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ABSTRACT

The design specifications for the United States Naval Academy leadership course developed by Westinghouse Learning Corporation are presented in this report, covering course system design, management, and evaluation. EM 010 418 through EM 010 447 and EM 010 451 through EM 010 512 are related documents, with the final report appearing under EM 010 418, EM 010 419, and EM 010 484. (RH)

Set #3

Westinghouse Learning Corporation

DESIGN SPECIFICATIONS DOCUMENT INCLUDING SPECIFICATIONS FOR PRODUCT AND COURSE DESIGN SYSTEM MANAGEMENT AND EVALUATION PROCEDURES

Contract No. N00600-68-C-1525

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INTRODUCTION

The terminal goal of this project is to produce an individualized multi-media course in Leadership, Psychology and Management, and to document the model used in the course development. The attainment of this goal involves the empirical validation of instructional effectiveness through successive revision cycles, and the establishment of an effective system to implement the course. In addition, a series of research questions were investigated that had a bearing on the materials and the system itself. These varied efforts are often in conflict with each other. That is, in order to obtain reliable data for the validation of instructional effectiveness, restrictions must be placed on the operational system. The inclusion of research in an ongoing course adds even further restrictions on the freedom of the system to operate at its full potential. If an individualized multi-media course system is to demonstrate its full potential for the student, the instructor and the educational environment in which it is being used, it eventually must be evaluated with all restrictions eliminated.

The full potential of the individualized multi-media course system can be evaluated from two basic viewpoints. First of all, it should attempt to optimize performance for each student on the basis of empirically reliable data.

It should be cautioned, however, that the establishment of an elaborate system to optimize instruction for each individual that is not based on hard data that is reliable and significant or that is unwieldy to implement may produce dissatisfaction with the entire course. In essence the optimization procedures must be educationally sound and realistic in terms of the capabilities and desires of the users of the system--instructors and students alike.

Secondly, the system should free the instructor from being a mere disseminator of information and allow him to interact in a meaningful manner with individual students when they are in need of his assistance for remediation or enrichment. It should allow for his interaction with small groups of students to integrate information and concepts that have been effectively self-taught with validated "programed" materials. The instuctor's lecture then becomes a structured discussion session that motivates and brings about the integration and transfer of important concepts and principles. With the assistance of a data clerk for administrative purposes, an instructor in this system should be able to manage well over 100 students and still provide individual assistance that would exceed that of a conventional class of thirty students.

The initial implementations of the course in the spring and fall semesters of 1970 have generally validated subsystems and the basic plan of operation for the Leadership Psychology

and Management course. In essence, the final course system to be installed in the spring of 1971 reflects successive refinements made on the basis of the two previous administrations of the course.

COURSE SYSTEM DESIGN

CONTENT

Core Instructional Materials - The refinements to the course content and structure proceed along two basic lines: 1) The refinement of core effectiveness and, 2) the development of depth core and enrichment. The first point of emphasis involved the revision of existing core materials to ensure a criterion level of mastery of the content by the midshipmen. Both performance and attitudinal data from the students, as well as input from subject matter experts were utilized in achieving this goal. The basic core content consists of twelve parts which build logically upon each other and which reflect major content areas.

Leadership, as a term, has different meanings for different people, and is used by many interchangeably with the term management. Part I of the course briefly presents theoretical bases of leadership, and evolves therefrom a view of leadership as a dynamic interaction process involving a leader, his followers and an environmental situation. Part I further delineates the use of the basic principles of psychology and management as components of naval leadership. Acceptance of a traditional deep sense of moral responsibility as an essential trait of a naval leader is stressed here and intermittently throughout the course.

The naval leader will most often be dealing with groups of individuals, his subordinates or followers, so he should be

aware of the effect of an individual's membership in a group. A fundamental knowledge of individual psychology and group dynamics is provided in Parts II and III.

No leader, regardless of his intelligence, or the originality or brilliance of his ideas, can be successful until he can communicate those ideas and directions effectively. Part IV is designed to impart to the midshipman a knowledge of the principles of communication so that he will be effective in his role as a leader.

A naval leader will, in his daily routine, be working with men, money, material and time. The effective use of resources available to him can best be achieved by the leader who can apply the Management Process. Part V provides the midshipman with the fundamentals of the Management Process.

The latter parts of the course concentrate more specifically on those aspects of leadership which are peculiar to the military.

The naval leader, as an appointed leader, has an official authority foundation in his commission or appointment. Moral responsibility for mission accomplishment, subordinate's welfare and general efficiency is perhaps more intimately related to the military leader than to leaders in other areas of endeavor. The general theories of authority, the responsibility coincident with authority, and proper delegation of authority are treated in Part VI.

A leader's behavior and style are variables in any leadership situation. The spectrum of leader behavior, the variety of styles, and the causes/effects of the variations are explained in Part VII. From such knowledge, the midshipman can formulate a personal concept of possible behavior and style for himself.

The effectiveness of a leader and the influence he can exert on his followers depend to a large extent on the relationship he establishes with the subordinates. Building on the foundation acquired in Parts II and III, Part VIII delineates specific guidelines for the leader in his relationship with his subordinates. The counselor role of a leader, among his many responsibilities for the welfare of his men, is emphasized.

Part IX treats the subject of morale and esprit de corps, their importance to an effective organization, and how a leader's actions influence the individual followers and the group collectively.

The ability to instill a willingness in one's self or one's followers to act correctly under adverse conditions is essential for a naval leader. The most desirable situation exists in a military organization when each member willingly chooses to do the right thing rather than because of fear of the consequences of not doing it. Such is the nature of discipline as treated in Part X - the positive aspect of discipline as opposed to the negative or punitive connotation.

An organization, properly managed by appointed leaders, prepares for the continuity of leadership of that organization. Essential to the selection and training of leaders, as well as the maintenance of high standards is a personnel evaluation process. Part XI provides the midshipmen with a knowledge of the system by which he is himself evaluated and introduces him to the role of evaluator which he must fill as a leader.

Part XII, Applied Leadership, serves as a review and synthesis of the course. Situational examples are provided for the midshipman to observe the application of material learned or to apply his acquired knowledge by selecting appropriate actions or decisions for the leader in the example.

Table I is a graphic representation of the relationships among the parts of the course. Reading from bottom to top will indicate the order in which the parts are taught. There exists within each part, a variety of segments, each of which consists of approximately 50 minutes of instruction. The segment titles, by part, are listed in Table 2.

TABLE 1

COURSE STRUCTURE BY PART

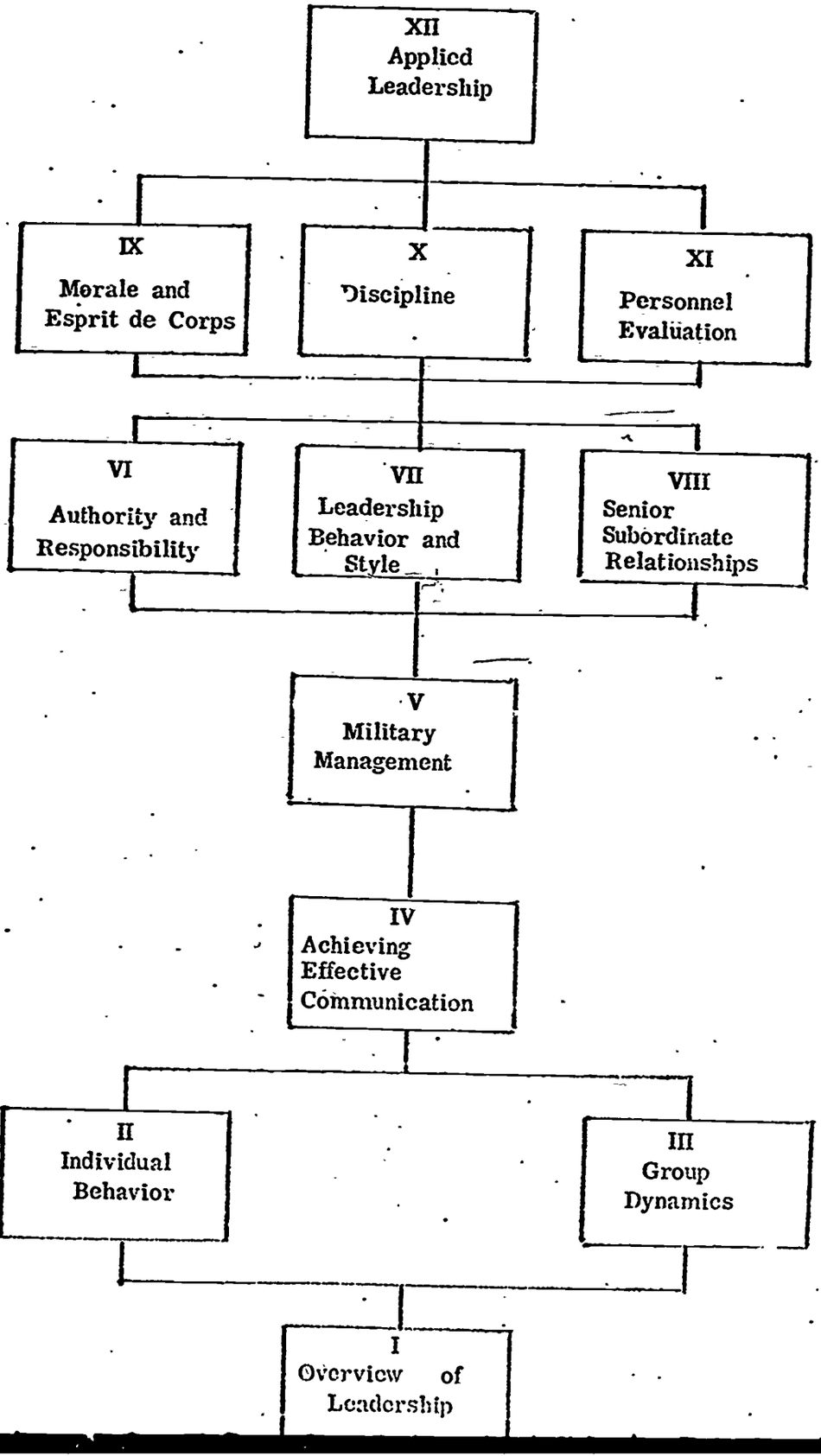


TABLE 2

COURSE CONTENT

PART ONE: Overview of Leadership

Segment I:	Concept of Leadership
Segment II:	Standards of Leadership in the Naval Service

PART TWO: Individual Behavior

Segment I:	Introduction to Psychology
Segment II:	Behavior and Its Observation
Segment III:	Learning
Segment IV:	Factors Affecting Learning
Segment V:	Attention and Perception
Segment VI:	Motivation
Segment VII:	Conflict
Segment VIII:	Neurotic and Psychotic Reactions
Segment IX:	Personality

PART THREE: Group Dynamics

Segment I:	Characteristics of Groups
Segment II:	The Relation of the Leader to the Group
Segment III:	Group Interactions
Segment IV:	Conformity as a Factor of Group Behavior
Segment V:	Relation of the Individual to the Group

PART FOUR: Achieving Effective Communication

Segment I:	Importance of Interpersonal Communication
Segment II:	Types of Communication
Segment III:	The Communication Process (Receiver and Barriers)
Segment IV:	The Communication Process (Sender and Feedback)
Segment V:	Formal Communication and Its Dimensions
Segment VI:	Informal Communication
Segment VII:	Communication Under Battle Situations

PART FIVE: Military Management

Segment I:	Introduction to Management and the Management Process
Segment II:	Decision Making and Creativity
Segment III:	Objectives
Segment IV:	Planning
Segment V:	Organizing: Principles and Process
Segment VI:	Organizing: Structure
Segment VII:	Organizing: Charting
Segment VIII:	Directing
Segment IX:	Controlling
Segment X:	Coordinating

PART SIX: Authority and Responsibility

Segment I:	Concept of Authority
Segment II:	Why People Accept/Resist Authority
Segment III:	Delegation of Authority; Line-Staff Relationship
Segment IV:	Responsibility

PART SEVEN: Leadership Behavior and Style

Segment I:	Leadership Behavior
Segment II:	Leadership Style
Segment III:	Determiners of Leadership Style - The Leader
Segment IV:	Determiners of Leadership Style - The Group and The Situation
Segment V:	Participative Leadership

PART EIGHT: Senior-Subordinate Relationships

Segment I:	Organizational Structure & Social Distance in Senior-Subordinate Relationships
Segment II:	Officer-Enlisted Relationships
Segment III:	Assumption of Command and Formal & Informal Leader Relationships
Segment IV:	Introduction to Counseling
Segment V:	The Counseling Process
Segment VI:	Relations with Seniors and Contemporaries

PART NINE: Morale - Esprit de Corps

Segment I:	Morale
Segment II:	Group Solidarity and Esprit

PART TEN: Discipline

Segment I:	Introduction to Discipline
Segment II:	Development and Maintenance of Discipline

PART ELEVEN: Personnel Evaluation

Segment I:	The Role of Evaluation
Segment II:	Enlisted Performance Evaluation
Segment III:	Officer Evaluation

PART TWELVE: Applied Leadership

Segment I:	Measurement of Effective Leadership
Segment II:	Generally Recognized Characteristics of an Effective Leader
Segment III:	Techniques of Assuming Command
Segment IV:	"That's an Order!"

