provision of appropriate regulatory guidance for survey administration). Surveys should be used as only one part of an integrated feedback system. Perhaps limited task-specific surveys could be used to provide initial indications of problems to be further addressed by approaches described below.

Interviews. The conduct of interviews to gather feedback information is an approach closely related to administration of surveys, but not as widely used. The primary differences are that an interview is generally conducted in a face-to-face setting and requires verbal rather than written responses. The relatively low use of interviews probably relates to the fact that they are more resource-intensive than are surveys. Interviews with battalion commanders indicated that Centers/Schools do not extensively use interview methods to gather feedback from the field; an average of less than one interview was conducted per battalion in the past year. Interviews are utilized to gather feedback by OAFMS personnel; they interview approximately 10 personnel in each Armor battalion visited. The Navy also uses this method to some extent; Hall and Hughes (1980) have developed an approach for interviewing petty officers attending advanced schools. It is interesting to note that almost all of the seven battalion commanders interviewed to provide input for this paper stated that they prefer to participate in an interview rather than a survey. Field commanders complete many questionnaires in today's Army, and they admit that they sometimes become fatigued by them and do not devote as much thought to them as they could. But the general response to an interview is: "If you're

going to take the time to talk to me, then I'll cooperate fully." Respondents are thus likely to provide more detailed comments in an interview than on a questionnaire. Also, many personnel in today's Army have limited writing skills, especially among the lower enlisted ranks. The oral interview is thus definitely a better method than the written survey for collection of data from such personnel. The interview is certainly an appropriate feedback collection method, and it should perhaps be used more widely, if resources allow.

Primary issues relating to the conduct of interviews include the degree of structure, the amount of detail, and the site of the interview. Interviews are generally categorized as structured or unstructured, with structured ones following a fairly rigid format and unstructured ones being more of a free-flowing conversation. The structured interview approach is more appropriate here, since feedback is generally sought on specific issues and more specific information can be obtained by using a structured format. However, the structure should not be so rigid as to stifle voluntary comments. Interviews should also be as task-specific as possible, since comments will be more useful if they relate to specific tasks. To accomplish this, interviews can be conducted following surveys or some other indication of tasks which may be key problem areas. Like surveys, interviews can be conducted either in field units or while personnel are attending advanced courses at Centers/Schools. The latter approach has the advantage of minimizing travel costs, but the disadvantage of gathering responses based upon relatively long-term memory. An interview approach must include methodology for gathering detailed responses from personnel while they are in field units, to the extent that resources allow. A final concern previously discussed with respect to surveys should also be mentioned here, and this is the accuracy or validity of interview data. Hall, Denton, and Zajkowski (1978) found no correlation between proficiency estimates obtained during interviews and performance on written tests. Their interview was essentially an oral questionnaire, and it would be more conclusive to compare interview estimates with hands-on rather than written tests, but their results indicate that the accuracy of interview data should be further examined.

In summary, the interview approach should be included in a field performance feedback system, since it may allow collection of more detailed data than the survey approach and it is more acceptable to many field personnel. Interviews should be structured, task-specific, and conducted in the field to the extent possible. Since interviews are relatively resource-intensive, they should be used in conjunction with other methods to ensure that interviews are directed at key problem areas and to check the accuracy of interview data.

Observation of Performance. If a Center/School was concerned about the proficiency of its graduates or the usefulness of its training materials in the field, a logical approach to addressing this concern would be to send personnel to field units to observe performance. Indications are that this does not occur frequently. The seven battalion commanders interviewed reported no visits by Center/School personnel to observe performance during the past year. They also reported that they had not been required to observe performance and develop data for a Center/School. The limited use of this methodology is probably due to resource and scheduling constraints. Center/School personnel generally do not have the time or travel funds available for the length of time

required to observe and record performance. Training schedules of field units are usually very dynamic and it would be difficult to coordinate a schedule of visits to a number of units undergoing a similar major training event. In addition, data collection visits are often perceived as training distractors by field personnel, so the potential benefits of such visits must be clearly explained. But the only way to know for sure what is happening in the field is to go out and see, so methodology for observation of performance should be included in a field performance feedback system.

