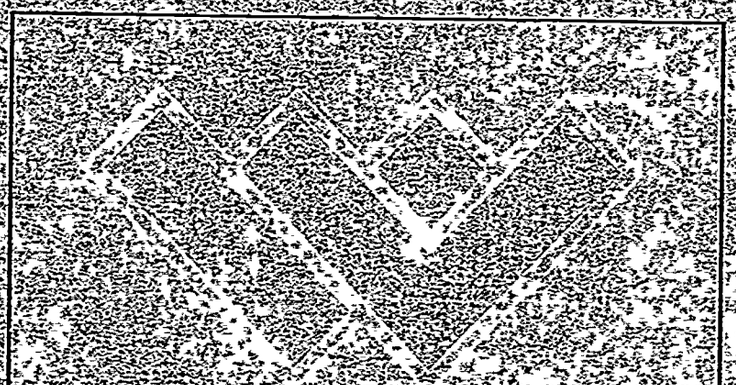
DOCUMENT RESUME

ED 071 334 EM 010 479

TITLE	Introduction to Psychology and Leadership. Leadership Management Course; Course Development Model for Phase I.
INSTITUTION	Naval Academy, Annapolis, Md.; Westinghouse Learning Corp., Annapolis, Md.
SPONS AGENCY	National Center for Educational Research and Development (DHEW/OE), Washington, D.C.
REPORT NO	TP-6-6
BUREAU NO	BR-8-0448
PUB DATE	28 Mar 69
CONTRACT	N00600-68-C-1525
NOTE	36p.; See also EM 010 418 and EM 010 419
EDRS PRICE	MF-$0.65 HC-$3.29
DESCRIPTORS	Autoinstructional Aids; *Communication (Thought Transfer); *Course Content; Curriculum Design; *Curriculum Development; Individualized Curriculum; *Individualized Instruction; Individual Psychology; Instructional Design; Leadership; *Leadership Training; Management Education; *Military Training; Multimedia Instruction; Psychology; Social Psychology; Technical Reports

ABSTRACT

The course development model used in the development of the leadership course for the United States Naval Academy by the Westinghouse Learning Corporation is briefly presented and examined, with those features which are specific to the USNA indicated. The final report of the project is under EM 010 418, EM 010 419, and EM 010 484. EM 010 418 through EM 010 447 and EM 010 451 through EM 010 512 are related reports. (Author/RH)



Westinghouse Learning Corporation

LEADERSHIP MANAGEMENT COURSE

COURSE DEVELOPMENT MODEL FOR PHASE I

CONTRACT NO. N00600-68-C-1525

TP-6.6

March 28, 1969

COURSE DEVELOPMENT MODEL FOR PHASE I

Contract No. N00600-68-C-1525

ABSTRACT

This report presents an overview of the Course Development Model, its purpose and its relationship to the total project effort. Those aspects which are unique to the USNA contract are indicated. Charts demonstrating the workflow of contingent functions are included.

Approved by:

Project Manager
Leadership Management Course

Westinghouse Learning Corporation
1840 Lomas Boulevard, Northeast
Albuquerque, New Mexico 87106

TP-6.6

March 28, 1969

TABLE OF CONTENTS

1. INTRODUCTION

This paper presents and briefly examines the Course Development Model (CDM). The CDM is an outgrowth of efforts directed by Westinghouse Learning Corporation (WLC) towards fulfilling the long-range goals of the Multi-Media Course Development Project.

These goals include the design, development, and verification of a CDM to be used for the development of a superior educational system, incorporating the most recent advances in educational technology. To accomplish these goals, the United States Naval Academy (USNA), in cooperation with the United States Office of Education (USOE), has contracted with WLC to develop a multi-media course in leadership psychology.

This course is constructed not only to improve the quality of a Midshipman's education, but also to serve as the basis for an extensive research program being conducted simultaneously with the development and validation of materials. The objective of the research program is to evaluate the effect of various media and presentational forms in terms of the individual student's learning style. By carefully planning and documenting the total effort and the resources involved in materials preparation and research, WLC will empirically develop and validate the CDM for use in the construction of further curriculum components.

2. DEVELOPMENT OF THE CDM

The CDM can best be constructed by using a modified operation sequence diagram.

The development of the sequence was begun by carefully identifying the major "function areas or function groupings." This process is analogous to the identification of major tasks.

The major function areas are identified below with a brief statement of their purpose.

Project Management -- management of the total project effort

Analysis and Course Design -- specification of the content and structure of the leadership course

Writing -- construction of programed materials, film scripts, lectures, etc., as required by the analysis and course design

Presentation Design -- specification of the media and presentation forms to be used, based on the requirements of the content and research design

Research Design -- design of the research effort, including experimental design for the multi-media research, design of the testing program, and specification of procedures for materials validation

Production and Control -- preparation of all materials for final manufacturing, including such sub-functions as typing, editing, and illustrating

Project Coordination -- direct supervision and coordination of the various functional areas

Data Processing -- processing and storage of all information necessary for the research project, materials validation, and prescriptive system

Contract Administration -- ensuring compliance with the contract, and communicating with the customer concerning changes in contract scope

Secretary Document Control -- general secretarial work in addition to keeping adequate records of all information regarding the contract

Subject Matter Consultants -- working with the contractor to ensure adequate content coverage

Manufacturing -- the technical manufacturing of course components, such as film production, printing, and binding

Customer -- technical direction, signoff of the product, and careful specification of parameters and logistics in which the contract must be performed

The second step in constructing the operation sequence diagram was to list the specific sub-functions, or tasks, in sequence of occurrence as they appeared in each of the previously identified function areas. For example, a list of sub-functions to be

performed in the area labeled Research Design includes such items as the following:

a. specify variables to be investigated for research design

b. specify developmental testing

c. specify design for validation of learning materials

Sub-functions do not always indicate precisely how the necessary function is to be performed; they merely state that the function must be accomplished. The specific procedural aspects of each sub-function will be further developed as the sub-function in question is actually performed.

After a skeleton sequence of sub-functions was developed for each area, it was necessary to sequence the sub-functions and indicate the relationships between them, i.e., the workflow for each aspect of the project was established. It is generally the case that, as new interface requirements are discovered and sequencing of sub-functions is completed, changes in the original sub-function designations become necessary. The CDM presented in this paper is empirically valid only to the present state of the contract.

Many of the sub-functions are still in the hypothetical state. Later reports will update the CDM and designate areas of deviation from its present form. These deviations will be examined to determine their consequent effect on the total CDM.

Because the CDM is not entirely empirical at this time, extensive research was conducted during its development in an effort to minimize the possibility of later changes. Specific

sources of information used in developing the function areas include WLC's proposal, A Proposal for the Development of a Multi-Media Course in Leadership, dated Sept. 11, 1967; the technical paper, Behavioral Approach to Instructional Design and Media Selection, dated Sept. 1968; the monograph, Instructional Media (AIR), dated 1967; WLC's past experience in course development; and numerous references in the area of materials preparation. Sections 1 and 6 of the multi-media leadership proposal were particularly useful in structuring the CDM, as they provided a listing of the major outputs demanded by the completion of each contract phase.

As mentioned earlier, every effort has been made to keep the CDM applicable to the development of further multi-media courses. Due to the nature of the contract and the customer, there are some function areas and sub-functions which are peculiar to the USNA project. These will be isolated and eventually removed from the CDM.

3. RELATIONSHIP OF THE CDM TO THE TOTAL PROJECT EFFORT

3.1 THE PERT NETWORK

The CDM is the basic planning document for the total project. Consequently, it serves as the foundation and reference source for both the PERT network and the cost accounting system. The CDM was used to determine the general workflow and milestones of the project. From this, the delivery schedule, manpower, and resource requirements for the PERT planning system were derived. The total development of the PERT system and its advantages and disadvantages for this type of project will be dealt with in another technical paper (TR-6.7).

3.2 THE COST ACCOUNTING SYSTEM

As previously mentioned, the CDM also serves as a basis for the cost accounting system (TP-6.5). In this section, the interrelationship of the CDM and the cost accounting system are explained. This adds further clarification of the CDM and emphasizes its part in the achievement of the contract's long-range goals.

The same function areas developed in the initial step of CDM construction were originally considered for use in the cost accounting system, as well. Much similarity still exists between the function areas of the two systems, although there is not a one-to-one correspondence. There are four important reasons for this discrepancy:

a. The objectives of the two systems are different. The cost accounting systems was designed primarily for the isolation of costs per medium or module, and secondarily for the reporting of costs per professional category as required by the USNA. (See quarterly reports QR-6.1 and QR-6.2.) The objective of the CDM is to construct a general system which can be used by any organization as a guideline for the preparation of educational materials. It is necessary, therefore, that the model be <u>independent</u> of the management structure and professional categories within WLC. The functions of the CDM should be viewed as separate and distinct from the personnel who perform them. However, the requirement of the cost accounting system is that the costs be isolated with respect to the personnel who perform the functions.

b. Out of necessity, the cost accounting system is a static system influenced by individual departments which have budgetary responsibility for certain functions. The CDM, however, can be as dynamic as the contact requires. Categories can be continually modified to reflect deviations or variations in the functions or tasks. Care will be taken, however, in attempting to discriminate whether deviations from the original model reflect "true" changes in procedure or "error" changes, which are a product of the idiosyncracies of a specific contact. In subsequent papers, deviations from the CDM will be noted, regardless of their nature.

c. In general, the CDM isolates groups of tasks which may be more inclusive than those itemized in the cost accounting system. Some tasks must be performed in groups to initiate subsequent tasks within the same general function area. The components of the tasks may be of such magnitude that they warrant charges against them, and yet, they derive their importance for the CDM only when viewed in combination with other related tasks.

d. Another reason, which accounts for the fact that specific categories identified in the CDM and cost accounting system are not identical, is that many function areas specified in the CDM (such as project management and customer interaction) cannot be charged directly to the project, and therefore do not carry costing numbers. It is evident that these are necessary functions and serve as links for the development of other functions.

Although major discrepancies do exist between these two systems, an effort has been made to keep them as consistent as possible. It would be of unlimited use to be able to identify the costs of any general task on the CDM. Consequently, by the use of special data reduction programs, it is believed that the costs for all functions in the CDM can be isolated. Records are being kept which will separate two different functions being performed under the same budget number (production and

manufacturing) and unite two identical functions being performed under separate budget numbers (secretaries "typing terminal objectives" in various departments).

As previously mentioned, an effort has been made to ensure that the CDM does not unduly reflect any particular organizational hierarchy. It should be noted that a great deal more organizational flexibility is gained by this process. For example, a given sub-function may be performed by two less experienced workers in one week, whereas it might be performed by a single more experienced person in two or three days. Thus, by keeping the work effort's description distinct from the personnel performing the work, scheduling and expenditure flexibility is gained. More important, however, is the ability of any organization to use the CDM within any management structure.

4. PRESENTATION OF THE CDM

4.1 FORMAT FOR WORKFLOW DIAGRAMS

Tasks which fall into a functional sequence and whose performance are contingent upon the completion of other tasks are presented in the diagrams on pages 14-18. Major functions are presented in columns and sub-functions in each area are listed vertically beneath the columns.

The output of each sub-function is noted and the point to which it is transmitted is identified. The diagrams employ ASME symbols, as follows:

a. transmission 

b. receipt 

c. storage 

d. interaction 

Tasks which are believed to be unique to this contract are marked with asterisks.

The diagrams depict the sequence of tasks necessary to be performed only during Phase I of the USNA project.

