DOCUMENT RESUME

ED 257 954 CE 041 585

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TITLE An Instructor's Diagnostic Aid for Feedback in Training.
PUB DATE Apr 85
NOTE 40p.; Paper presented at the Annual Meeting of the American Educational Research Association (69th, Chicago, IL, April 1985).
PUB TYPE Reports - Descriptive (141) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Adult Education; Diagnostic Teaching; *Educational Diagnosis; Educational Needs; Error Patterns; Evaluation Criteria; *Evaluation Methods; *Feedback; Instructional Improvement; Material Development; Military Personnel; *Military Training; Models; Needs Assessment; Postsecondary Education; Research Needs; *Student Evaluation; Systems Approach; Teacher Education; Team Teaching
IDENTIFIERS *Instructors Diagnostic Aid Feedback in Training; Navy

ABSTRACT

The time constraints facing most Navy instructors often preclude their providing feedback concerning poor performance of trainees in various military training programs that takes into account such psychological considerations as contiguity, repetition, reinforcement, or consideration of a learner's internal conditions of learning. The Instructor's Diagnostic Aid for Feedback in Training (IDAFT) has been proposed as one possible solution to this problem. Major steps in the IDAFT process include introduction to the program, performance measurement (either objective or subjective), error analysis, determination of major sources and types of error, identification of categories of training deficiency, determination of causes of error and events of instruction that were not properly addressed, development of a general feedback prescription from IDAFT, modification of the general prescription for specific application, and presentation of the feedback prescription to the training team. The model has been field tested with actual team instructors involved in antisubmarine warfare training teams. This trial has shown that it takes an instructor who is familiar with the system from three to five minutes to work through an IDAFT prescription. Plans are being formulated to assess the effectiveness of the IDAFT system and to determine whether it is the best method for providing feedback aids in naval team-training situations. (MN)

An Instructor's Diagnostic Aid For Feedback in Training

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Running Head: AN INSTRUCTOR'S DIAGNOSTIC AID FOR FEEDBACK

An Instructor's Diagnostic Aid for Feedback in Training

Introduction

Military instructors are required to perform a variety of difficult instructional tasks. These tasks include: diagnosis of trainee entry-level skill deficiencies; delivery of instruction; analysis of student errors; and giving feedback to students who do poorly in practice or on criterion tests. This last task requires a sophisticated set of subject matter expertise and instructional skills. While military instructors typically possess requisite content knowledge, pedagogical skills are often weak because they lack formal training in education. This problem is particularly pronounced in the training of teams where complex interactions make feedback especially difficult (e.g., which trainee was responsible for an error and what effect will remediation on one part of the team have on another part?).

Modern training devices are often designed to provide instructors help in delivering instruction (e.g., computer-assisted instruction, large screen displays, enhanced cues) and analyzing errors (e.g., performance measurement and assessment systems). The devices, however, provide little help in prescriptions to trainees who commit errors. This lack of automated help means instructors must develop their own feedback strategies. This feedback task is not easy for experienced

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educators and it has proven to be very difficult for most military team instructors.

A method for aiding instructors in diagnosis and feedback is discussed in this paper. The method is based upon error analysis, domains of learning, and events of instruction. The aid is called the Instructor's Diagnostic Aid for Feedback in Training (IDAFT). IDAFT is computer-based and its use with Navy team instructors is currently being explored. The figures and tables show the various branches of the feedback program and provide a detailed, step-by-step description of one branch.

Background

IDAFT is based on a number of related concepts. Error analysis, domains of learning, and principles of instruction all underlie the procedures used in IDAFT. This section will briefly discuss these major concepts and provide references for those readers who would like to explore them in more detail.

Error analysis (or error diagnosis) is required of any instructional system if trainees are to receive feedback. Regardless of whether an instructor or a computer provides a feedback prescription, it must be based upon some notion of the learning problem. The system must, in some way, ask and answer a series of questions about the source of the error. Gagne (1977) has proposed a framework with which to structure these questions.

Gagne's domains of learning divide learning outcome into five main types. These types focus on "what is learned" rather than upon the process of learning. The domains are intellectual skills (discriminations, concepts, rules and problem-solving), motor skills, verbal information, attitudes, and cognitive strategies. By using these main types of learning, the instructional delivery medium (in IDAFT's case this is the instructor) can determine the major performance errors that have occurred.

Each domain of learning has different prerequisites and conditions. Determining into which domain the error falls will allow a detailed error analysis to be performed. Questions such as "What is the error?", "What caused the error?", "Who committed the error?", will be asked and answered differently depending upon the domain of concern.

Gagne and Briggs (1979) have provided a series of key "events of instruction" which must be satisfied if learning is to take place.

> "The purpose of instruction, however it may be done, is to provide support to the processes of learning. It may therefore be expected that the kinds of events that comprise instruction should have a fairly precise relation to what is going on within the learner whenever learning is taking place. In order

to undertake instructional design at the level of individual learning episode, it appears necessary to derive the desirable characteristics of instructional events from what is known about the learning process" (p. 153, Gagne & Briggs, 1979).

The learning processes include attention, selective perception, rehearsal, semantic encoding, search and retrieval, response organization, feedback, and executive control process. Good instruction should consider these inferred internal processes and contain events which support them. Gagne and Briggs suggest that a large body of research supports the following events: Gaining Attention; Informing the Learner of the Objective; Stimulating Recall of Prerequisite Learnings; Presenting the Stimulus Material; Providing Learning Guidance; Eliciting the Performance; Providing Feedback about Performance Correctness; Assessing the Performance; and Enhancing Retention and Transfer. These events encompass the major principles of instruction which have been developed through years of research and practice. These principles include: reinforcement; corrective feedback; stimulus control; motivation; diagnosis; evaluation; and behavioral objectives (Anderson & Faust, 1973). In order to diagnose student errors, IDAFT relies on instructors' ability to determine if proper events of instruction have been addressed for

areas of trainee performance which have proved to be erroneous.

