PRINCIPLES OF TRAINING IN MARINE CORPS TASK ANALYSIS

Training Manual I

Arthur H. Kuriloff

Technical Report No. 7

EVALUATION OF THE MARINE CORPS
TASK ANALYSIS PROGRAM

A Research Project Supported By
Commandant of the Marine Corps (Code RD)
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This is the first in a series of five Training Manuals developed for use by the Office of Manpower Utilization, HQ, USMC (OMU) in its Task Analysis program. This initial Manual is designed for trainers of OMU staff members assigned to the Task Analysis (TA) Program. The objectives of this Training Manual are: (1) To recommend procedures and training materials for minimizing the time required to orient and train new Task Analysis team members; (2) To increase the period of time new staff members will be productive on a TA

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team by shortening the indoctrination and training period; and (3) To upgrade skills for increasing the effectiveness and productivity of experienced, as well as new members of TA teams. The initial section of this Training Manual discusses individual competencies required for Task Analysis and qualifications for TA research. Motivation for training and learning is reviewed and recommendations to stimulate learning are made. The dimensions of the training problem are outlined and include determining the training content and the training method, and evaluating the training. The final section of the manual discusses the skills required to support team performance in Task Analysis. A selected annotated bibliography is included. It suggests reference materials to provide trainers with sources to supplement this introductory Manual and further to increase their competencies in determining training needs, developing effective training materials and methods, and measuring the effectiveness of training programs.

SUMMARY

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The initial section of this Training Manual discusses individual competencies required for Task Analysis and qualifications for TA research. Motivation for training and learning is reviewed and recommendations to stimulate learning are made. The dimensions of the training problem are outlined and include determining the training content and the training method, and evaluating the training. The final section of the manual discusses the skills required to support team performance in Task Analysis. A selected annotated bibliography is included. It suggests reference materials to provide trainers with sources to supplement this introductory Manual and further to increase their competencies in determining training needs, developing effective training materials and methods, and measuring the effectiveness of training programs.

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FOREWORD

Research Area 6, Orientation, Training and Team Performance is one of eight Research Areas (R.A.s) into which the project for Evaluation of the Marine Corps Task Analysis program was divided. R.A. 6 studied a variety of problems in the development, planning, conduct and management of Task Analysis (TA) projects. Our findings in this and other Research Areas are reported in a series of Training Manuals and other Technical Reports. The Technical Reports published or in press at the time of this report are listed in the Appendix.

This Training Manual is one of the end products of R.A. 6 and is one of several designed to be used by Marine Corps personnel responsible for training Task Analysis specialists. The five Training Manuals in the series bring together a variety of short presentations, outlines, and excerpts from management books and articles, with recommendations and suggestions for helping members of TA teams acquire essential capabilities for training and for performing TA functions.

Portions of these manuals are couched in the general language of management. Training personnel responsible for the education and development of TA analysts may find it necessary to adapt some terms to military usage. This should not prove difficult, as the specific application should readily suggest language appropriate to its purpose.

Trainers will find annotated references at the end of several of the Training Manuals. These and footnotes identify sources that

should prove useful in further inquiry into a variety of training subjects should this be needed or desired.

This first Training Manual is concerned with the training of members and leaders of TA teams and discusses general principles of training as they may be helpful in shaping and directing the entire training process.

Training Manual II is designed to aid in the orientation to the Marine Corps Task Analysis program of Marines newly assigned to the Office of Manpower Utilization (OMU).

Training Manual III provides a guide to the development of skills in observation and interviewing in Marine Corps Task Analysis. This Manual is an end product of Research Area 1, Observation and Interviewing.

Training Manual IV is directed to the area of communications among staff members in OMU and especially among members and leaders of TA teams.

Training Manual V focuses on organization for teamwork and outlines procedures for improving organizational effectiveness, with special reference to matrix organization and to management by objectives.