Depth Core and Enrichment - In this course, with its orientation to the self-instructional method, some serious questions were raised as to the absence of guided group discussions which most USNA instructors deemed imperative. Secondly, since self-instructional material tends toward a linear, or flat organization of materials, some concern was raised as to the opportunity for students to integrate on a higher plane the principles across many segments. Hence, for this course, the concept depth core evolved from a "look in depth" at sections of core to a mechanism where group discussions would allow for the integration and transfer of information that the students had achieved on their own in individualized sessions.

Two of these depth-core sessions were utilized in the first implementation of the course, and several others were employed in the fall run of the course. It is expected that for the spring "71" implementation of the Leadership course, sixteen depth-core sessions will be available. The titles of these depth core sessions and their recommended points of usage are given in Table 3.

TABLE 3

DEPTH CORE

NUMBER	ASSOCIATED PART	TITLE
1	Part II	Perception and Leadership
2	Part III	Brainstorming and Group Pressure
3	Part IV	Leavitt-Mueller Experiment
4	Part IV	Techniques of Communication
5	Part V	Preparing a Plan
6	Part V	Team Management Game for Allocation of Resources
7	Part V	Allocation of Resources in a Crisis Situation
8	Part VIII	Counseling, Role Playing
9	Part VIII	Responsibility of Junior Officer in Counseling
10	Part XI	Promotion Review Board
11	Part XI	Design of New Enlisted Evaluation Form
12	*	Group Ordering of Critical Management Factors
13	*	Race Relations
14	*	Drug Problem
15	*	The Leader and Situation(s)
16	*	The World of Charlie Company

* Depth core topics which can be used at any point in the course.

The depth core sessions are optional for the instructor. That is, he may use as many as he deems necessary. The sixteen depth core are more than can be used in one semester, but they do give the instructor a variety of packages from which to choose.

Enrichment units imply individual study of discrete areas of subject matter, usually a project or experiment resulting in a written report or statement of findings. Our approach has been different in that the subject matter seemed to lend itself to the pursuit of case studies through a structured discussion. Hence, over the past eighteen months, a series of Structural Communication modules have been developed. At present there are eight, each of which uses three to four problems. Since each module, in its present format, takes two and one-half to three hours for completion we recommend that after content sign off by the USNA, they be modularized into 30 individual units for enrichment requirements.

COURSE CONFIGURATION

Impact of Research on Initial Course Development - In addition to the development of the basic core of 59 segments of instruction, WLC developed a series of instructional research hypotheses which had an impact on the course configuration. The research effort has been well documented in previous publications (TR-6.3, 6.3a, 6.4, 6.4a, 6.11 and 6,12a and b); however, a brief review is provided below.

Research hypotheses were based on concepts presented in A Behavioral Approach to Instructional Design and Media Selection, in which a distinction is made between the importance of media and presentaiton forms (Tosti and Ball, 1969). The distinction is that a medium is only the mode of transmission of information whereas the truly important characteristics of instruction are the forms of presentation of the information within the medium. Any medium can be described with respect to its capability for varying dimensions of presentation. The most basic dimensions of presentation which characterize a medium are the form and frequency of the stimulus, response, and management decisions. In matrix form these dimensions are:

DIMENSIONS OF PRESENTATION

	Form	Frequency
Stimulus	Stimulus representation	Duration
Response	Response demand form	Response demand frequency
Management	Management form	Management frequency

Stimulus representation is the form in which the stimulus is presented. It can be written, spoken, or pictorial.

Stimulus duration is the temporal stability of the stimulus. Duration can be transient - such as movies and lectures, or persistent - such as textbooks or other printed matter.

Response demand form is the type of response the subject is required to make. The form of the response demanded can be covert, written, or spoken.

Response demand frequency is the frequency with which the subject is required to respond. The frequency with which questions are asked within an instructional sequence can be high, medium, or low.

Management form is the type of remediation the subject is given. It can be multilevel - remediation by differing the levels of response demand frequency within a single form; multiform - remediation by a different form of presentation; repetition - a simple repeat of the same presentation; or error diagnostic - remediation by branching according to specific incorrect responses.

Management frequency is the frequency with which the presentation is repeated or changed according to the need for remediation. The frequency of management can be high, medium, or low depending on response demand frequency.

In line with the assumption that presentation variables were the critical elements in instruction rather than the medium itself, WLC developed five hypotheses, four of which were based directly on variations in presentation rather than variations in media. The hypotheses were:

> Hypothesis 1: Given both simple and complex tasks, transient presentations with high response demand frequency (HRDF) will be more effective than transient presentations with low response demand frequency (LRDF). There will be no difference in student performance between covert or overt response demand (RD) presentations, or between videotape and audiotape-panelbook media.
>
> Hypothesis 2: Given both simple and complex learning tasks, persistent presentation with high RDF will be more effective than persistent presentation with low RDF. There will be no difference in student performance between three conditions of RD (overt-written, overt-spoken, and covert).
>
> Hypothesis 3: High RDF will be more effective than low RDF with either high, medium, or low management frequency.
>
> Hypothesis 4: If performance is below criterion level with low RDF presentation, remediation with high RDF will result in a significant improvement in performance.
>
> Hypothesis 5: The use of "peer-monitor" procedures will significantly improve student performance in an instructional sequence.

Media selected for the first validation of the instructional system were based on three major considerations: research design requirements, multimedia requirements, and implementation requirements.

1. Media included in the instructional research design were selected on the basis of their capabilities for varying presentation according to requirements of the experimental hypotheses. For example, Hypothesis 1 required transient stimulus duration in addition to media comparison; therefore, videotapes and audiotapes were selected. By using both audiotapes and videotapes in parallel modules over the same content, it was possible to control all irrelevant presentation variables and study the effects of transient presentation across two media as well as compare the effectiveness of the two media.

2. In addition to selecting media for their research capabilities, media were selected which would provide diversification in the instructional sequence. Although it was not the intention to directly compare media throughout the course, i.e., Medium A vs. Medium B, or Medium C vs. Medium D, a number of media were included so that some statement could be made about student performance via those media.

3. The third major consideration in media selection was the project plan for implementing and maintaining the multimedia system beyond the design stage. Of primary concern were the costs for developing, implementing, revising and maintaining the system. For example, material for certain media could be programed during the design stage of the project but would be prohibitively expensive to implement or maintain (revise) after the termination of the contract.

Another concern was that media fit conveniently into an individually paced program of studies without creating undue logistical problems. In this regard, special attention was given to existing facilities at the USNA, such as computer consoles, media centers, etc., and to the project availability of those facilities.

Media included in the first validation in the spring of 1970 were: videotaped and audiotaped lectures with panelbooks, syndactic text, linear programed text, computer assisted instruction, learning activity summaries (bibliographies), film and group discussion.

Table 4 presents a summary of the research plan which was conducted during the spring 1970 run of the course. In implementing this plan a variety of alternate forms for 45 of the 59 segments were developed. This resulted in the creation of approximately 250 modules of instruction.

TABLE 4

SUMMARY OF THE RESEARCH PLAN

EXPERIMENT	CPT & SEGMENT	MEDIA	VARIABLES	CONDITIONS
I	CPT 1 2.2-2.5 CPT 3 3.1-3.4 CPT 7 5.7-5.10 CPT 9 7.1-7.4	Taped Lecture, Audio & Video (with Panel Book)	A. Response Demand Frequency (RDF) B. Form of Response Demand (RD) C. Media (Audiotape vs. Videotape)	A B 1. High RDF-Overt RD 2. High RDF-Covert RD 3. Low RDF-Overt RD 4. Low RDF-Covert RD These conditions apply for both audio & video presentations.
II	CPT 4 4.1-4.3 CPT 6 5.4-5.6 CPT 10 8.1-8.3	Linear Text	A. Response Demand Frequency (RDF) B. Form of Response Demand (RD)	A B 1. High RDF-Overt selected RD 2. High RDF-Overt spoken RD 3. High RDF-Covert RD 4. Low RDF-Overt selected RD 5. Low RDF-Overt spoken RD 6. Low RDF-Covert RD
III	CPT 5 4.4-4.7	Audiotape/Intrinsically Programmed Booklet (AT/IP)	A. Response Demand Frequency (RDF) B. Management Frequency (MF)	A B 1. High RDF-High MF 2. High RDF-Medium MF 3. High RDF-Low MF 4. Low RDF-Low MF These conditions apply for both AT/IP & CAI.
	CPT 13 12.1-12.4	Computer Assisted Instruction (CAI)		
IV	CPT 2 2.6-2.8 CPT 8 6.1-6.3 CPT 12 11.1-11.3	Syndactic Text	Remediation method	1. High RDF Remediation 2. Low RDF Remediation 3. No Remediation
V	CPT 11 8.4-8.6	Learning Activity Summary (LAS)	Peer Interaction	1. Peer Interaction 2. No Peer Interaction

A module is a particular instructional condition used to prepare and deliver materials for a segment, identified in terms of the categories of the Tosti-Ball (1969) model. Several parallel modules were prepared in each segment utilized for research purposes, representing variations specified by the experimental designs. The different modules of a segment are distinguishable from one another by differences in presentation design and/or media, although the content is the same. Specifications of the modules for each segment are outlined in later sections of the paper giving the design of each experiment.

The cumulative posttest (CPT) unit listed in Table 4 is a group of three or four adjacent segments within a part. There were 13 CPT units involving 45 of the 59 segments of the course. The primary criteria for grouping segments into CPT units were that the segments dealt with similar types of content and objectives, and that the instructional sequences relating to particular concepts which were initiated in the unit would also terminate in the same unit. All segments in a CPT unit were developed in the same medium and with the same variations in instructional conditions between modules.

The CPT unit was the fundamental unit of instruction for research purposes, providing the framework on which the experimental designs were constructed. The students were divided into groups assigned to different modules in the CPT

unit. A student in any one group would thus encounter the same experimental conditions in progressing through the three segments of the unit, and would take three progress checks (PC's), one after completing his module of each segment. After completing the segments and PC's all students then took the CPT, a test administered to assess overall achievement level under the experimental conditions represented in the CPT unit.