Another concept which underlies IDAFT is adaptive instruction. This type of instruction changes new instructional stimuli given to trainees based upon their responses (Kribs, 1973; Sleeman & Brown, 1979; Hopf-Weichel, Purcell, Freedy & Lucaccini, 1980). Adaptive instruction usually refers to computer aiding in the adaptive process. Adaptive instruction, however, is what every good instructor does as a trainee is remediated. Instructors modify the external conditions of instruction based upon feedback from trainees. IDAFT prompts an instructor to determine which events of instruction were not properly addressed in a trainee's initial training. A good instructor should then adapt new instruction (stimuli) to the individual differences among trainees, or in our case, teams.

Current Problem

In order to better understand the need for an instructor's feedback aid, a typical scenario in an Anti-Submarine Warfare (ASW) team trainer is described below. In addition, there is a discussion of the typical background of an ASW team instructor.

Device 14A2 (single ship ASW team trainer) is located at various sites throughout the Navy. It simulates the operational equipment required for an ASW mission (i.e., sonar, bridge, combat information center, navigation). Most training scenarios require

over twenty enlisted and officer trainees, each having a different set of tasks to perform. As many as six instructors are assigned to a training problem. Their duties include designing the scenarios, initializing the trainer, providing preliminary directions to the team, manning their instructor positions during the scenario, recording errors, evaluating overall performance, and providing appropriate feedback in a debrief. Some instructors go on to provide prescriptions for correcting poor performance through re-explanation of salient knowledge and concepts. This, however, does not always happen because of time constraints and instructors' doubts about what should be done.

Even when feedback is given, it is seldom based upon sound instructional principles. Instructors, while quite expert in their respective content areas, usually lack the educational expertise which would allow them to relate specific errors to relevant categories of human learning and performance. All feedback and prescriptions, therefore, are heavily weighted with content considerations (e.g., "You should have reported that contact four minutes earlier."). The feedback does not have a framework which takes into account such psychological considerations as contiguity, repetition, reinforcement, or consideration of a learner's internal conditions of learning. These concepts, if they do happen to be applied to a team training

setting, occur by chance instead of design.

Instructor's Feedback Aid

Three possible solutions to the problem described above include embedding feedback aids into trainers, intensifying instructor training, and providing an instructor job aid. A first solution is to have a training device not only provide performance measurement information, as many currently do, but also provide automatic prescriptions. These prescriptions would be designed with the proper instructional considerations automatically programmed. While there is some thought presently being given to this approach for future trainers, it is not expected to be operational for some time. The necessity of using an artificial intelligence approach to satisfy the complex nature of such tasks makes early realization of this technique doubtful.

A second solution would require considerably more instructor training in instructional concepts and techniques. Presently, most military instructor training consists of a two-week course in basic classroom management techniques and lecture principles. As one can imagine, the time limitations allow very little attention to training in the use of complex instruction principles. This problem is compounded for team training instructors since many of them do not even receive the two-week course.

The time required to properly train all instructors in the

necessary instructional techniques required for their preparation of proper feedback would be far too lengthy and costly for military instruction. The Navy hierarchy might question such a use of expert instructors' time, and it is doubtful that most instructors would be interested in such a detailed course of instruction.

The third possible solution is based upon the notion of an instructor's job aid. This aid is programmed to question an instructor about team behaviors and errors which have been observed. The instructional concepts are built into the IDAFT. Instructors receive a short two- to three-hour training course on the use of the device. It is anticipated that they will gain increased understanding of the concepts as they use the aid in a team training setting. They are not required, however, to be more than minimally familiar with the key concepts before they start to use IDAFT.

Error Analysis

The steps in IDAFT are presented in Figure 1. Early in the (IDAFT) process is an error analysis. What error occurred? Why did it happen? Who in the team caused the error? How did it affect the rest of the team? These questions, and others like them, should be constantly asked by instructors as a training scenario proceeds and after it has concluded. Many modern

Insert Figure 1 about here

training devices provide objective performance measures to assist instructors in this function. Even if a device does have this capability, however, it is only useful for machine-measurable behavior (e.g., buttons pushed on time, the right buttons pushed, etc.). Many team training functions, especially communications, must be subjectively measured. The basic point is that the expertise of intelligent instructors is quite necessary for the error analysis process, both now and in the future.

Major Source of Error (Individual, Sub-team, Team)

The introduction to IDAFT explains the purpose of the program and gives instructors examples of how it can be used. It then asks the instructor to decide, after error analysis, the source (individual operator, sub-team, or key decision maker) of the error. Individual operator errors are those caused by trainees who work with consoles (e.g., sonar) or display boards and who usually pass information up the line to key decision makers. The errors they commit are a result of their own misunderstanding or inattention and are not caused by anyone else on the team.

Sub-team errors occur among groups of trainees who share essentially the same function (e.g., sonar, navigation). The

error occurs as a result of two or more members of a sub-team performing or communicating incorrectly. More will be said about sub-team errors when types of errors are discussed.

Key decision maker errors are those which are attributable to the tactical commander of a team (e.g., Tactical Action Officer, Air Tactical Action Coordinating Officer). For an error to be classified as a key decision maker error, the correct information from the various team components must have been passed to the key decision maker and the error can only be attributed to the decision maker's inaction or incorrect action.

Help options are provided for this and all phases of the IDAFT process. By selecting the help option, an instructor can get definitions and examples of all key terms and concepts.

Type of Error

After the major source of error has been determined, the IDAFT program then branches an instructor to a choice page which addresses the types of error. These types of errors are related to the function which an operator, sub-team, or key decision maker was required to perform. See Figure 2. The types of error for an operator are equipment operation, data interpretation, and communication errors.