PRINCIPLES OF TRAINING
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INDIVIDUAL COMPETENCIES REQUIRED FOR TASK ANALYSIS

All training plans and programs begin by identifying training needs. In the work of the Office of Manpower Utilization, HQ, USMC (OMU), these needs are defined by recognition of the knowledge, skills and capabilities required for satisfactory performance of assigned duties in the Task Analysis mission.

Task Analysis (TA) in the Marine Corps is essentially a research procedure; the Marine analyst responsible for Task Analysis should understand and apply the techniques of research appropriate to TA to enable his results to be scientifically accurate. (Task Analysis as research is discussed in Technical Report No. 2, and all of Technical Report No. 4 is devoted to Research Planning and Design in Task Analysis.) This kind of accuracy results from performance based upon (a) technical competence as a researcher and (b) interpersonal competence as a member of a Task Analysis research team. This manual is designed for trainers of TA analysts. Its purpose is to provide guidance for trainers in their work of helping TA analysts acquire necessary competencies.

The objectives of this Training Manual are as follows:

- To recommend procedures and training materials for minimizing the time required to orient and train new Task Analyst team members.
- To increase the period of time new members will be productive on an analyst team by shortening the indoctrination and training period.

o To upgrade skills for increasing the effectiveness and productivity of experienced, as well as new members of TA teams.

Qualifications for TA Research

The qualifications needed to achieve proficiency in Task Analysis may be summarized as follows:

- Ability to understand, accept, and learn the techniques of scientific research necessary for Task Analysis.
- Commitment to personal development and the acquisition of competence in TA.
- Ability to use these techniques well in the various phases of TA.
- Willingness to work well with others on TA teams.

These qualifications can provide guidance in selecting an individual for entry into a TA team. A carefully conducted interview based on these criteria could tell a good deal about the potential of the person as a member of a TA team.

MOTIVATION FOR TRAINING AND LEARNING[1]

The acquisition of competence in TA, as in any other field of research, can come only with training, and, formal or informal, training when well done results in learning, which in turn is supported by these four basic conditions:

- Motivation: The Marine learner should be motivated to respond to the stimuli presented in training.
- Achievement: A sense of achievement has been found by

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1. Folley, John D., Jr., "The Learning Process", ch. 3, TRAINING AND DEVELOPMENT HANDBOOK, New York: McGraw-Hill Book Co., 1967.

research to be perhaps the greatest motivator known.[2]

- Recognition: Achievement alone is not enough to give solid long-time motivation. It must be reinforced by recognition.[2]
- Personal Growth: The acquisition of skill and competence is the third powerful motivating force. When the Marine learner feels confident of his ability to conduct an interview in a capable fashion, he experiences personal growth and will usually be motivated to continue improving his performance.[2]

To sum up, the appropriate stimuli to produce motivation in the Marine learner are: a sense of achievement, being recognized for achievement, and experiencing personal growth through acquiring skill in the TA process.

RECOMMENDATION FOR TRAINEE MOTIVATION

Trainers, whether Marine personnel or civilians, should grasp every opportunity to use these motivating forces in the educational effort.

Feedback to Stimulate Learning

The key technique available to the trainer for stimulating the learner to learn is feedback on performance. When the

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2. Herzberg, Frederick, and Mausner, Bernard, and Snyderman, Barbara Block, THE MOTIVATION TO WORK, New York: John Wiley & Sons, Inc., 1959, ch. 8.

learner gives the right response to a question, or diagnoses a practice TA situation correctly, he should be commended for his response. A friendly pat on the back can do wonders to show a man that he has taken an achieving step and that his achievement is being acknowledged. Also, learning can be encouraged through a graph or chart, or other means that shows personal progress in the acquisition of skill on a timely basis, perhaps monthly.

RECOMMENDATION FOR SUPPORTING ACHIEVEMENT THROUGH CONFIRMATION

Trainers should confirm the trainee's performance immediately. Immediate confirmation tends to reinforce the learner's desire to learn more. Delay in giving confirmation tends to lessen the impact of the psychological reward; the trainee loses the connection between performance and the pat on the back that is its consequence.