In addition to group comparisons of media and prese presentation design a series of analyses of the relationship of student characteristics to perofrmance in the course.

The purposes of research on student variables in the present case concerned the prediction of overall course performance, and, more importantly, the prediction of achievement with particular media and presentation forms. Because of the number of conditions of instruction compared in the Leadership course, an invaluable opportunity was provided for one of the first large scale investigations of student-method interactions. To this end, a large battery of potentially predictive variables was included in the student data base.

Use of research findings in course configuration modification - The results from the first implementation indicated the need for some refinements in the research design as well as some additional investigations. Consequently some changes were

made to the research plan and it was replicated in the fall 1970 run of the course. The general nature of these changes are listed below.

In the first implementation of the course, confirmation or knowledge of results was not used. It was felt that more reliable data needed for revision of materials could be obtained without confirmation. For the fall semester replication, confirmation within all instructional sequences was added.

In Experiment I the use of videotapes was dropped, and the issue of confirmation was experimentally investigated.

In Experiment II the overt-spoken condition of response demand was replaced with a condition where the students underline the response they select.

Relatively high levels of performance were attained on the CAI materials in Experiment III. In order to determine whether this effect was due to the medium or the content programed for it, a parallel "paper" version was prepared for both the CAI segments and the audiotape-intrinsically programed booklet segments.

With respect to Experiment IV, it was found that many students did not need to proceed through the remedial sequences. The syndactic text summaries were very effective. In order to obtain a more complete test of the effectiveness of each of the remediation forms, students were forced through the sequences.

Additional activities included a comparison of the effectiveness of the use of audiotape scripts in place of the tapes, and an assessment of the use of content maps in selected segments as advance organizers. The resultant presentation design which was carried out in the fall 1970 administration of the course is given in Appendix A.

Final Course Configuration - In arriving at the final course configuration a variety of inputs were considered. The empirical data considered were the research and effectiveness data, and student ratings and time. Two equally important inputs were administrative ease of use and costs. In lieu of conclusive findings from the empirical data, the later two inputs were given considerable weight.

An initial concern was with the overall effectiveness of the various media. The research data, the effectiveness data, student ratings and student time all supported the general conclusion that differences among media, if they exist, are no more substantial nor important than variation among units in the same media, resulting from variation in content programing skill, or test items. There was no support for the contention that segments already programed in a particular medium should be recast in another medium. It was indicated that with careful programing and revision, an acceptable level of effectiveness can be reached in almost any medium. Table 5 indicates the variety of media utilized and the number of segments programed in each medium for the spring 1971 installation run.

TABLE 5

FINAL COURSE MEDIA USAGE

Medium	No. of Segments
Audiotape/Panel Book	19 *
Audiotape/Intrinsically Programed Booklet (IPB)	6 *
Computer-Assisted Instruction (CAI)	4 *
Linear Programed Text	9
Syndactic Text	20
Discussion Booklet	1

* These media are "hardware bound." In order to increase ease of use and reduce administrative costs, "paper" versions of these media were prepared for all segments involved.

The use of the audiotape media and computer-assisted instruction, being hardware bound media, raised some questions about administrative ease of use and costs when large numbers of students are involved. In response to this realistic consideration by the USNA, the 19 segments of Audiotape/Panel Book were also made available in syndactic text format. The six segments of Audiotape/IPB were also made available in a paper version by utilizing the tape scripts with the Booklet. Finally the four segments of CAI had an alternate paper version in the format of intrinsically programed booklets.

With the basic media issue settled, the next question to be answered was what to do about the multitude of modules across the course. As can be noted in Appendix A there were

as many as six modules or variations in the presentation form for a single segment. The average was four modules to a segment all delivering the same content. It would take some rather conclusive data to justify maintaining all modules as the administrative problems and costs would be prohibitive. It was decided that unless the data strongly indicated that more than one module for any one segment would be equally effective, the single most effective module (based on considerations of the research and effectiveness data as well as interest and time) would be selected. In reducing the large number of modules to manageable proportions four basic variables had to be considered: 1) the form of the response demand, 2) the response demand frequency, 3) management frequency and 4) the form of remediation internal to the syndactic texts.

Although major differences were not found with respect to the form of response required of the student, the trend was that the overt-selected response condition was slightly better than either overt-spoken or covert. This finding is generally in concert with the major body of prior research that indicates that the form of response utilized within the instructional materials should be similar to that required of the student on the tests of achievement on those materials. In addition, if data is needed for revision then the overt response must be demanded.

It was found that the high response demand frequency condition was generally superior to the low response demand frequency condition. A facilitative effect does appear to be produced by the insertion of a significant number of questions in the instructional materials.

A less conclusive finding involved the issue of management frequency. However, considering all the inputs, it appears that the most efficient condition was the use of moderate levels of management frequency in conjunction with high response demand frequency.

In terms of the remediaton form in the syndactic texts, the programed sequence version utilizes high response demand frequency. Therefore, the module selected from those shown in Appendix A within each segment, was one that, where applicable, required an overt response, had a high response demand frequency and a middle level management frequency.

The result of this effort was 59 segments of maximally effective instructional programed in a variety of media with distinct media options available in 29 of these segments. The final course configuration for the installation run in the spring of 1971 is shown in Appendix B, the Course Activities Chart. In addition to displaying the media options, the chart also indicates the suggested placement of depth core, administrative testing and the minimum weekly pace to follow.

Materials Design Considerations- The physical appearance of the instructional materials has changed considerably from when they were first prepared for the research and validation runs. The requirements of research control directed that each module be individually packaged to allow for both the changes in experimental conditions and the careful control of evaluation and research tests. They physical size of a single student's packet, as it accumulated over the semester, was prohibitive by any normal standard of operation. With the reduction of the number of modules it was possible to make the course more physically manageable. Multiple segments were bound in a single volume. Experiments were made in reducing the camera-ready copy from 8 1/2 x 11", standard size, to 5 1/2 x 8 1/2", and 7 x 10". After some initial experimentation the decision was made to use the 7 x 10" size.

The developmental materials when used by some students and appraisal by some reviewers were characterized as having a quality of sameness. This, it was felt, was a euphemism for what was considered bland by standards of graphic presentation. An extensive analysis resulted in a redesign to include design elements which would both separate frames, highlight important summaries, and which would generally contribute to the overall appearance of the page and the entire book.

In a further effort to improve the graphic appeal, redesign of the cover page was commissioned which resulted in a more contemporary cover design. Each part has a different symbolic connotation for the substance of material under study. The designs are simple, yet attractive and meaningful.

In an effort to respond to the comment that the student as well as reviewers were not completely aware of the macrocosmic objectives of each particular part and segment, forewords were prepared for each segment which briefly discussed what was to be learned in the segment, its importance and its relationship to other topics. In addition, the literature was culled for appropriate quotations to introduce the segments.

A concern had been voiced about the ability of the consultants or reviewers to get a larger picture or structure of the course materials. In responding to the latter, content maps by objectives were prepared which presented graphically the hierarchical arrangement of content within each segment. It was realized that since programed material by its very format, tends to give a flat organization to content, the content maps would be well used as overviews or advanced organizers for the student. Viewed as advance organizers, the maps provide ideational scaffolding for topics of subject matter to be studied. Hence, in the final product they are placed immediately following the foreword of each segment.

The resulting product is materially attractive, substantively accurate and validated, graphically appealing and easy to use.

COURSE SYSTEM MANAGEMENT

GENERAL CONSIDERATIONS

Just as the course content and structure has undergone successive refinements based on the previous administrations of the course so too has the manner in which the student interacts with the instructional materials. The refinements have been made on the basis of the requirements for revision and research. Basically, each student studied a segment of instruction and then was tested on his mastery of the objectives for that segment. If he achieved 80 percent or better on this criterion referenced progress check, he proceeded to the next segment. If he did not achieve this level, he was given specific remediation instructions and was required to retake the progress check. If he still failed to achieve the appropriate level of mastery, he received special tutoring from the instructor. To obtain maximally reliable data for revision from the first implementation, the midshipmen were required to take the progress checks individually in class under the guidance of the course administrator. In essence, this required the midshipmen to come in after each segment. To allow the midshipmen more freedom in the fall run, they were given the progress checks with the materials but they still had to come in and have the course administrator grade them to determine if they needed remediation.

The research imbedded in the course imposed further restrictions on the students' interaction with the instructional materials. In order to accurately assess the research questions being asked, separate norm-referenced tests (Cumulative Posttests) were developed which the students had to take in class at specific points in the instruction. The students also had to delay remediation on segments within a Cumulative Posttest Unit until they completed the research test. However, with the completion of the research in the fall run, the Cumulative Posttests and the resultant restrictions were removed from the course.

The installation run of the course in the spring of '71 will be characterized by maximum freedom for each student to proceed at his own pace and to manage his own time and place of study. The freedom for the student to manage his own instruction is an important motivational effect of an individualized instructional system. The rather rigid controls imposed on the students in the previous implementations of the course which were necessary in order to obtain valid revision and research data will no longer necessary. With the removal of the research Cumulative Posttests, the students will be required to come to scheduled classes only for depth core sessions and administrative tests. The progress checks which were controlled on site will be used as self tests for the students.

Thus, the students will grade their own progress checks and determine their requirements for remediation and/or tutoring with the instructor. The instructor will, of course, be available for any non-required tutoring and for assignment of enrichment sessions. Rather than being required to prepare thrice-weekly lectures, the instructor can concentrate on the integration and transfer of important concepts, and he can work with individual students as they need his assistance. In addition, the instructor will be aided by the course administrator in record keeping and scheduling.

The management of the course system involves three major components that interact with the instructional materials and media. These three components are the course administrator, the instructor, and the students. A discussion of the role of each of these groups and their interactions with each other and the instructional materials will clarify the intended management of the system.

ROLE OF THE COURSE ADMINISTRATOR (CA)

The CA provides the interface between the student and the materials and between the student and the instructor. His raison d'etre is to relieve the instructor of as much of the administrative work as possible so that the instructor is free to handle more students with greater efficiency and effectiveness.

Responsibilities of the CA include:

* storage of all core course materials, depth core, enrichment materials, A/V equipment, and test items
* distribution of all course materials
* assisting the instructor in scheduling students for depth core, administrative tests and CAI and notifying students of times of required attendance
* collection of all forms (progress check answer sheets and answer sheets internal to the materials)
* recording and reporting to the instructor the student's progress through the course materials, his performance on progress checks (graded by the student), and scoring and recording administrative tests
* keeping both the instructor and student informed about the student's progress and grades.

