1977

Project plan to standardize client basic learning needs assessment procedures at the Center for Employment Training

Arturo Marîn López
San Jose State University

PROJECT PLAN TO STANDARDIZE CLIENT BASIC LEARNING NEEDS ASSESSMENT PROCEDURES AT THE CENTER FOR EMPLOYMENT TRAINING

A Thesis Project

Presented to

The Faculty of the Mexican-American Graduate Studies Department (ISSPA)

San Jose State University

In Partial Fulfillment

of the Requirements for the Degree

Master of Arts

---

by

Arturo Marín López

May 1977

APPROVED FOR THE DEPARTMENT OF THE MEXICAN-AMERICAN GRADUATE STUDIES

TABLE OF CONTENTS

ACKNOWLEDGEMENTS

I would like to thank the following individuals for helping me through this project: To Mr. Humberto Garza, for his endless sarcastic remarks that made me work even harder; to Felix Garcia, Jr. Ph.D., for "cracking the whip", which gave me the initiative to see it through; to Mr. Mauro Chavez for his thought provoking questions; and most of all, to my wife Diana for her support, belief, and encouragement.

LIST OF FIGURES

LIST OF TABLES

CHAPTER I

INTRODUCTION

Managerial instructional planning of goals and objectives in vocational training is related to the standardization of various procedures.

The Center For Employment Training (CET), a manpower training program, functions to instruct unemployed and unskilled clients in various vocational areas. CET has planned and implemented various instructional programs designed to teach on an "individualized" basis learning and vocational skills needed for employment. There is a need, however, to develop a project to standardize accepted client basic learning needs assessment procedures as a means for more effective determination of all clients training needs. What currently exists are various formal and informal procedures to assess a trainee's basic learning needs. Some instructional components provide tests to determine a trainee's level of readiness for instruction; others fail to do this completely. What results is that many trainees receive remedial math and reading instruction almost immediately at program entry and many others must wait a month or so until the instructor "discovers" that he/she is unable to complete an assignment due to a deficiency in basic skills.

Standardizing learning needs assessment procedures could serve as a benefit for all CET clients. It could

provide information related to client's remedial needs. Furthermore, it could serve as a means for planning individualized instruction for all CET trainees related to their individual need.

In identifying this need the project planner dealt with an interplay between benefit and detriment to produce the following conflict:

Why (benefit) does CET plan instructional programs to meet trainee learning needs?

Why (detriment) are standardized assessment procedures lacking to effectively assess all trainees basic learning needs?

Why (conflict) does CET plan instructional programs to meet all trainees learning needs when standardized assessment procedures to effectively assess trainees basic learning needs are lacking?

PROBLEM

Statement of the Problem

The problem of this project was to generate a proposal plan to be used in the standardization of client basic learning needs assessment procedures at CET.

The major step in the solution of the problem was to construct a planning sub-system consisting of the following major steps:

(1) Work Breakdown Structure.

(2) Work Flow.

(3) Time Estimation.

(4) Schedule and Resource Allocation.

(5) Cost and Budget Estimation.

Purpose of the Project

The purpose of the proposal plan was to develop a planning sub-system for CET management to be used as a means for standardizing client's basic learning needs assessment procedures. Such procedures could serve as a means for a more effective assessment of client's basic learning needs. For example, a student entering the program could be tested immediately and a program of instruction could be developed to meet his need.

Importance of the Project

The importance of the project was to generate a proposal plan to standardize assessment procedures as a means for a more effective determination of CET client's basic learning needs.

Such an assessment of basic learning needs could serve as a means for improved instructional planning related to individual needs. Both the trainee and the program could value from such procedures. The trainee could experience less frustration in the training process and possibly complete training in a shorter period of time. The program staff in turn could have a means to determine what a trainee needs or does not need

to complete training.

Delimitation of the Project

1. This project was limited to the development of a proposal plan for the standardization of assessment procedures to determine client basic learning needs at The Center For Employment Training, 425 South Market Street, San Jose, California.
2. This proposal plan will deal with the standardization of assessment procedures but not their implementation.
3. The target group will consist of all new CET trainees.
4. This project plan will be developed during the months of February through May 1977.

DEFINITION OF TERMS

Client

The term client denoted any person officially enrolled and receiving instructional services at the Center For Employment Training. For the purpose of this project client referred to any person officially enrolled and whose basic learning needs would be assessed. Please note that the terms client and trainee were used interchangeably.