The diagrams do not include all functions necessary for the execution of the project. Two other types of tasks must be considered. They are:

a. discrete or temporal tasks whose performance is not directly contingent upon the completion of any other task (In general, these are temporally scheduled.)

b. ongoing tasks, which are neither temporally scheduled nor necessarily

contingent upon the completion of any other task

4.2 TEMPORAL TASKS

Temporal tasks consist of reports on the progress of the contract, and reports on specific systems or approaches which have been developed, or are being developed, independent of the conditional workflow of the course construction effort. A list of these tasks designated for delivery in Phase I, are listed below, along with the function areas responsible for their execution.

Temporal Tasks	Responsible Function Area
a. Write the technical paper entitled "Cost Accounting System" (TP-6.).	Project Coordination
b. Write the technical paper entitled "A Behavioral Approach to Instructional Design and Media Selection" (TP-6.1).	Presentation Design
c. Write the technical paper entitled "Sequencing Rationale" (TP-6.2).	Analysis and Course Design
d. Write the technical paper entitled "Course Description" (TP-6.3).	Analysis and Course Design
e. Write the technical paper entitled "Course Strategy" (TP-6.4).	Analysis and Course Design
f. Write the technical paper entitled "Cost Effectiveness" (TP-6.5).	Research Design
g. Write the technical paper entitled "Course Development Model" (TP-6.6).	Project Coordination
h. Write the technical paper entitled "Use of PERT" (TP-6.7).	Project Coordination

Temporal Tasks	Primary Function Area
i. Write monthly reports, as scheduled (MR - 6.X series).	Project Coordination
j. Write quarterly reports, as scheduled (QR - 6.X series).	Project Coordination
k. Write the final report upon completion of Phase I.	Project Coordination

4.3 ONGOING TASKS

Ongoing tasks generally consist of management or maintenance tasks. These tasks, although vital to the project effort, are continuous and cannot be represented as discrete steps in a work-flow system. They are listed below.

a. Project Management

1) Ensure compliance with contract.

2) Negotiate contractual changes, if necessary.

3) Guide project personnel with regard to man-hours, costs, and intent.

4) Assign functional responsibilities to staff.

5) Arrange for necessary meetings between WLC staff and customer.

6) Inter-division coordination.

7) Keep other WLC offices informed of progress on the contract.

8) Interact with the customer, whenever necessary.

b. Subject Matter Expert (SME)

1) Supply source material and guidance.

2) Assist as necessary on all phases of project.

c. Project Coordination (in-plant)

1) Coordinate all activities of project.

2) Establish schedules for document delivery.

3) Ensure compliance with schedules.

4) Maintain cost accounting system.

5) Monitor the document control system.

6) Maintain personnel capabilities

7) Keep all division personnel informed of progress on contract.

8) Document all discrepancies from the CDM .

9) Update PERT network.

d. Project Liaison (on-site)

1) Interaction with SME on-site.

2) Coordinate with on-site WLC staff.

3) Expedite communications between customer and contractor when possible.

e. Production and Control.

1) Packaging considerations

2) Product design specifications

f. Secretarial

1) Maintain records of all correspondence between customer and contractor.

2) Maintain document files for the project.

g. Data Processing

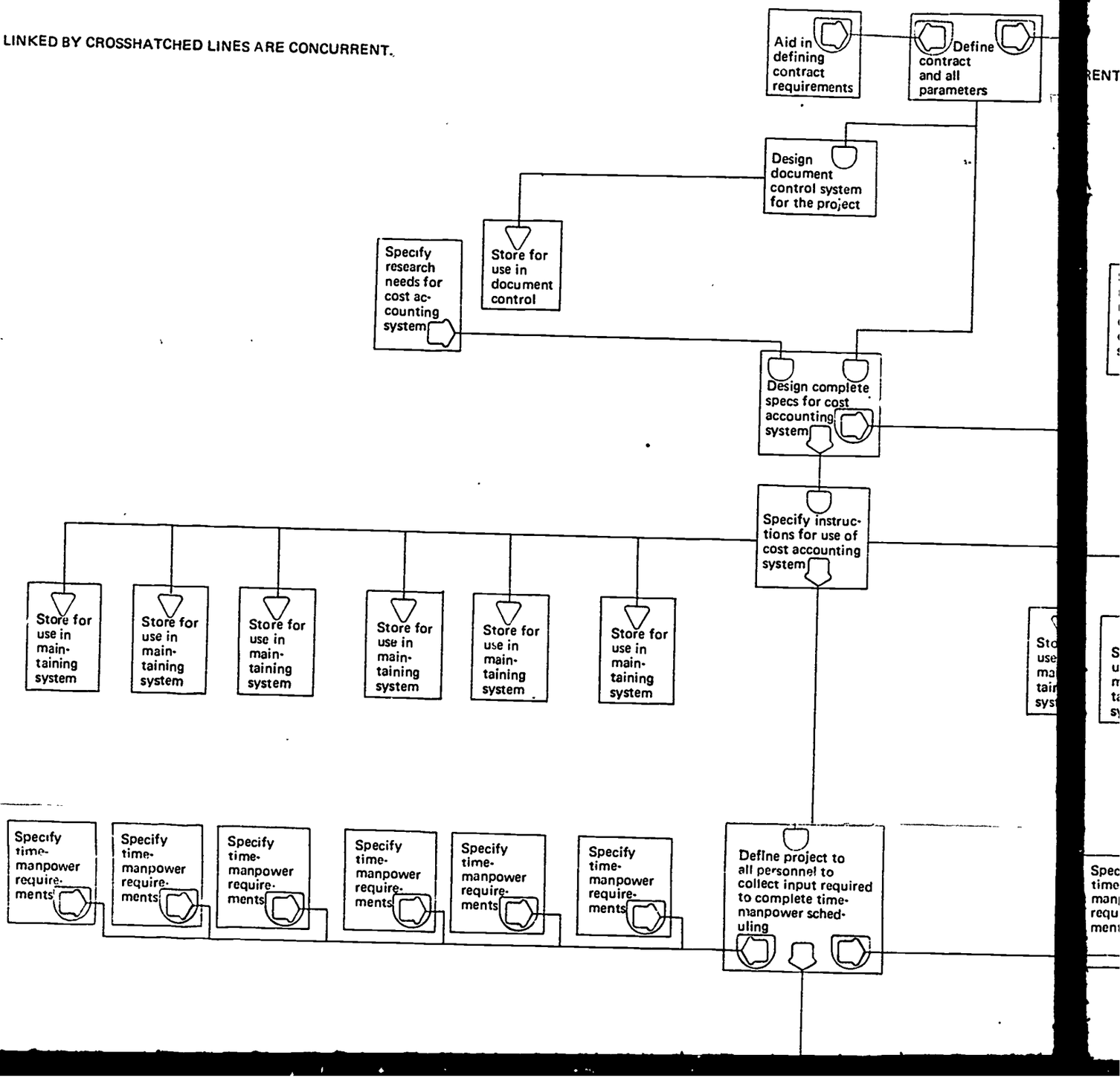
1) Maintain and modify data collection/reduction system.

2) Maintain cost accounting data.

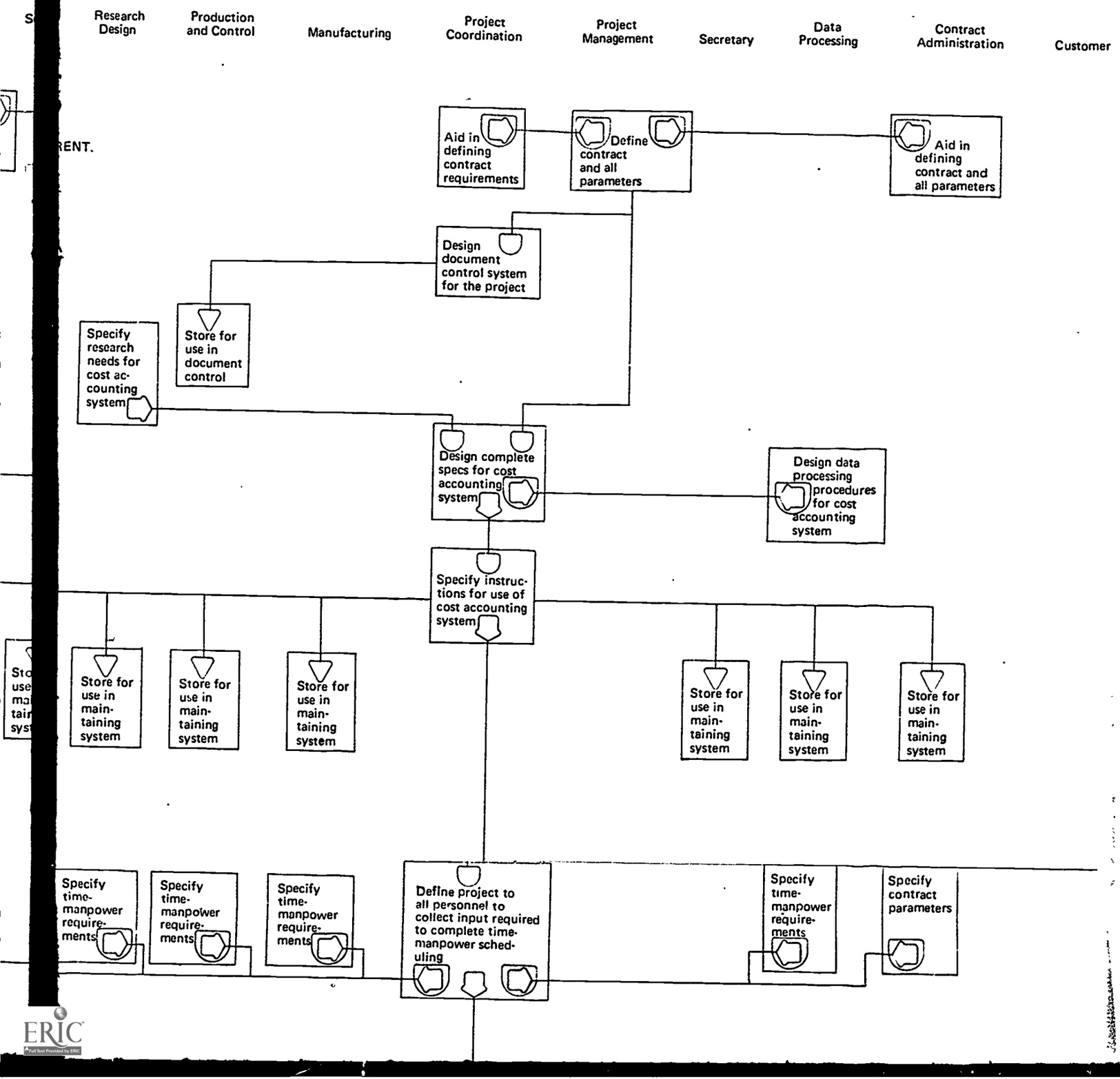
WORKFLOW DIAGRAM (Page 1 of 5)