Materials Distribution - When the student has completed the administrative pretest which will be given at the first class meeting, the CA will issue him Volume I. The segments included in each volume as well as the media available for that content are indicated in Table 6 . When the student has completed Volume I he will return his progress check answer sheets to the CA in Room 220, Luce Hall. The CA will record each student's performance data and verify that all forms are filled out correctly. If the student failed to achieve at least 80% the second time through any progress check, the CA

TABLE 6

SEGMENTS BY VOLUME AND MEDIA EMPLOYED

Volume Number	Segments Included	Media	Alternate Media	Volume Number
I	1.1	Syndactic Text		
	1.2	Discussion booklet		
II-A	2.1	Syndactic text		
	2.2	Audiotape/Panel book	Syndactic text	II-B
	2.3	Audiotape/Panel book	Syndactic text	
	2.4	Audiotape/Panel book	Syndactic text	II-C
	2.5	Audiotape/Panel book	Syndactic text	
II-D	2.6	Syndactic text		
	2.7	Syndactic text		
	2.8	Syndactic text		
	2.9	Syndactic text		
III-A	3.1	Audiotape/Panel book	Syndactic text	III-B
	3.2	Audiotape/Panel bjok	Syndactic text	
	3.3	Audiotape/Panel book	Syndactic text	III-C
	3.4	Audiotape/Panel book	Syndactic text	
	3.5	Syndactic text		
IV-A	4.1	Linear text		
	4.2	Linear text		
	4.3	Linear text		
	4.4	Audiotape/Intrinsi-call- Programed booklet	Tape Script & Intrinsically Programed booklet	IV-A
IV-B	4.5	Audiotape/Intrinsically Programed booklet	Tape Script & Intrinsically Prgoramed booklet	IV-B
	4.6	Audiotape/Intrinsically Programed booklet	Tape Script & Intrinsically Programed booklet	
	4.7	Audiotape/Intrinsically Programed booklet	Tape Script & Intrinsically Programed booklet	
V-A	5.1	Syndactic text		
	5.2	Syndactic text		
	5.3	Syndactic text		
	5.4	Linear text		
V-B	5.5	Linear text		
	5.6	Linear text		
	5.7	Audiotape/Panel book	Syndactic text	V-C
	5.8	Audiotape/Panel book	Syndactic text	
	5.9	Audiotape/Panel book	Syndactic text	V-D
	5.10	Audiotape/Panel book	Syndactic text	

TABLE 6 (Continued)

Volume Number	Segments Included	Media	Alternate Media	Volume Number
VI-A	6.1	Linear text		
	6.2	Linear text		
VI-B	6.3	Linear text		
	6.4	Syndactic text		
VII-A	7.1	Audiotape/Panel book	Syndactic text	VII-B
	7.2	Audiotape/Panel book	Syndactic text	
	7.3	Audiotape/Panel book	Syndactic text	VII-C
	7.4	Audiotape/Panel book	Syndactic text	
	7.5	Audiotape/Panel book	Syndactic text	
VIII-A	8.1	Linear text		
	8.2	Linear text		
	8.3	Linear text		
VIII-B	8.4	Syndactic text		
	8.5	Syndactic text		
	8.6	Syndactic text		
IX-A	9.1	Audiotape/Panel book	Syndactic text	IX-B
	9.2	Audiotape/Panel book	Syndactic text	
X	10.1	Audiotape/Intrinsically Programed booklet	Tape Script & Intrinsically Programed booklet	X
	10.2	Audiotape/Intrinsically Programed booklet	Tape Script & Intrinsically Programed boklet	
XI	11.1	Syndactic text		
	11.2	Syndactic text		
	11.3	Syndactic text		
	12.1	Computer-Assisted Instruction	Intrinsically Programed booklet	XII-A
	12.2	Computer-Assisted Instruction	Intrinsically Programed booklet	XII-B
	12.3	Computer-Assisted Instruction	Intrinsically Programed booklet	XII-C
	12.4	Computer-Assisted Instruction	Intrinsically Programed booklet	

will ensure that the student receives the required tutoring. If his own instructor is not available at the moment, the student may be tutored by any available instructor, or he may arrange a later time for tutoring. The student will be given the materials for the next part unless the instructor specifically indicates that he wants the student tutored before he receives the next set of materials.

For the convenience of both the student and CA, materials will be distributed in sets larger than single volumes. The student would have to make 19 trips to the administrative office to turn in one volume and pick up the next if the materials were distributed on a volume-by-volume basis. Distributing materials by parts (there are at most three volumes per part) would seem to be the most logical way of handling materials distribution.

In handing out materials by part, the CA will ascertain ahead of time whether any media selection is involved for the volumes contained in that part. If there is none, the CA will simply give the student his next set of materials. If media selection is entailed, however, the CA will tell the student to check first with his instructor about which medium to choose. If the instructor has said that the student can select the medium on his own, the CA will ask the student which medium he prefers.

Record-Keeping - The CA will update records of the student's progress through the materials, and record his performance. Records will also be kept by the CA on

* performance on administrative tests
* attendance at depth core discussions
* performance on enrichment materials
* materials distributed to student
* checkout and return of audio tapes and players.

Scheduling - The CA will assist the instructors in determining dates and times for testing and depth core, and will schedule the students for these activities. Notification of required student attendance (by section) will be posted on a bulletin board outside the administrative office (Room 220 Luce Hall).

ROLE OF THE INSTRUCTOR

One benefit to be derived from an individualized course such as the Leadership, Psychology and Management course is that the core content is delivered via instructional materials which have undergone extensive revision and validation and have been proven effective. The instructor is thus freed from the normal routine of determining what content to teach and how best to teach it, and no longer has the thrice-weekly task of preparing and delivering instructional lectures.

The instructor will generally meet with a student after he has completed a certain area of work. He can then clarify for him any points which gave him trouble, discuss the relation of the content area to leadership problems which the student may currently have or may expect to face in the future, and explore other content areas of interest to the student but covered only peripherally by the core materials.

The instructor has the option of dealing frequently with the student on this one-to-one basis to the degree that each finds the discussion helpful and has the time and interest to pursue them. Alternatively, if a student seems to be learning well from the materials (as evidenced by his performance on administrative tests and progress checks), the instructor need not deal on a close personal basis with him. The instructor can regulate the degree of interaction with his students, ranging from seldom seeing alone the student who is performing adequately to frequently seeing the student who has difficulty with or great interest in the content of the course. Instructor-student consultations can be initiated by either participant or by some predetermined criterion (e.g., the instructor insisting on seeing any student who gets a "C" or below on a test.)

It should be apparent that by releasing the instructor from the task of developing and teaching core content, more time is available for him to engage in other, more

meaningful, educational contacts with his students on an individual basis. Established points of interaction with the students are: a) the first day of class, b) assignment of media, c) system required tutoring, d) depth core and enrichment sessions, and e) administrative testing.

The First Day of Class.- The first class meeting should be devoted to a complete explication of the course, the mechanics of procedures, and the expectation that is placed upon the student in this self-paced individualized instructional course. Since most courses that the student has been exposed to are lock step and require little self-discipline, great care should be taken that the students understand their responsibility to this innovative approach to instruction. The orientation session is perhaps the most important meeting of the entire course. At that time, student guides will be handed out and discussed. It is recommended that the students be told to contact the CA to answer any questions relating to the student guide and to clarify up any administrative questions on procedures. As documentation for the instructor's role in these opening sessions, an instructor guide will be available with suggested procedures for opening day activities. Instructions should be given to the students to see the course administrator in Room 220, Luce Hall to take the administrative

pretest before taking out the first volume. The students should be informed that the pretest is intended to assess their entering level of knowledge and will not be used in grading. After completing the pretest, they will be issued Volume I, and they may begin proceeding at their own pace.

Assignment of Media - When the instruction is offered in more than one medium, the instructor may want the student to consult with him about which medium over particular content areas may be more profitable for that student. Table 6 indicates the alternate media available. The instructor would base his advice on the student's previous performance in that medium and on the student's attitude toward the medium.

It is hoped that the cross validation results on the relationship of student characteristics to performance with the various conditions of instruction will be available as additional input in the media selection process by the time the student reaches the later selection points.

It is recommended that for administrative ease the same medium be assigned for contiguous segments as indicated below. For instance, the four segments in 2.2 through 2.5 are available as audiotape/panelbook or syndactic text segments. The student who opts for tapes

for these segments will be provided with tapes and a tape player by the course administrator who will see that these items are checked out and returned by the student. Permitting the student to select tapes in 2.2 and 2.4 and syndactic texts in 2.3 and 2.5 with corresponding bookkeeping, would increase the CA's job considerably and would risk tying up tape players (which are in limited supply) if they were not returned promptly. Furthermore, if the instructor wishes to advise the student on media selection, only six student-instructor consultations would be necessary if media were assigned over contiguous segments. These consultations would be needed at the following points:

When student has completed Volume:	Discuss media selection for segments:
I	2.2 - 2.5
II-D	3.1 - 3.4
III-C	4.4 - 4.7
V (A or B)	5.7 - 5.10
VI-B	7.1 - 7.5
VIII-B	9.1 - 9.2
	10.1 - 10.2
	*12.1 - 12.4

* Early selection needed to permit advance CAI scheduling.

If the instructor does not wish to participate on these six occasions in the student's media selection, he may have one meeting with each student at the beginning of the semester to determine the student's media selections for the entire course. This has the drawback that the student may find himself committed to use a medium which he later discovers he does not like.

Alternatively, the instructor may want to leave media selection for some or all of the blocks of segments entirely up to the student.

WLC will provide forty copies of each tape used in the course. To prevent the occurence of a situation in which the instructors assign more than forty students to the same tapes at the same time, the CA will allot an equal number of copies of each tape to each instructor. The instructor may then allocate them among his own students. If an instructor is not going to use his full allotment, and another instructor could use more, they can easily be reassigned by the CA. If an instructor permits his students to decide for themselves the media they want to use, the CA will distribute the tapes on a first-come-first-served basis.

Tutoring One of the assets of the system as now conceived is that a student should be able to receive tutoring or assistance from an instructor at any time during normal office hours. The student will be more prone to drop by and talk over problems with the instructor if he feels unfettered by the nuisance of having to arrange to see him at a certain time. Since all instructors should be equally familiar with the content, any instructor would be able to handle tutoring sessions with another instructor's students.

If a student fails to achieve a score of 80% or better after taking the progress check twice, he is required by the instructional system to meet with the instructor for tutoring. The instructor should go over the progress check questions which the student missed, discuss why one answer is correct, determine why the student chose an incorrect response, and insure that the student has a correct understanding of the content area which caused him difficulty.

Past experience shows that tutoring time varied from ten to thirty minutes. The instructor is requested to record (on a WLC-provided log) the time he spends per student, per segment in tutoring.

Depth Core and Enrichment - The depth core sessions give the instructor the opportunity to conduct effective guided discussion to integrate and bring about the transfer of important concepts. The course activities chart (see Appendix B) indicates the temporal placement of each depth core session, approximating the content which the "on schedule" student should have completed in relation to the depth core.

Most of the depth core sessions are introduced by a short (five to ten minute) audio or film presentation and may have accompanying written materials; these can be obtained from the CA. The instructor will determine which depth core units he wants to use and will request the CA to notify his students of the dates of required attendance. To stimulate discussion and small-group intimacy, it is recommended that the instructor divide his section of 20 to 25 students in half and require that half of the class attend, for example, the Monday class meeting and the other half the Wednesday class meeting. The CA will post on a bulletin board outside Room 220, Luce Hall all pertinent information about required class attendance.

The instructor may use all or none of the depth core units, and may require student attendance or make it optional (he could increase the student's grade for each optional depth core discussion that the student attended). Depth core and enrichment packets will be outlined in detail and available to the instructor as they are needed.

Administrative Tests - As in any other course, the instructor is responsible for the student's grade. The Course Activities Chart (Appendix B) suggests possible dates and content areas on which tests can be given. These tests are spaced at an average of every two weeks although there is no requirement that the instructor test at such frequent intervals.

In constructing a test, the instructor has access to several sources of test items:

* a pool of 1,900 test items covering the entire course; this represents about 25 to 30 criterion-referenced test items per segment.
* almost 500 CPT test items which are more highly discriminating. All but eleven of the 59 segments were included in the CPT tests; for those segments tested by a CPT test, ten norm-referenced test items per segment were developed.
* a file of all the administrative tests used in the two validation runs of the course.

The instructor is not obligated to use any of the aforementioned test items (most of which are four-response multiple choice) but may test his students in any way he sees fit. It is recommended, however, that the instructors be as consistent as possible from section to section.