Standardized Assessment Procedures

The term standardized assessment procedures denoted the use of formal testing instruments. As described by

Gronlund (1976, p. 287) a standardized test includes a fixed set of test items designed to measure a clearly defined sample of behavior, specific directions for administering and scoring the test, and norms based on representative groups of individuals like those for whom the test was designed. Standard content and procedure make it possible to give an identical test to individuals in different places and at different times. The norms enable us to compare an individual's test score to the scores of known groups who have taken the test. Thus, test norms provide a standard frame of reference for determining an individual's level of performance on a particular test and for comparing his relative level of performance on several different tests. Operationally speaking, standardized assessment procedures denoted the explicit chronological steps required to assess CET trainees basic learning needs. This involved: 1) selecting test administrator, 2) surveying test materials, 3) selecting standard test, 4) establishing test norms, 4) identifying students to be tested, 5) scheduling tests, 6) administering tests, 7) scoring tests, 8) compiling record of test results, 9) reviewing test results, 10) recommending individualized instructional program, 11) finalizing results in a summary report, and 12) completing a trainee learning needs folder.

Basic Learning Needs

The term basic learning needs denoted the difference between a client's functional reading, writing and math level

at program entry and the functional levels required to complete the training process. Operationally speaking, basic learning needs referred to the actual determination of a person's functional reading, writing and math levels through a process of testing, evaluation and the establishment of a learning needs packet. The learning needs packet would outline the alternative courses of action by which a person could complete training relative to his learning needs.

Individualized Instructional Planning

The term individualized instructional planning denoted the planning and selection of goals, objectives, curriculum, materials, and methods used to best fulfill a client's learning need. In this project individualized instructional planning denoted the use of a client's determined need to best plan an individual program of instruction.

Individualized Instruction

The term individualized instruction denoted a one to one teaching process in which certain instructional goals and objectives were reached on an individual basis. Operationally speaking, individualized instruction meant the actual teaching of CET clients individually; based on planned and selected goals, objectives, curriculum, materials, and method by which to best fulfill their learning needs.

ANALYTICAL DEFINITIONS

The following functional propositions were used to symbolize the relationship between the functions of project terms. The project terms were:

(1) Standardized Assessment Procedures.

(2) Determination of Client's Basic Learning Needs.

(3) Individualized Instructional Planning.

(4) Individualized Instruction.

Analytical Statement

The function of standardized assessment procedures is related to the function of determining a client's basic learning needs.

(1) Translation of analytical statement into symbols:

a. Standardized Assessment Procedure = SAP

b. function = f

c. Related = R

d. Determination of Client's Basic Learning Needs = DCBLN

(2) Analytical Formula:

SAPf R DCBLNf or f(SAP) R f(DCBLN)

Analytical Statement

The function of determining a client's basic learning needs is related to the function of individualized instructional planning.

(1) Translation of analytical statement into symbols:

a. Determination of client's BASIC learning needs	= DCBLN
b. function	= f
c. Related	= R
d. Individualized Instructional Planning	= IIP

(2) Analytical Formula:

DCBLNf R IIPf or F(DCBLN) R f(IIP)

Analytical Statement

The function of individualized instructional planning is related to the function of individualized instruction.

(1) Translation of analytical statements into symbols:

a. Individualized Instructional Planning	= IIP
b. function	= f
c. Related	= R
d. Individualized Instruction	= II

(2) Analytical formula:

IIPf R IIf or f(IIP) R f(II)

RESEARCH QUESTIONS

From the analytical statements the following research questions were formulated:

1. What is the relationship between the standardization of assessment procedures and the determination of client's basic learning needs?
2. What is the relationship between determination of client's basic learning needs and individualized instructional planning?
3. What is the relationship between individualized instructional planning and individualized instruction?

HYPOTHESES

From the research questions the following qualitative hypotheses were formulated:

1. There is a functional relationship between the standardization of assessment procedures and the determination of client's basic learning needs.
2. There is a functional relationship between determination of client's basic learning needs and individualized instructional planning.
3. There is a functional relationship between individualized instructional planning and individualized instruction.

CHAPTER II

REVIEW OF LITERATURE

In the review of literature relevant information on four selected key topics relative to the project plan were reviewed. These four topics were:

(1) Standardized Assessment Procedures.

(2) Basic Learning Needs.

(3) Individualized Instructional Planning.

(4) Individualized Instruction.

The information was found in the areas of psychology, education and vocational training.

Standardized Assessment Procedures

Torgerson (1954, p. 13) stated that standardized tests were important tools to aid teachers in understanding students and that the test results be obtained at the beginning of the term, when they were most needed. The test norms revealed the pupils educational status in comparison with achievement typical of his age and grade. Furthermore, he asserted that use of diagnostic achievement tests helped the teacher to locate and discover certain types of errors and underlying difficulties which needed to be corrected.