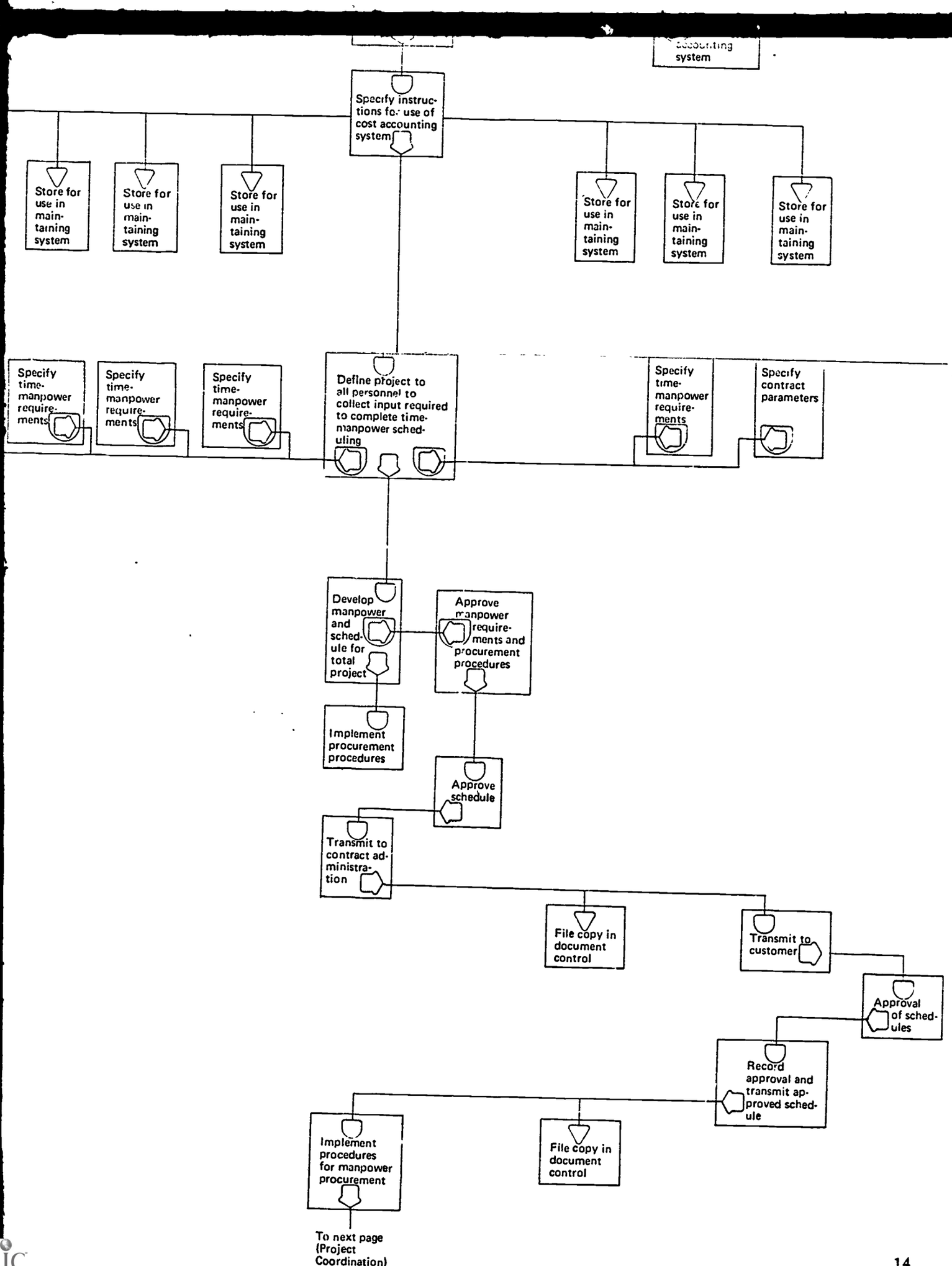
Subject Matter Expert	Analysis and Course Design	Writing	Presentation Design	Research Design	Production and Control	Manufacturing	Project Coordination	Project Management	S

ITEMS LINKED BY CROSSHATCHED LINES ARE CONCURRENT.

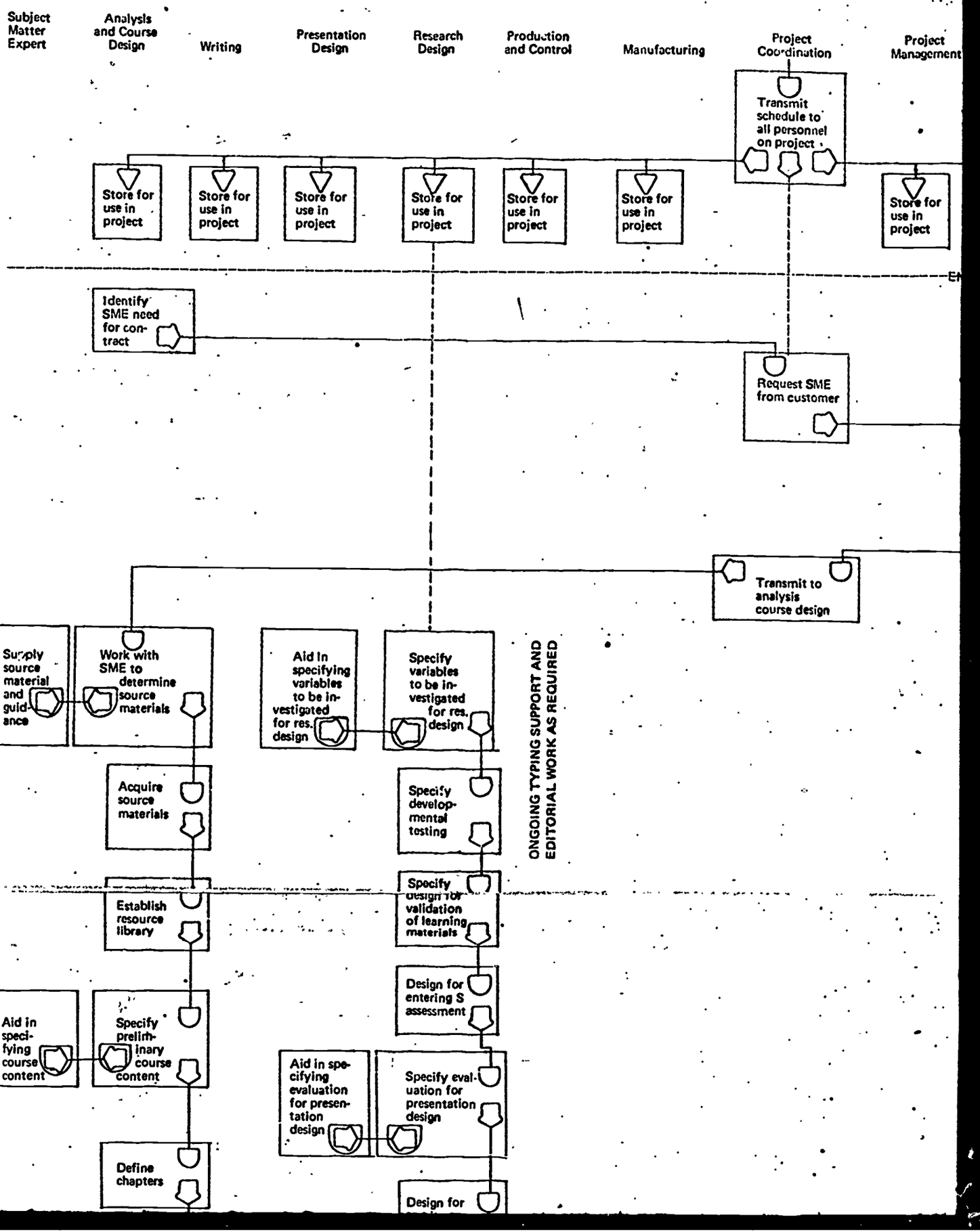


WORKFLOW DIAGRAM (Page 1 of 5)