A major issue relating to this approach is how to derive individual task data from observation of collective exercises. The resources available to Centers/Schools do not allow extensive observation of individual task performance in the field, but the observation of collective exercises could potentially provide a large amount of data during a relatively short period of time. Surveys and interviews could also be conducted immediately after such exercises to collect data on specific problems observed and to reduce memory problems mentioned in the previous discussions of other methodologies. For example, in Armor battalions the performance of crew drills and platoon battle runs could be observed and follow-up instruments could be tailored to these exercises. Objective criteria for observation of such performance need to be developed, along with methods for relating collective performance to the accomplishment or failure of individual tasks. As mentioned earlier, the relationships of ARTEP and individual tasks are becoming more clearly defined (for example, the Infantry School has developed a Student Text (ST 21-6-188-1) detailing such relationships), and work is also progressing on further specification of crew drills and platoon exercises. A field performance feedback system should be integrated with such exercises in order to optimize the utility and cost-effectiveness of field observation.

Field Testing. The ultimate method for Centers/Schools to determine the proficiency of their graduates would be to follow them to the field and test them. Such tests would ideally be unannounced, hands-on, task-specific, and conducted by impartial testers. That is, soldiers would be given a "pop quiz." Interviews with battalion commanders and previous research experience indicate that this approach to gathering feedback is rarely utilized. The closest method in use is the administration of SQT's, which were previously discussed as a type of existing record. SQT's are not unannounced and are not entirely hands-on, but these may not be critical problems. Conducting unannounced "pop" tests would be practically impossible and would be disruptive of the unit schedule; all that is required is that soldiers not know exactly what is to be tested and not be trained for just those tasks. As discussed earlier, written tests are an acceptable approach, as long as they are validated against operational performance. SQT's may thus provide an acceptable approach to gathering test data as field performance feedback, if tasks to be tested are not specifically announced and prepared for.

However, in some cases it might prove advantageous for Centers/Schools to collect test data in addition to SQT results. Additional, more detailed data might be needed on specific tasks which surface as problem areas, or data might be desired for checking the accuracy or reliability of SQT results. Such data might also be used to validate subjective estimates obtained from

surveys or interviews. For example, survey estimates of soldiers' ability to perform specific tasks could be compared with results of performance tests. Whatever the reason for its collection, additional performance test data cannot be extensively obtained by Centers/Schools, because of the resource requirements involved. Previous research, such as ARTS, has shown that testers' biases can only be controlled by using a constant team of testers to collect performance data. Moving a team of testers from a Center/School to various installations is not practical. In addition to the need for testers, the collection of hands-on performance data will tie up a good deal of a unit's time and equipment. This approach thus does not meet two of the criteria mentioned in the introductory section of this paper; i.e., it may not be doable within current resources and it could be viewed as a detractor to unit training. Hands-on performance test data in addition to SQT results should thus only be collected in special situations where training problems have previously been identified, or in research on comparison of different types of performance measures. Such data could also perhaps be collected by administering tests to students in process for professional development courses. Hall, Denton, and Zajkowski (1978) provide data demonstrating the high cost of testing as compared to survey and interview methods, and they agree with the conclusion reached here by recommending that the testing approach to feedback be used only in limited situations.

Note that the testing approach to gathering feedback data applies only to assessing the proficiency of graduates, and not to assessing the utility of training materials. The latter assessment will have to be accomplished through observation, survey, and interview techniques. Conducting detailed observations of normal unit exercises and testing will allow Centers/Schools to evaluate the usefulness of materials and will probably minimize the need for additional testing of personnel. In the feedback system of the future, performance testing should be reserved as a last option to obtain feedback in specific problem areas.

MAJOR FEEDBACK ISSUES

In the previous section six methods of collecting field performance feedback were reviewed and all were found to be useful, at least to a limited extent. In the next section initial proposals will be developed for improving feedback and developing an integrated system combining these methods. But before doing this, several major issues and their impact on a feedback system should be discussed. Many of these issues were touched upon in the previous section, but they need to be further considered in general rather than in the context of a specific feedback approach. These issues are briefly discussed below.