DIMENSIONS OF THE TRAINING PROBLEM

The dimensions of the training problem are defined by three basic terms: content, method, and evaluation.

Determining the Training Content

Content includes knowledge and skills that must be learned. In the observation and interview phase of Task Analysis, for example, the Marine analyst should understand the method of participant observation in gathering data; he should have the skills

needed to practice effectively as a researcher using participant observation techniques. The Marine charged with data analysis through computer procedures should understand CODAP theory and be able to use the computerized procedures for analyzing TA data. And the Marine who must prepare the final report on a specific TA study must know how to write a concise, clear report.

The first step in determining the training content is to find the difference between what trainees should be able to do in performing their function in TA and what they can do before training. This difference, called the "training differential", should be the starting point for deciding what should be included in the training program. The training differential is a list of tasks that must be performed but that beginning trainees are not prepared to perform.

This means that a statement of what the trainee must do should be derived from an analysis of the functions he is to perform. A desirable way of preparing this statement is to examine three variables that influence the TA team member's performance:

- Inputs the team member must accept: what he hears, sees, and touches.
- Outputs required of him: reading, noting, writing, speaking, assessing what he sees and hears, making decisions, cooperating with other team members, planning, and other required activities or actions.
- Information processing: what goes on between input and

output, and transforms inputs into outputs.

The statement of what the trainee must do to perform well in the functions of TA comes from this kind of study. The result is a "job description" of the task analyst's job.

Determining the Training Method

Method aims at answering the question: How can the desired learning best be brought about? Training can be accomplished through different approaches. The responsible trainer should study the situation and select the method or methods that seem most likely to produce the desired results in the shortest possible time. For example, training in observation may be done in reality on the job, or through the use of a prepared film or TV tape presentation of Marines performing tasks in a specific job. Training through the use of the film might precede observation on the actual job. Or perhaps on-the-job observation might be followed by a session with the film. The trainer might wish to try these and other approaches to find the one or more most effective.

Among the several methods available for training, those judged most suitable for TA are lectures, conferences, role playing, management games, and reading. Each has advantages and disadvantages; each can be used for specific purposes under specific conditions.[3]

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3. This section on methods has been drawn for the most part from TRAINING AND DEVELOPMENT HANDBOOK, Craig, Robert L. and Bettel, Lester R., Eds., New York: McGraw-Hill Book Co., 1967.

Lecture. The lecture is useful in informing or instructing. Decision to use the lecture can be made on the basis of the following factors:

1. The size of the learning group indicates the advisability of using the lecture. When the group exceeds about twenty, the lecture should be considered. It should be followed by some kind of small group activity to reinforce the content presented.

2. The instructor should be expert in the subject matter and should be able to make a clear presentation keyed to the educational level of the audience.

3. The time factor is of major importance. The lecture can deal with more facts, principles, and concepts in a shorter time than it would take to teach the same material by any known group method.

4. The availability of teaching and reading materials may influence the choice of teaching method. The lecture might be chosen when such materials are in short supply. If these are available, the lecture might be used effectively to supplement and summarize group learning using appropriate teaching and reading materials.

5. The characteristics of the information to be taught may suggest the choice of instructional method. Factual, descriptive, or explanatory material may often be absorbed by the learner through a lecture. On the other hand, many principles and concepts, particularly those dealing with developing or changing

attitudes and human behavior, may best be learned through participative procedures.

The lecture, in summary, might be best used in TA for orientation, explanation of policy and procedures and information about changes in the program.