Insert Figure 2 about here

Equipment Operator.

Equipment operation errors simply mean that trainees were not able to correctly operate the equipment (e.g., buttons were incorrectly manipulated, improper modes were used, incorrect symbology was employed). A trainee did not understand how to make necessary inputs or how to get useful outputs from the equipment.

Data interpretation errors occur when operators make appropriate inputs, get appropriate output, but do not know what to do with the information given by the equipment. In other words, trainees lack the necessary knowledge and skills which would allow understanding of the stimuli given by the equipment. Trainees, therefore, draw incorrect conclusions.

Communication errors simply mean that either inappropriate communication techniques were used or the information was not passed in a timely fashion.

It should be obvious that these types of error are not mutually exclusive. It is possible that an error may fit into two types at once An instructor is asked to decide which type more closely describes the error observed.

Sub-Team and Key Decision Maker.

Sub-team and key decision maker errors may take the form of data interpretation errors, communication errors, data synthesis errors, tactical errors or failure to correct team deficiencies.

Errors made at the sub-team level can usually be attributed to a sub-team evaluator (i.e., middle-level manager). Data interpretation errors and communication errors have the same definitions for sub-team and key decision maker errors as they do for individual operator errors. In the sub-team case, a communication error may occur within a sub-team or it may be external to a sub-team. That is, a sub-team evaluator received proper information from a sub-team but passed it incorrectly, in improper format, or in an untimely manner.

Key decision makers make communication errors either within their team or in communicating with other teams. Data synthesis errors occur when an evaluator or key decision maker has received proper interpretations of information from various sub-team or team members. The various inputs, however, have not been reduced to a useful set of meaningful conclusions. For example, a sonar evaluator may receive hundreds of bits of information from a sub-team during an attack. An evaluator, however, cannot pass all of this information to the key decision maker. It must be condensed to a few pieces of key data and recommendations which are easily understood and given. Failure to perform this reduction is a data synthesis error.

Tactical errors occur when an evaluator has all the appropriate, correct inputs from a sub-team or team but cannot use

some key tactical rule(s), does not understand enemy tactics, or cannot effectively deploy tactical resources.

A final key decision maker error is the failure to correct sub-team or team deficiencies. This responsibility should be exercised whenever a team weakness is noted. When a key decision maker fails to address deficiencies, an instructor should note an error.

Categories of Trainee(s) Deficiency

After instructors have selected the major error source and error type, the IDAFT program presents them with choices about a trainee's deficiencies related to the error. The deficiencies are based upon Gagne's (1977) domains of learning (intellectual skills, verbal information, motor skills, attitude, and cognitive strategies. Intellectual skills are divided into problem-solving, rules, concepts and discrimination.) These deficiency categories and their corresponding error types are presented in Figure 3. An instructor is asked to decide which deficiency categories (e.g., insufficient prerequisite knowledge or skills, lack of attention, etc.) was most responsible for the error. Again, the deficiency categories are not mutually exclusive and the program relies heavily on instructor judgement.

Insert Figure 3 about here

Note that in Figure 3 none of the deficiency categories reflect the domains of learning entitled "cognitive strategies" or "attitudes". Certainly these domains are important in team training, but our work with instructors thus far shows that they have difficulty in understanding how these domains can be applied. We have included "attention" as a possible category. While "attention" is not a domain in Gagne's terms, it is very important in military operations and instructors understand its meaning.

Causes of Error

The final step before feedback prescriptions are actually given by IDAFT is to have instructors make decisions about the causes of the error. Figure 4 shows the relationship between the categories of trainee deficiency and the causes of the error. The "causes" portion of IDAFT presents more detailed options which explain why an error occurred. For example, if instructors

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Insert Figure 4 about here

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indicated an error was caused by insufficient prerequisite skills, IDAFT asks them to decide whether discrimination skills, concepts, rules or problem-solving skills were lacking. Again, trainees may have lacked more than one type of skill, but for efficiency's sake an instructor chooses the primary cause.

Prescriptions Based upon Events of Instruction

Instructors have now made enough decisions about the error, in consort with the IDAFT to be given the specific feedback prescriptions. These prescriptions are based upon the events of instruction of Gagne and Briggs (1979). Research has shown that the possibility of learning is increased as the number of events of instruction, which are qualitatively addressed by an instruction, is increased.

Carey and Briggs (1977) matched conditions of learning to instructional events and types of learning. The resulting matrix contains 99 event statements which can be called instructional prescriptions. For example, the instructional event of providing learning guidance for problem-solving has the following prescription: "Provide a minimum amount of indirect verbal cues for selection of previously learned rules to achieve a novel combination." This prescription is different from (or unlike) the learning guidance prescription for any other domain.

The IDAFT program automatically presents the instructional events to an instructor in question form (see the example in Table 1). The purpose of all of the previous steps is to get an

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Insert Table 1 about here

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instructor to this point. Instructors can now make decisions about which instructional events were adequately performed during previous team instruction. Each event is phrased in question form such that a "yes" answer moves the program to the next event because the event had been adequately addressed previously. If, however, an instructor answers "no", the program reveals the specific prescription. This questioning process continues through all ten events of instruction. An instructor is then asked if a printout of questions and prescriptions is desired. Only those events which elicited a "no" response are printed.

Other Features of IDAFT

At the beginning of the IDAFT program instructors can type in a three-line sentence describing the nature of the specific error observed. This input can be printed at the end of the IDAFT run. In addition, instructors can type in specific applications of the general feedback prescription recommendation as it appears. For example, a prescription might read "ask the learner to demonstrate the rule by stating it verbally and applying it." This prescription is necessarily general, as are all of the Carey-Briggs prescriptions. It is assumed that an instructor/instructional designer will be able to translate the general guideline into a specific prescription for the situation of interest. In this example, an instructor might have observed

the sub-team violate a communication rule. Upon seeing the general prescription, an instructor might then type in a more specific prescription, such as "tell sonar evaluator and Tactical Action Officer to stress proper format of communication messages."

