

AD-A057 283

NAVAL WAR COLL NEWPORT RI CENTER FOR ADVANCED RESEARCH F/G 5/10
BEHAVIORAL OBJECTIVES: THE DILEMMA OF EMPIRICAL ADEQUACY.(U)
JUN 78 H B MURRAY

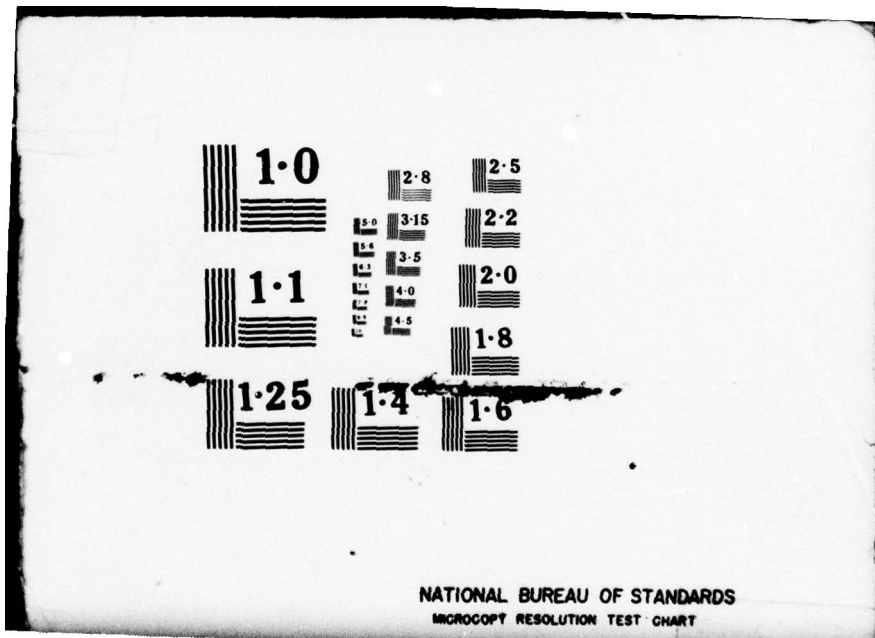
UNCLASSIFIED

NL

1 OF 1
ADA
057283



END
DATE
FILMED
9 -78
DDC



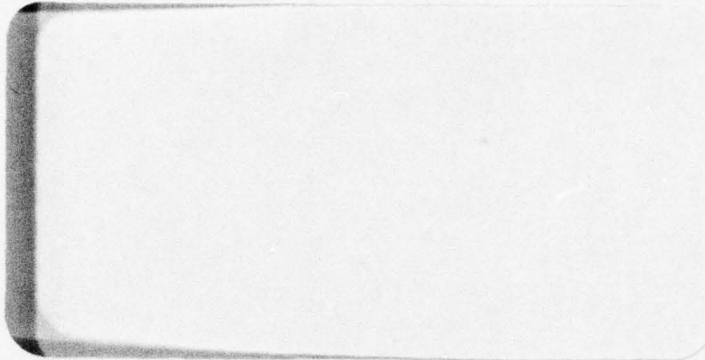
NATIONAL BUREAU OF STANDARDS
MICROCOPY RESOLUTION TEST CHART

LEVEL #

113
nu

AD A 057283

THE UNITED STATES NAVAL WAR COLLEGE



AD No. _____
DDC FILE COPY



DDC
AUG 9 1978
RECEIVED
F

PUBLISHED BY

This document has been approved
for public release and sale; its
distribution is unlimited.

**THE NAVAL WAR COLLEGE
CENTER FOR ADVANCED RESEARCH**

78 08 07 116

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) ⑥ Behavioral Objectives: The Dilemma of Empirical Adequacy		5. TYPE OF REPORT & PERIOD COVERED ⑨ Final Repts
7. AUTHOR(s) Murray M.B., LTC, USA ⑩ H.B. / Murray		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS Center for Advanced Research Naval War College Newport, Rhode Island 02840		8. CONTRACT OR GRANT NUMBER(s)
11. CONTROLLING OFFICE NAME AND ADDRESS Center for Advanced Research Naval War College Newport, Rhode Island 02840		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) ⑫ 69P.		12. REPORT DATE ⑩ June 78
		13. NUMBER OF PAGES 68
		15. SECURITY CLASS. (of this report) UNCLASSIFIED
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

Unlimited.

DISTRIBUTION STATEMENT A
Approved for public release
Distribution Unlimited

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

Unlimited.

DISTRIBUTION STATEMENT A
Approved for public release
Distribution Unlimited

18. SUPPLEMENTARY NOTES

410 268

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

TEACHING METHODS; JOB ANALYSIS; TAXONOMY; BEHAVIOR; BEHAVIOR AND MODELS; COURSES (EDUCATION); COURSES (EDUCATION) AND PLANNING; PERFORMANCE (HUMAN); MODELS; OBSERVATIONS; INFORMATION; EDUCATION; METHODOLOGY; THEORY; INDIVIDUAL TRAINING

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

The proposed research project will address the feasibility of setting learning objectives for a senior service college. The research methodology will be a combination of literature search and interviews. The product will be a "boiled-down" analysis of what the most knowledgeable individuals in this area think is possible or not possible. It will be in a form useful to others desiring to (quoting M.G. Morrison) "apply the findings and recommendations at the War College level as well as to selected subjects at the Command and Staff College level? A study of this nature is particularly timely and challenging.

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

in view of DOD's penetrating scrutiny of officer education programs and the concomitant pressures on the services to restructure their educational systems.

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

AD A057283

AD No. _____
DDC FILE COPY

BEHAVIORAL OBJECTIVES:

THE DILEMMA OF EMPIRICAL ADEQUACY

BY

H. B. MURRAY, LTC, U.S. ARMY

JUNE 1978

DDC
RECEIVED
AUG 9 1978
F

The views contained herein are those of the author, and publication of this research by the Center for Advanced Research, Naval War College, does not constitute endorsement thereof by the Naval War College, the Department of the Navy, or any other branch of the U.S. Government.

Further reproduction of this paper by agencies of the U.S. Government must be approved by the President, Naval War College. Reproduction by nongovernment agencies or individuals without the written consent of the President, Naval War College, is prohibited. The content, however, is open to citation and other reference in accordance with accepted research practices.

ACCESSION	
NTIS	<input checked="" type="checkbox"/>
DDC	<input type="checkbox"/>
UNANNOUNCED JUSTIFICATION	<input type="checkbox"/>
BY	
DISTRIBUTION/AVAILABILITY CODES	
Dist.	
A	

DISTRIBUTION STATEMENT A
Approved for public release
Distribution Unlimited

78 08 07 116

EXECUTIVE SUMMARY

This research project was conducted at the request of the Chairman, Review of Education and Training for Officers, U.S. Army, Washington, DC.

An analysis of behavioral objectives as instructional strategies and as aids in curriculum design is conducted by describing the theoretical arguments for their use and by comparing the conceptual frameworks of the most widely used models. Because the logic of the proponent literature so compellingly favored the use of behavioral objectives, the strong theoretical arguments are contrasted against the reality of the empirical evidence. Although the use of behavioral objectives was proven to enhance learning in a limited number of studies, the empirical evidence did not demonstrate a congruent advantage for their use, nor did the findings confidently delineate the conditions under which behavioral objectives should be used. However, the overall significance of the empirical findings must be mitigated by the conceptual and methodological weaknesses attributed to the available research. Because the results presented in the experimental literature were, to a significant degree, both inconclusive and contradictory, the value of behavioral objectives should perhaps not be assessed solely on empirical grounds. The strong rational and functional arguments in favor of behavioral objectives

could best be improved by suggesting that behavioral objectives be considered one of several educational tools available to the military educator. With credible, empirically derived knowledge concerning the advantages and limitations of behavioral objectives and the conditions under which they can be used most effectively, military curriculum designers and instructors could then rationally determine whether or not this tool is likely to be useful in their own particular educational situation.

TABLE OF CONTENTS

CHAPTER		PAGE
	EXECUTIVE SUMMARY	i
I	INTRODUCTION	1
II	THE DERIVATION OF BEHAVIORAL OBJECTIVES. . .	5
	Perspective.	5
	The Composition of Behavioral Objectives .	9
	Mager Model.	10
	Gagne-Briggs Model	17
III	EMPIRICAL RESEARCH	25
	Survey of the Research	25
	Empirical Effect	35
IV	INSTITUTIONAL COMPARISON	37
	Air Command and Staff College.	38
	Army Command and General Staff College . .	43
	Contrast	48
V	SYNTHESIS OF THE ARGUMENT.	51
	NOTES.	56
	BIBLIOGRAPHY	62

CHAPTER I

INTRODUCTION

It has often been argued that organization is the hallmark of effective military teaching. The appropriate arrangement and sequencing of educational materials appears to influence not only what military students learn but also their perceptions of the usefulness and importance of what is to be achieved, either as specified or unspecified goals. Therefore, procedures which enhance educational organization are likely to facilitate the learning of meaningful material. By providing the student with a useful perspective of what lies ahead in a course of instruction, a framework can be conceptualized from which subsequent learning can be arranged and related. In curriculum development, particularly in the military, the design and use of teaching materials is directed toward facilitating the introduction of new and unusual situations and knowledge. The preface to the teaching to come has usually been accomplished by the use of an introductory statement or preinstructional strategy.