Conference. The training conference aims at involving a group of people to share facts, pool ideas, discuss differing points of view, test assumptions, and draw conclusions--all intended to improve performance of the job. The procedure requires and promotes constructive thinking and participation by the trainees. The implication is that the participants must have sufficient background to engage productively in the exchange of ideas that should go on in the group. The conference leader should act as a resource person, providing information and steering the proceedings as required to keep them on the desired course and to prevent the conference from degenerating into a bull session. The following suggestions should help the conference leader to ensure the success of a training conference:

1. Make a good start. Choose opening statements carefully. Explain the purpose of the meeting clearly and briefly.

2. Remember that good discussion means participation. Invite all participants to speak. Encourage quiet ones to enter the discussion. Try to catch the contribution of each conferee, no matter

how poorly stated. Don't be alarmed by a lull; thinking is a slow and difficult process for many people. Take it easy--don't rush.

3. Ask good questions. Plan your questions carefully. Don't direct all questions to the group at large; direct a question once in a while to an attendee who hasn't said much. Avoid asking questions that can be answered by a yes or no. Prevent the discussion from becoming a question-and-answer session.

4. Keep the proceedings aimed at the objectives of the meeting. Keep the discussion on course. Permit an occasional diversion, but bring the conversation back to the subject. Encourage the expression of different points of view. Bring out phases that have been omitted. If the meeting goes flat, drop the subject in hand for a while and take up a different one. Summarize the proceedings occasionally. This allows the participants to gather their thoughts--and helps to keep the meeting on target.

5. Keep control of the conference. The conference leader should control the proceedings at all times without being officious. This does not mean that the leader should control the decisions made by the group. Control should be aimed at ensuring that conclusions are unbiased and represent the thinking of the group. Do not allow the conferees to engage in side discussions that disturb the group process. Tactfully restrain the long-winded talker. Encourage participants to speak loudly enough to be heard by all.

6. Develop courtesy among the participants. The leader

should make sure that the participants realize that there may be disagreements that lead to debate. All opinions should be entertained, and so long as the debate is conducted on a reasonably polite basis, the outcome can contribute to a better understanding of the subject than before. The conference leader should adopt a goodhumored "light touch". If the group reaches a conclusion thought wrong, the leader should steer the group toward rethinking the subject rather than trying to make the correction alone.

7. Avoid the appearance of being the "expert". The conference leader should avoid any appearance of being the final authority or expert on any point the group raises. The group should be guided into making the appropriate decision in so far as possible. Even if the answer is obvious the leader should refrain from giving it. Rather, the answer should be drawn from the group by stimulation and direction of the thinking process through the skillful use of questions and examples.

8. Make a good ending. Limit the meeting to the time allotted to it. Don't prolong the discussion merely to fill in time. The conference leader should leave the group with something to think about after the meeting. An effective way to do this is to have the group summarize the key points of the meeting with the conference leader charting them on a blackboard.

Role Playing. "Role playing may be defined as a method of

human interaction that involves realistic behavior in imaginary situations."[4] Role playing involves action and practice. Its value lies in its process of helping people and groups to improve their effectiveness by actually doing something about a problem or situation rather than just talking about it. The goal of action comes through people "playing" parts or roles in a hypothetical or real situation. The experience of the interaction between people brings out problems that need solving and suggests ways of solving them.

Role playing as generally employed has the following characteristics:

1. Enactment. Role playing involves interaction between at least two people and as many more as the training design and the imagination of the trainer or the group suggest. Individuals play themselves, their superiors, their subordinates, or any other real or imagined person.

2. "Real" behavior. The situation in which participants are asked to act may simulate an actual experience or may be one developed from the imagination of trainer or group for a specific training episode. The important point is that the players try

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4. Corsini, Raymond, Shaw, Malcolm, and Blake, Robert, ROLE-PLAYING IN BUSINESS AND INDUSTRY, New York: The Free Press of Glencoe, 1961.

to achieve feelings and reactions that are psychologically real.

3. Spontaniety. Role playing should give the players opportunity to innovate, to try a variety of responses and reactions. Spontaneity tends to stimulate insights into behavior, which can often be translated into ways of building more cooperative working relationships through solving interpersonal problems.