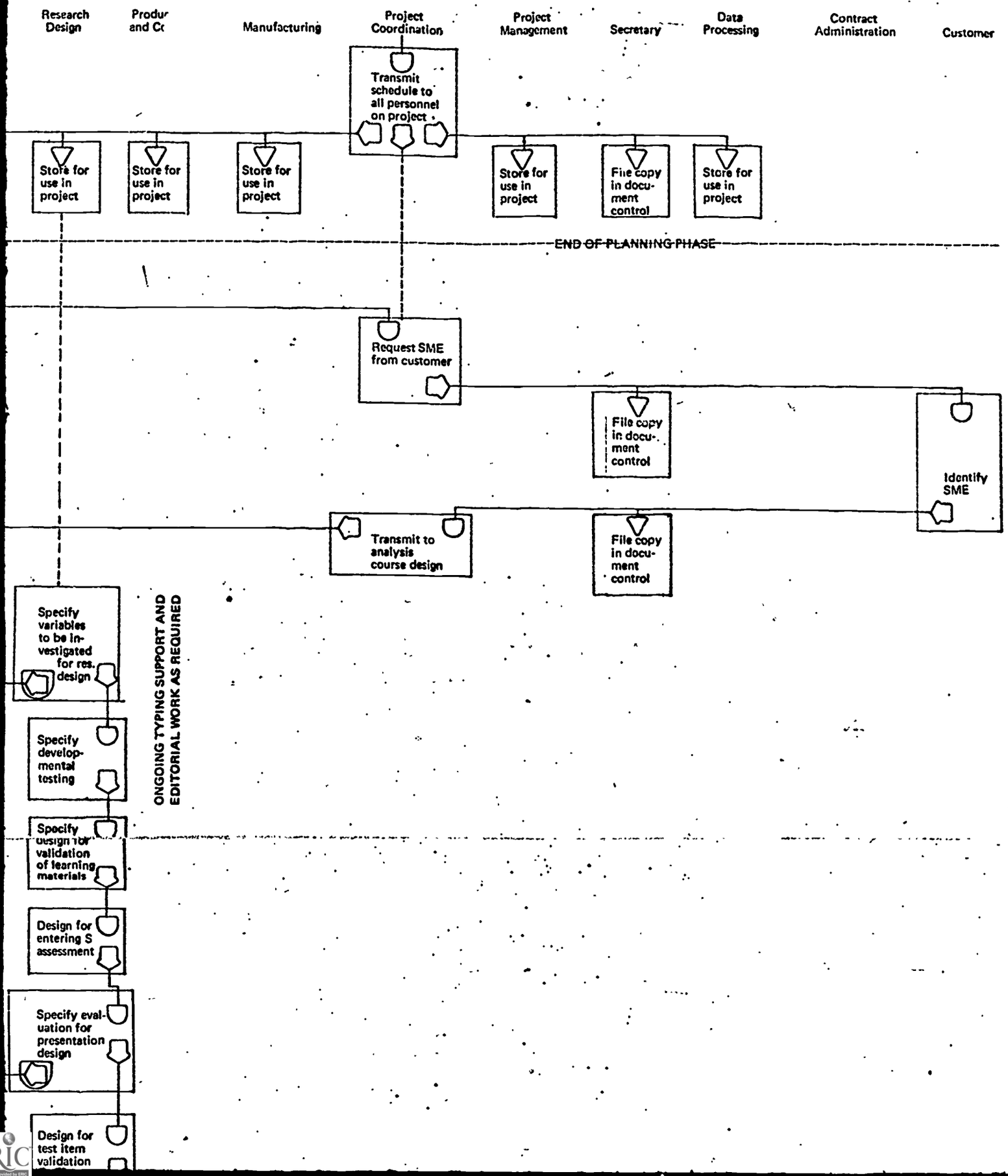


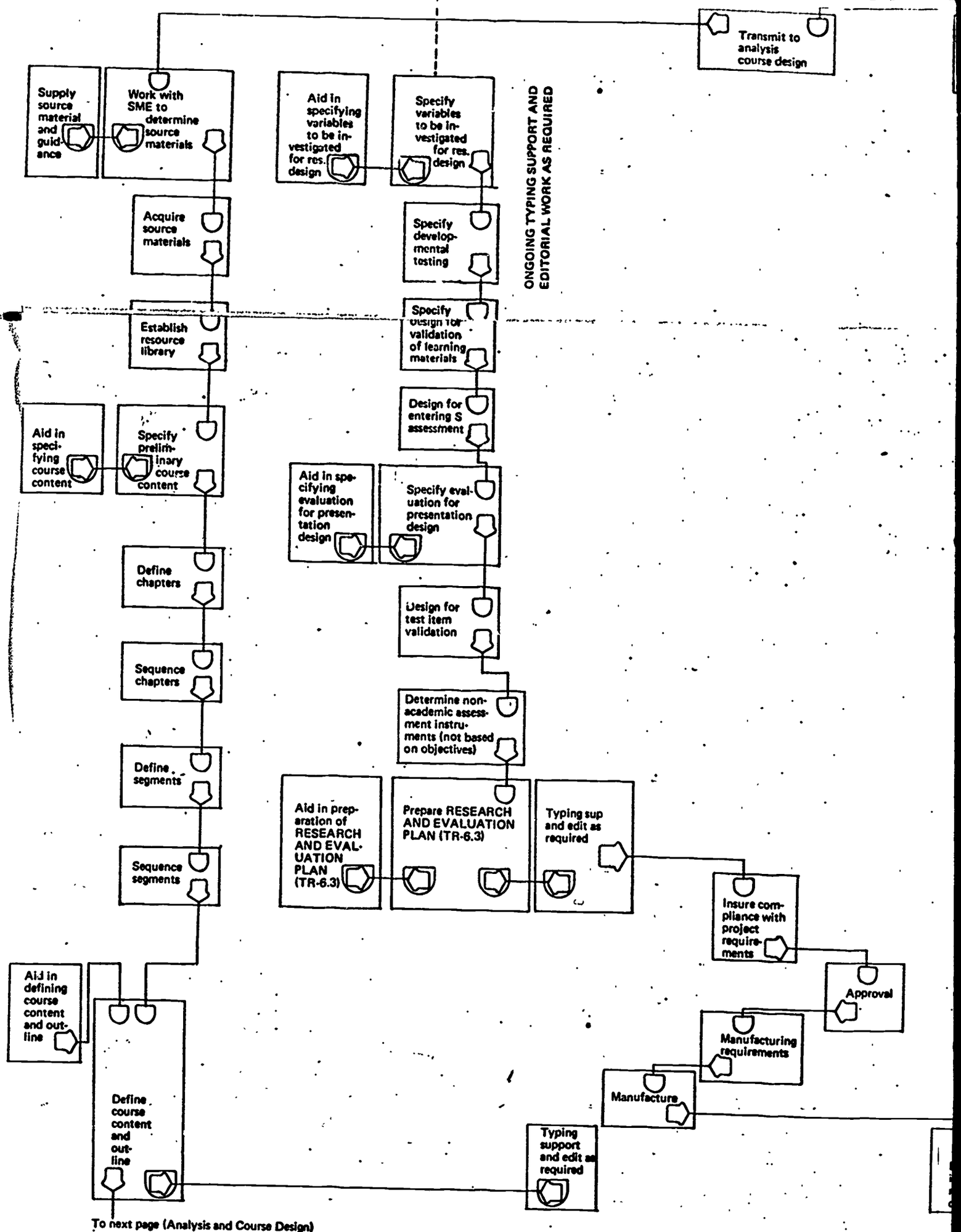

accounting system
Specify instructions for use of cost accounting system
Store for use in maintaining system
Store for use in maintaining system
Store for use in maintaining system
Store for use in maintaining system
Store for use in maintaining system
Store for use in maintaining system
Specify time-manpower requirements
Specify time-manpower requirements
Specify time-manpower requirements
Define project to all personnel to collect input required to complete time-manpower scheduling
Specify time-manpower requirements
Specify contract parameters
Develop manpower and schedule for total project
Approve manpower requirements and procurement procedures
Implement procurement procedures
Approve schedule
Transmit to contract administration
File copy in document control
Transmit to customer
Approval of schedules
Record approval and transmit approved schedule
Implement procedures for manpower procurement
File copy in document control
To next page (Project Coordination)

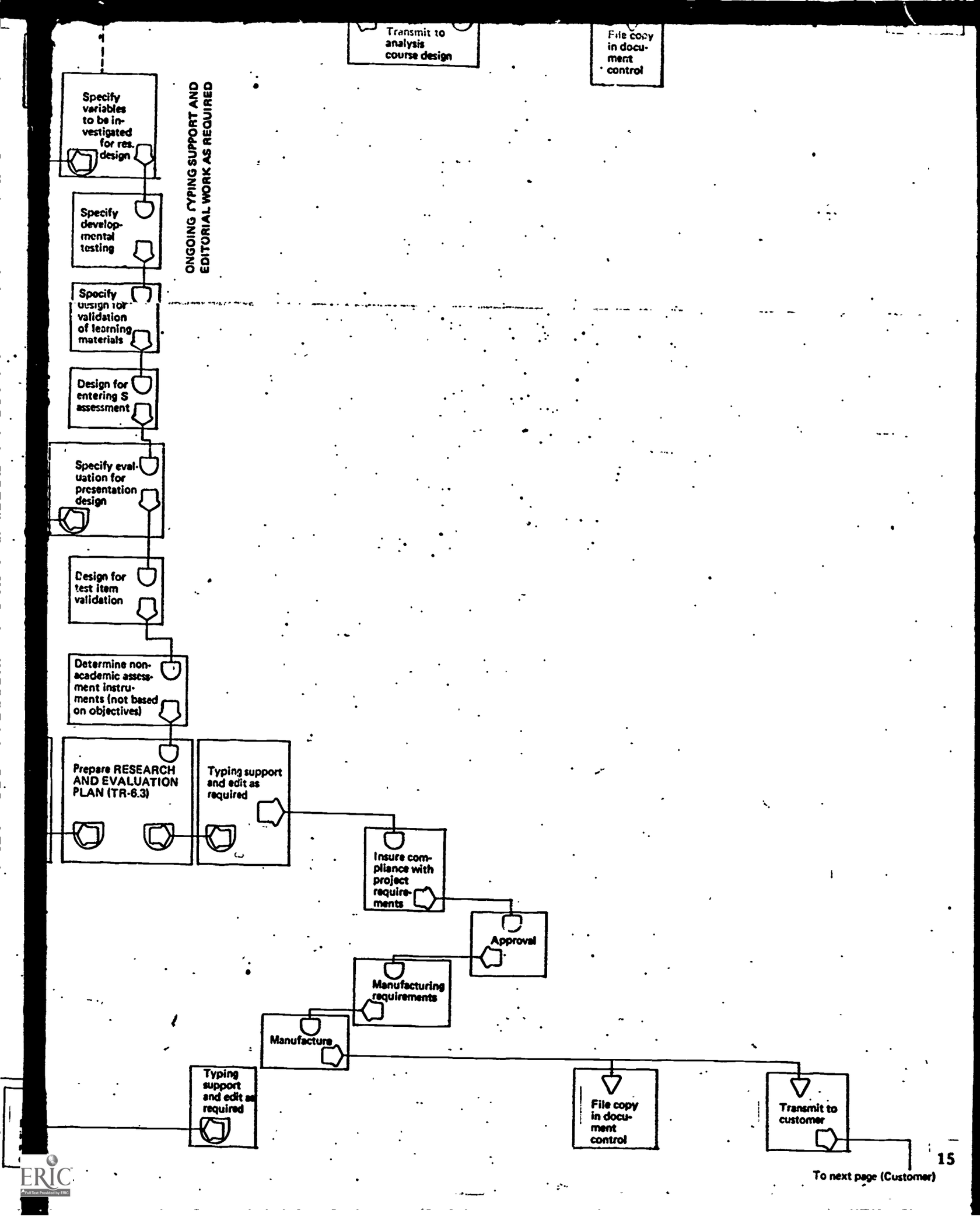
WORKFLOW DIAGRAM -- Continued (Page 2 of 5)



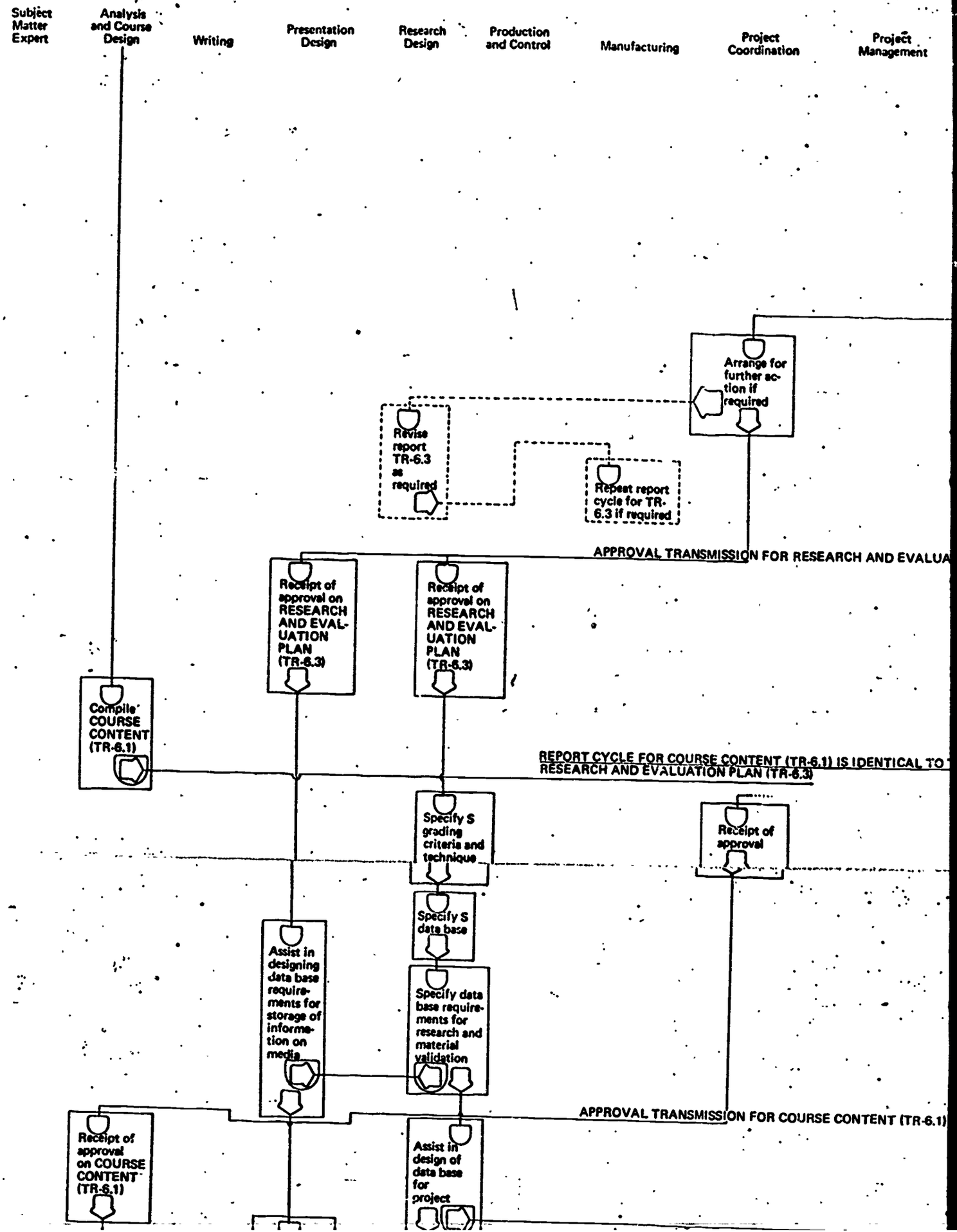
WORKFLOW DIAGRAM -- Continued (Page 2 of 5)