For several years the Army has been attempting to state accurately and unequivocally the educational objectives of officer education and training programs and to describe the criteria of acceptable performance. Recently, there has been an increasing interest in defining the objectives of

teaching and learning in terms of observable performance at the higher levels of the Army's education system. Since learning must be planned, rather than haphazard, so that the diversity of talents among individuals can be enhanced while concurrently providing for institutional socialization, the instructional design must be based upon the knowledge of how human beings learn. There are several types of human capabilities: intellectual skills, cognitive strategy, verbal information, motor skills, and attitudes, that are typically acquired in an educational environment. Because any or all of these human capabilities occur in subject areas such as international relations, military tactics, management, language and science, it is contended that the determination of what capabilities are to be learned is a function of defining needs, goals, and finally the specific behavioral objectives.

Although still controversial, the philosophical basis for behavioral objectives has been discussed and debated for many years, but scholarly empirical research has emerged only within the last decade. The extent to which the empirical research supports the use of behavioral objectives in facilitating the learning process is a key question.

As the research for this project progressed it became evident that general agreement was lacking, not only within the military but also within the education community, concerning the utility of behavioral objectives as instructional

strategies or in curriculum design. Everyone seemed to have a different idea of what behavioral objectives were and how good ones were developed. For these reasons, among others, I elected to structure the final product as described below.

Since this paper is directed more toward the military instructor than the professionally trained instructional technologist, I thought it necessary to first present a theoretical overview concerning the derivation of behavioral objectives. In addition, Chapter II describes the conceptual framework of two of the most widely used paradigms: the Mager and the Gagne-Briggs Models.

Because the logic of the proponent literature was so compellingly in favor of the use of behavioral objectives, it was necessary to contrast the strong theoretical arguments for their use against the reality of the empirical evidence. Chapter III presents a review of the available empirical research from the perspective of three separate surveys of the literature.

Proceeding from the theoretical and empirical aspects of the research to practical contemporary application, Chapter IV contrasts the derivation of behavioral objectives at two intermediate military educational institutions: the Air Command and Staff College and the Army Command and General Staff College. Chapter IV, while detailed in the comparative phase, does not examine the measurements of effectiveness at either institution.

Chapter V is a synthesis of the theoretical, empirical and practical aspects of the behavioral objective dilemma.

This project began as a study of the derivation of behavioral objectives at the higher orders of learning; however, because the subject of behavioral objectives in general is both complex and controversial, the higher end of the behavioral continuum is not considered in isolation. Explicitly described in the models and implicit throughout the paper is the assumption that the literature provides the conceptual framework for the derivation of both lower order and higher order objectives.

Because of the pragmatic constraint of available time, five weeks for research and preparation, the scope of this paper has been necessarily restricted as indicated.

For the purpose of this paper, performance objectives, behavioral objectives, and learning objectives are considered to be synonymous terms.

CHAPTER II

THE DERIVATION OF BEHAVIORAL OBJECTIVES

Perspective

Instruction is done to assist students in the learning process and it should be done responsibly. When a teacher considers the ramifications of the application of learning principles to instruction, there is no better question to be asked than: What is to be learned? Learning must be planned, rather than haphazard, so that each student will come closer to the goals of optimal use of his or her talents and their integration with the physical, professional and social environment. Also, diversity among individuals must be enhanced while concurrently providing for, in the case of the military, institutional socialization.

Instructional design must be based upon knowledge of how human beings learn. In considering how an individual's abilities are to be developed, it is not enough to state what they should be; one must examine closely the question of how they can be acquired. Instructional materials need to reflect not simply the intellect of the author but how the student is intended to learn such knowledge. Accordingly, instructional design must take into account the learning conditions that need to be established in order for the desired effects to occur.¹

Theories of learning have identified a number of conditions for learning, and some of these are controllable by the procedures of instruction. Older theories emphasize particularly the external conditions for learning, embodied in the principles of contiguity, repetition and reinforcement. Modern theories add to these the internal conditions that arise within the learner. These internal states are made possible by the recall of previously learned material from the learner's memory. An act of learning is, therefore, greatly affected by these internally generated processes. In particular, new learning is influenced by the recall of previously learned information, intellectual skills, and cognitive strategies. The varieties of learned capabilities, and the conditions for their learning, constitute the basis for instructional planning.²

There are several different kinds of human capabilities that are typically learned in educational institutions: intellectual skills, cognitive strategy, verbal information, motor skills and attitudes.³ Because any and all of them can occur within each subject area such as science, social studies, mathematics and language, the basic action that must be taken in determining what capabilities are to be learned is one of defining needs, goals and finally the specific behavioral objectives.

The literature generally agrees with the principle that instruction should be planned from the top down and that general needs and goals should be defined before more specific objectives are developed; however, until recently there were no organized methods to serve as guidelines for the instructional designer in accomplishing this task.

Briggs points out that, for a brief workshop of two days, there perhaps would be one general goal and 10 specific objectives; for a course of instruction lasting 12 weeks, there would possibly be three general goals and 30 specific objectives; and for an entire curriculum, there could be dozens of goals and hundreds of objectives.⁴

Since there was no standard method of organizing the objectives of a course of instruction or an entire curriculum in a particular subject or skill area, Briggs developed what has become known as the Six-Level Method. This method consists of (1) needs analysis, (2) goal definition, (3) life-long objectives, (4) end-of-course objectives, (5) unit objectives, and (6) specific behavioral objectives.⁵

In needs analysis the resultant curriculum product must be capable of being defended on the basis of statements of the reasons why the intended population of learners need that particular content and method of instruction.⁶ In the military profession, one method of conducting a needs analysis is to incorporate a job content analysis.

The goal definition should be consistent with the curriculum product developed by the needs analysis. Goals can be stated in behavioral terms so that assessment can be addressed directly to the goals, or the goals can be stated in non-behavioral terms, leaving the assessment of goal attainment to a separate evaluation, or the goals can be expressed in non-behavioral terms with the intent of assessing goal achievement at either the level of unit objectives or specific objectives.⁷

In stating life-long objectives the long term purpose of the course must indicate clearly the total program aspect of the instruction in the subject or skill area. If a single course in typing is to be sufficient for the learner to obtain employment as a typist, the objective should be stated in such terms. In contrast, other courses may only be segments of an overall educational program. For example, if a course in algebra is the initial course in a degree granting program in mathematics, that specific intent should be made clear.

End-of-course objectives serve to distinguish those performances which are expected at the end of the period of instruction. They also serve to facilitate the development of unit and specific objectives.⁹ Briggs believes that after the end-of-course objectives have been compiled, one should next prepare the final examination, if there is to be one. This

back-to-back inspection of the objectives and the examination provides a comparison between objectives and assessment criterion.¹⁰

Unit objectives are most often used to indicate the importance of sequencing instructional units. These objectives may or may not be stated in behavioral terms and their use generally depends upon the duration and/or complexity of the instruction being organized. Some instructional designers may not utilize unit objectives because the structure of the course may be adequately described by using only end-of-course objectives and a series of specific behavioral objectives.¹¹

As previously stated, once the learning goals have been established, either by a job content analysis or by the process of consensus, the next step is to further define the goals in detail by clearly specifying the desired performance or behavioral objectives. The total process is one of working from the top downward; broad goals are first defined, and then more specific objectives, arranged in a layering sequence with respect to the duration, content and complexity of the intended instruction. The "Six Layers" of goals and objectives end with the development of specific behavioral objectives.¹²

The Composition of Behavioral Objectives

The usual distinction between goals and objectives is dependent on the level of generality of the specific statement

and its intended purpose. Goals are indicative of educational outcomes of a general nature that are long-range.¹³ Objectives are statements of specific desired outcomes that are short range and are considered most effective when stated in behavioral terms, so as to clearly describe what behavior should be displayed by a student, as a result of instruction, to demonstrate mastery of the objective. Behavioral objectives generally delineate the terminal products or terminal performance of instruction in terms of observable, measurable behavior.¹⁴

Before writing behavioral objectives the instructional technologist, curriculum developer or teacher must study the statements of goals and determine under what circumstances and to what degree the student can achieve this goal. The key question is: "How can it be determined that a student has achieved the particular goal?"¹⁵ A properly developed objective will provide a precise description of the student's achievement upon mastering the learning implied by the goal statement.

By comparing the two most popular models--the Mager Model and the Gagne-Briggs Model--the formulation of behavioral objectives can be effectively demonstrated in understandable terms.

Mager Model

Robert F. Mager has been credited with producing the first generally accepted set of instructions concerning the

writing of instructional objectives. Since the original book, Preparing Instructional Objectives, was published in 1962, other works have been written; however, according to Kibler and Bassett the contribution of Mager is evident in that subsequent models and approaches have, for the most part, continued to include the basic components of his model.¹⁶

In the Mager Model the objective is "...an intent communicated by a statement describing a proposed change in a learner--a statement of what the learner is to be like when he has successfully completed a learning experience."¹⁷

Mager recommends the use of three components in composing such descriptions:

First, identify the terminal behavior by name; you can specify the kind of behavior that will be accepted as evidence that the learner has achieved the objective.