One major issue relating to field performance feedback is the question of to whom it should be provided or, alternatively, what schools should be included in a feedback system. The answer is basically all of them. As mentioned in the introductory section, a general external feedback approach should apply to all levels of institutional training, from initial entry training to the US Army War College. It should also apply to all military specialties, both officer and enlisted. The application of feedback methods reviewed in

this paper has thusfar been concentrated upon institutional training of junior enlisted personnel and, in some cases, junior officers. Some of the commanders interviewed to provide background for this paper expressed the view that feedback to Centers/Schools should be limited to basic entry skills, with higher level skills being the responsibility of the unit. But this is not the case; rather, feedback should be provided to all levels of schools, including those providing basic and advanced NCO training and advanced officer training. The tasks to be addressed in feedback are thus not just those at the basic entry level, but all types of tasks, including command, control, and communications. This leads to the need to integrate individual and collective tasks in a feedback system, which will be discussed as a separate issue below. The next question relates to who within a Center/School should be provided feedback. The optimal solution appears to be the establishment of a separate element for this purpose, such as OAFMS. In this way appropriate resources can be devoted to gathering and collating feedback data on a long-term basis. This office should also have the authority to follow-up changes recommended based upon the data gathered and to ensure that these changes are made.

As mentioned earlier, another major issue is the gathering and integration of both collective and individual task data. Collective data are important to collect in their own right, since they are important feedback to advanced courses of instruction and to developers of collective training materials. Gathering data during or shortly after collective exercises may also provide a more economical means of collecting individual task data, if methods can be developed for deriving individual task performance from collective results. Progress has been made in this direction, as exemplified by the Infantry School's ST 21-6-188-1, so future feedback research will address collection of both individual and collective data. In the past, feedback approaches have concentrated too heavily upon individual task data.

Another issue of concern is the timing of feedback data collection. One question which has frequently arisen in the past concerns when feedback should be gathered on the proficiency of Center/School graduates. The answer has generally been three to six months after graduation, so that ample time has been available to perform in the unit. This is probably an appropriate approach, although in some cases longer term data collection might be desirable. But this solution applies basically to only survey methodology. When should an integrated collection of individual and collective task data of various types take place? The answer seems to be during and after major collective exercises. Observations and unsolicited comments could be gathered during such exercises, and existing records, questionnaire responses, and interview comments could be gathered shortly afterwards. In this way, records which are highly perishable could be obtained and memory failures of respondents could be minimized. Much work will be required to determine optimal schedules for integrated feedback data collection, but such collection will benefit from being coordinated with unit activities to the maximum extent possible.

If one has gathered a large amount of various types of feedback data, how can it be collated, analyzed, or otherwise combined to support appropriate decisions? OAFMS has collected a large amount of survey and interview data, but has not yet found a way to combine and maintain them to establish long-term

trends. LST research has shown that survey data and data from existing records do not always correlate highly, and O'Mara (1981) has shown that elements of existing records do not have high intercorrelations. The problem is thus to form composites of large amounts of data which may be disparate. No solution to this issue can be offered at present, except to point out that computer support will be needed and to suggest that data be organized by specific tasks. The data management system should also include a method to update the data base by replacing the oldest data with new. That is, data over a year old might be purged from the system as new data are added. Data management will be a primary focus of future research on field performance feedback, especially with regard to comparison and combination of different types of data.

Throughout this paper the collection of feedback data on the proficiency of Center/School graduates and the usefulness of training materials have been discussed largely in conjunction. In reality, somewhat different approaches must be developed for gathering feedback in these two areas. Interviews of battalion commanders and a review of the literature indicate that feedback systems have in the past concentrated upon the collection of data relating to the evaluation of graduates. Feedback in the future should more formally address the evaluation of training materials, through the approaches of surveys, structured interviews, and observation of field performance. The observational approach appears to be an especially fruitful one which should be used more widely here. Materials cannot be tested in the same way that personnel can, but their use can be monitored and objectively evaluated. The gathering of feedback data during and immediately after the use of training materials in field exercises may provide a context for addressing both areas of concern.