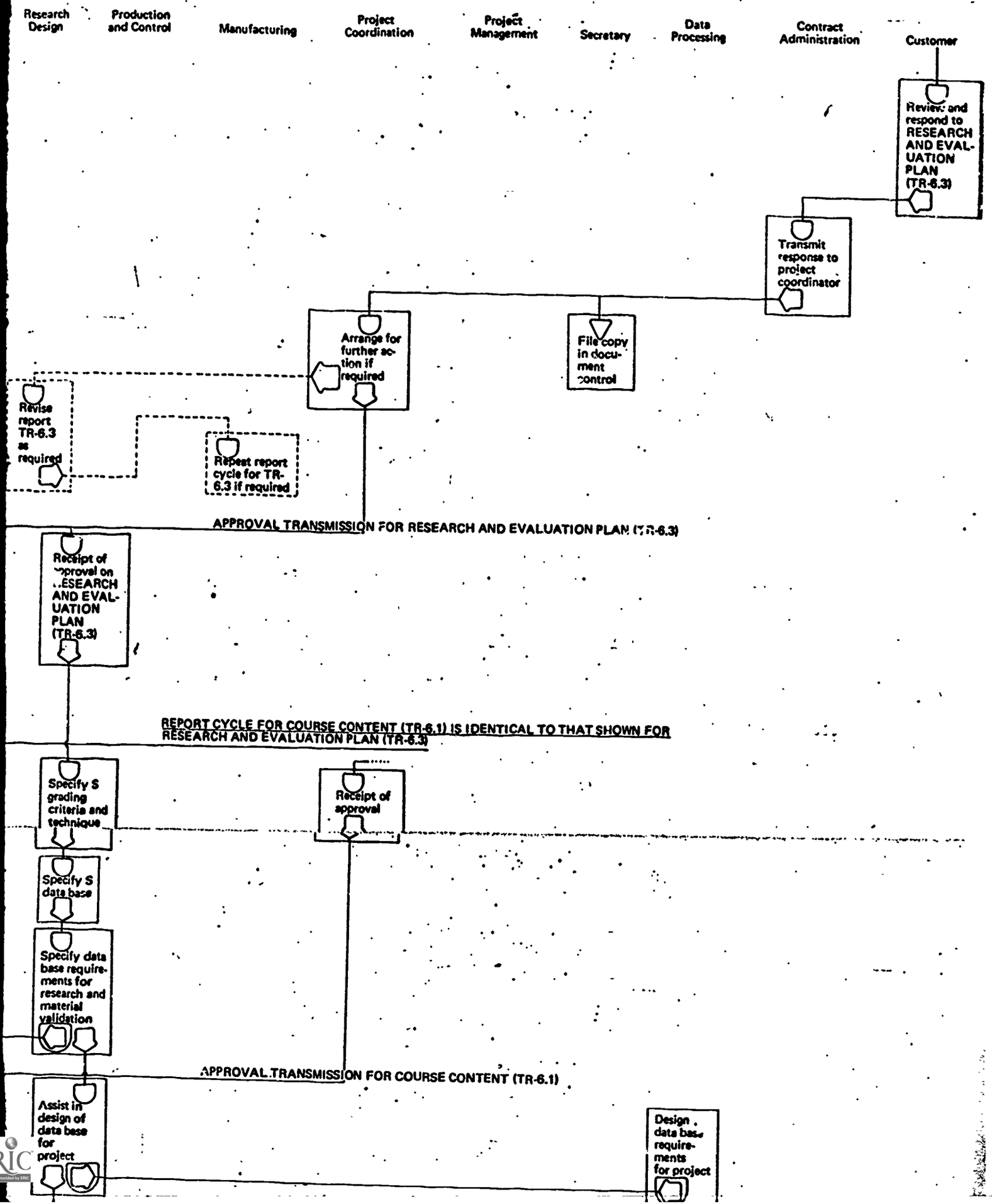

Transmit to analysis course design
Supply source material and guidance
Work with SME to determine source materials
Aid in specifying variables to be investigated for res. design
Specify variables to be investigated for res. design
ONGOING TYPING SUPPORT AND EDITORIAL WORK AS REQUIRED
Acquire source materials
Specify developmental testing
Establish resource library
Specify design for validation of learning materials
Design for entering S assessment
Aid in specifying course content
Specify preliminary course content
Aid in specifying evaluation for presentation design
Specify evaluation for presentation design
Define chapters
Design for test item validation
Sequence chapters
Determine non-academic assessment instruments (not based on objectives)
Define segments
Aid in preparation of RESEARCH AND EVALUATION PLAN (TR-6.3)
Prepare RESEARCH AND EVALUATION PLAN (TR-6.3)
Typing sup and edit as required
Sequence segments
Insure compliance with project requirements
Aid in defining course content and outline
Approval
Manufacturing requirements
Define course content and outline
Manufacture
Typing support and edit as required
To next page (Analysis and Course Design)

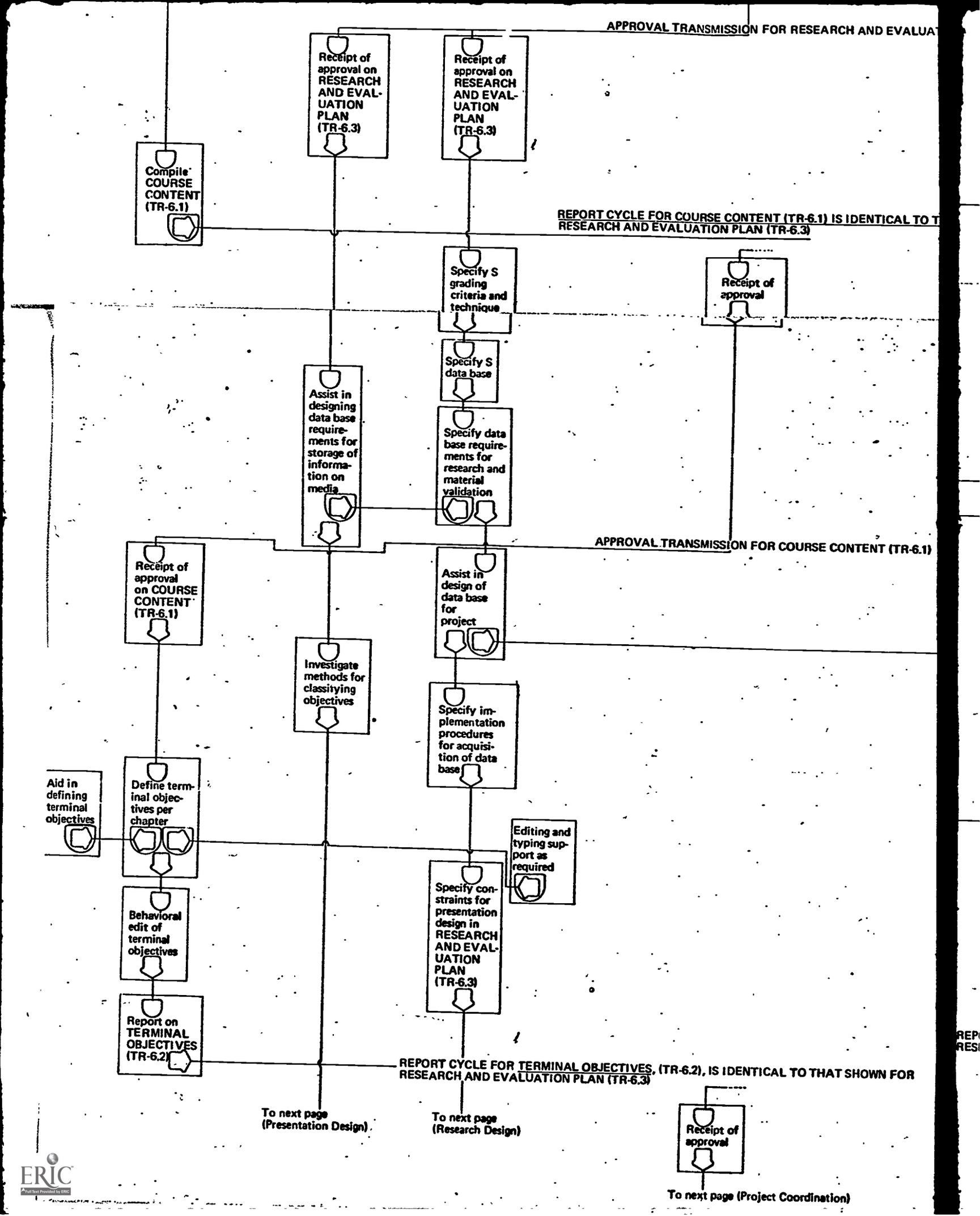

Transmit to analysis course design
File copy in document control
ONGOING TYPING SUPPORT AND EDITORIAL WORK AS REQUIRED
Specify variables to be investigated for res. design
Specify developmental testing
Specify design for validation of learning materials
Design for entering S assessment
Specify evaluation for presentation design
Design for test item validation
Determine non-academic assessment instruments (not based on objectives)
Prepare RESEARCH AND EVALUATION PLAN (TR-6.3)
Typing support and edit as required
Insure compliance with project requirements
Approval
Manufacturing requirements
Manufacture
Typing support and edit as required
File copy in document control
Transmit to customer
To next page (Customer)

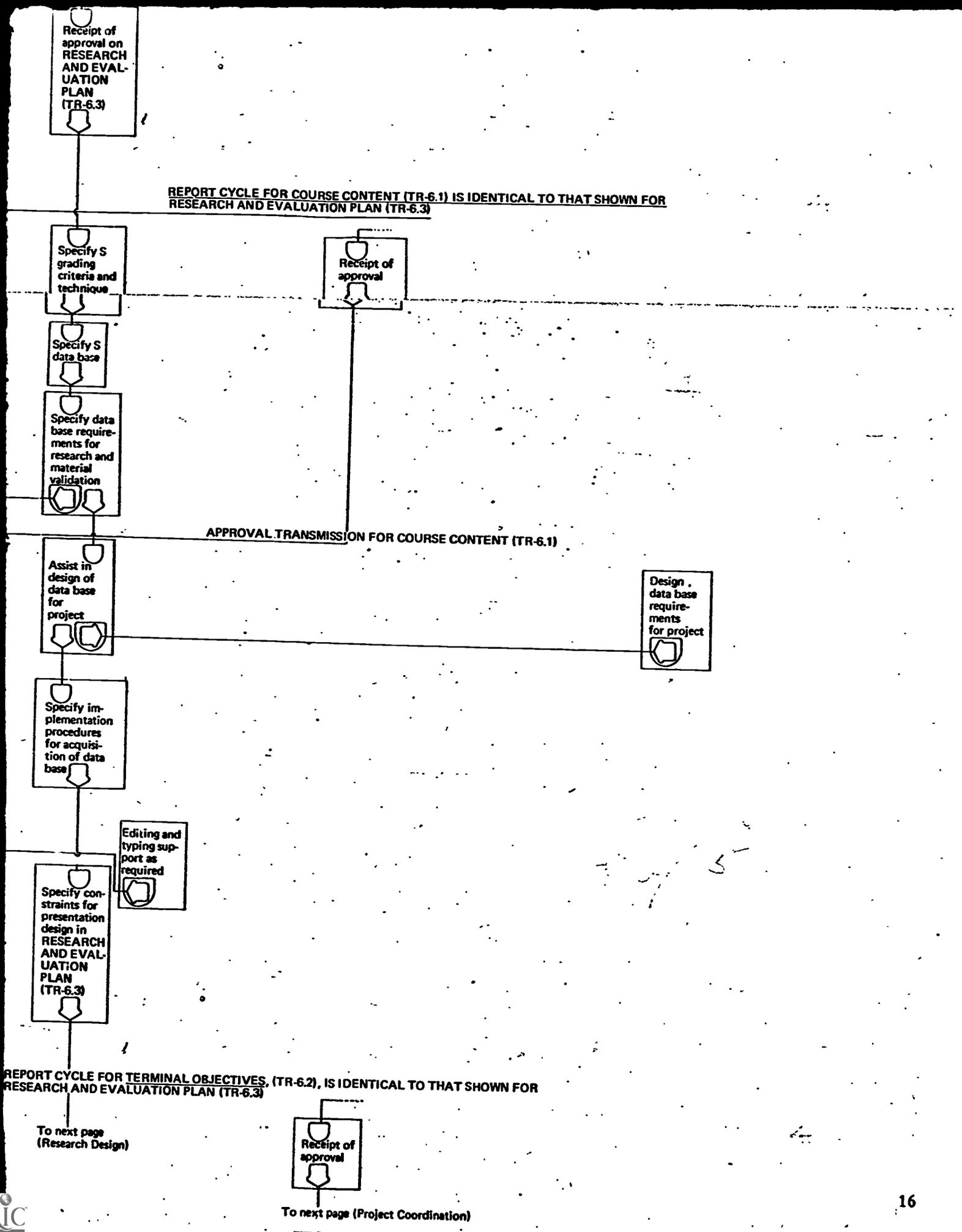
WORKFLOW DIAGRAM -- Continued (Page 3 of 5)