Again, every new phase of IDAFT has help options which allow instructors to receive definitions and examples of concepts. In addition, instructors can receive a summary of the steps that they had taken to get to a particular spot in the IDAFT program. This "road map" gives them an overview of what might be a somewhat confusing process the first few times through. The option is also available for going back to the main menu at any time to start over.

IDAFT Application Issues

IDAFT is now being tried out with actual team instructors. In the first iteration of IDAFT all examples are aimed at Anti-Submarine Warfare teams since the Human Factors Laboratory is working with these teams. Feedback from instructors thus far has been generally positive. Preliminary adjustments, based upon recommendations from instructors, have included changing some of the terms first used, such as "discrimination" and "synthesis", which have been replaced with synonyms.

Our first notion was that IDAFT would be used after the training scenario was completed. We envisioned the instructors

gathering around IDAFT prior to debriefs with lists of critical errors that they had observed. Each instructor would then work through the IDAFT for the error(s) he/she had observed. Feedback from the instructors, however, has suggested that the more likely use would be in real time as the exercise is running. As an error is observed, one instructor would be assigned to sit at the IDAFT computer. The instructor would work the error through the IDAFT program and then report the results back to the instructor who had observed the error. That instructor would then decide whether to give the feedback while the problem is running or wait until the debrief at the end of the exercise.

Two reasons were given for this recommendation. First, the time taken for preparation of debriefs is usually not long enough to allow many errors to be addressed via IDAFT. (The instructors and teams would rather spend their time in the trainer than talking to each other in a debrief.) Second, it is felt that the feedback will be better understood if it is derived and given soon after the error occurs rather than waiting until the end of a two- or three-hour exercise. Experience has shown that it takes an instructor who is familiar with the system 3-5 minutes to work through an IDAFT prescription.

The IDAFT, or an aid of some other design, should be general in the recommendations it gives. Making the recommendations

content specific has two key disadvantages. First, for most team training topics it would require a considerable resource investment to define all the possible errors and develop feedbacks for each. Second, even if the specific feedbacks could be developed, the instructors might not use them. The instructors would be cut out of the creative problem-solving process for which they are paid.

The Appendix contains a detailed example of the IDAFT process for one feedback branch.

Research Issues

Research issues for investigation with IDAFT include:

1. Is it effective? Does its use increase the quality of feedback given to teams?

2. Will the instructors use IDAFT? Is it "user friendly"? Is the reading level appropriate? How much training in IDAFT use will be required?

3. When will the instructors be most likely to use IDAFT? Will its use necessitate an alteration of current team training techniques?

4. Is the approach used (error analysis-domains of learning-events of instruction) the best method for providing feedback aids? Would another set of theoretical constructs be more useful as a foundation for IDAFT?

We plan to address these questions in the next few months as we work with ASW team instructors. Currently the IDAFT is programmed in BASIC and is being prototyped on an Apple II. An Apple IIc will be used during the hands-on research portion of the project because of its increased portability. Should the IDAFT concept prove effective, it is feasible that the software could be built into team trainers. The instructors could access the program directly on their instructor consoles.

Regardless of the level of success IDAFT attains, our experience leads us to believe that more attention should be paid to instructors of team training. The complexity of their tasks, when combined with the serious nature of those tasks makes their training and aiding a topic of keen importance.

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Appendix

Detailed Example of the IDAFT Process for One Feedback Branch

(A Data Interpretation Error by the Key Decision Maker)

TYPE OF KEY DECISION MAKER ERROR

WAS THE KEY DECISION MAKER ERROR A RESULT OF:

A. KEY DECISION MAKER'S INABILITY TO UNDERSTAND INFORMATION GIVEN (CALLED DATA INTERPRETATION ERROR)

B. DATA REDUCTION ERROR

C. COMMUNICATION ERROR

D. TACTICAL ERROR

E. FAILURE TO CORRECT TEAM DEFICIENCIES

(M)ENU-(S)UMMARY-(H)ELP PRESS THE LETTER ASSOCIATED WITH THE ERROR YOU OBSERVED

DATA INTERPRETATION ERROR

REASON FOR ERROR IS:

A. INSUFFICIENT PREREQUISITE KNOWLEDGE

B. INSUFFICIENT PREREQUISITE SKILLS

C. INSUFFICIENT PREREQUISITE ATTENTION PAID TO THE CUES

(M)ENU-(S)UMMARY-(H)ELP-(L)AST SCREENPRESS THE LETTER OF THE REASON WHICH EXPLAINS WHY THE ERROR WAS MADE

INSUFFICIENT PREREQUISITE KNOWLEDGE

THE CAUSE OF THE ERROR IS:

A. PROBLEM WITH NAMES/LABELS

B. PROBLEM WITH FACTS

C. PROBLEM WITH ORGANIZED KNOWLEDGE

(M)ENU-(S)UMMARY-(H)ELP-(L)AST SCREEN PRESS THE LETTER OF THE CAUSE WHICH EXPLAINS WHY THE ERROR WAS MADE

CURRENT SUMMARY THUS FAR

- KEY DECISION MAKER ERROR -

- DATA INTERPRETATION ERROR -

- INSUFFICIENT PREREQUISITE KNOWLEDGE -

- PROBLEM WITH FACTS -

T-UP HIT (N)EXT TO CONTINUE (M)ENU-(S)TART OVER-(N)EXT FOR PRESCRPT

PLEASE RESPOND (Y)ES OR (N)O TO THE FOLLOWING LIST OF QUESTIONS. AN ANSWER OF 'N' TO ANY QUESTION WILL PROMPT AN IMMEDIATE PRESCRIPTION.