4. Experimentation and practice. Role playing gives the players the chance to experiment with different modes of behavior. They can try again if the chosen mode does not produce the kind of results they desire. Players may rotate through various roles, or they may replay a role several times to increase understanding of the situation and gain skill in dealing with it.

5. Feedback and analysis. Feedback and analysis of the role play reinforces the learning that takes place. Feedback and analysis may be quite informal or fairly structured. In the former case the trainer may merely interview the players and members of the audience to elicit analytical data or personal reactions. Often, feedback is requested from individual players. In the case of formal feedback and analysis, the participants and the audience are given guides about what to observe in the interplay among the role players. These may include, as the trainer decides, such items as "helping" behavior; needling,

blocking, or thwarting of one player by another; seizing command of the conversation; displays of anger; facilitating a problem-solving effort; and helping others to express feelings of regard or disdain. The guides should be prepared ahead of time by the trainer and supplied to the audience before the role play.[5]

6. Diagnosis. Role playing, because it identifies needs for improvement in such areas as relationships among people, teamwork and definitions of roles, permits the diagnosis of training needs. Trainers can use role playing to good advantage in improving the training process by careful observation of the activities of the role play.

The foregoing outline shows that role playing is particularly useful in resolving problems of human behavior. It might well be used in Task Analysis for building teamwork within a TA team, for reducing inter-team competition, for smoothing relationships among individuals, and for practicing the participant-observer role that is a key to the success of the TA program.

Management Games. A management game takes the form of a

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5. Chris Argyris gives an excellent outline of role playing for training purposes in ROLE PLAYING IN ACTION, New York: New York State School of Industrial and Labor Relations, Cornell University, Bulletin no. 16, May 1951. Some of the theoretical considerations and original research performed in this field are discussed in Leland P. Bradford, Jack R. Gibb, and Kenneth D. Benne, T-GROUP THEORY AND LABORATORY METHOD, New York: John Wiley & Sons, Inc., 1964, pp. 431-433.

training exercise using a model of a situation that needs resolution, or a major problem that needs solving. Trainees are usually divided into small groups. In a typical game the groups are given the background of the situation and sufficient information to allow them to come to decisions by consensus. The outcome of the game--winning and losing--depends upon the quality of the decisions made along the way.

Most games contain obvious measures of performance such as net profit, productivity, reduced labor turnover, or ability to survive in a dangerous environment. There is always some form of competition among groups, which arouses the members to do their best. The resulting learning takes place from the experience of the game and from comparison and analysis of the decision-making processes adopted by winning teams.

Games may well be employed in TA training to improve consensual decision-making within TA teams, to build cooperation among teams, and to show the need for effective group processes for improving cooperation and teamwork within and among teams.

Some of the changes that can take place as a result of appropriately used games, and some that the trainer can look for, are:

1. Improvement in technical performance.
2. Improvement in quality of leadership.
3. Improved teamwork within and among teams.
4. Evidence of new attempts to define goals.
5. Improvement in communications.

6. Improved use of time.
7. Greater awareness of destructive competitive factors.
8. Evidence of encouragement of quieter members to participate.
9. Improvement in decision-making procedures and techniques.

Reading. Reading, a common adjunct of training, can be used with increased effectiveness when it is tailored to a specific purpose or set of purposes. In the TA program, it should be directed towards increasing knowledge, increasing skills, and changing attitudes. Readings should be incorporated into the TA training program as adjunct material to support the other methods employed: lectures, conferences, role playing, and management games. Reading assignments should therefore be carefully prepared to provide supplementary materials. Any reading built into the TA training program should be written at a level readily comprehensible by the trainees.

Evaluating the Training

Evaluation addresses the question: How good is the training?

This step in the preparation of the training program makes it necessary to attach performance standards to each task in the job. These standards, identified in the description of outputs, tell what level of performance is acceptable and help the trainee to see his progress in acquiring essential skills. They give him a

yardstick for measuring his personal growth.