WLC will provide a standard test answer form for multiple choice questions and the CA will assume responsibility for scoring all non-essay test items and notifying the students and instructor of the grades.

WLC will also provide an 80-item pretest which is to be administered before a student is permitted to study any of the course materials. The same 80-items will be re-administered at the end of the course either as a posttest or as part of the final examination.

ROLE OF THE STUDENT

In this individualized system a great deal of responsibility will be placed on the student. Although he may proceed at his own pace, there will be a minimum pace suggested. The course activities chart (Appendix B) will be provided for the student (as well as the instructor) which will assist him in managing his time. The student will be responsible for grading his own progress check and determining whether he is in need of remediation

or tutoring. He will pick up and return the instructional materials and related forms from the course administrator (CA). He is also responsible for checking with the CA for scheduled depth-core and administrative test sessions. With the system established as it is for the spring, the student should find the instructor more readily available on an individual and small group basis in which he can gain maximum benefit from the interaction.

EVALUATION PLANS FOR THE INSTALLATION PHASE

The initial implementations of the course in the spring and fall semesters of 1970 involved the validation of instructional effectiveness through successive empirical revision cycles. During both runs of the course, several research studies were conducted. These studies were not intended for research sake alone. It was hoped that the results would provide insight for revision and further development of the course, and to a large degree they have.

The evaluation plans for the installation phase (spring 1971) will be aimed at verifying the effectiveness of the validated materials. In essence, this will be a summative evaluation of instructional effectiveness. In addition, careful consideration will be given to the aspects of course system operation and management. The course system being employed in the installation run reflects successive refinements made on the basis of information obtained during the initial tryouts of the course. It is at this point then that careful evaluation of systems operation and management has full meaning. The summative evaluation of instructional effectiveness will be discussed first, followed by evaluation plans for the course system operation and management.

INSTRUCTIONAL EFFECTIVENESS

Total Course Effectiveness based on Administrative Tests - The evaluation of course effectiveness has been based on student performance over two types of criterion referenced tests: the administrative pre and posttest and the segment progress check. Since both tests consist of items which have one-to-one correspondence with the behavioral objectives, it is reasonable to estimate the percentage of objectives attained by the average percentage of test items answered correctly. To the extent then that test items and objectives have been directly matched, the percentage of objectives attained and the percentage of test items achieved can be viewed interchangeably. Results of total course effectiveness based on administrative tests represent estimates of effectiveness from a representative sample of objectives. Descriptive statistics, gain score ratios and a test of mean difference will be given for the pre and posttest measures. The percentage of students achieving various criterion levels will be presented. In addition to estimates of total performance, descriptive statistics on total learning time will be given.

Course Effectiveness Based on Segment Progress Checks - The administrative test represents a sample of total course performance. One might reasonably expect a variability of

performance across segments of instruction. An in-depth assessment of the systems effectiveness can be obtained from segment progress check performance tabulated before and after remedial instruction. The mean percentage of objectives achieved and the mean learning time by segment will be given. In addition, the percentage of total objectives attained by each student (as measured by progress checks), and the mean percent across students both before and after remediation will be tabulated.

Since the course consists of 12 Parts of fairly distinct content, similar types of analyses as done by segment will be presented by Part. In assembling the materials, most Parts were able to be packaged in a single basic volume - exclusive of media options. Some Parts were of sufficient size to warrant multiple volumes. In either case however, a student questionnaire was included at the end of each basic volume.

student questionnaire was included because it is felt that in any instructional development and implementation, student acceptance is an important factor. One might feel that if a student achieves the desired criterion level performance in an acceptable period of time, then the instruction is effective. However, if in the process of learning the student continually finds the instruction lacking in some respect, then his

motivation to approach similar content or presentation forms in the future will be diminished. This may be due to the specific content itself, the difficulty level, or to the medium used to present the material. The questionnaire was developed to assess these factors as well as general comments about the system itself. The student questionnaire is given in Appendix C.

Media Effectiveness within and across Segment Blocks - In addition to the variety of media provided across the 59 segments of the course, there are eight points within the course, involving 29 segments, where media options are available across comparable blocks of segments. These points, the segments involved and the media available are presented in Table 7.

Comparative performance and time statistics as well as student reaction will be given for each option point. In addition, data will be summarized across segment blocks where media options are identical. Finally, summary statistics on performance, time and student reaction to each of the seven basic media employed across the course will be presented. Six of these media are indicated in Table 7. The remaining medium is Linear Text.

TABLE 7

MEDIA OPTIONS

Option Number	Segments	Media Options
1	2.2-2.5	Audiotape/Panel Book; Syndactic Text
2	3.1-3.4	Audiotape/Panel Book; Syndactic Text
3	4.4-4.7	Audiotape/Intrinsically Programed Booklet; Audiotape Script/Intrinsically Programed Booklet
4	5.7-5.10	Audiotape/Panel Book; Syndactic Text
5	7.1-7.5	Audiotape/Panel Book; Syndactic Text
6	9.1-9.2	Audiotape/Panel Book; Syndactic Text
7	10.1-10.2	Audiotape/Intrinsically Programed Booklet; Audiotape Script/Intrinsically Programed Booklet
8	12.1-12.4	Computer-Assisted Instruction (CAI); CAI Script (Intrinsic Booklet Format)

Use of Effectiveness Data - The types of data discussed above as well as being descriptive can provide an intended user of the system with invaluable information. The administrative tests, segment and media performance data are also sources of information that may be used by the course developer for possible revision purposes. Certainly it is the case that possible problem areas may be identified from the above types of data. However, unless one wishes to make the mistake of proceeding on intuition alone, other types of empirical data should be collected. These additional bits of data are the responses to individual learning frames, and responses to individual test items assessing achievement on specific course objectives. Both of these types of data are being collected and will be available to the USNA staff for revision purposes if required.

INSTRUCTIONAL SYSTEM VARIABLES

Media Options - As was mentioned previously, there are eight points within the course involving 29 segments where media options are available. The decision process for the selection of media for a particular student could be based on many factors. It could involve student preference, past history of performance, predictions based on individual characteristics, administrative considerations or some combination of these. In lieu of reliable empirical data it would make

sense to allow the student to select the medium he prefers. It is often the case, however, that a student will not have a strong preference because of lack of information on which to base his decision. That is, he may not have had prior exposure to the media involved. In this case, student performance on the initial exposure to various media at the beginning of the course can be tabulated and used in the decision process at later points in the course. It should be noted here, however, that this performance includes the effects of the content covered as well as the media employed.

If reliable predictors of performance with various media are available, a large step towards optimizing the instruction for each individual can be made. This is certainly not intended to lessen the value of the student selecting the media provided he has some data with guidelines for interpretation on which to base his decision Considering the many qualifications necessary in applying complex regression equations to a new population of students even after cross-validation, student preference in media selection might well be just as effective. Some of the restrictions involved in the use of the student characteristic data should be noted here.

The investigation of the relationship of student

characteristics to performance in the course was in essence added on to a complex research design involving group comparisons. If the sole objective was the investigation of student characteristics, the research design would have looked quite different. Secondly, the student characteristics were related to performance on the norm-referenced Cumulative Posttests (CPT's). In order for this information to be used effectively during the installation phase, the precise relationship of performance on the CPT's to performance on segment and administrative test must be determined. Finally, it should be noted that a direct comparison of the relationship of student characteristics to performance with audiotape/panel book as opposed to syndactic text is not available. The syndactic texts for media options 1, 2, 4, 5, and 6 shown in Table 7 were not in use during the first two runs of the course. In addition no direct comparisons of the media involved in media options 3, 7 and 8 were made because of the small number of students utilizing one of the media in each case. This does not preclude, however, the use of the data on the relationship of student characteristics to performance with audiotape/panel book, for example. Although we may be able to predict that a particular student would perform poorly on audiotape/panel book, we cannot necessarily say that he would do better with syndactic text. This does not preclude the use

of the student characteristic data in attempting to optimize performance, but it does mean that we should be aware of the limitations. In any case, the decision process and the type of information involved will be reported. Due to the limited number of tape recorders available the number of students able to select the audiotape option at any one point will most likely be limited to 30 to 50 students.

Depth core and Enrichment - Since depth core is optional for the instructor and enrichment is optional for the student, these topics are included under instructional system variables. Depth core and enrichment sessions will be evaluated as they are used. Where appropriate, the evaluation procedures for these sessions which will be outlined in detail as they are delivered will include attitudinal data from students and instructors as well as performance data.

The Instructor - The instructional system frees the instructor from being a mere disseminator of information and allows him to interact in a meaningful manner with individual students when they are in need of his assistance for remediation or enrichment. It allows for his interaction with small groups of students in depth core sessions to integrate information and concepts that have been effectively self-taught with validated programed materials. The amount of time

that an instructor engages in tutoring, depth core and enrichment session with the students will be tabulated. This type of data is essential in attempting to estimate the number of students that any one instructor can handle. Finally, the instructors will be asked to keep a continual record of their assessment of their role in the system, comparing what was established with what actually occurred and noting any discrepancies or problems. This will allow for documentation of problem areas in the system that were not anticipated at the beginning of the course.

The Course Administrator - The major responsibility of the course administrator is to relieve the instructor of as much of the administrative work as possible so that the instructor is free to handle more students with greater efficiency and effectiveness. The amount of time that the course administrator is involved with distribution and collection of materials as opposed to record keeping and reporting of data will be tabulated. The course administrator will also be required to keep a comment log to document any problems that might arise.

Record keeping and Data Management - Control of the distribution of the introductory questionnaires, the pretest, the instructional materials, and tapes and tape recorders is

maintained by means of the Materials Distribution Form. A sample page of this form is given in Appendix D . The media selected at each option point is given in order to ensure that the proper volumes have been handed out.

Each student records his answers to segment progress checks on the Progress Check Response Form (See Appendix E) and grades it himself to determine if he needs to remediate and re-take the progress check. When this form is turned in by the student, the course administrator records the performance on the Progress Check Performance Record. A sample of this form is given in Appendix F . The students are listed by section so that an instructor can check on the overall class performance with relative ease. In addition, the media chosen and the average performance across segments within each media option will be tabulated.

As can be noted on the Progress Check response form, the students are asked to indicate the total time spent on each segment (see Appendix E). An individual student's learning time is recorded on the Segment Learning Time Record (See Appendix G). As was done with the Progress Check Performance Record, the media chosen and the average time spent across segments within each media option will be tabulated.

If a student fails to achieve 80% on any progress check, he must remediate and re-take the missed items. If he again fails to achieve 80%, he must see the instructor for tutoring. In this case the instructor will be given a form indicating the questions missed, and after the tutoring session is completed, the instructor will indicate the time spent. The tutor form will be returned to the course administrator and the time will be recorded on the Tutor Time Record (see Appendix H).