AFTER EACH PRESCRIPTION YOU MAY INPUT YOUR OWN PERSONAL STRATEGY FOR IMPLEMENTING THE PRESCRIPTION.

HIT (N)EXT TO CONTINUE

YOUR INITIAL EVALUATION OF THE ERROR: "TRAINEE COULD NOT DETERMINE LOCATION OF TARGET IN RELATION TO OWN SHIP"

1. DID THE KEY DECISION MAKER PAY ATTENTION DURING THE INITIAL TRAINING? N

PRESCRIPTION

DIRECT ATTENTION TO IMPORTANT FEATURES OF THE NAME/LABEL.

PERSONAL STRATEGY FOR ACCOMPLISHING PRESCRIPTION:

"TRAINEE DID NOT KNOW RANGE OF SONAR. TELL TRAINEE THE RANGE AND ACOUSTIC LIMITATIONS OF THE X SONAR."

2. DID THE KEY DECISION MAKER UNDERSTAND THE TRAINING OBJECTIVE? N

PRESCRIPTION

TELL THE TRAINEE HOW LEARNING THE FACT WILL IMPROVE HIS/HER JOB PERFORMANCE.

PERSONAL STRATEGY FOR ACCOMPLISHING PRESCRIPTION: "TELL TRAINEE THAT IT WILL BE IMPOSSIBLE TO LOCATE TARGET IF X SONAR RANGE IS NOT KNOWN."

3. DID THE KEY DECISION MAKER POSSESS THE NECESSARY KNOWLEDGE? N

PRESCRIPTION

HAVE THE TRAINEE RECALL INFORMATION WHICH IS RELATED TO THE NEW FACT.

PERSONAL STRATEGY FOR ACCOMPLISHING PRESCRIPTION:

"REMIND TRAINEE OF Y SONAR'S RANGE."

4. WAS THE INITIAL TRAINING MATERIAL PROPERLY ORGANIZED AND PRESENTED BY SOMEONE THE KEY DECISION MAKER RESPECTS? N

PRESCRIPTION

PRESENT THE NEW INFORMATION IN A MEANINGFUL CONTEXT TO THE TRAINEE.

PERSONAL STRATEGY FOR ACCOMPLISHING THE PRESCRIPTION:

"RELATE X SONAR'S RANGE TO Y SONAR."

5. DID THE KEY DECISION MAKER HAVE THE NECESSARY GUIDANCE WHILE LEARNING THE SKILL? N

PRESCRIPTION

PROVIDE VERBAL OR GRAPHIC INFORMATION SO THAT THE TRAINEE WILL RECALL A LARGER BODY OF MEANINGFUL INFORMATION. RELATE FACTS TO THIS LARGER BODY OF MEANINGFUL INFORMATION.

PERSONAL STRATEGY FOR ACCOMPLISHING THE PRESCRIPTION:

"PRESENT A GRAPHIC OF X SONAR'S RANGE IN RELATION TO OTHER SONARS."

6. CAN THE KEY DECISION MAKER PERFORM THE TASK AT ALL (I.E., EITHER CORRECTLY OR INCORRECTLY)? N

PRESCRIPTION

ASK THE TRAINEE TO STATE THE FACT.

PERSONAL STRATEGY FOR ACCOMPLISHING THE PRESCRIPTION:

"ASK TRAINEE TO GIVE THE RANGE."

7. DID THE KEY DECISION MAKER PERFORM THE TASK CORRECTLY?' N

PRESCRIPTION

ID FOR THE TRAINEE WHAT WAS INCORRECT ABOUT THE STATEMENT OF FACT.

PERSONAL STRATEGY FOR ACCOMPLISHING THE PRESCRIPTION:

"IF THE RANGE GIVEN BY THE TRAINEE IS INCORRECT, DESCRIBE WHY THE EQUIPMENT PRODUCES A RANGE IS MORE OR LESS THAN THE RANGE THE TRAINEE STATED."

8. WAS THE APPROPRIATE FEEDBACK GIVEN TO THE KEY DECISION MAKER? N

PRESCRIPTION

HAVE THE TRAINEE RESTATE THE FACT WITHIN A LARGER CONTEXT. (THAT IS, HAVE HIM DESCRIBE HOW THE FACT IMPACTS HIS JOB.)

PERSONAL STRATEGY FOR ACCOMPLISHING THE PRESCRIPTION:

"IF THE RANGE GIVEN BY THE TRAINEE IS INCORRECT, DESCRIBE WHY THE EQUIPMENT PRODUCES A RANGE IS MORE OR LESS THAN THE RANGE THE TRAINEE STATED."

9. CAN THE KEY DECISION MAKER RETAIN THE KNOWLEDGE? N

PRESCRIPTION

HAVE THE TRAINEE PRACTICE USING THE FACT AT FREQUENT INTERVALS IN THE FUTURE.

PERSONAL STRATEGY FOR ACCOMPLISHING THE PRESCRIPTION:

"IN FUTURE TRAINING SCENARIOS MAKE SURE THE X SONAR IS REQUIRED SO THAT THE TRAINEE WILL BE FORCED TO USE KNOWLEDGE ABOUT ITS RANGE.

10. CAN THE KEY DECISION MAKER TRANSFER THE KNOWLEDGE? N

PRESCRIPTION

PROVIDE A NEW SITUATION WHERE THE FACT MUST BE USED.

PERSONAL STRATEGY FOR ACCOMPLISHING THE PRESCRIPTION:

"ASK THE TRAINEE ABOUT THE X SONAR'S RANGE AFTER NEW TRAINING SCENARIOS. DETERMINE IF HE REALLY KNOWS WHAT THE RANGE IS."

Figure Captions

Figure 1. Major Steps in the IDAFT Process.

Figure 2. Major Sources of Error and Types of Error.

Figure 3. Reasons for Error.