Another major issue is assuring that feedback has the proper impact. Several measurement and decision-making issues which have been mentioned previously are relevant here, and they are briefly summarized below. Feedback must validly and reliably represent the situation in the field, and it should be as objective as possible, in order to allow combination of data and drawing of proper conclusions. A feedback system should thus not rely entirely upon the gathering of subjective survey and interview data, since research by Hall, Denton, and Zajkowski (1978) raises doubts about the accuracy of such responses. Feedback must be task-specific in nature, so that precise follow-up actions can be taken. It must be based upon a large enough sample to represent large-scale problems in the field, and not just problems in selected units. Appropriate sampling criteria must be developed and followed, so that premature decisions are not reached, based upon preliminary data. Criteria must also be developed for reaching sound decisions once sufficient samples of data are gathered. And finally, actions and revisions developed must be doable within available resources and must be monitored to ensure proper implementation.

An issue closely related to the previous one of assuring that feedback has the proper impact is organizational capability to manage a feedback system. The typical Army Center/School does not have the personnel or skills available to adequately conduct feedback planning, collection, analysis, and interpretation. If the Army wants a useful feedback system, adequate resources must be devoted to it at each Center/School. These resources should include a team of well-trained data collectors to gather data from the field, a data analyst with

automated data processing experience, and a system manager who can properly interpret findings and communicate them to nontechnical personnel. These resources should be civilian or stabilized military personnel who will not be reassigned just as they are developing useful feedback skills; a mix of military and civilian personnel would probably be ideal. Resource requirements will vary somewhat in different Centers/Schools, and they will be addressed in further detail during the research described below.

The final issue, which has been a predominant one throughout this paper, is the integration of various approaches to the collection of field performance feedback. Six approaches have been identified which have utility in certain situations. They can be integrated by tailoring them both to the resources available and the severity of the problem identified. That is, problems can initially be identified by review of unsolicited comments, existing records, and survey responses. Serious problems can then be further addressed through structured interviews, observation, and, if necessary, field testing. Such an overall approach will be a focus of further research in the area of feedback, as discussed in the following section.

FUTURE RESEARCH DIRECTIONS

In order to support development of an integrated approach to field performance feedback, research following up on this paper will be concentrated in at least three directions: the collection of feedback during and after field exercises, the comparison of data gathered from different feedback approaches, and the management of feedback data. General plans for research in each of these directions are briefly described below.

An initial effort to collect feedback data from collective exercises will be conducted within the context of crew and platoon level exercises in Armor battalions. Based upon documentation that presently exists or is being developed, the individual tasks involved in crew drills and platoon battle runs will be delineated. Methods for observing and recording performance on these tasks in as objective a manner as possible will be developed and applied during appropriate exercises. Structured interviews will also be developed and will be conducted with participants shortly after exercise completion. These interviews will be directed toward particular problems that occurred during the preceding exercise, rather than toward an exhaustive review of all tasks that were performed. In this way, the interview approach will be made more efficient and less dependent upon long-term memory. Unsolicited comments and existing records will also be gathered during the crew and platoon exercises as they become available, in order to determine their utility as feedback and to compare them to interview and observational results. As a result of this entire effort, feasible methods of gathering individual and collective performance feedback from crew and platoon level exercises will be tested, compared, and refined.

The comparison of data collected via different feedback approaches will address, as a minimum, the results of surveys, interviews, and hands-on tests. Personnel in Armor battalions will be asked, through a survey or interview, to estimate the proficiency with which they or personnel working for them can

automated data processing experience, and a system manager who can properly interpret findings and communicate them to nontechnical personnel. These resources should be civilian or stabilized military personnel who will not be reassigned just as they are developing useful feedback skills; a mix of military and civilian personnel would probably be ideal. Resource requirements will vary somewhat in different Centers/Schools, and they will be addressed in further detail during the research described below.

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