Performance standards should be clear and specific. It is not enough, for example, to state that the trainee must be able to read. At what school grade level should the trainee be able to read? Performance standards will influence the training program by helping to set the training objectives. It is important that they be set specifically and that quantitative measures of performance be used wherever possible.

The final step prior to preparation of the training program is to find out what skills the trainees bring to the job in TA. This identifies the performance differential--the difference between what they must do and what they already can do.

The performance differential may be found by giving the new team members a repertory test, prepared from a list of skills the trainees will be required to use in the TA functions that they will perform, before they enter training. A repertory test for O & I may be developed from the items recommended in the O & I Training Guide, (Technical Report No. 2, Training Manual III). If it is not practicable to prepare a repertory test, the background and experience of the prospective TA team member will provide clues about what he is prepared to do. It is reasonably safe to assume that a high school graduate can read well enough for the job, for instance. Or, it is likely that a trade school graduate can use certain tools. Experience in a previous job can also suggest skills that the individual brings to the TA job.

Whichever approach is used to identify the skills the new-

comer brings to the job, the procedure should be essentially diagnostic. It should identify specific tasks that the new member can and cannot perform adequately. This requires that repertory test scores, if such a test is used, be stated for individual items and not simply for the test as a whole. Similarly, interviewing the candidate for the TA team should identify areas in which individual training will be required.

It may be found over time that the Marines entering TA assignments represent a somewhat homogeneous group in the skills they bring with them. Input testing could then be limited to an occasional spot check to verify the reality of assumed input skills.

RECOMMENDATIONS FOR EVALUATION OF TRAINING

The effectiveness of training should be evaluated on a systematic basis to ensure that the results desired are being obtained. Effectiveness may be measured by comparing before and after scores in each of the skills required by the TA job description. This should be done for each individual entering the training program. Records for a number of entrants over a period of time would show trends in the effectiveness of training. Improvements and corrective changes could then be made in the training as indicated by these records.

Indices, such as interobserver reliability in O & I procedures, between individuals and between groups, can give a quantitative measure of the effectiveness of training. As the Marine analysts gain experience in TA and awareness of the possibilities

for their improvement, ways for increasing the effectiveness of training methods and techniques will suggest themselves. The procedures outlined in Task Analysis Training Manuals II through V are tools that can be used for this purpose.

SKILLS REQUIRED TO SUPPORT TEAM PERFORMANCE IN TASK ANALYSIS

The participant observation method for gathering and analyzing data in TA is discussed in the Training Guide for Task Analysis Observation and Interviewing, (Training Manual III). To restate briefly the criteria for reliability and validity discussed in that O & I Training Guide, reliability requires that repeated measurements yield results that are identical or are so close to being identical as to fall within narrow and predictable limits, and validity requires that the measurement actually measures what it is supposed to measure.[6]

Competent performance in participant observation undergirds the achievement of reliability and validity in data collection and analysis in TA. Competent performance, once individual skills are developed, as disclosed by the variety of studies made by the Research Staff of the ONR-USMC Task Analysis Research Project, depends upon the development of skills in two basic areas of team performance:

1) Skills to support effective performance as a team member, and
2) Skills to support cooperation among TA teams.

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6. Festinger, Leon and Katz, Daniel, RESEARCH METHODS IN THE BEHAVIORAL SCIENCES, Holt, Rinehart, and Winston, Inc., 1953 pp. 327-361

Task Analysis is essentially person-oriented research; the original data in the program are obtained from people, and collected by people who must work together to check and verify their data and to improve their methods and procedures. Both sets of skills should rest on a foundation of methods and techniques derived from accepted practice in the behavioral sciences. These relate to both individual and interpersonal skills.

The materials included in Training Manuals II through V provide information, procedures, methods, outlines, and references for use in training to improve the individual and inter-personal skills needed to support internal TA team capabilities and to build teamwork among the TA teams.