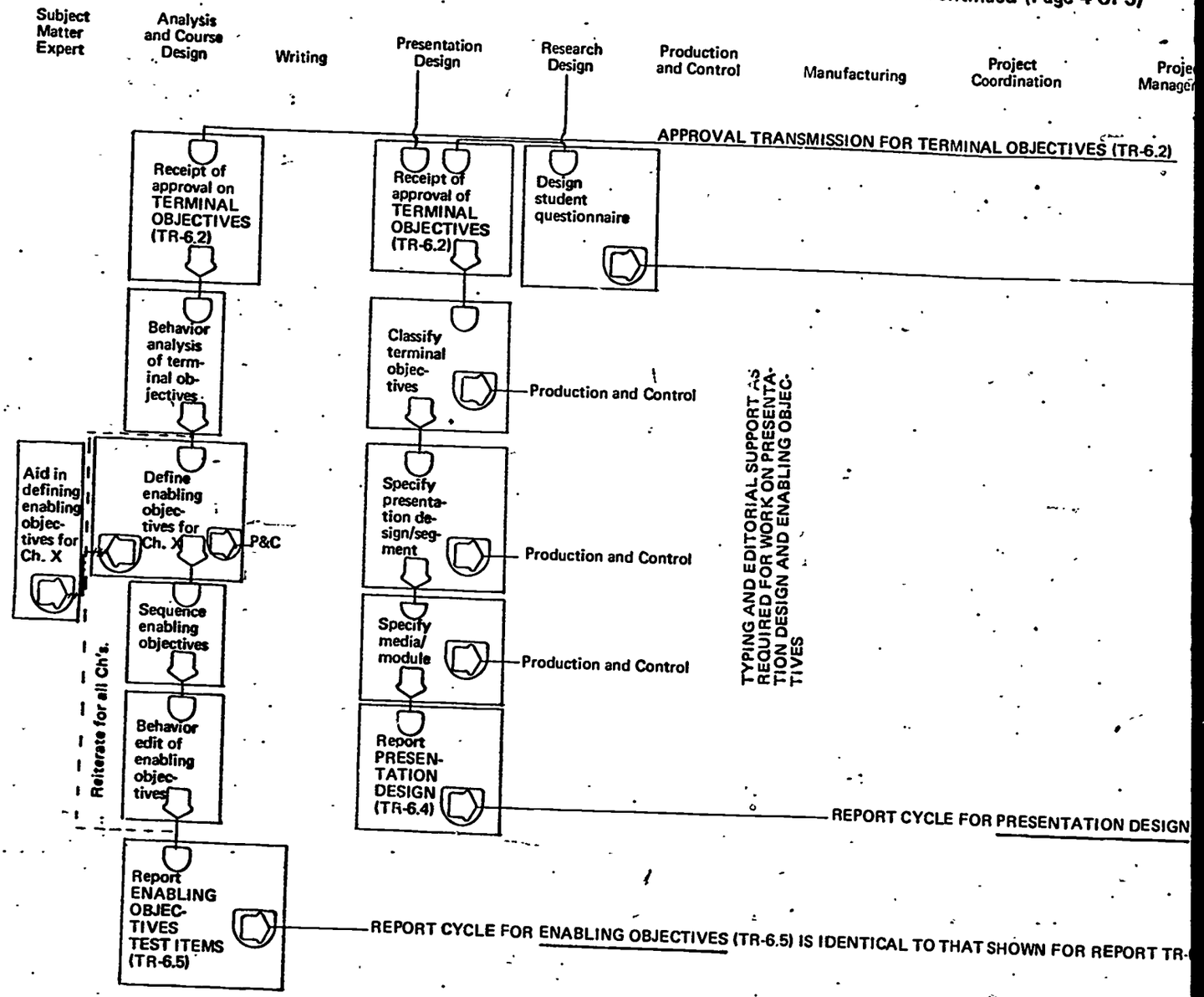
WORKFLOW DIAGRAM -- Continued (Page 3 of 5)

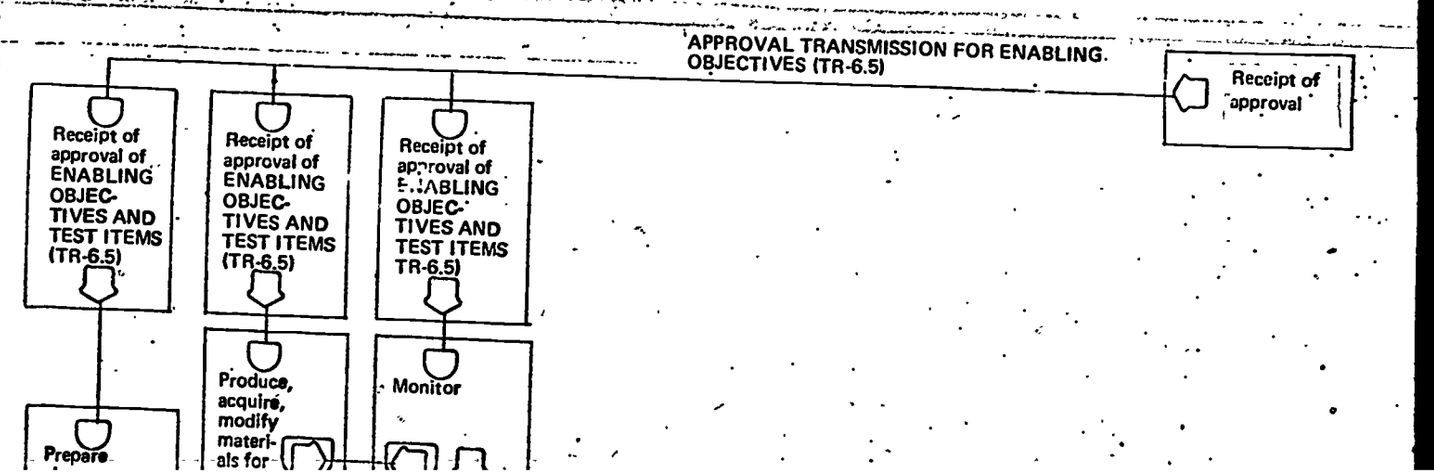



APPROVAL TRANSMISSION FOR RESEARCH AND EVALUA
Receipt of approval on RESEARCH AND EVAL-UATION PLAN (TR-6.3)
Receipt of approval on RESEARCH AND EVAL-UATION PLAN (TR-6.3)
Compile COURSE CONTENT (TR-6.1)
REPORT CYCLE FOR COURSE CONTENT (TR-6.1) IS IDENTICAL TO T
RESEARCH AND EVALUATION PLAN (TR-6.3)
Specify S grading criteria and technique
Receipt of approval
Specify S data base
Assist in designing data base require-ments for storage of informa-tion on media
Specify data base require-ments for research and material validation
APPROVAL TRANSMISSION FOR COURSE CONTENT (TR-6.1)
Receipt of approval on COURSE CONTENT (TR-6.1)
Assist in design of data base for project
Investigate methods for classifying objectives
Specify im-plementation procedures for acquisi-tion of data base
Aid in defining terminal objectives
Define term-inal objec-tives per chapter
Editing and typing sup-port as required
Specify con-straints for presentation design in RESEARCH AND EVAL-UATION PLAN (TR-6.3)
Behavioral edit of terminal objectives
Report on TERMINAL OBJECTIVES (TR-6.2)
REPORT CYCLE FOR TERMINAL OBJECTIVES, (TR-6.2), IS IDENTICAL TO THAT SHOWN FOR
RESEARCH AND EVALUATION PLAN (TR-6.3)
To next page (Presentation Design)
To next page (Research Design)
Receipt of approval
To next page (Project Coordination)


Receipt of approval on RESEARCH AND EVALUATION PLAN (TR-6.3)
REPORT CYCLE FOR COURSE CONTENT (TR-6.1) IS IDENTICAL TO THAT SHOWN FOR RESEARCH AND EVALUATION PLAN (TR-6.3)
Specify S grading criteria and technique
Receipt of approval
Specify S data base
Specify data base requirements for research and material validation
APPROVAL TRANSMISSION FOR COURSE CONTENT (TR-6.1)
Assist in design of data base for project
Design data base requirements for project
Specify implementation procedures for acquisition of data base
Editing and typing support as required
Specify constraints for presentation design in RESEARCH AND EVALUATION PLAN (TR-6.3)
REPORT CYCLE FOR TERMINAL OBJECTIVES, (TR-6.2), IS IDENTICAL TO THAT SHOWN FOR RESEARCH AND EVALUATION PLAN (TR-6.3)
To next page (Research Design)
Receipt of approval
To next page (Project Coordination)

WORKFLOW DIAGRAM -- Continued (Page 4 of 5)





WORKFLOW DIAGRAM -- Continued (Page 4 of 5)

Proje
lanage

Research Design | Production and Control | Manufacturing | Project Coordination | Project Management | Secretary | Data Processing | Contract Administration | Customer

.2)

APPROVAL TRANSMISSION FOR TERMINAL OBJECTIVES (TR-6.2)