Lembo (1969, p. 42) pointed out that if the instructor was to have accurate information regarding his student's current level of readiness, he needed to measure kinds and

levels of performance that his students could exhibit in his course. He stated that an instructor needed to devise a pre-test of student's current knowledge and skills to perform at a particular level in the subject-matter area in question. Furthermore, he stated that an instructor needed to use a procedure that could accurately measure the particular capabilities of the learner under consideration ... not only for planning appropriate instruction but also for establishing a valid basis for assessing the effectiveness of a particular program of instruction.

Gordon F. Lawin "Teaching Strategies For Individual Learning", Krebs (1972, p. 170) revealed that a basic precept in teaching was that learning should progress from the known to the unknown. For the teacher who gets an unsorted mix of students into a class, the first step was to find out what students already know. If the subject was related to mathematics, a standardized general mathematics test could be given to accomplish this task.

Nevin R. Frantz Jr., in "Individualizing Instruction For Multioccupational Laboratories", Krebs (1972, pgs. 178-186) outlines procedures for developing individualized instruction in a Multioccupational setting. The third step in this sequence is to diagnose prior learning experience before placing the student in a program of instruction.

Client's Learning Needs

Torgerson (1973, p. 13) asserted that for materials and

techniques of instruction to be effective these must be geared to the learning needs of the student.

Enoch I. Sawin (1969, p. 12) stated that there was a definite relationship between instructing students and accurately assessing their learning needs. He further emphasized that a teacher must have available assessment techniques to ascertain the nature of his student needs.

In his article "Learning About The Individual Vocational Student", Krebs (1972, p. 109) declared that a vocational teacher had to be aware of a student's lack of basic skills, i.e., reading, writing, math in order to provide individualized education. Moreover, George J. Mouley (1968, p. 74) established that the school had a definite responsibility to see that every student achieved at least a minimum satisfaction of his needs.

Individualized Instructional Planning

John M. Lembo (1969, p1 28) clearly indicated that pre-requisite, to planning instructional goals and objectives an instructor must know the individual student's current level of cognitive development and its influence on his readiness in order to engage in particular kinds of learning tasks. Lembo (1969, p1 28) raised the following questions:

1. How may the instructor accurately identify each student's current level of readiness for performing satisfactorily in a particular course of study?

2. If students are not currently functioning at the minimum level to perform satisfactorily in a course of study, can the instructor provide for readiness?

Robert Gloger in "Measurement in Learning and Instruction", Thorndike (1971, p. 639) elaborated on the need to plan instructional objectives relative to test information concerning the knowledge and skills already possessed by the individual before he began an instructional sequence.

Gronlund (1976, p. 8) concluded that in order to plan instructional objectives to fit the needs of the learner a preassessment of their knowledge and skill was mandatory.

Individualized Instruction

David J. Pucel (1975, p. 23) emphasized that in developing individualized vocational programs of instruction the instructor must know what the student prerequisites skills are. He states, learning activities and materials are always developed for students with certain prerequisite skills and knowledge in mind. For example, he said that we could assume people could walk before we teach them to run. One of the more frustrating experiences students could have is to attempt to study a subject without having sufficient amount of skills and knowledge to even begin studying it. Therefore, in the designing of an individualized instruction program the instructor must be very clear as to what the student should be able to do and know before attempting to study a task.

David J. Pucel (1975, p. 23) emphasized that some students who entered vocational training programs lacked the basic skills, i.e., reading, writing, and math. He concludes that it is important to develop methods that allow students to determine if they possess these basic skills to the expected level. He suggested that this could benefit the student by assisting him/her in developing their basic skills so they could receive maximum benefit from the program.

SUMMARY

Authorities in education, psychology and vocational training agreed that standardized assessment procedures were necessary in determining a student's basic learning needs. They also concurred that standardized testing was a prerequisite to planning instructional programs so as to fit individual needs. According to these authorities individualized instruction was to be rooted in a sound understanding of a student's current knowledge and skills.

CHAPTER III

PLANNING THE PROJECT

In the preceding chapter, the problem was stated, hypotheses were formulated and the literature was reviewed. The succeeding section employed Desmond Cook's project management model to develop a planning sub-system for conducting the project.

Project Model

The major steps used to develop the planning sub-system included the following component parts:

(1) Project definition or work breakdown structure.