SELECTED BIBLIOGRAPHY

Bruner, Jerome S., TOWARD A THEORY OF INSTRUCTION, Cambridge: Harvard University Press, 1966.

This book by a noted psychologist, researcher in the educational process, presents several essays on learning and teaching. The presentation is rather advanced but will repay the interested reader with insights that can be very useful in developing teaching and educational methods. Chapter 3, "Notes on a Theory of Instruction" will be found particularly illuminating for the purposes of TA.

Craig, Robert L, and Bittel, Lester R., eds., TRAINING AND DEVELOPMENT HANDBOOK, New York: McGraw-Hill Book Company, 1967.

This handbook, sponsored by the American Society for Training and Development, presents a comprehensive collection of articles by 36 well-known specialists in the management training field. It is a standard source for information on the education, training, and development of the human resources in organizations.

Davies, Ivor K., ed., THE ORGANIZATION OF TRAINING, New York: McGraw-Hill Book Company, 1973.

This manual is intended for all those concerned with training--in industry, in the armed forces, and in government. It shows how up-to-date principles of motivation and productivity may be applied to the organization of resources for learning. It is particularly recommeded for training in TA, as it treats the approach to training in a modern systems methodology based upon widely accepted findings of the behavioral sciences.

McGehee, W. and Thayer, P.W., TRAINING IN BUSINESS AND INDUSTRY, New York: John Wiley & Sons, 1961.

This book is a classic in the training field. It provides basic recommendations for analyzing training requirements and developing appropriate solutions for meeting them

Proctor, John H. and Thornton, William M., TRAINING: A HANDBOOK FOR LINE MANAGERS, New York: American Management Association, 1961.

This handbook is written at a basic level. It deals with the fundamentals of the training process, from determining the needs for training and a discussion of the learning process to preparing a training program and measuring its effectiveness. An elementary text, it gives useful material in simple language.

Warren, Malcolm W., TRAINING FOR RESULTS, Reading, Mass.: Addison-Wesley Publishing Company, 1969.

This is a comprehensive text that treats in considerable detail methods and techniques for training and personnel development. It concentrates on a modern "systems" approach to the development of human resources.

APPENDIX

List of Project Technical Reports

PROJECT TECHNICAL REPORTS

Technical Reports that have been published or are in press as this Training Manual goes to the printer are listed below. This present Technical Report, No. 7, is included for the sake of completeness and continuity.

Farrell, William T., HIERARCHICAL CLUSTERING: A BIBLIOGRAPHY, Technical Report No. 1.

Kuriloff, Arthur H., Yoder, Dale, and Stone, C. Harold, TRAINING GUIDE FOR OBSERVATION AND INTERVIEWING IN MARINE CORPS TASK ANALYSIS, Training Manual III, Technical Report No. 2.

Hemphill, John M., Jr., Stone, C. Harold, and Yoder, Dale, PROGRAM EVALUATION AND REVIEW TECHNIQUE (PERT): A PLANNING AND CONTROL TOOL FOR OCCUPATIONAL FIELD STUDIES, Technical Report No. 3.

Farrell, William T., Stone, C. Harold, and Yoder, Dale, GUIDELINES FOR RESEARCH PLANNING & DESIGN IN TASK ANALYSIS, Technical Report No. 4.

Hemphill, John M., Jr., and Yoder, Dale, MANAGEMENT AUDITING, Technical Report No. 5.

Yoder, Dale, Hemphill, John M., Jr., and Stone, C. Harold, OMU ORGANIZATION AND PERSONNEL, Technical Report No. 6.

Kuriloff, Arthur H., PRINCIPLES OF TRAINING IN MARINE CORPS TASK ANALYSIS, Training Manual I, Technical Report No. 7.

Kuriloff, Arthur H. and Yoder, Dale, COMMUNICATIONS IN TASK ANALYSIS, Training Manual IV, Technical Report No. 8.

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