Second, try to define the desired behavior further by describing the important conditions under which the behavior will be expected to occur.

Third, specify the criteria of acceptable performance by describing how well the learner must perform to be considered acceptable.¹⁸

Kibler and Basset have interpreted Mager's three components as follows:

- (1) identify the action the learner will be taking when he has achieved the objective (e.g., to write, to speak);
- (2) describe the relevant conditions under which the learner will be acting (e.g., 'without the use of references'); and
- (3) specify how well the learner must perform the action (e.g., '100 percent correct').¹⁹

To Mager a meaningfully stated objective is one that effectively communicates the author's intent. The most useful statement is one that excludes the greatest number of possible interpretive alternatives.²⁰ In order to demonstrate how to reduce the ambiguity of action words or phrases and to reduce the number of alternative interpretations, Mager provides a contrasting list of words:²¹

Words Open to Many Interpretations

to know
to understand
to really understand
to appreciate
to fully appreciate
to grasp the significance of
to enjoy
to believe
to have faith in

Words Open to Fewer Interpretations

to write
to recite
to identify
to differentiate
to solve
to construct
to compare
to list
to contrast

According to Mager it is acceptable to include such words as "understand" and "appreciate" in an objective statement; however, the statement will not be explicit enough to be useful as a behavioral objective until there is an indication of how the sampling of the "understanding" and "appreciating" will be accomplished. It is imperative that the individual writing objective statements describe clearly what the student will be doing when he has achieved the instructional intent.²²

Even though the terminal behavior has been unequivocally imparted to the student by the use of appropriate action statements, the specifying of the terminal act alone may not

be enough to preclude misunderstanding. In order to state performance objectives that convey the exact intent of the author, Mager indicates that it is advantageous to describe the conditions that will be imposed upon the student when he is demonstrating his mastery of the instructional objective.²³

The following are examples of the conditions, limitation and restrictions that could be incorporated into the text of a behavioral objective:

Given a problem of the following class...
Given a matrix of intercorrelations...
Without the aid of references...
With the use of notes and references...
Without the aid of an electronic calculator or
other mechanical calculating device....²⁴

Mager proposes that four questions should be asked in order to identify the important aspects of the desired terminal behavior:

1. What will the learner be provided?
2. What will the learner be denied?
3. What are the conditions under which you will expect the terminal behavior to occur?
4. Are there any skills that you are specifically NOT trying to develop? Does this objective exclude such skills?²⁵

Kibler and Bassett suggest that, within the context of the Mager Model, the following three considerations would be useful in determining the conditions under which the learner will be expected to demonstrate achievement:

1. Specify the information, tools, equipment, source materials, and anything else that will be available to students to help them perform the terminal behavior required of the objective.
2. Specify the information, tools, equipment, source materials, and anything else the student cannot use when demonstrating the terminal behavior.
3. List as many of the actual conditions as possible under which the student might be expected to demonstrate the terminal behavior in a real-life setting, and try to include as many of them in the objective as possible.²⁶

Pragmatically, the writer of objectives should describe enough relevant conditions for the objective to imply clearly the variety of test items appropriate for sampling the specified terminal behavior.

In the Mager Model the last component of an objective statement is measurement criterion. Once a student has been informed of what he is to do and the conditions under which he must achieve the instructional objective, he should, according to Mager, be informed as to what the acceptable level of performance will be.²⁷ By specifying at least the minimum acceptable performance level for each instructional objective, there will consequently be a performance standard against which the instructional program can be evaluated. Additionally, the curriculum developer, instructional technologist and teacher will have a means to determine if the educational programs are successful in achieving the instructional intent.

The criterion of successful performance or minimum acceptable skill can be stated in various ways; for example, by specifying the time limit (if a time limit is intended), the minimum number of correct responses that will be acceptable, the number of principles that must be applied in a given situation, or the number of principles that must be identified.²⁸

The following list of performance standards extracted from Instructional Objectives and Evaluation provides some alternative forms of specifying the measurement criterion component of an objective relative to the Mager model:

Minimum Number:

"...must list four steps..."

"...write all ten words presented accurately..."

"...distinguish three main ideas..."

Percent or Proportion:

"write (spell) accurately 100 percent of the 10 words presented..."

"list 80 percent of the verbs appearing in a 200 word message..."

Limitation of Departure from a Fixed Standard

"must be within five decibels of..."

Distinguishing Features of Successful Performance

"...the radio plays within a one-day period..."

"...all balls on the paper are colored red..."²⁹

There are many ways of specifying excellence of performance; however, it is not always possible to specify a criterion with as much detail as desired. Nevertheless, Mager maintains that even if an objective's author feels something cannot be measured adequately, a concerted effort should be made in trying to develop an appropriate method for measurement.³⁰

In summary, an objective statement in the Mager Model is a collection of words or symbols describing an educational intent which communicates what the learner will be doing when demonstrating the desired level of achievement and how the instructor will know that the intent has been accomplished. Stated in another manner, behavioral objectives effectively describe terminal behavior, when these statements identify and name the overall behavioral acts, define the conditions under which the behavior is to occur and lastly define the criterion of acceptable performance.

The following behavioral objective statement is an example of a higher order behavioral objective requiring synthesis behavior or creative activity on the part of the learner:

The student is to be able to prepare an analysis of any three of the five management cases given him at the time of the examination. This analysis should attempt to discuss the cases according to the principles developed during the course, and the student must show evidence of having considered each problem from at least two theoretical points of view by restating these in his own words.

References and notes may be used, and up to four hours may be taken for completing the three case analyses.

_____ behavior (task)
----- criterion (standard)
_____ - conditions

Gagne-Briggs Model

The Gagne-Briggs Model does not differ in any critical respect from the Mager Model. The description of the components of their operational definitions of objectives are related to those of other authors in the field. There are, however, differences in the manner in which they distinguish verbs of action from verbs used to identify the "learned capability" implied by the observed behavior.³¹

Gagne and Briggs describe a precise objective as one which facilitates the observation of another person and includes a number of components which describe the situation in which the action takes place, the limits within which the performance will be expected to occur, and the kind of human performance involved. The last requires that the kind of human capacity which is to be inferred from the observed performance must also be described.³²

The specific components of the model are:

1. Action. What observable act will the learner be doing (e.g., analyzing, comparing, creating)?
2. Object. What is the learner expected to produce as a result of the performance (e.g., analysis, composition, painting)?
3. Situation. An objective must specify the features of the situation. What are the circumstances in which the learner must demonstrate performance (e.g., given five case studies, given the details of an event, given a conceptual framework)?

4. Tools and Other Constraints. How must the action be carried out and what are the limits, if required, to the performance (e.g., using available references, without the use of texts and within one hour, using the medium of water colors)?
5. Capability to be Learned. The inferred kind of human capability must be stated. What is the learned capability that the action gives evidence of having been acquired (e.g., classifies, generates, originates)?³³

According to Kibler and Bassett the five part model differs from Mager's Model in three ways, the most important variance being the distinction that Gagne and Briggs make between verbs which identify the observable action the learner is performing and the verbs which identify the learned capability which may be inferred from the action. The second difference concerns Gagne and Briggs' inclusion of a component referred to as the "object of the performance." While the object is obviously present in the Mager Model, it is not separated from the action verb. The third difference is the exclusion of a specification of performance criteria in the Gagne-Briggs Model. They argue that assessment procedures should be considered later in the instructional design process.³⁴

As in the Mager Model the choice of verbs in the definition of objectives is of critical importance in avoiding ambiguity. The purpose of an objective statement is to communicate unequivocally and reliably so that two

literate people will agree that a specific instance of an observed performance is or is not an example of the performance described by the objective. It is basic to the formulation of objectives that verbs be chosen which accomplish the primary purpose of unequivocal and reliable communications.³⁵ In the Gagne-Briggs Model, there is the important distinction which was alluded to previously concerning the use of two kinds of verbs in a complete definition of an objective; these are the action verb and the verb which identifies the learned capability.³⁶

The consistent theme throughout the literature concerning the writing of behavioral objectives is that the primary requirement of an objective is that it precisely convey the instructional intent of the curriculum designer, instructional technologist and teacher. The concern for instructional integrity or communicative precision apparently led Gagne and Briggs to argue that action verbs alone were too imprecise because they did not denote the learned capability which the learner had acquired.³⁷

According to Gagne and Briggs, action verbs are unambiguous when they reliably communicate observable performances; beyond this criterion, however, no further distinctions appear feasible. From the total set of verbs in the language there are, of course, many which communicate action precisely. However, an action verb does not in itself identify the intellectual skill involved in a specific performance.³⁸

In the section entitled "Describing Human Capabilities," Gagne and Briggs identify the words that can be used as the major verb of an objective statement. The purpose of these words is to communicate the kind of human capability one expects to be learned, as it may be observed in the performance exhibited by the student.³⁹ Five types of intellectual skills are presented under the heading of human capabilities: (1) discrimination, (2) concrete concepts, (3) defined concepts, (4) rules, and (5) higher order rules. Five rather abstract verbs that permit inference about behavior are designated to describe these intellectual skills: (1) discriminates, (2) identifies, (3) classifies, (4) demonstrates, and (5) generates.⁴⁰ (see Table 1.)