Figure 4. Cause of Error.

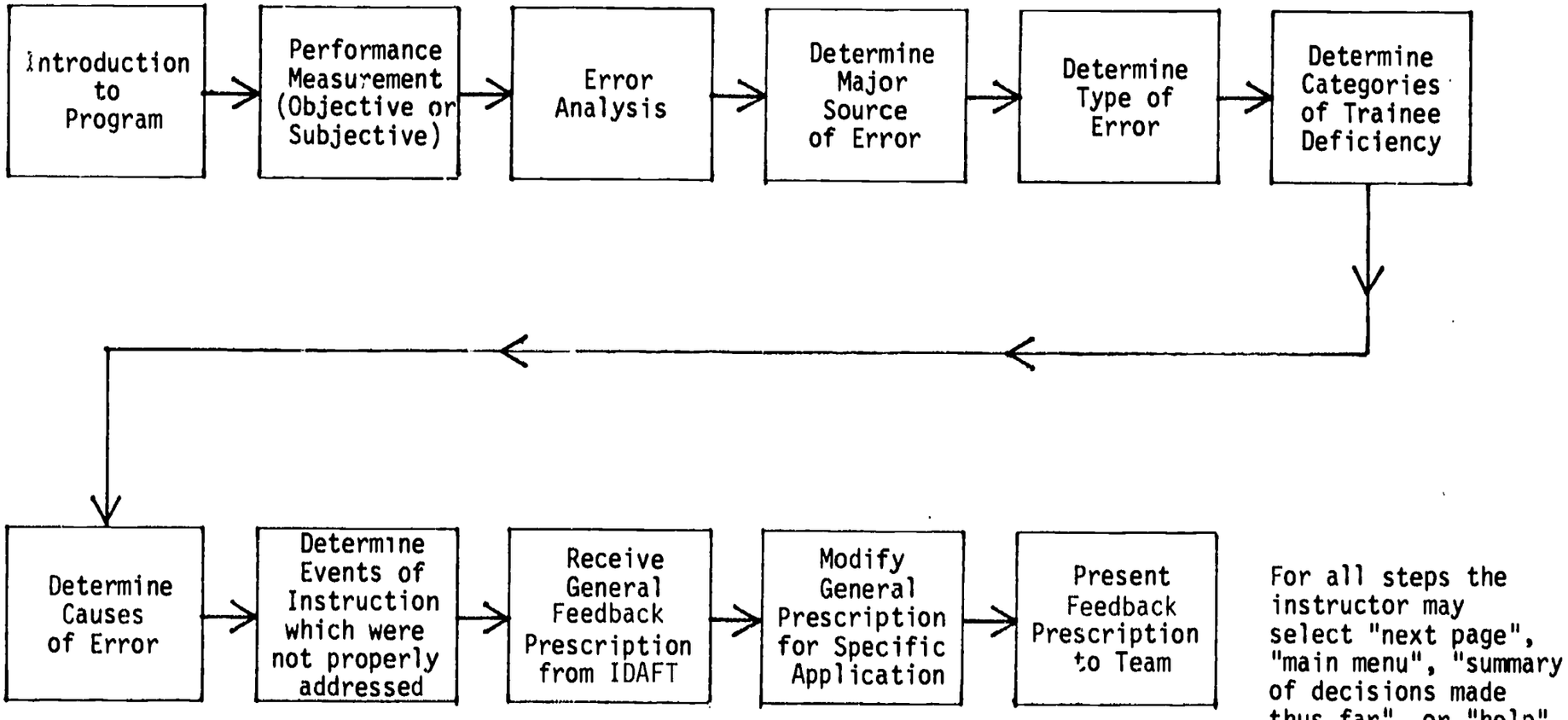

Figure 1 - MAJOR STEPS IN THE IRATT PROCESS

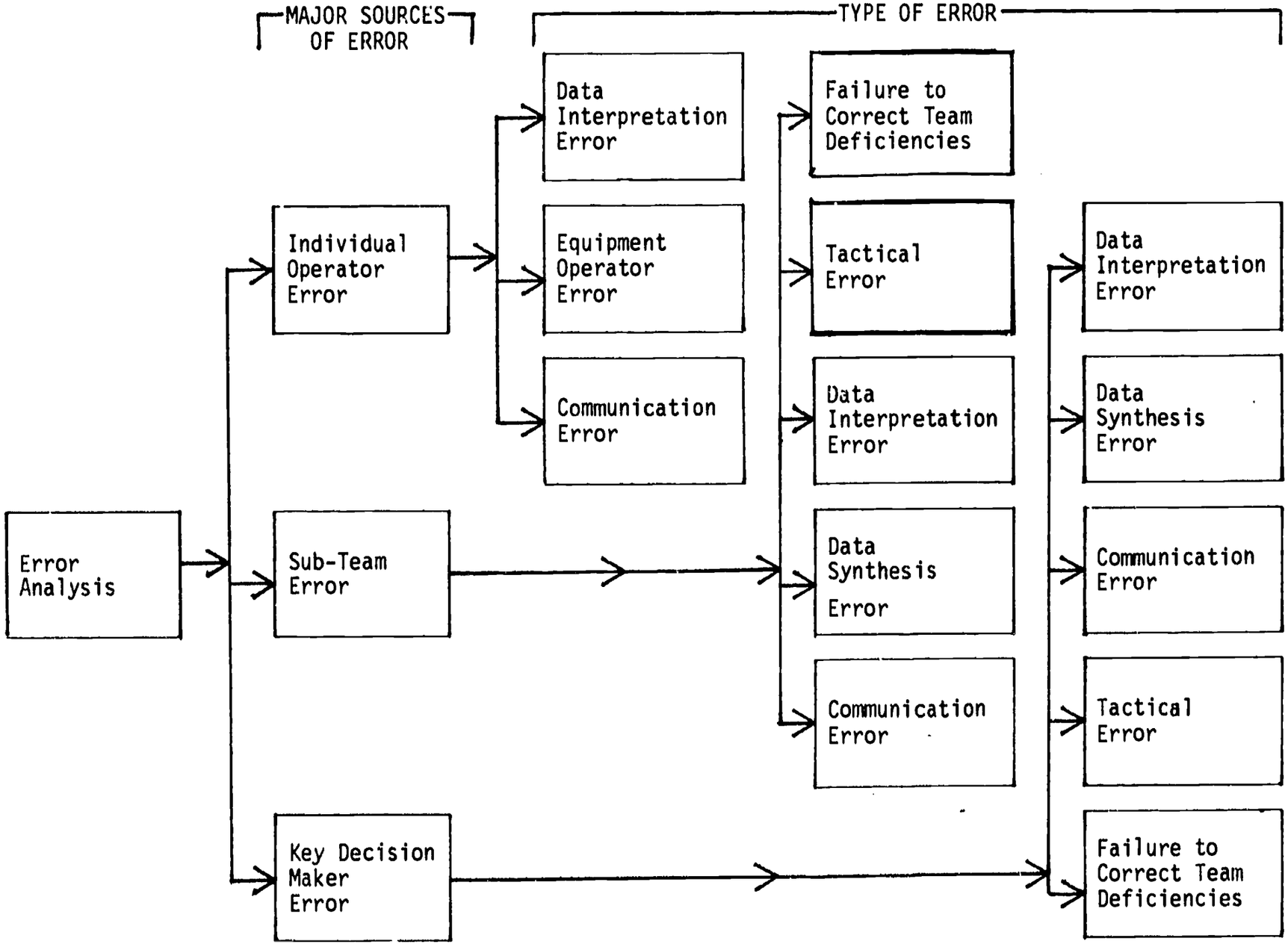