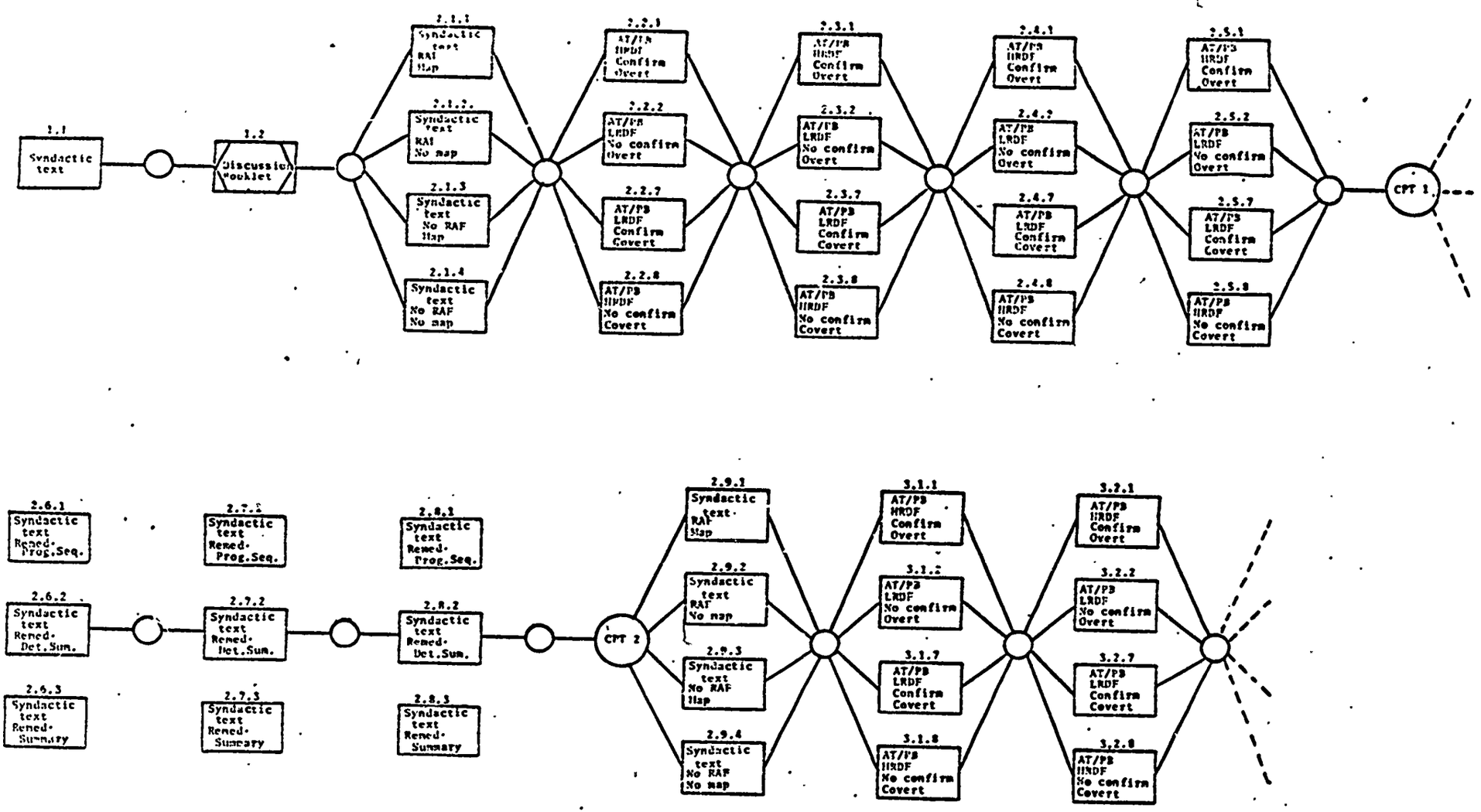
All of the above forms will be available for the instructors' inspection in the administrative office. In addition to these forms, a weekly report will be given to the instructors indicating his students' pace through the course. Those students who are behind schedule will be clearly noted. The weekly performance record is shown in Appendix I.

The use of the above mentioned forms allows for a simplistic and efficient management system that does not require the use of a computer. However, the forms are set up in such a manner that the conversion to a computer managed system could be made. The question yet to be investigated is whether it would be cost effective.

APPENDIX A

PRESENTATION DESIGN

FALL 1970

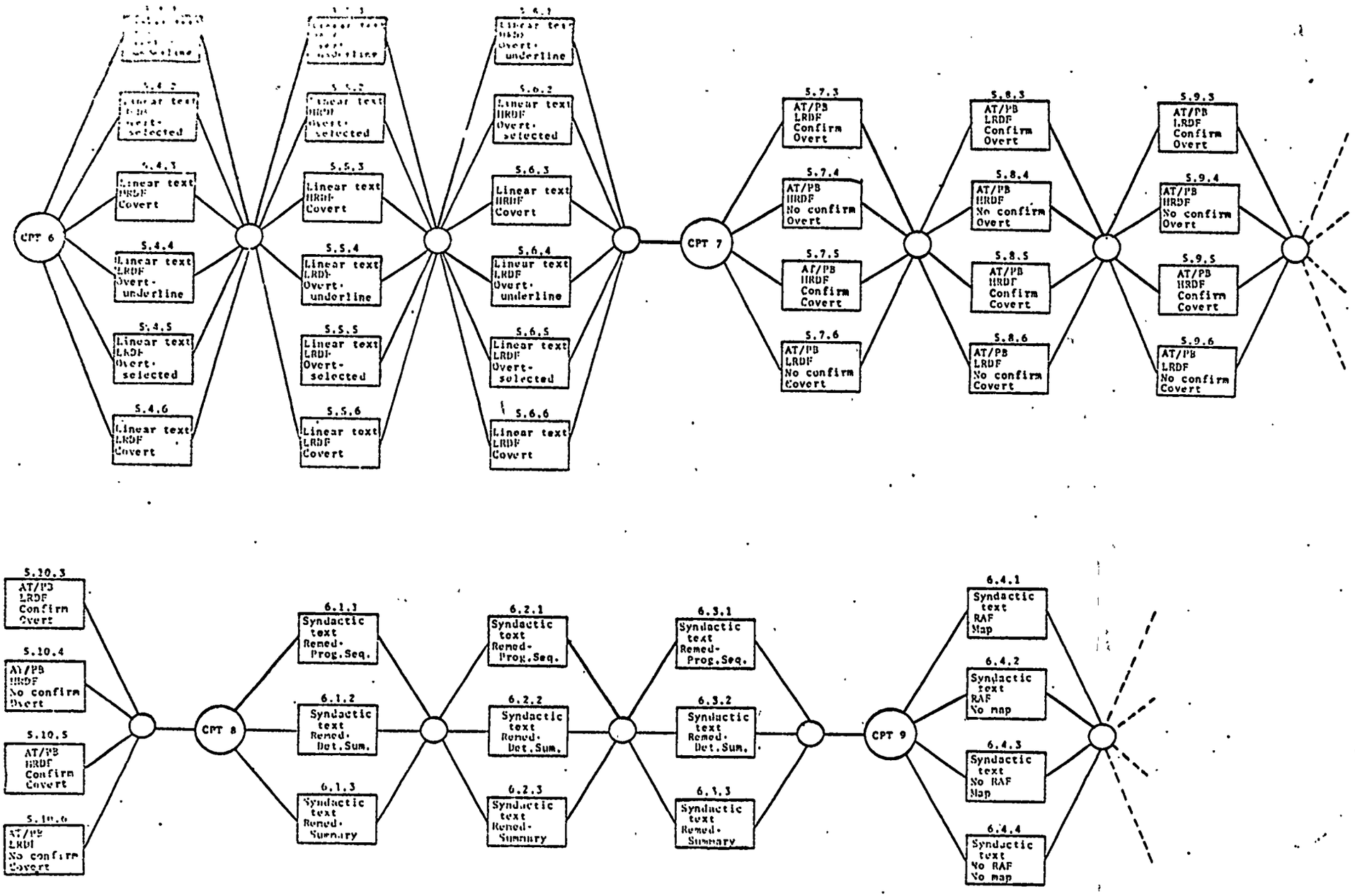


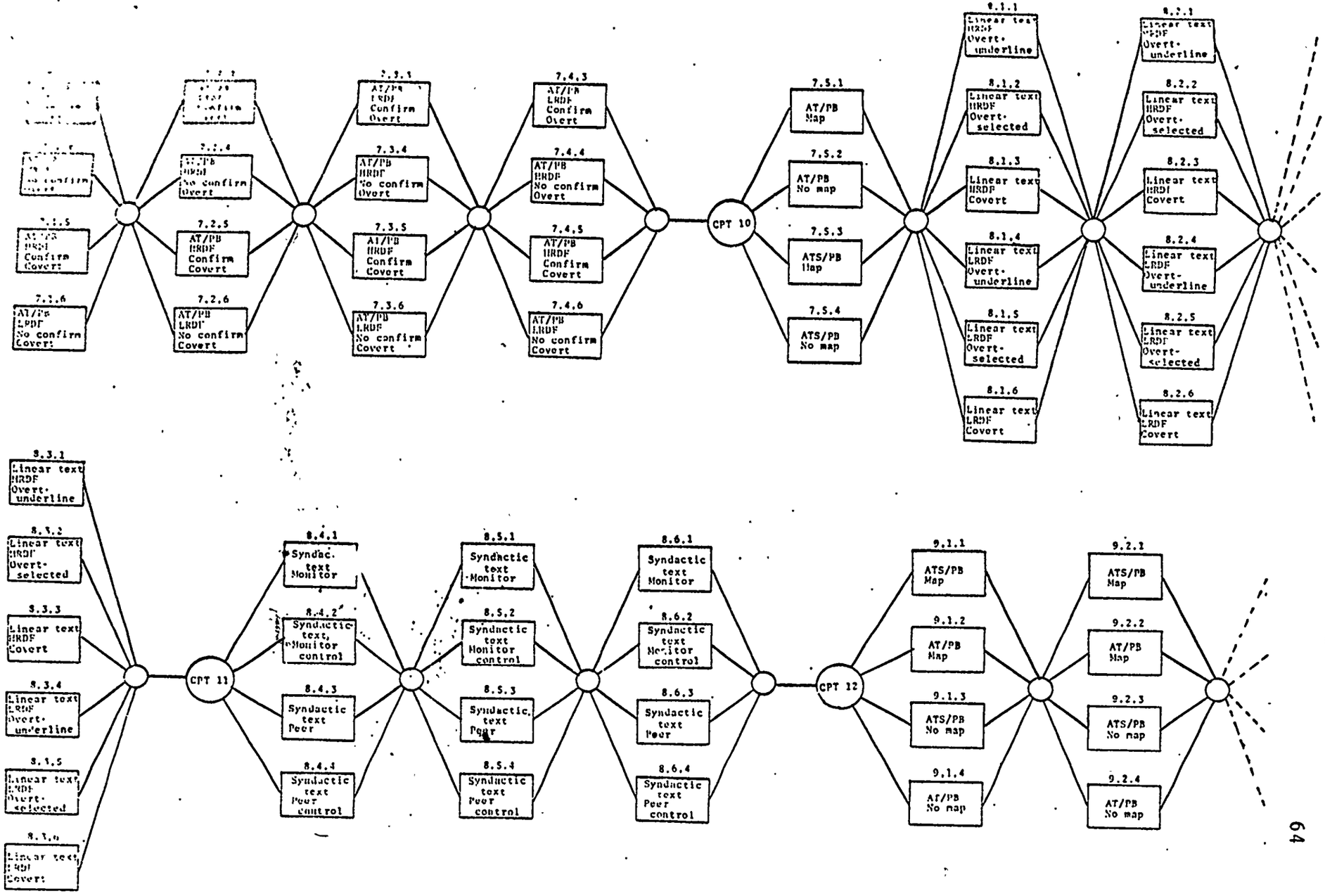
AT/IP • Audiotape/Intrinsic Program
ATS/IP • Audiotape Script/Intrinsic Program
AT/PB • Audiotape/Panelbook
ATS/PB • Audiotape Script/Panelbook
CAI • Computer Assisted Instruction