The authors concede that statements resulting from the use of the human capability verbs have a formal character that can sometimes be unduly cumbersome. However, distinctions are necessary and the use of the five prescribed words for intellectual skills has the effect of preserving the desired operational characteristics.⁴¹

Referring again to Table 1, the major verbs suggested for cognitive strategy, information, motor skill, and attitude are in order: "originates," "states," "executes," and "chooses."

The verb "originates" implies the kind of intellectual process that is considered to be involved in tasks requiring

TABLE 1
 VERBS TO DESCRIBE HUMAN CAPABILITIES
 WITH EXAMPLES OF PHRASES INCORPORATING THEM

<u>CAPABILITY</u>	<u>VERB</u>	<u>EXAMPLE</u>
1. Intellectual Skill Discrimination	Discriminates	- discriminates by matching French sounds of "u" and "ou"
Concrete Concept	Identifies	- identifies by naming the root, leaf and stem or representative plants
Defined Concept	Classifies	- classifies, by using a definition, the concept family
Rule	Demonstrates	- demonstrates, by solving verbally stated examples, the addition of positive and negative membranes.
High-Order Rank (Problem Solving)	Generates	- generates, by synthesizing applicable rules, a paragraph describing a person's actions in a situation of fear
2. Cognitive Strategy	Originates	- originates a solution to the reduction of air pollution by applying the model of gaseous diffusion.
3. Information	States	- states orally the major issues of the Presidential campaign of 1932
4. Motor Skill	Executes	- executes backing a car into a driveway
5. Attitude	Chooses	- chooses playing golf as a leisure activity.

Source: Robert M. Gagne and Leslie J. Briggs, Principles of Instructional Design (New York: Holt, Rinehart and Winston, 1974), p. 85.

problem solving or thinking. Internally organized capabilities or cognitive strategies imply a sequence of mental operations which permit a learner when confronted with a novel task, without a familiar context, to search for applicable rules and information, formulate a general type of solution, and finally attempt to apply the solution.⁴²

In the information domain the major verb "states" communicates the kind of human capability that can be observed in some performance exhibited by a student. The verb "executes" implies the capability of a highly organized motor skill which can be observed by means of a particular performance. And lastly, since an attitude is a human capability that influences individual choice of action, the major verb is "chooses."⁴³

Gagne and Briggs emphasize the need to carefully choose action verbs suitable for describing both the learned capability inferred from the observed performance, and the nature of the performance. However, in order to reduce ambiguity, the nine human capability verbs are standard in the model.⁴⁴

In summary, the Gagne-Briggs Model advocates the use of a five component guide to facilitate the writing of unambiguous statements of objectives for varying instructional needs. A precise behavioral objective within the context of the model facilitates the observation of another person and includes the components which describe the situation

in which the action takes place, the limits within which the performance will be expected to occur, and the kind of human performance involved.⁴⁵ The five components are:

1. Situation
2. Learned capability
3. Object
4. Action
5. Tools or other constraints.⁴⁶

It is the opinion of Kibler and Bassett that the Gagne-Briggs Model is the most complete in the field and has the added advantage of reflecting an operational linkage to the research concerning human capabilities.⁴⁷

The following behavioral objective statement is an example of a Gagne-Briggs higher-order objective requiring synthesis behavior or creative activity on the part of the learner:

Given a general statement of the scope and sequences of topics, concepts, or unit objectives for a college course in International Relations, the student will generate the appropriate student objective in each of the five domains of learning, by writing such objectives, to include all five elements for each objective, within a one-week period.

The same objective statement is presented as component parts of the model:⁴⁸

<u>Objective</u>	<u>Element of Objective</u>
a. Given a general statement of the scope and sequence of topics, concepts, or unit objectives for a college course in International Relations	a. Situation
b. the student will <u>generate</u>	b. Learned Capability (problem-solving)
c. the appropriate student objectives in each of the five domains of learning	c. Object
d. by writing such objectives	d. Action
e. to include all five elements for each objective within a one-week period.	e. Tools, Constraints and Special Requirements

CHAPTER III

EMPIRICAL RESEARCH

A review of the literature concerning objectives indicates that the philosophical basis for behavioral objectives has been discussed and debated for many years but that scholarly empirical research has emerged only in the last 10 years. The extent to which empirical support exists for the use of behavioral objectives in facilitating the learning process is subject to controversy. Empirically, the experimental literature does not appear to demonstrate a consistent advantage in the use of behavioral objectives.¹ However, before proceeding, it must be pointed out that several scholars who have recently reviewed the available experimental literature concluded that many of the studies cited contain numerous theoretical and methodological weaknesses.²

Survey of the Research

Survey 1

J.P. Byers, et al., provides the most comprehensive summary of the current state of empirical findings concerning behavioral objectives. Over 150 experimental articles, theses and dissertations were examined with the intent of, among other things, producing a theoretical rationale for the prediction of the positive effects of behavioral objectives on learning.

There appear to be four particularly key areas of concern for the curriculum designer, instructional technologist or teacher with respect to the use of behavioral objectives. These are the interrelationship between the student's possession of objectives and subsequent learning; the student's possession of objectives and learning efficiency; the form in which the objectives are stated and subsequent learning; and the teacher's possession of objectives and subsequent student achievement.³

Because of the rather extensive portion of the contemporary educational literature devoted to either praising or damning the use of behavioral objectives, I anticipated that there would be an extensive body of empirical knowledge that would serve to specify the conditions under which behavioral objectives could effectively be used to enhance the learning process. Regrettably, as the conclusions of the Byers, et al., study indicate, careful examination of the empirical literature did not produce either consistent or particularly confident results concerning the effectiveness of using behavioral objectives.⁴

Did the possession of behavioral objectives by students aid in the learning process?

Investigation of the effects of student's possession of behavioral objectives on learning provides no conclusive findings, but current results favor the preliminary observation that no differential effects on learning can be attributed to students' use of objectives.⁵

With only 30 studies, of the 71 examined in this area, reporting that the use of behavioral objectives improved learning significantly, the research did not clearly support the use of behavioral objectives.⁶ However, Kibler and Briggs, commenting on the same findings, contend that the "...prevailing logic of instructional systems design suggests that students provided with performance objectives should demonstrate superior learning...."⁷

Does the form in which the objectives are stated aid in subsequent learning?

While inconclusive, investigation of the effects of objective form (specific versus general statements) suggest there are no differential effects on student learning attributable to the way in which objectives are stated.⁸

Again the research is inconclusive because, of the 13 studies reviewed in which the form of the objective served as the independent variable, only four reported that students provided with objectives written in behavioral terms achieved meaningfully higher scores. The remaining studies reported no significant difference between the use of specific or general objectives.⁹ One of the apparent problems in examining the studies was the lack of information provided by the authors concerning the operational definitions for specific and general objectives. Once more, Kibler and Bassett maintain that, although the empirical data is inconclusive, there are logical grounds for the continued use of behavioral objectives.¹⁰

Did the possession of behavioral objectives by teachers aid in subsequent student achievement?

While inconclusive, present investigations suggest that it may make little difference whether or not teachers possess objectives.¹¹

Even though there appear to be sound reasons for providing teachers with behavioral objectives, of the seven studies examined in which the teachers' use of objectives served as an independent variable, none provided evidence indicating that there were significant effects on student achievement.¹² Although the research indicated that student performance did not increase as expected as a function of providing teachers with objectives, Kibler and Bassett maintain there was certainly no debilitating effect on student achievement.¹³

Did the possession of behavioral objectives by students influence learning efficiency?

While inconclusive, investigations of the effects of behavioral objectives on efficiency of learning (in terms of time) suggest that whether students are provided with objectives is not an influential factor on the time required for learning.¹⁴

One of the ostensible advantages for providing behavioral objectives was because it was felt that students would be assisted in directing their efforts towards behaviors necessary for mastery of a given course of instruction. However, of the 11 studies in which time was a dependent

variable, eight studies reported no difference in learning time between students provided behavioral objectives and those not provided objectives, while only three studies reported that the use of objectives meaningfully reduced learning time.¹⁵ Although the expectation was not realized, it is the opinion of Kibler and Bassett that "...reason favors an expected increase in learning efficiency with the use of objectives...."¹⁶

Survey 2

In a 1976 review of the experimental literature, J. Hartley and I. K. Davis examined those studies which considered the effect of deliberately teaching students, and/or teachers, how to utilize behavioral objectives as aids to learning or teaching. Paradoxically, no significant advantage was reported in the available research literature concerning the training of students in the use of objectives; however, the training of teachers in the use of objectives was found to enhance subsequent student learning.¹⁷ This could become a key contemporary issue, because there are prominent scholars in the field of instructional technology who believe that the primary use of behavioral objectives should be in curriculum and course design.

Hartley and Davis use teaching strategies, task characteristics, and learner characteristics as variables to summarize their review of the research literature concerning behavioral objectives.

Teaching strategies: Objectives would seem to work best when they are salient to the instructional task. Several studies have demonstrated a greater recall of prose material when instructional objectives are used by the subject as directions to learn specific subsets of material. The research also suggests that disclosing objectives to students prior to traditional types of teaching is more advantageous than disclosing them prior to nontraditional teaching situations like programmed instruction, computer-assisted instruction, etc. It would seem that the closely structured nature of carefully developed materials tend to make objectives - like pretests - superfluous, whereas the explicitness of objectives prior to more loosely formed and more dynamic material help them to serve as useful "organizers."