Figure 2 - MAJOR SOURCES OF ERROR AND TYPES OF ERROR

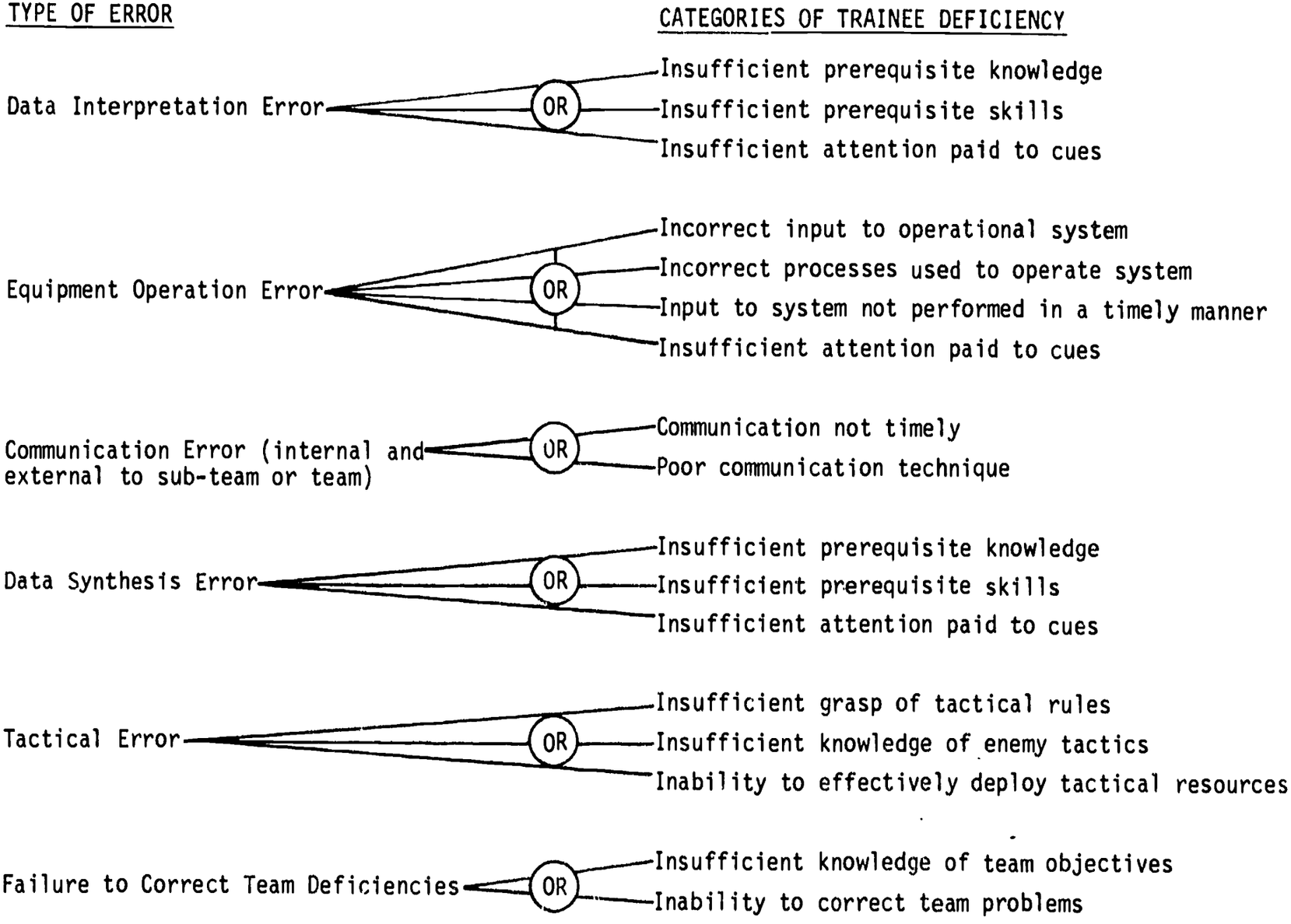

Figure 3 - REASONS FOR ERROR