Design student questionnaire

Augment S data base format

Production and Control

Production and Control

Production and Control

TYPING AND EDITORIAL SUPPORT AS REQUIRED FOR WORK ON PRESENTATION DESIGN AND ENABLING OBJECTIVES

SIGN

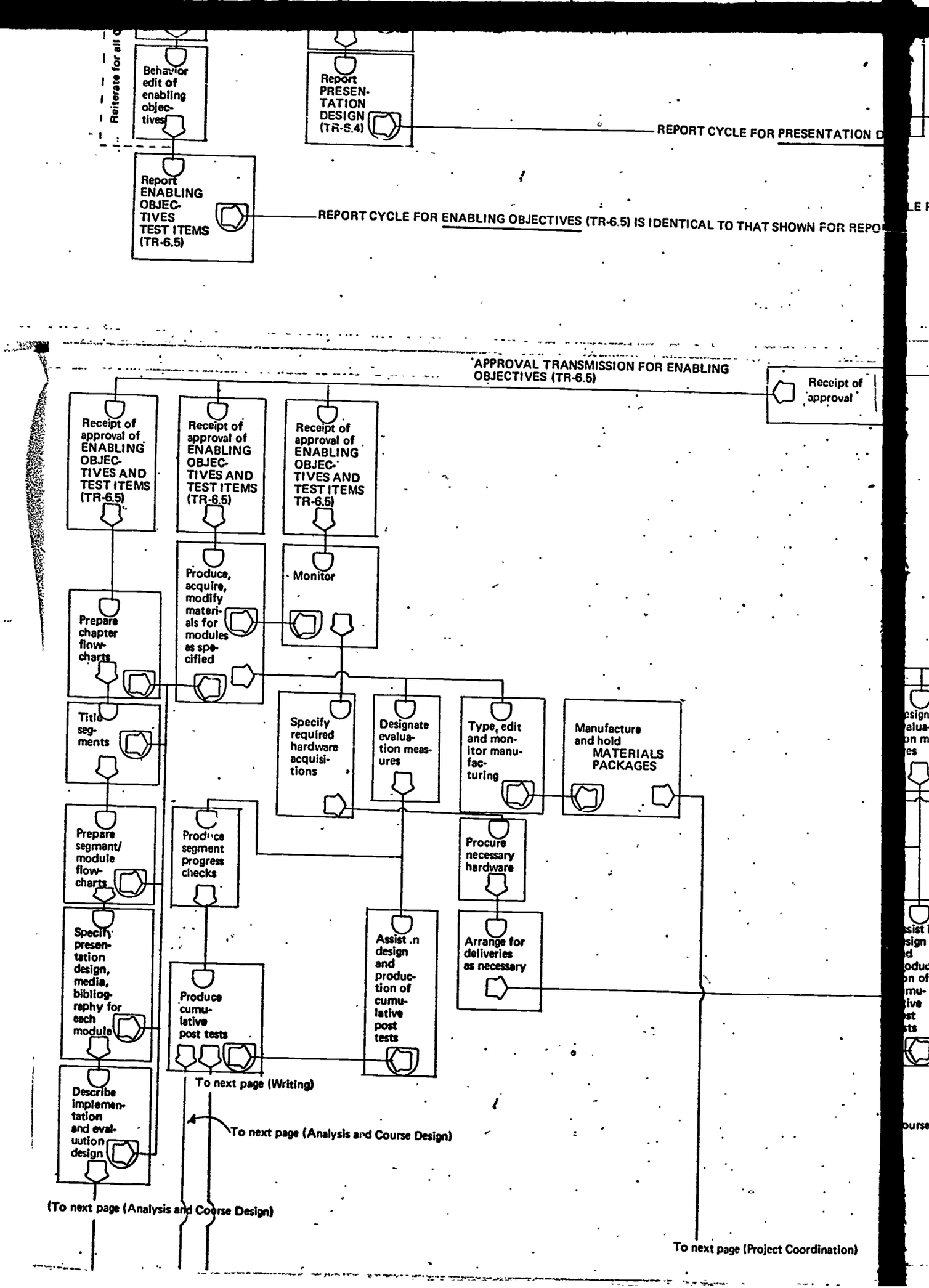
REPORT CYCLE FOR PRESENTATION DESIGN (TR-6.4) IS IDENTICAL TO THAT SHOWN FOR REPORT TR-6.1

T TR-

E FOR ENABLING OBJECTIVES (TR-6.5) IS IDENTICAL TO THAT SHOWN FOR REPORT TR-6.1

APPROVAL TRANSMISSION FOR ENABLING OBJECTIVES (TR-6.5)

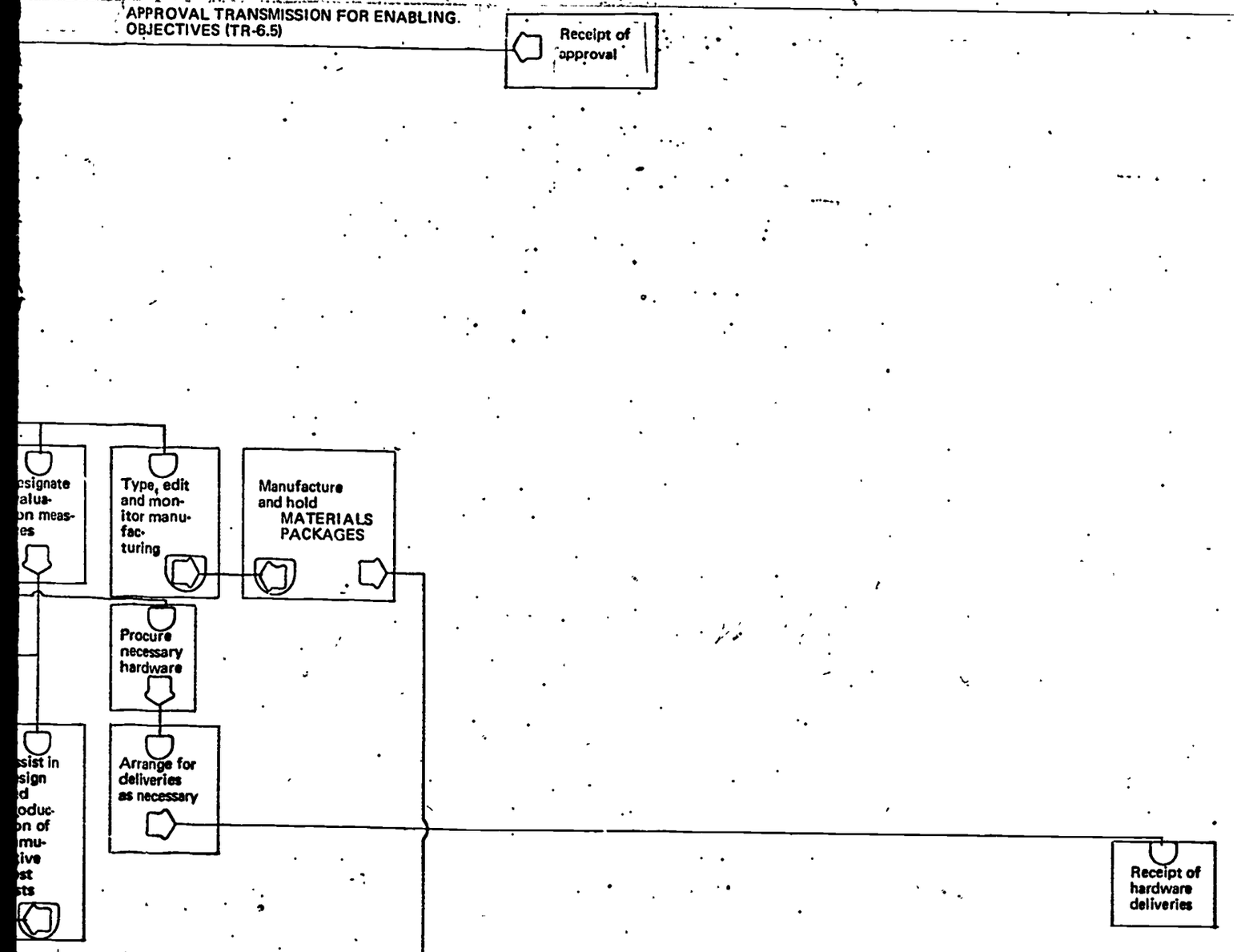
Receipt of approval


Reiterate for all
Behavior edit of enabling objectives
Report PRESENTATION DESIGN (TR-6.4)
REPORT CYCLE FOR PRESENTATION D
Report ENABLING OBJECTIVES TEST ITEMS (TR-6.5)
REPORT CYCLE FOR ENABLING OBJECTIVES (TR-6.5) IS IDENTICAL TO THAT SHOWN FOR REPO
APPROVAL TRANSMISSION FOR ENABLING OBJECTIVES (TR-6.5)
Receipt of approval
Receipt of approval of ENABLING OBJECTIVES AND TEST ITEMS (TR-6.5)
Receipt of approval of ENABLING OBJECTIVES AND TEST ITEMS (TR-6.5)
Receipt of approval of ENABLING OBJECTIVES AND TEST ITEMS TR-6.5)
Prepare chapter flowcharts
Produce, acquire, modify materials for modules as specified
Monitor
Title segments
Specify required hardware acquisitions
Designate evaluation measures
Type, edit and monitor manufacturing
Manufacture and hold MATERIALS PACKAGES
Prepare segment/module flowcharts
Produce segment progress checks
Procure necessary hardware
Specify presentation design, media, bibliography for each module
Assist in design and production of cumulative post tests
Arrange for deliveries as necessary
Produce cumulative post tests
To next page (Writing)
To next page (Analysis and Course Design)
Describe implementation and evaluation design
(To next page (Analysis and Course Design)
To next page (Project Coordination)

REPORT CYCLE FOR PRESENTATION DESIGN (TR-6.4) IS IDENTICAL TO THAT SHOWN FOR REPORT TR-6.1

LE FOR ENABLING OBJECTIVES (TR-6.5) IS IDENTICAL TO THAT SHOWN FOR REPORT TR-6.1

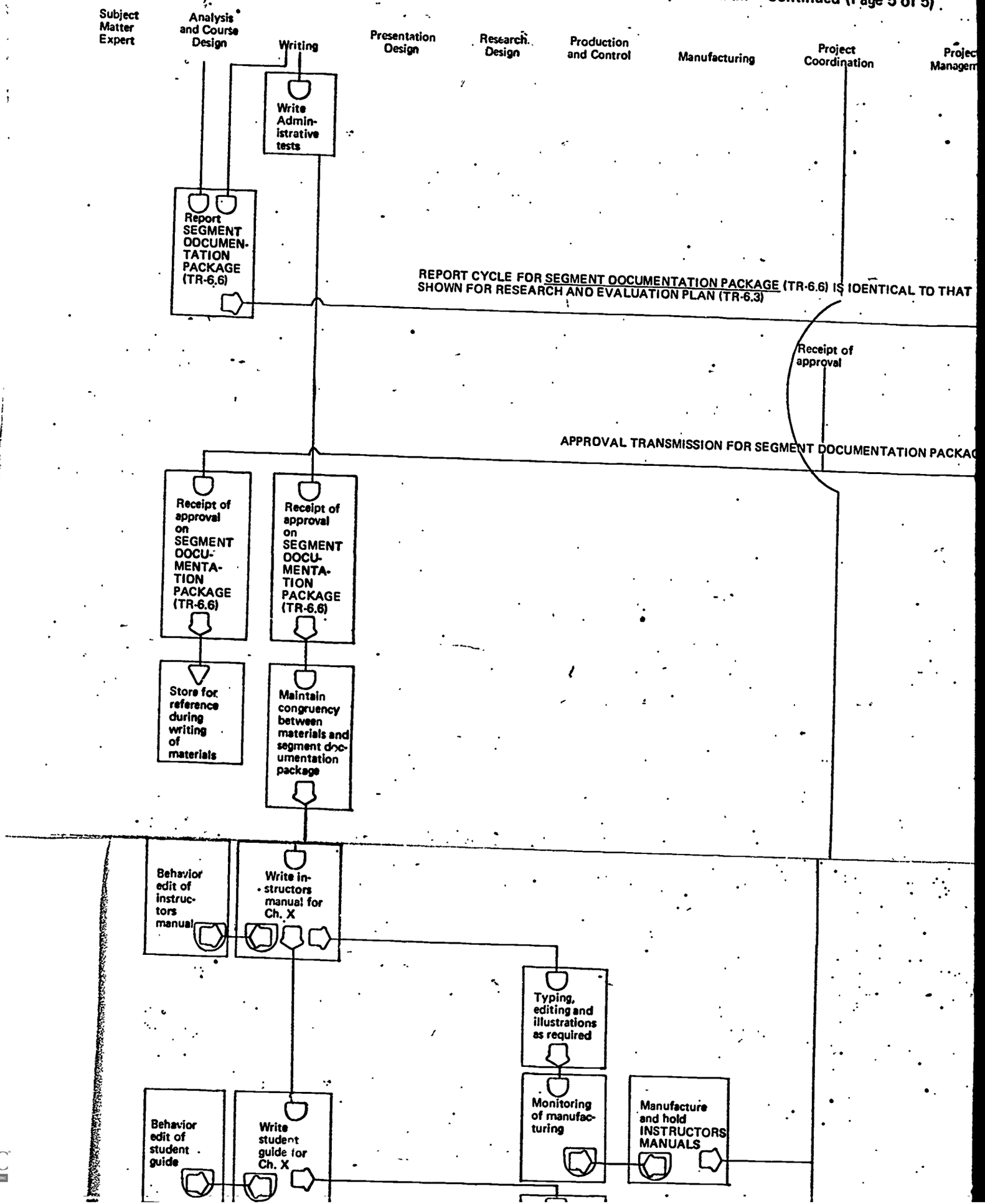
APPROVAL TRANSMISSION FOR ENABLING OBJECTIVES (TR-6.5)



ourse Design)