Task characteristics: ...Behavioral objectives do not appear to be useful, in terms of ultimate post test scores, in learning tasks calling for knowledge and comprehension. On the other hand, objectives do appear to be more useful in higher level learning tasks calling for analysis, synthesis and evaluation. Furthermore, objectives appear to reduce the requirement for reasoning in some tasks, and they sometimes have an interfering effect on tasks calling for problem solving skills.

Learner characteristics: ...Students of middle ability...appear to profit more from being given behavioral objectives than students of higher or lower ability. Furthermore, it would seem that the possession of objectives can reduce anxiety.... Male students from a high socioeconomic background achieved significantly more when given objectives than students from other backgrounds or of the opposite sex....More independent and less conscientious students would appear to benefit more from perspective and structure that objectives can give to a task.¹⁹

It would appear, according to Hartley and Davis, that the possession of behavioral objectives by a student does have a beneficial effect on learning, but the consequence is less meaningful than many advocates claim. Interestingly,

the level of education did not appear to affect the effectiveness of behavioral objectives, nor did the length of the period or course of instruction. Also, the topic or type of subject matter such as the physical or social sciences did not seem to be a factor. The result of the Hartley-Davis survey would therefore indicate that behavioral objectives are useful pre-instructional strategies which perhaps could best be used in situations requiring that the student be explicitly informed of the task. Additionally, the use of objectives appears to be most appropriate when prefacing extended periods of instruction which typically have a dominant overall structure.²⁰

Survey 3

To this point a large number of claims have been made in arguing the cases for and against the use of behavioral objectives. Of these claims, two are of particular interest and are the subject of a review of the research literature by R. F. Milton.

Not only are these claims repeated time and again, but they are apparently in direct conflict. Milton points out that those who support the use of behavioral objectives, such as Gagne and Mager, typically espouse that "...behavioral objectives clearly indicate to students what is required of them, and as a result student performance improves."²¹ In contrast, those who challenge the effectiveness of behavioral objectives, such as Arstine and Raths,

characteristically state that "...behavioral objectives discourage students from expanding their horizons by encouraging them to confine their learning to specified objectives."²²

Since in the final analysis it is an empirical question as to whether or not behavioral objectives are of educational value, Milton presents the evidence in support of the two conflicting claims and also provides possible explanations for the contradictory evidence.

Do behavioral objectives in the possession of students improve learning performance?

A number of studies have described research which lend support to the claim that providing students with behavioral objectives improved learning, however Milton's review indicates that a substantial number of research efforts did not demonstrate improved student performance. A meaningful point here though, is the fact that in none of these instances did the availability of behavioral objectives appear to detract from student performance.²³

In an attempt to explain the anomalies, Milton again reviewed the various studies. He noted in one experiment in which the availability of behavioral objectives had had no apparent effect, that the instructions were presented to the students in written form and could have actually been ignored. The point is that it is not sufficient to simply provide the objectives; the students must necessarily

be aware of them.²⁴ A follow-up study, in which it was noted whether or not the control group read the objectives provided, concluded that so long as students were aware of the behavioral objectives, student performance was enhanced.²⁵

Milton also suggests a number of additional conditions under which behavioral objectives might be ineffective:

- a. If the objectives are not sufficiently clear (too general) or too ambiguous to be of particular assistance.
- b. If the objectives are of extreme facility or difficulty. (The readability of instructional material may often be related to this condition.)
- c. If the instructional material is not structured in such a way as to ensure that the specified objectives (and related test items) can be mastered (e.g., instructional material not sufficiently relevant).
- d. If students are so highly motivated that they are likely to master the objectives regardless of whether or not they are specified. (The degree to which the instructional material interests the student is likely to relate to this condition.)²⁶

Do behavioral objectives in the possession of students discourage them from expanding their intellectual horizons?

Unfortunately, there are few studies available for review which adequately address the complex nature of the question, and those that do present findings that appear contradictory.

One study concluded that the use of behavioral objectives enhanced student performance in relation to specified objectives without adversely affecting or distracting from incidental learning performance relative to unspecified objectives within a lesson.²⁷ Another similar study reported that the use of behavioral objectives enhanced student performance relative to specified objectives, but in contrast to the previous study, incidental learning, relative to unspecified objectives was adversely affected.²⁸ A third study concluded, as the previous two had, that the use of behavioral objectives enhanced intentional learning; however, in contrast to the previous findings concerning unspecified objectives, incidental learning was actually enhanced by the use of specified behavioral objectives.²⁹

Other pertinent studies describe the effects of the placement of questions (assuming questions serve the same function as behavioral objectives) within the text of a lesson. Generally, the learning of relevant information was enhanced by the use of inserted questions, post-questions being more effective than pre-text questions. Also it was reported that incidental learning tended to be improved by the use of post-questions but not by the use of pre-questions, which in some cases reduced incidental learning.³⁰

From these contrasting studies it is interesting to note that behavioral objectives inserted prior to a related text appear to act as "orienting stimuli" and serve to

focus the student's attention toward the relevant material, thereby enhancing relevant learning while ostensibly depressing incidental learning. Conversely, behavioral objectives presented immediately after the related text appear to operate as "reinforcing stimuli" without adversely affecting the incidental learning that has already taken place.³¹

As Milton's review of the research indicates, a variety of conditions determine whether or not behavioral objectives improve relevant learning and adversely affect or enhance incidental learning. This complex situation is exacerbated by an apparent tendency of problem oversimplification by those who adamantly support or oppose the use of behavioral objectives.

Empirical Effect

As previously stated, the extent to which empirical support exists for the use of behavioral objectives in facilitating the learning process is the subject of continuing controversy. While behavioral objectives have been shown to specifically facilitate learning in a limited number of studies, the empirical evidence does not generally demonstrate a consistent advantage for their use, nor do the findings confidently delineate the conditions under which behavioral objectives should be used.

It appears, then, in an attempt to improve the efficacy of behavioral objectives, proponent educators have inadvertently encouraged the use of objectives beyond their

empirically determined value. However, the significance of a great many of the findings must be mitigated by the conceptual and methodological flaws attributed to much of the available research.³² Since much of the experimental literature presented inconclusive results and the remaining studies were often diametrically contradictory, it would, perhaps, not be prudent to judge the value of behavioral objectives solely on empirical grounds.

CHAPTER IV

INSTITUTIONAL COMPARISON

Ideally, the identification and definition of behavioral objectives serve as important steps in the design of instruction by providing guidelines for the development of instruction, and for devising measures of performance that facilitate the determination of whether or not course or curriculum objectives have been satisfied. The instructional intents are frequently formulated as a set of purposes for a course; these are then further refined and finally transformed to operational terms by the process of defining the specified behavioral objectives. These behavioral objectives then serve as a basis for evaluating the success of instruction by describing the planned outcomes of the intended instruction.

Throughout this paper the theoretical importance of stating instructional objectives as learning outcomes and of defining each objective in terms of observable student behavior have been emphasized. The procedures for preparing, selecting, and utilizing behaviorally defined objectives have been described using both the Mager and Gagne-Briggs Models. Selected examples of course design from the Air Command and Staff College and the Army Command and General Staff College will be presented to demonstrate contemporary variations in usage of behavioral objectives at the higher echelons of military education.

Air Command and Staff College

Of the two military educational systems examined, the Air Command and Staff College, located at Maxwell Air Force Base, Alabama, currently has the most comprehensive behaviorally-designed curriculum.

The example will present, in order, the College's mission, its overall instructional goals, the Command and Management Department's area objectives, and the Command and Management Department's Command and Leadership phase objectives, followed by the specific behavioral objectives developed for a particular lesson within the phase and area cited above.

The most general component is the mission statement which was derived from a "needs analysis" that incorporated a field grade officer job content analysis.¹

Mission: The mission of the Air Command and Staff College is to develop the professional knowledge and skills of selected field grade officers to prepare them for the assumption of increasing responsibility, both on the staff and in command.²

The definitions of curriculum goals are consistent with the product of the "needs analysis," the mission statement. Goals are, in this instance, expressed in non-behavioral terms with the intent of assessing goal achievement at the level of unit or specific objectives.³

COURSE GOALS:

COMMON STAFF SKILLS:

1. To further prepare staff officers to reason logically, solve problems effectively, communicate clearly and organize effectively for executive decision.
2. To develop an understanding of the organization, policies and programs through which the Air Force functions.
3. To develop field grade officer leadership and management skills.

SPECIFIC STAFF SKILLS:

4. To develop Air Command and Staff graduates with skills for employing aerospace forces against the background of historical and contemporary perspectives on warfare.

SPECIALIST SKILLS:

5. To expand an officer's knowledge of a functional specialty and increase his aptitude, insights, and analytical skills within that discipline. This indepth instruction must serve to increase an ACSC graduate's effectiveness within his area of specialization and reduce the transition time required in his next assignment.

BROADEN KNOWLEDGE OF THE AIR FORCE:

6. To develop and emphasize knowledge consistent with action officer, mid-level supervisor, and unit command responsibilities.

BROADEN VIEW BEYOND THE AIR FORCE:

7. To develop an understanding of the world environment as it affects the Air Force officer's knowledge and application of skills and to increase his sensitivity to the national security process.