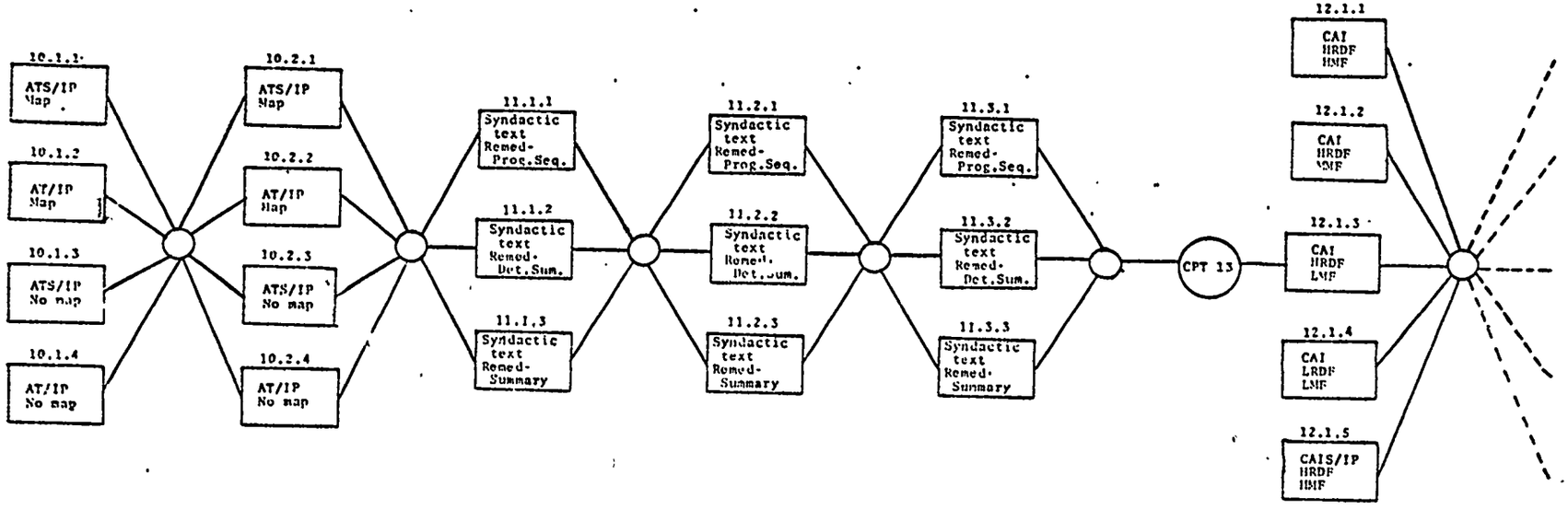
CAIS/IP • Computer Assisted Instruction Script/Intrinsic Program
CPT • Cumulative Posttest
Confirm • Confirmation
HMF • High Management Frequency

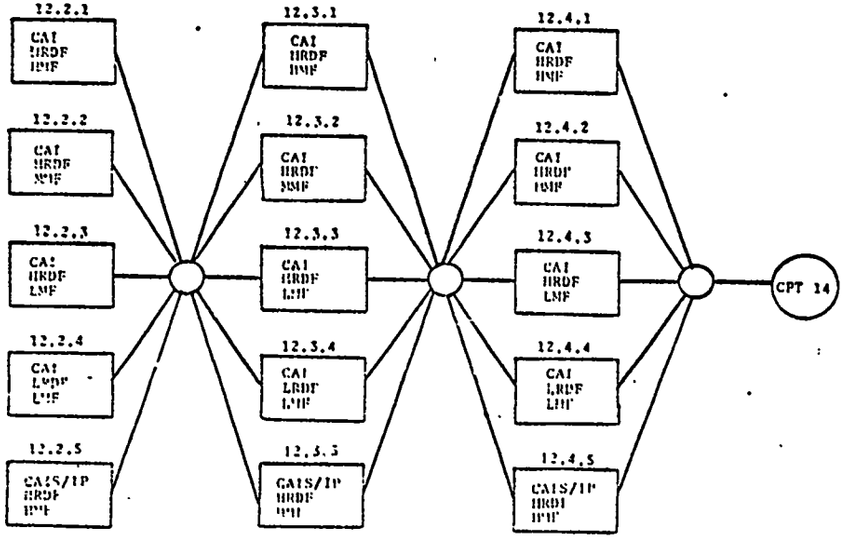
HRDF • High Response Demand Frequency
LMF • Low Management Frequency
LRDF • Low Response Demand Frequency
MMF • Medium Management Frequency
RAF • Revealed Answer Form
Remed • Remediation

○ • Progress Check






10.1.1
ATS/IP Map
10.1.2
AT/IP Map
10.1.3
ATS/IP No map
10.1.4
AT/IP No map
10.2.1
ATS/IP Map
10.2.2
AT/IP Map
10.2.3
ATS/IP No map
10.2.4
AT/IP No map
11.1.1
Syndactic text Remed-Prog.Seq.
11.1.2
Syndactic text Remed-Det.Sum.
11.1.3
Syndactic text Remed-Summary
11.2.1
Syndactic text Remed-Prog.Seq.
11.2.2
Syndactic text Remed-Det.Sum.
11.2.3
Syndactic text Remed-Summary
11.3.1
Syndactic text Remed-Prog.Seq.
11.3.2
Syndactic text Remed-Det.Sum.
11.3.3
Syndactic text Remed-Summary
CPT 13
12.1.1
CAI HRDF HMF
12.1.2
CAI HRDF LMF
12.1.3
CAI HRDF LMF
12.1.4
CAI LRDF LMF
12.1.5
CAIS/IP HRDF HMF

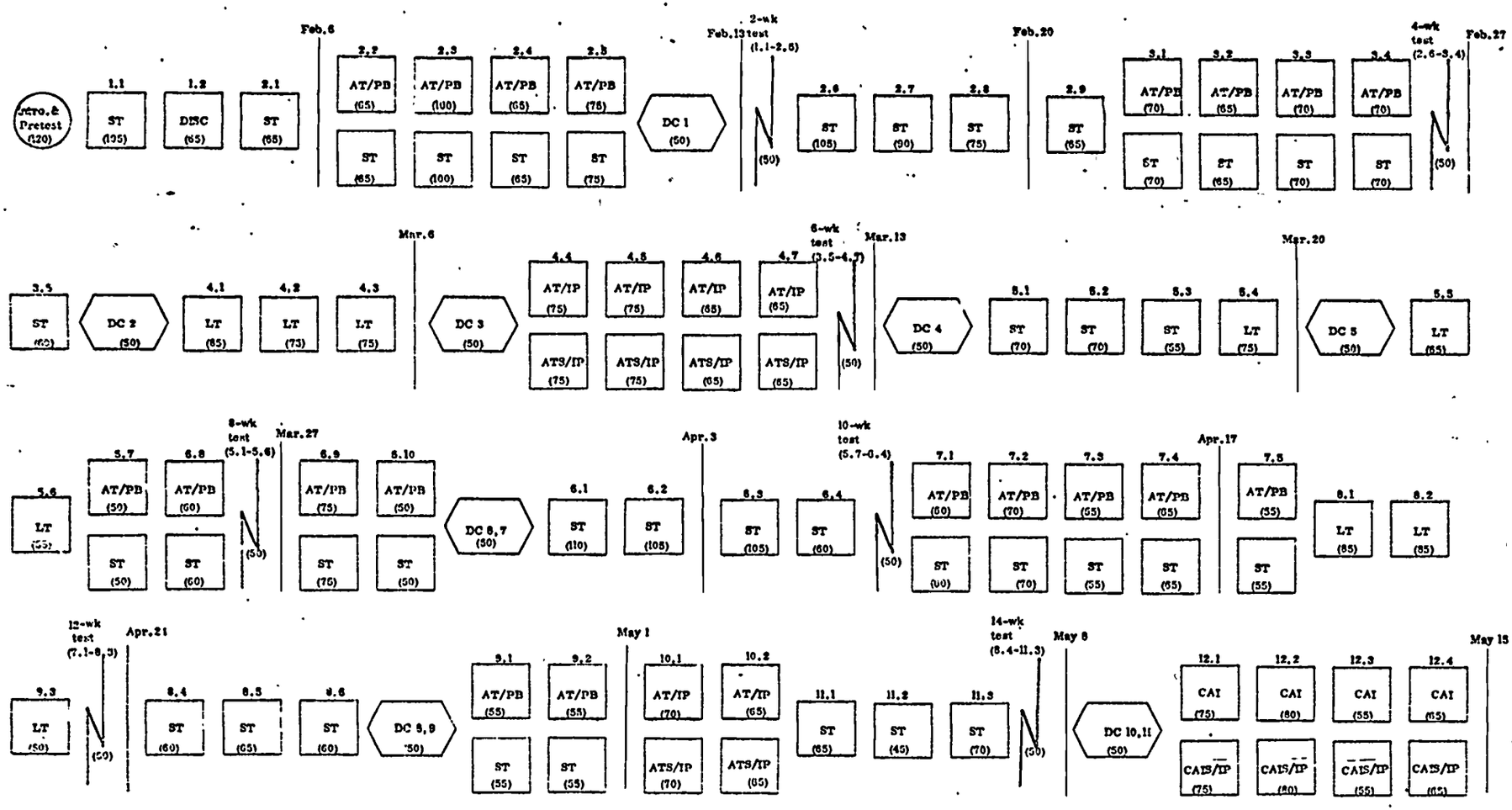

12.2.1
CAI HRDF HMF
12.2.2
CAI HRDF LMF
12.2.3
CAI HRDF LMF
12.2.4
CAI LRDF LMF
12.2.5
CAIS/IP HRDF HMF
12.3.1
CAI HRDF HMF
12.3.2
CAI HRDF LMF
12.3.3
CAI HRDF LMF
12.3.4
CAI LRDF LMF
12.3.5
CAIS/IP HRDF HMF
12.4.1
CAI HRDF HMF
12.4.2
CAI HRDF LMF
12.4.3
CAI HRDF LMF
12.4.4
CAI LRDF LMF
12.4.5
CAIS/IP HRDF HMF
CPT 14

APPENDIX B

COURSE ACTIVITIES CHART

INTRODUCTION TO PSYCHOLOGY AND LEADERSHIP

SPRING 1971



LEGEND

AT/IP = Audiotape/Intrinsically Programed Booklet
ATS/IP = Audiotape Script/Intrinsically Programed Booklet
AT/PB = Audiotape/Panel Book
CAI = Computer Assisted Instruction
CAIS/IP = CAI Script/Intrinsically Programed Booklet
DC = Depth Core Sessions
DISC. = Group Discussion
LT = Linear Text
ST = Syndactic Text
( ) = Estimated time of Activity

Admin. Test

Completion dates of minimum units of materials

APPENDIX C
STUDENT QUESTIONNAIRE

1. Volume number? _____

For the following questions circle the appropriate number.

		High	Above Avg	Avg	Below Avg	Low
2.	Was the material interesting?	1	2	3	4	5
3.	Was the material difficult?	1	2	3	4	5
4.	Rate your approval of the way the material was presented (check only the media used in this Volume).					
	a. Audiotape/Intrinsically Programed Booklet (IPB)	1	2	3	4	5
	b. Audiotape Script/IPB	1	2	3	4	5
	c. Audiotape/Panelbook	1	2	3	4	5
	d. Computer Assisted Instruction (CAI)	1	2	3	4	5
	e. CAI Script/IPB	1	2	3	4	5
	f. Discussion Booklet	1	2	3	4	5
	g. Linear Text	1	2	3	4	5
	h. Syndactic Text	1	2	3	4	5

5. If your answer to number 4 was "Below Avg." or "Low," identify the media and indicate why.

_____

_____

_____

_____

_____

6. Have you had any difficulties with regard to:

	Yes	No
a. Maintaining the minimum pace as indicated in the Course Activities Chart?		
b. Following procedures as outlined in the Student Guide?		
c. Obtaining instructional materials?		
d. Meeting with the instructor?		