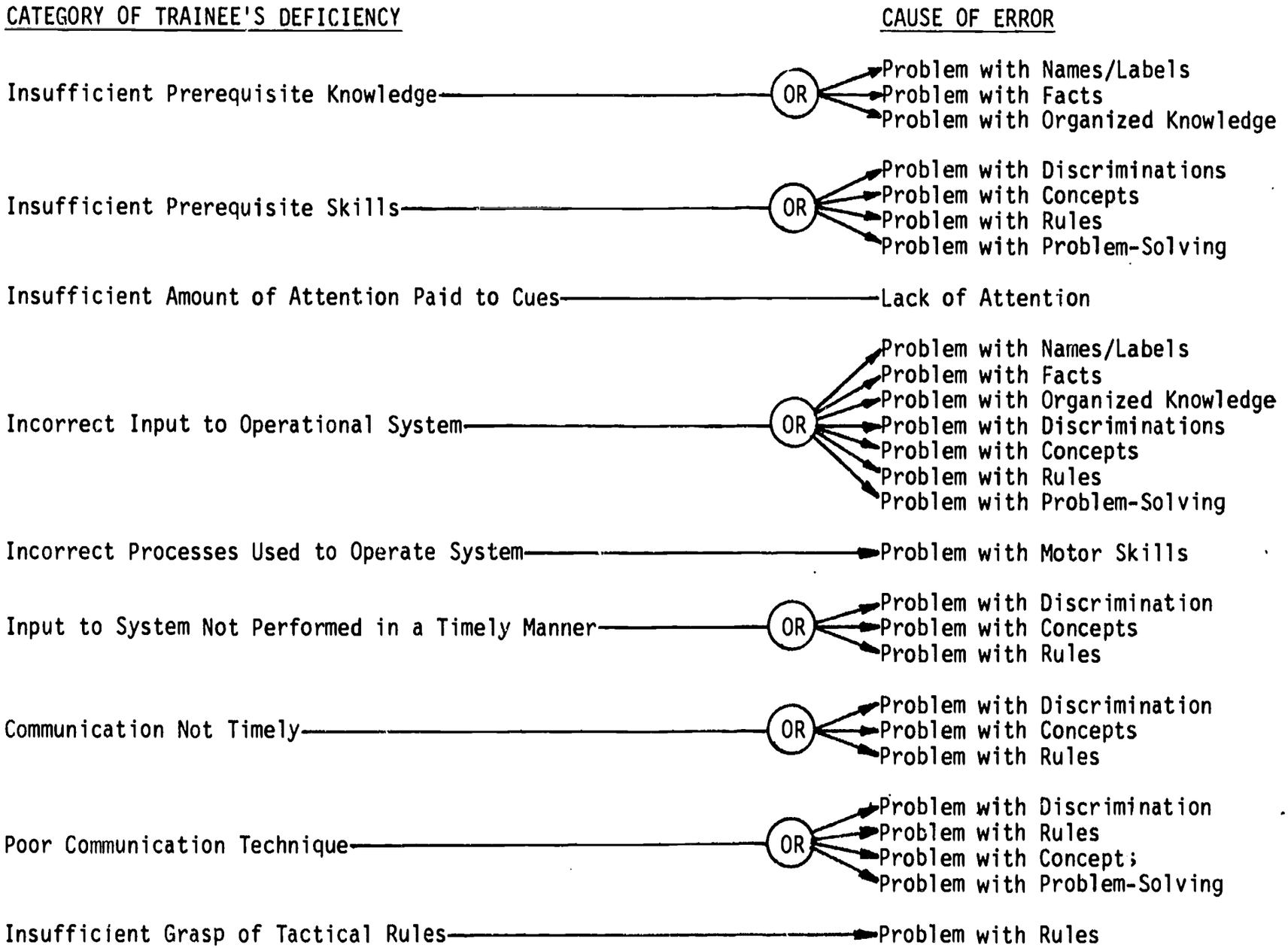

Figure 4 - CAUSE OF ERROR

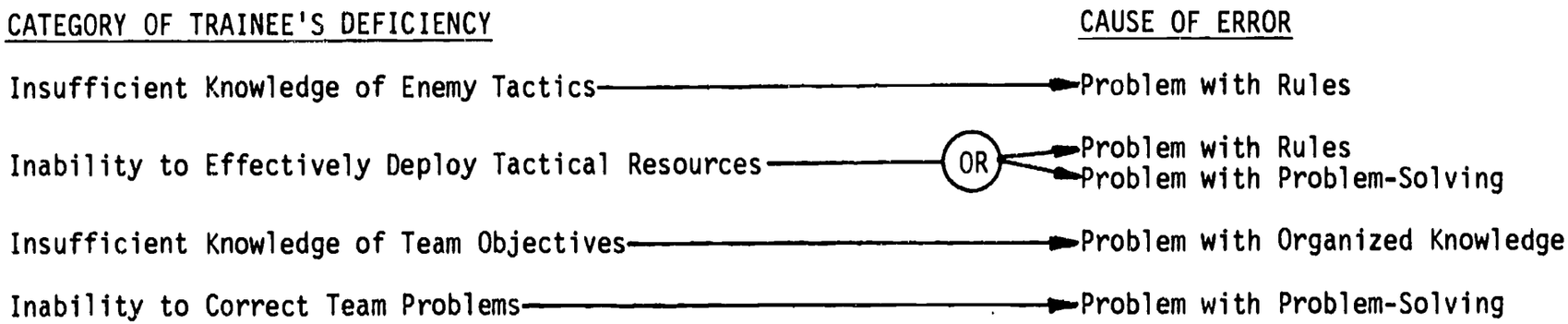

Figure 4 (Continued) - CAUSE OF ERROR