RESEARCH:

8. To research, document findings and provide insight and recommendations to the DOD/Air Force on functional topics.⁴

The goal definitions are followed by area and phase objectives which are closely related to the "end-of-course" and "unit" objectives used by Briggs to describe the Six-Level-Method of organizing the objectives of a course or curriculum.⁵

The area or "end-of-course" objectives distinguish those performances which are expected at the end of the period of instruction. They also assist in the development of unit and specific objectives.

...Area 2: Command and Management

Objective: At the end of this phase the student should be able to:

1. Apply selected nonquantitative decision making techniques in deriving solutions to management problems (supports Goal 1).
2. Comprehend the use of selected quantitative techniques as aids in interpreting analytical studies (supports Goal 1).
3. Comprehend the structures and purpose of existing DOD/AF staffs (supports Goal 2).
4. Apply field grade officer leadership skills in the Air Force environment (supports Goal 3).
5. Apply field grade officer management skills in the Air Force environment (supports Goal 3).
6. Comprehend logistics support to Air Force operations (supports Goal 4).
7. Comprehend the impact of current Air Force programs and policies on mid-level supervisors and commanders (supports Goal 6).
8. Comprehend the impact of national attitudes and policies on Defense Resource allocations (supports Goal 7).⁶

The phase or "unit" objectives are used primarily to indicate the importance and sequencing of instructional units. At the Air Command and Staff College, phase objectives are stated in general behavioral terms.⁷

...Phase 2: Command and Leadership

Objective: At the end of this phase, the student should be able to:

1. Comprehend the impact of attitudes of Air Force people on the leader.
2. Comprehend leadership characteristics which enhance effective and proper exercise of authority and responsibility.
3. Apply leadership techniques in a simulated command and staff situation.
4. Comprehend directives, policies, and programs pertinent to command and staff leadership.⁸

The development of objectives in the present example has evolved from an overall mission statement of the institution from which consistent educational goals were derived. These broad goals were further refined in terms of the major curriculum subject areas by stating general area behavioral objectives. Subsequently, objectives were developed which delineated the general behavioral performance requirements for the particular sub-course or phase of instruction. The final step involved the stating of specified behavioral objectives for a specific lesson.

M30303- 2S Group Problem Solving - Nominal
Group Technique

Objectives:

1. Apply the Nominal Group Technique in a problem-solving scenario.

1.1 Explain the steps of the Nominal Group Technique (NGT).

1.2 Explain the situations in which NGT is appropriate.

1.3 Participate as a group member in an NGT exercise.⁹

...

The instructional system design techniques used by the Air Command and Staff College focus on objective statements that accurately indicate instructional intent and desired student performance. Unmanageable lists of specific learning tasks are avoided by writing objective statements which are general enough to provide guidelines for teaching without overly constraining the instructional process, yet specific enough to accurately state the behavior that students are expected to demonstrate when the objectives have been satisfied.

It is interesting to note that although the specific behavioral objectives used by the Air Command and Staff College are intended to specify the desired learning outcome, they were not intended to infer that incidental learning was not expected. Curriculum evaluation found that, in some cases, information that was not directly related to a

specific behavioral objective was ignored in the process of satisfying what were perceived as being only terminal objectives. In theory, the curriculum designers had intended that the specified behavioral objectives would serve not only as terminal indicators but would also concurrently act as enabling objectives to stimulate incidental learning.¹⁰

Army Command and General Staff College

The U.S. Army Command and General Staff College, located at Fort Leavenworth, Kansas, is in a period of transition concerning the use of behavioral objectives. At the time of this writing, however, the four departments had implemented a program that emphasized the stating of instructional objectives as learning outcomes and intended student performance indicators.

At the Army Command and General Staff College, in contrast to the Air Command and Staff College, it is more difficult to trace the path of curriculum design from the institutional mission statement to the specific lesson behavioral objectives. The example will present, in order, the College's mission, its functions, the Management course description, and the Management and Force Development sub-course goals, followed by the specific behavioral objectives developed for a particular lesson within the sub-course cited above.

At Fort Leavenworth the mission statement has also been derived from a "needs analysis"; however, to date no serious job content analysis has been conducted.¹¹

Mission: The mission of the Command and General Staff College is to provide instruction for officers of the Active Army and Reserve components, worldwide, so as to prepare them for duty as field grade commanders and principal staff officers at brigade and higher echelons.¹²

Although not as extensive as the goals stated for the Air Command and Staff College, the instructional goals at Fort Leavenworth, stated as functions, are consistent with the institutional mission statement.

Functions:

The College will perform the following functions:

- a. Prepare officers to -
 - (1) Command battalions, brigades and equivalent-sized units in peace of war.
 - (2) Train these units to accomplish their assigned mission.
 - (3) Employ and sustain weapon systems to optimize their effect in the conduct of combined arms operations.
 - (4) Serve as principal staff officers from brigade through division to include support commands, and as staff officers of higher echelons, including major Army, joint, unified, or combined headquarters.
 - (5) Manage manpower, equipment, money, and time with maximum efficiency. ...¹³

In this instructional scheme, function statements or general instructional goals are followed by course description

and sub-course goals. This procedure is in contrast to the instructional system design techniques of the Air Command and Staff College in which progressively more well defined end-of-course (area) and unit (phase) objectives pragmatically follow the general instructional goals.

Course 2 - Management

Upon completion of this course the student will have acquired a body of knowledge pertaining to the procedures, methods, and techniques of Army resource management sufficient to enable its use. Included are several analytical techniques, supported by automation, which enable the commander/manager to more efficiently and effectively manage his resources in consonance with current tactical and logistical doctrine. The student will acquire a basic understanding of the process by which Army force requirements and the supporting financial/manpower requirements are determined. Selected case studies are used to enable the student to apply the techniques of resource management within fiscal constraints, to develop force alternatives, and to evaluate tradeoffs and performance....¹⁴

In behavioral terms the preceding statement has little apparent value in distinguishing those performances which are expected of a student at the end of a course of instruction.

Subcourse goals for the Management and Force Development sub-course are stated more in terms of a course description in combination with general non-behavioral objectives.¹⁵

Management and Force Development Subcourse goals:

This subcourse is designed to give the student a knowledge of resource management, force development, operations research/systems analysis, automatic data processing management information

systems. The student will understand the process by which the Army force structure is determined and the development of the requirements for the associated financial and manpower resources; use selected analytical techniques to solve management problems; and understand selected automatic data processing management information systems.¹⁶

The identification and definition of performance objectives are important steps in the design of instruction. The design process, however, should begin, as previously stated, by establishing the learning goals either by job content analysis or by consensus. Ideally, the next step is to further define the goals in more detail by accurately stating the general objectives. The final step is to develop the specified behavioral objectives. The total process is one of working from the top downward.¹⁷

The terminal learning objectives, as they are called at Fort Leavenworth, appear to have been developed in isolation and not as part of an overall instructional systems design.

Lesson 10. Economic Analysis

1. Terminal Learning Objective

- a. Task: Explain economic analysis terms.
Condition: Given specified terms; from memory...
Standard: Brief explanation of five specified terms...
Reference: ...

- b. Task: Explain the components of the economic analysis process.
Condition: Given the same components of the economic analysis process; from memory...
Standard: Brief explanation of any three of seven components...
Reference: ...
- c. Task: Identify economic analysis components.
Conditions: Given a brief economic analysis problem scenario and the seven components of the economic analysis process.
Standard: Brief explanation of all components contained in the scenario...
Reference: ...
- d. Task: Recommend a decision.
Condition: Given a brief economic analysis problem scenario and a DOD discount factor table.
Standard: Decision supported by application of discounting sunk cost, residual/terminal value and life cycle cost computations without procedural/logic error...
Reference: ... 18

By specifying the task, condition, and standard, the preceding technique does clearly indicate instructional intent and expected student performance in both lower and higher order skills. However, over the period of an entire course, the process of repeatedly referring to what appear to be a cumbersome, simplistic and perhaps overly explicit series of tasks, conditions and standards could possibly constrain both the instructional and learning process.

The development of objectives in the Command and General Staff College example did not appear to be an evolutionary process. There was no apparent sequential flow from the

mission and functions statements to the process of developing specific behavioral objectives for particular sub-course lessons. There was an apparently abrupt transition from the broad goals to specific behavioral objectives that fosters the impression that the process of developing behavioral objectives was directive in nature and not an original component of the overall instructional system design at the college.

Contrast

There is a distinct difference between the two institutions' use of behavioral techniques. The Air Command and Staff College has an educational system which is designed to incorporate the principles of behavioral techniques from top to bottom. There are conspicuous and progressively more specific linkages from the institutional mission statement down to the specified behavioral objectives of a particular lesson. These progressive linkages appear to be missing at the Army Command and General Staff College.

Simplistic and overly explicit objectives are avoided at the Air Command and Staff College by the considered development of objective statements which are general enough to provide instructional guidelines without unduly constraining the process of teaching. They are also specific enough to clearly state the behavior the student is expected

to demonstrate. While, at the Army Command and General Staff College, the specification of tasks, conditions, and standards does clearly indicate instructional intent and expected student performance for a specific lesson; nevertheless, there appears to be a problem with the overspecification of objectives. As previously stated, this could, over a period of time, constrain both the instructional and learning processes.