7. If you answered "Yes" to any portion of number 6, please specify the area and the problem.

_____

_____

_____

_____

_____

8. If you have any additional comments to make with regard to the above questions or any other aspect of the course, please do so here.

_____

_____

_____

_____

_____

MATERIALS DISTRIBUTION CONTROL FORM

NAME	SECTION	Gen. Ques.	Stu. Ques.	Pre-Test	2.2-2.5 Media Sel.*	2.2-2.5 Vol. I	Vols. II-A, II-B, II-C	Vol. II-A	2.2-2.5 Tapes Out	Tapes In	Record Out	Record In
Accursi	401	✓	✓	✓	A	✓		✓	2/12	2/17	Ale	
Albert	201	✓	✓	✓	S	✓	✓					
Boost	701	✓	✓	✓	S	✓	✓					
Boy	201	✓	✓	✓	S	✓	✓					
Bradley	601	✓	✓	✓	S	✓						
Brownsberger	701	✓	✓	✓	S	✓						
Carlson	601	✓	✓	✓	S	✓	✓					
Clarkin	701	✓	✓	✓	S	✓	✓					
Clifford	401	✓	✓	✓		✓						
Coleman, A.	201	✓	✓	✓	A	✓		✓	2/13	2/19	2/13	2/
Coleman, D.	401	✓	✓	✓	S	✓	✓					
Collins	701	✓	✓	✓	S	✓	✓					
Cooper	501	✓	✓	✓	S	✓	✓					
Covington	701	✓	✓	✓	S	✓	✓					
Coyle	501	✓	✓	✓	S	✓	✓					
Crook	201	✓	✓	✓	S	✓	✓					
Davidsson	501	✓	✓		S	✓	✓					
Dentler	701	✓	✓	✓	A	✓		✓	2/11		2/11	
Dillon	501	✓	✓	✓	S	✓	✓					
Dohse	201	✓	✓	✓	S	✓	✓					
Donlan	501	✓	✓	✓	A	✓		✓	2/12		No	
Drawneck	601	✓	✓	✓	A	✓		✓	2/11		2/11	
Endicott	501	✓	✓	✓	A	✓		✓	2/12		2/12	
Englund	201	✓	✓	✓	S	✓	✓					
Evans	601	✓	✓	✓	S	✓	✓					
Feltes	701	✓	✓	✓	S	✓	✓					
Fleming	501	✓	✓	✓	S	✓	✓					
Frazier	401	✓	✓	✓	A	✓		✓	2/12	2/17	2/12	
Gallup	201	✓	✓	✓	S	✓						
Gilbert	501	✓	✓	✓	S	✓	✓					
Goodwin	201	✓	✓	✓	S	✓	✓					
Griffiths	701	✓	✓	✓	S	✓	✓					
Hall	701	✓		✓	S	✓	✓					
Harrison	401	✓	✓	✓	S	✓						
Harrold	501	✓	✓	✓	S	✓	✓					
Hartley	501	✓	✓	✓	S	✓	✓					
Hearding	201	✓	✓	✓	S	✓	✓					
Henry	201	✓	✓	✓	A	✓		✓	2/18		No	
Hill	701	✓	✓	✓	S	✓	✓					
Hoffmann	401	✓	✓	✓	A	✓		✓	2/6	2/12	No	

* A - Audiotape/panel book

B - Syndactic text

PROGRESS CHECK RESPONSE FORM

PART 4 SEGMENT 1

Name _____ ID _____

Total time spent on segment (including Progress Check and Remediation)

_____ minutes.

TEST ITEM	RESPONSES		REMEDIATION REFERENCES
	FIRST TRIAL	SECOND TRIAL	4.1 Linear Text, Volume IV-A
1			Pages 3-6
2			Pages 2-6
3			Pages 7-10
4			Pages 11-14
5			Pages 14-16
6			Pages 16-19
7			Pages 19-27
8			Pages 21-31
9			Pages 20-27
10			Pages 31-43
11			
12			
13			
14			
15			
Total Number Correct			
Percentage Correct			

PROGRESS CHECK PERFORMANCE RECORD

Boys 201

	1.1		1.2		2.1		2.2		2.3	
	PC-1	PC-2	PC-1	PC-2	PC-1	PC-2	PC-1	PC-2	PC-1	PC-2
ALBERT	90		80		80		90		90	
BOY	90		100		80		90		80	
COLEMAN	80		100							
CROOK	70	100	60	100	100		90		70	100
DOHSE	100		100		100		100		90	
ENGLUND	80		100		90		100		80	
GALLUP										
GOODWIN	90		80		90		90		80	
HEARDING	100		90		90		100		80	
HENRY	100		90							
JOHNSON	100		100		100		100		100	
KEITH	90		70	100	100		90		100	
KNIGHT	80		100							
NEWLAN	80		90		90		70	100	70	100
OSTENDORF	100		90		100		90		90	
PALMATIER	90		80		90		100		90	
PATTERSON	80		90							
POTAMPA										
RAE	80		60	100						
SCHLUDERBERG	90		100							
SCHNEIDER	90		80							
SCHULTZ	100		70	100	90		100		90	
SWAILES										
VELDSTRA										
WEHRLE	90		100		80		90		70	90
WICK	100		100		60	100	80		80	
WILCOX	90		90		100		90		90	

Boys 701

	1.1		1.2		2.1		2.2		2.3	
	PC-1	PC-2	PC-1	PC-2	PC-1	PC-2	PC-1	PC-2	PC-1	PC-2
BOOST	100		80		100		100		90	
BROWNSBERGER	90		60	90						
CLARKIN	100		80		80		100		100	
COLLINS	90		100		90		80		90	
COVINGTON	100		80							
DENTLER	80		100							
FELTES	100		100		100		100		90	
GRIFFITHS	90		80		90		100		90	
HALL	90		100							
HILL	90		90		100		90		90	
HORSTMANN	100		90							
JENKINS	90		100							
JONES T L	100		70	100						
MCKAY	90		80		80		90		70	90
MILLER										
NADEAU	100		100		90		100		80	
NORRIS S J	90		100		90		60	100	80	
POY	90		70	100	100		100		90	
RILEY	80		100		100		100		90	
ROSENWEIG	100		80		70	100	80		70	100
STEVENSON	90		90							
STOCKTON	70	100	90		70	100	100		80	
SUGG										
SWITZER	90		100							
TOBIASON	90		70	100						

SEGMENT LEARNING TIME RECORD

		1.1	1.2	2.1	2.2	2.3	2.4	2.5	2.2-2.5 Media Ave.		
Accursi	401	90	60	40	60	40	50	60	A		
Albert	201	165	100	60	105	70	40	65	S		
Boost	701	90	45	45	90	70	70	75	S		
Boy	201	120	50	60	60	50	90	40	S		
Bradley	601										
Brownsberger	701	120	—								
Carlson	601	260	30								
Clarkin	701	90	45	45	65	—	25	45	S		
Clifford	401										
Coleman, A.	201	110	95								
Coleman, D.	401	70	50	50	60	55	40	45	S		
Collins	701	130	65	75	75	75	60	85	S		
Cooper	501	40	45								
Covington	701	65	50								
Coyle	501	55	—	35	45	40	30	50	S		
Crook	201	30	30	40	40	45	25	20	S		
Davidsson	501	35	25	30	40	40	30	35	S		
Dentler	701	40	120								
Dillon	501	70	40	40	40	75	45	55	S		
Dohse	201	150	75	80	90	90	60	60	S		
Donlan	501	10	150								
Drawneck	601	300	45								
Endicott	501	40	40								
Englund	201	180	60	60	70	60	45	55	S		
Evans	601	90	50								
Feltes	701	50	55	45	45	35	40	45	S		
Fleming	501	70	30	20	20	15	35	35	S		
Frazier	401	45	20	30	50	45	50	50	A		
Gallup	201										
Gilbert	501	95	60	50	55	55	70	70	S		
Goodwin	201	—	—	75	95	—	90	50	S		
Griffiths	701	100	40	50	60	60	45	60	S		
Hall	701	—	—								
Harrison	401										
Harrold	501	65	45								
Hartley	501	90	40								
Hearding	201	60	40	40	45	45	30	30	S		
Henry	201	—	—								
Hill	701	120	70	40	70	50	70	50	S		
Hoffmann	401	180	70	70	50	45	55	60	A		

TUTOR TIME RECORD

	Sect.	1.1	1.2	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8
Accursi	401										
Albert	201										
Boost	701										
Boy	201										
Bradley	601										
Brownsberger	701										
Carlson	601										
Clarkin	701										
Clifford	401										
Coleman, A.	201										
Coleman, D.	401										
Collins	701										
Cooper	501										
Covington	701										
Coyle	501										
Crook	201										
Davidsson	501										
Dentler	701										
Dillon	501										
Dohse	201										
Donlan	501										
Drawneck	601										
Endicott	501										
Englund	201										
Evans	601										
Feltes	701										
Fleming	501										
Frazier	401										
Gallup	201										
Gilbert	501										
Goodwin	201										
Griffiths	701										
Hall	701										
Harrison	401										
Harrold	501										
Hartley	501										
Hearding	201										
Henry	201										
Hill	701										
Hoffmann	401										

B = Boys
G = Green
S = Shelso

WEEKLY PERFORMANCE RECORD

STUDENT PACE (Last Segment Completed)

	Week Ending		2/13	2/20	2/27	3/6	3/13	3/20	3/27	4/3	4/17	4/24	5/1
	Boys 201	Co.											
	ALBERT	7	1.2*										
	BOY —	1	1.2*										
	COLEMAN	10	1.2*										
	CROOK	12	2.5										
	DOUSE	24	1.2*										
	ENGLUND	1	2.5										
	GALLUP — DROP		—										
	GOODWIN	27	1.2*										
2.5	HEARDING	16	1.2*										
	HENRY	2	1.2*										
	JOHNSON	14	1.2*										
	KEITH	5	2.5										
	KNIGHT	19	— *										
	NEWLAN	21	1.2*										
	OSTENDORF	13	1.2*										
	PALMATIER	10	1.2*										
	PATTERSON	14	— *										
	POTAMPA	10	— *										
	RAE	5	1.2*										
	SCHLUDERBERG	22	1.2*										
	SCHNEIDER	17	1.2*										
	SCHULTZ	20	2.5										
	SWAILES	7	— *										
	VELDSTRA	8	— *										
	WEHRLE	4	2.5										
	WICK	23	2.5										
	WILCOX	3	1.2*										
	Suggested Minimum Pace		2.5	2.8	3.4	4.3	4.7	5.4	5.8	6.2	7.4	8.3	9.2

* Student Behind Schedule

	Boys 701												
2.5	BOOST	24	1.2*										
DROP	BROWNSBERGER	—	— *										
2.5	CLARKIN	5	1.2*										
	COLLINS	11	2.5										
	COVINGTON	—	1.2*										
	DENTLER	11	1.2*										
2.5	FELTES	1	— *										
	GRIFFITHS	14	2.5										
	HALL	21	1.2*										
2.5	HILL	9	1.2*										
	HORSTMANN	1	— *										
	JENKINS	21	1.2*										
	JONES T L	13	1.2*										
	MCKAY	16	2.5										
	MILLER	21	—										
	NADEAU	12	2.5										
2.5	NORRIS S J	22	1.2*										
2.1	POY	3	— *										
2.5	RILEY	3	1.2*										
	ROSENWEIG	7	1.2*										
	STEVENSON	1	— *										
	STOCKTON	23	1.2*										
	SUGG	23	— *										
1.2	SWITZER	1	— *										
	TOBIASON	20	1.2*										