To next page (Project Coordination)

WORKFLOW DIAGRAM -- Continued (Page 5 of 5)



WORKFLOW DIAGRAM -- Continued (Page 5 of 5)

Project Manager	Research Design	Production and Control	Manufacturing	Project Coordination	Project Management	Secretary	Data Processing	Contract Administration	Customer

REPORT CYCLE FOR SEGMENT DOCUMENTATION PACKAGE (TR-6.6) IS IDENTICAL TO THAT SHOWN FOR RESEARCH AND EVALUATION PLAN (TR-6.3)

Receipt of approval

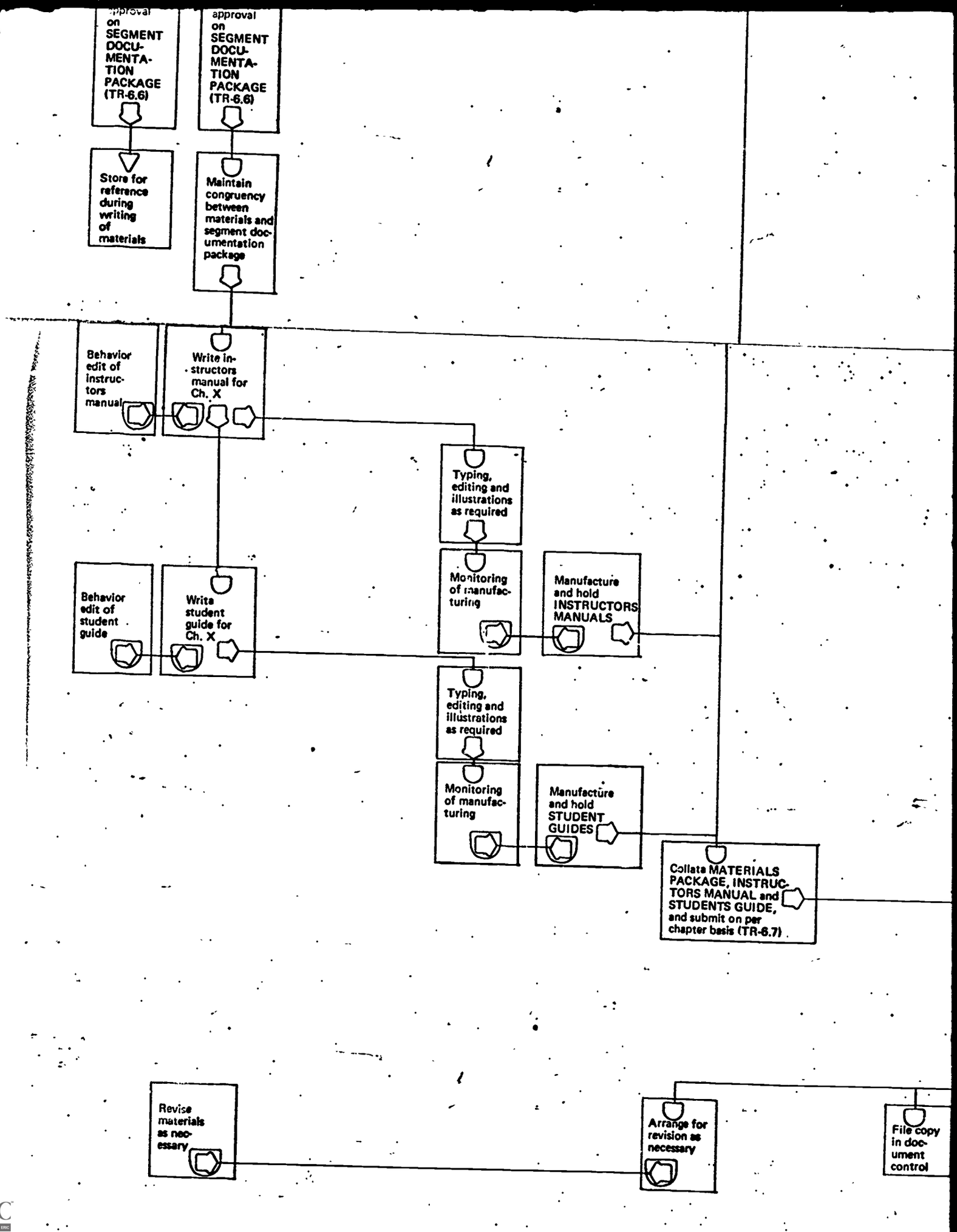
APPROVAL TRANSMISSION FOR SEGMENT DOCUMENTATION PACKAGE (TR-6.6)

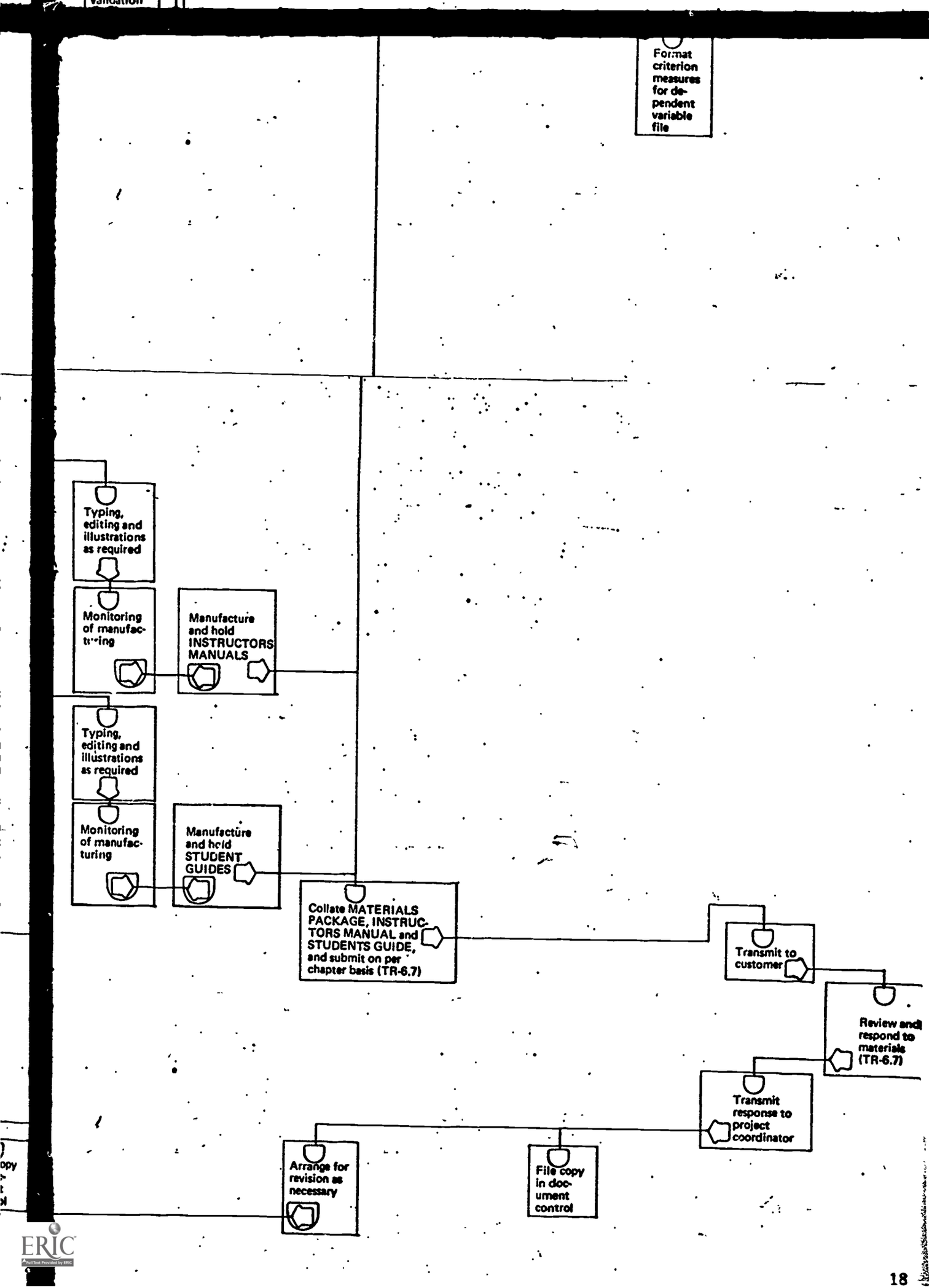
Format criterion measures for dependent variable file

Typing, editing and illustrations as required

Monitoring of manufacturing

Manufacture and hold INSTRUCTORS MANUALS


approval on SEGMENT DOCU-MENTA-TION PACKAGE (TR-6.6)
approval on SEGMENT DOCU-MENTA-TION PACKAGE (TR-6.6)
Store for reference during writing of materials
Maintain congruency between materials and segment documentation package
Behavior edit of instructors manual
Write instructors manual for Ch. X
Typing, editing and illustrations as required
Monitoring of manufacturing
Manufacture and hold INSTRUCTORS MANUALS
Behavior edit of student guide
Write student guide for Ch. X
Typing, editing and illustrations as required
Monitoring of manufacturing
Manufacture and hold STUDENT GUIDES
Collate MATERIALS PACKAGE, INSTRUCTORS MANUAL and STUDENTS GUIDE, and submit on per chapter basis (TR-6.7)
Revise materials as necessary
Arrange for revision as necessary
File copy in document control


Format criterion measures for dependent variable file
Typing, editing and illustrations as required
Monitoring of manufacturing
Manufacture and hold INSTRUCTORS MANUALS
Typing, editing and illustrations as required
Monitoring of manufacturing
Manufacture and hold STUDENT GUIDES
Collate MATERIALS PACKAGE, INSTRUCTORS MANUAL and STUDENTS GUIDE, and submit on per chapter basis (TR-6.7)
Transmit to customer
Review and respond to materials (TR-6.7)
Transmit response to project coordinator
Arrange for revision as necessary
File copy in document control