The following outlines provide a condensed perspective of the two contrasting models. In the first outline notice how the objectives are sequentially derived from the top down and are supportive from the bottom up.

ACSC

Mission (institutional)

Goals (educational goals)

Area objectives (end-of-course objectives), (directly support one or more of the goals).

Phase objectives (unit objectives), (directly support one or more of the area objectives).

Lesson objectives (specific behavioral objectives), (directly support one or more of the phase objectives).

CGCS

Mission (institutional)

Functions (goals)

Course descriptions

Sub-course goals

Lesson objectives (specified behavioral objectives)

CHAPTER V

THE SYNTHESIS OF THE ARGUMENT

Behavioral objectives, in the purest sense, are deliberately designed to facilitate learning and to engender expectation toward the educational task. They are, perhaps, best considered as an attempt to improve both the quality and effectiveness of teaching. It is argued, in Chapter II, that by setting out what the student is expected to achieve, results can be brought more into line with expectations. Ostensibly, in order to inform the instructors of what is expected of them and to communicate what a student should be able to do at the completion of the learning tasks, great care must be exercised in defining and writing objectives as unambiguously as possible.

Mager suggested that an objective, at a minimum, should identify the kind of behavior that will be accepted as evidence that the objective has been achieved, define the important conditions under which the behavior is expected to occur, and specify the standard which will be used to determine whether this performance is acceptable.¹ To Gagne and Briggs a precise behavioral objective facilitates the observation of another person. It includes the components which describe the situation in which the action takes place, the limits within which the performance will be expected to occur, and the kind of human performance involved.²

As a result of the work of educators such as Mager and Gagne, a whole technology of writing objectives has evolved, replete with competing classifications and taxonomies, which, has, if nothing else, perhaps inspired instructors to think about what objectives mean.³ There are authors who maintain that "...at the root of the behavioral objective movement... is the elementary notion of 'operationalism', which replace the intangible phenomena such as 'understands' with a more tangible phenomena that can be observed and measured."⁴

Theoretically, behavioral objectives have a number of different functions. They can serve in various ways as guides to teaching and curriculum design, as well as guides for analysis and evaluation. Additionally, they have an important professed role as preinstructional strategies, in which they stimulate learning. Ostensibly, behavioral objectives give direction to learning through their introductory role, by providing an overall learning set for what is to follow.

Ideally, instruction should be planned from the top down, and general needs and goals should be defined before more specific objectives are developed. Once the institutional needs have been derived and broad educational goals are developed, the next step is to further define the goals in terms of more specific objectives. The final step is to accurately specify the desired behavioral performance outcome.⁵

In the process of developing progressively more specific objectives, care should be taken to avoid long lists of specific learning tasks, particularly at advanced levels of education. Gronlund has indicated that behavioral objectives must be general enough to provide instructional guidelines, without unduly constraining the instructional process, while at the same time specific enough to accurately indicate expected student performance. "This approach provides for the inclusion of learning outcomes of all types and at all levels - ranging from the simplest to the most complex."⁶

Since all educators do not view effective teaching as being dependent on predetermined, specific, behaviorally defined objectives, scholars have both praised and damned the use of behavioral objectives as instructional strategies and as aids in curriculum design. The controversy was by no means settled by the findings provided in the contemporary empirical literature. The research has actually not kept pace with the proliferation of behavioral objective usage. In an attempt to improve the efficacy of behavioral objectives, proponent educators appear to have inadvertently encouraged the use of objectives beyond their empirically ascertained value.⁷

There are strong, prevailing, theoretical arguments within the literature that promote the logic of using behavioral

objectives; however, an enervating controversy persists concerning the extent to which empirical support exists for the application of behavioral theory to the learning process. If, as the preponderance of the research has suggested to date, the use of behaviorally defined objectives is not a critical variable in the learning process, what is critical needs to be defined. Although behavioral objectives have been proven to categorically enhance learning in a limited number of studies, the empirical evidence did not demonstrate a congruent advantage for their use, nor did the findings confidently delineate the conditions under which behavioral objectives should be used.

As indicated in Chapter III, the overall significance of the empirical findings must be mitigated by the conceptual and methodological weaknesses attributed to the available research. Because the results presented in the experimental literature were, to a significant degree, both inconclusive and contradictory, the value of behavioral objectives should perhaps not be assessed solely on empirical grounds.

Until empirical evidence is available in which confidence can be ascribed, there are strong rational and functional arguments that have been presented in the literature which promote the use of behavioral objectives in the instructional system design process. However, these rational arguments

in favor of behavioral objectives could best be ameliorated by suggesting that behavioral objectives be considered one of several educational tools available to the military educator. With credible, empirically derived knowledge concerning the advantages and limitations of behavioral objectives and the conditions under which they can be used most effectively, military curriculum designers and instructors could then rationally determine whether or not this tool is likely to be useful in their own particular educational situation.

NOTES

CHAPTER II

1. Robert M. Gagne and Leslie J. Briggs, Principles of Instructional Design (New York: Holt, Rinehart and Winston, 1974), pp. 4-5.
2. Ibid., pp. 6-9.
3. Robert M. Gagne, The Conditions of Learning (New York: Holt, Rinehart and Winston, 1976), pp. 26-28.
4. Leslie J. Briggs, ed., Instructional Design, Principles and Applications (Englewood Cliffs, Educational Technology, 1977), p. 99.
5. Ibid., pp. 101-109.
6. Ibid., p. 101.
7. Ibid., pp. 101-102.
8. Ibid., pp. 102-103.
9. Ibid., pp. 103-104.
10. Ibid., p. 105.
11. Ibid., pp. 107-109.
12. Ibid., pp. 109-110.
13. Gagne and Briggs, Principles, pp. 76-77.
14. Briggs, pp. 54-55.
15. Ronald E. Bassett and Robert J. Kibler, "Writing Performance Objectives," in Leslie J. Briggs, ed., Instructional Design, Principles and Applications (Englewood Cliffs: Educational Technology, 1977), p. 63.
16. Ibid., pp. 52, 63-64.
17. Robert F. Mager, Preparing Instructional Objectives (Palo Alto: Fearon, 1962), p. 3.
18. Ibid., p. 12.
19. Bassett and Kibler, p. 64.
20. Mager, pp. 10-11.

21. Ibid., p. 11.
22. Bassett and Kibler, p. 65.
23. Mager, p. 11.
24. Ibid., pp. 25-26.
25. Ibid., p. 26.
26. Ibid., p. 27.
27. Bassett and Kibler, p. 66.
28. Mager, p. 44.
29. Ibid., pp. 44-51.
30. Robert J. Kibler, et al., Instructional Objectives Evaluation (Boston: Allyn and Bacon, 1974), pp. 40-41.
31. Mager, pp. 50-51.
32. Bassett and Kibler, "Writing," pp. 67-68.
33. Gagne and Briggs, Principles, pp. 79-80.
34. Ibid., p. 80.
35. Bassett and Kibler, "Writings," pp. 68, 77-78.
36. Gagne and Briggs, Principles, pp. 82-84.
37. Ibid., pp. 83-89.
38. Ibid.
39. Ibid., pp. 83-84.
40. Ibid., pp. 84-87.
41. Ibid., p. 85.
42. Ibid., p. 85.
43. Ibid., pp. 86-87.
44. Ibid., p. 87.
45. Ibid., pp. 84-87.

46. Bassett and Kibler, p. 72.
47. Gagne and Briggs, Principles, p. 97.
48. Bassett and Kibler, "Writing," p. 72.
49. Ibid., pp. 73-74.

CHAPTER III

1. Joseph P. Byers, et al., "Behavioral Objectives and Communications Instruction: State of the Research," Paper presented at the Annual Meeting of the International Communication Association, Portland, Oregon: April 13-17, 1976, p. 8.

2. Ibid., pp. 1-13; James Hartley and Ivor K. Davies, "Preinstructional Strategies: The Role of Pretests, Behavioral Objectives, Overviews, and Advance Organizers," Review of the Educational Research, Spring 1976, V. 46, No. 2, pp. 239-259; Leslie J. Briggs, ed., Instructional Design, Principles and Applications (Englewood Cliffs, Educational Technology, 1977), pp. 80-87.

3. Byers, et al., "Behavioral," pp. 6-8.
4. Ibid., pp. 8, 13.
5. Ibid., pp. 6-7.
6. Ibid., p. 7.

7. Robert J. Koblner and Ronald E. Bassett, "Writing, Performance Objectives," in Leslie J. Briggs, ed., Instructional Design, Principles and Applications (Englewood Cliffs: Educational Technology, 1977), pp. 82-83.

8. Byers, et al., p. 7.
9. Ibid., pp. 7-8.
10. Kibler and Bassett, p. 86.
11. Byers, et al., p. 8.
12. Ibid.
13. Kibler and Bassett, pp. 86-87.
14. Byers, et al., p. 8.
15. Ibid., p. 8.

16. Kibler and Bassett, pp. 83-84.
17. James Hartley and Ivor K. Davies, "Preinstructional Strategies: The Role of Pretests, Behavioral Objectives, Overviews, and Advanced Organizers," Review of the Educational Research, Spring 1976, V. 46, No. 2, p. 249.
- 18.
19. Hartley and Davies, pp. 250-251.
20. Ibid., pp. 251-259.
21. Reginald F. Milton, "Resolution of Conflicting Claims Concerning Behavioral Objectives," Paper presented at the American Education Research Association Conference, New York, 1977, p. 1.
22. Ibid.
23. Ibid., p. 2.
24. Ibid., p. 3.
25. R.S. Engel as cited in Reginald F. Milton, "Resolution of Conflicting Claims Concerning Behavioral Objectives," Paper presented at the American Education Research Association Conference, New York, 1977, p. 3.
26. Milton, p. 5.
27. J.A. Mores and M.H. Tillman as cited in Reginald F. Milton, "Resolution of Conflicting Claims Concerning Behavioral Objectives," Paper presented at the American Educational Research Association Conference, New York, 1977, pp. 5-6.
28. P.C. Duchastel as cited in Reginald F. Milton, "Resolution of Conflicting Claims Concerning Behavioral Objectives," paper presented at the American Educational Research Association Conference, New York, 1977, p. 6.
29. E.Z. Rothkopf and R. Kaplan as cited in Reginald F. Milton, "Resolution of Conflicting Claims Concerning Behavioral Objectives," Paper presented at the American Educational Research Association Conference, New York, 1977, pp. 6-7.
30. Milton, p. 8.

31. Ibid.

32. Byers, pp. 1-13; Hartley and Davies, pp. 239-259; Briggs, ed., pp. 80-87.

CHAPTER IV

1. Interview with Major Frank A. Tantello, Instructional Technologist, Deputy Director of Curriculum, Air Command and Staff College, Air University, Maxwell Air Force Base, Alabama: 14 April 1978.

2. U.S. Air Force, Air University Catalog, Air University, Maxwell Air Force Base, Alabama: 1977-78, p. 14.

3. Interview with Tantello, Maxwell AFB.

4. "Air University Catalog," pp. 14, 17.

5. Leslie J. Briggs, ed., Instructional Design, Principles and Applications (Englewood Cliffs: Educational Technology, 1977), pp. 103-109.

6. "Air University Catalog," p. 18.

7. Interview with Tantello, Maxwell AFB.

8. "Air University Catalog," p. 18.

9. U.S. Air Force, Readings and Seminars, Command and Management, Volume 3, Air Command and Staff College, Air University, Maxwell Air Force Base, Alabama, 1977, p. 39.

10. Interview with Tantello, Maxwell AFB.

11. Interview with LTC James B. Channon, Instructional Technologist, Office of Curriculum Analysis and Design, U.S. Army Command and General Staff College, Fort Leavenworth, Kansas: 11 April 1978.

12. U.S. Army, Command and General Staff College Catalog, Command and General Staff College, Fort Leavenworth, Kansas: 1977-78, p. iii.

13. Ibid.

14. Ibid., p. v-2.

15. Interview with Channon, Fort Leavenworth.

16. U.S. Army, Draft, "Management and Force Development," Advance Sheet, P212-1," Command and General Staff College, Fort Leavenworth, Kansas: April 1978, p. L1-1.

17. Briggs, pp. 101-110.

18. Draft, "Command and Force Development Advance Sheet, P212-1," Command and General Staff College, Fort Leavenworth, Kansas: April 1978, pp. L1-18, L1-20.

CHAPTER V

1. Robert F. Mager, Preparing Instructional Objectives (Palo Alto: Fearon, 1962), p. 10.

2. Robert M. Gagne and Leslie J. Briggs, Principles of Instructional Design (New York: Holt, Rinehart and Winston, 1974), pp. 84-87.

3. James Hartley and Ivor K. Davies, "Preinstructional Strategies: The Role of Pretests, Behavioral Objectives, Overviews, and Advance Organizers," Review of Educational Research, Spring 1976, V. 46, No. 2, p. 243.

4. Ibid.

5. Gagne and Briggs, Principles, pp. 101-109.

6. Norman E. Gronlund, Stating Objectives for Classroom Instruction (New York: Macmillan, 1978), p. iii.

7. Joseph P. Byers, et al., "Behavioral Objectives and Communications Instruction: State of the Research," Paper presented at the Annual Meeting of the International Communication Association, Portland, Oregon: April 13-17, 1976, pp. 2, 8.

BIBLIOGRAPHY

- Arstin , D.S. "The Language and Values of Programmed Instruction, Part II." The Educational Forum, 1964, pp. 337-346.
- Bassett, R.E. and Kibler, R.J. "Effects of Training in Use of Behavioral Objectives on Student Achievement." Journal of Experimental Education, 1975, pp. 12-16.
- Bloom, B.S., et al. Taxonomy of Educational Objectives The Clarification of Educational Goals. Handbook I: Cognitive Domain. New York: David McKay, 1956.
- Briggs, Leslie J. An Overview of Instructional Systems Design. Tallahassee: Florida State University, 1975.
- _____, ed. Instructional Design, Principles and Applications. Englewood Cliffs: Educational Technology, 1977.
- Byers, J.P., Bassett, R.E., and Kibler, R.J. "Behavioral Objectives and Communications Instruction: State of the Research." Paper presented at the Annual Meeting of the International Communication Association, Portland, Oregon, April 13-17, 1976.
- Duchastel, P.C. and Merrill, P.F. "The Effects of Behavioral Objectives on Learning: A Review of Empirical Studies." Review of Educational Research, 1973, pp. 43, 53-70.
- Duell, O.K. "Effect of Type of Objective Level on Test Questions, and the Judged Importance of Tested Materials Upon Posttest Performance." Journal of Educational Psychology, 1974, pp. 225-232.
- Gagne, Robert M. The Conditions of Learning 3rd ed. New York: Holt, Rinehart, and Winston, 1977.
- _____. and Briggs, Leslie J. Principles of Instructional Design. New York: Holt, Rinehart, and Winston, 1974.
- Gronlund, Norman E. Stating Objectives for Classroom Instruction. New York: Macmillan, 1978.
- Hartley, James and Davies, Ivor K. "Preinstructional Strategies: The Role of Pretests, Behavioral Objectives, Overviews, and Advance Organizers." Review of Educational Research, Spring 1976, Vol. 46, No. 2, pp. 239-265.

Interview with Cpt. Robert T. Begland, Ph.D. (c), Center for Educational Technology, Florida State University, Tallahassee, Fla.: 12-13 April 1978.

Interview with LTC James B. Channon, Instructional Technologist, Office of Curriculum Analysis and Design, U.S. Army Command and General Staff College, Fort Leavenworth, Kansas: 11 April 1978.

Interview with Major Frank A. Tantello, Instructional Technologist, Deputy Director of Curriculum, Air Command and Staff College, Air University, Maxwell Air Force Base, Alabama: 14 April 1978.

Kaufman, Roger A. Needs Assessment: What It Is and How to Do It. San Diego: University Consortium on Instructional Development and Technology, 1976.

_____. Educational System Planning. Englewood Cliffs: Prentice-Hall, 1972.

Kibler, Robert J., et al. Instructional Objectives and Evaluation. Boston: Allyn and Bacon, 1974.

Lindvall, C.M., ed. Defining Educational Objectives. Pittsburgh: University of Pittsburgh, 1969.

Macdonald-Ross, M. "Behavioral Objectives - A Critical Review." Instructional Science, 1973, pp. 1-52.

Mager, Robert. Developing Attitude Toward Learning. Belmont, CA: Fearon, 1978.

_____. Analyzing Performance Problems. Belmont, CA: Fearon, 1976.

_____. Preparing Instructional Objectives. Palo Alto: Fearon, 1962.

Milton, Reginald F. "Resolution of Conflicting Claims Concerning Behavioral Objectives." Paper presented at the American Educational Research Association Conference, New York, 1977.

Mirie, L.M. and Raburn, M.D. "Accountability in Instruction: The Efficiency of Instructional Objectives in a Mastery Learning System." Paper presented at the Annual Meeting of the International Communication Association, Portland, Oregon, April 13-17, 1976.

Popham, W.J. and Baker, E.L. Establishing Instructional Goals. Englewood Cliffs: Prentice Hall, 1970.

Raths, J. "Teaching Without Specific Objectives," Educational Leadership, 1971, pp. 714-720.

Rothkopf, E.Z. "The Concept of Mathemagenic Activities." Review of Educational Process, 1970, pp. 325-336.

_____. and Kaplan, R. "Instructional Objectives and Directions to Learners: Effect of Passage Length and Amount of Objective-Relevant Content." Journal of Educational Psychology, 1972, pp. 295-302.

_____. "Exploration of the Effect of Denisty and Specificity of Instructional Objectives on Learning From Text." Journal of Educational Psychology, 1974, pp. 448-456.

U.S. Air Force. Air University Catalog. Air University, Maxwell Air Force Base, Alabama: 1977-78.

_____. Readings and Seminars, Command and Management. V. 3. Air Command and Staff College, Air University, Maxwell Air Force Base, Alabama: 1977.

U.S. Army. Command and General Staff College Catalog. Command and General Staff College, Fort Leavenworth, Kansas: 1977-78.

_____. "Draft, Management and Force Development, Advance Sheet, P212-1." Command and General Staff College, Fort Leavenworth, Kansas: April 1978.