(2) Project work plan with graphical representation procedures.

(3) Project time frame for work tasks.

(4) Project schedule and resource allocation.

(5) Project cost estimation and budget preparation for proposed work.

The planning sub-system served to develop the project data/information base needed to implement the project plan in the operational phase of the project.

PROJECT DEFINITION

The function of this sub-system was to establish the boundaries of the project by developing an ordered structure of major and minor objectives that reflected the work to be

accomplished by the project manager.

Mission Statement

The overall mission of the project was to generate a project plan for the development of standardized client basic learning needs assessment procedures at the Center For Employment Training.

Purpose

The purpose of the project was to develop a planning sub-system for CET Management to be used as a means for standardizing client basic learning needs assessment procedures.

Limits and Constraints

The limits and constraints of the project were described by defining the form of project representation and limitations of the project plan.

In addition, the project representation was probabilistic in form. The probabilistic system was useful when the functioning of the system was at a level that prohibited strong predictions according to given output. Since the associated time and cost of the project was uncertain, the project was best planned and controlled by using this technique.

Moreover, the project was limited in that: Staff assignment to the project would be contingent on CET Management acceptance of project plan.

Definition of System Concepts

Work Breakdown Structure. In Cook's project model, work breakdown structure denoted the planning sub-system used to

summarize the schedule and cost status of the project at higher levels of management. In this sub-system, the most common terms used were:

(1) Work packages -- denoted the list of specific jobs which contributed to the development of one end item on the work breakdown structure.

(2) Component -- denoted those series of lesser tasks combined to produce the objectives represented by the work packages.

(3) Major end-item -- denoted the major objectives within the project. Completion of each of these objectives would complete the project.

Work flow. In Cook's project model, work flow denoted a work plan which portrayed in graphical manner the inter-relationships and inter-dependency of tasks done to accomplish the objectives in the project definition. In this sub-system, the most common terms used were:

(1) Flow graph -- denoted a diagrammatic representation in which flow through this system was portrayed by a sequence of unidirected arrows.

(2) Network -- denoted a graphical representation of all the tasks or jobs that must be accomplished to reach the intermediate and final objectives of the project.

(3) Activities -- denoted those individual tasks or jobs which must be accomplished to reach the project objectives.

(4) Milestone events -- denoted the accomplishment of a major piece of work in the form of a work package.

Time estimation. In Cook's project model, time estimation denoted the time frame for the total project and the individual activities and events within the project. In this sub-system, the most common terms were:

(1) Probabilistic estimates -- denoted time estimate procedures based on the idea that uncertainity existed about a particular activity.

(2) Expected elapse time -- denoted the activity time estimation for the project and was designated by the symbol (te) in mathematical calculation.

(3) Optimistic time estimates -- denoted the time estimation based on the assumption that "everything will go well" in completing an activity and was designated by the letter (o) in mathematical calculations.

(4) Most likely time estimates -- denoted the most realistic estimate of time the activity may take and was designated by the letter (r) in mathematical calculations.

(5) Pessimistic time estimate -- denoted the longest time the activity would take under the most adverse conditions and was designated by the letter (p) in mathematical calculations.

(6) Critical path -- denoted the most time consuming pathway in the network and was obtained by moving forward while adding the longest activity time estimates along the various pathways in the network.

Scheduling. In Cook's project model, scheduling denoted the translation of the developed plan into a timetable, showing the calendar dates for the start and the completion of the tasks in the project.

Resource allocation. In Cook's project model, resource allocation denoted the translation of the accepted work flow into a schedule. This process was achieved by assigning the resources into man-days to accomplish the planned activities.

Cost and budget preparation. In Cook's project model, cost and budget preparation denoted the management plan for operating and financing the project during specific time periods. Furthermore, this detailed plan of action was developed as a guide for control operations and as a standard for evaluating performances. In this sub-system, the most common terms used were:

(1) Direct costs -- denoted those costs that were directly traced to or associated with a parti-

cular activity or task in the project.

(2) Indirect costs -- denoted those costs that were not traced to a particular activity, task, or costing unit. Moreover, indirect costs were also frequently referred to as "overhead."

(3) Fixed costs -- denoted those costs that were incurred in order to provide the supplies for an activity.

(4) Costing units -- denoted the work packages or segments of a work package for which the costs of operation were accumulated.

(5) Variable costs -- denoted those costs which when totaled depended upon the level of activity during the work period.

Project objectives.

For the purpose of this project plan, the term project objectives was synonomous with the terms milestone events and major end items. The objectives were short ranged and consisted of the following three major objectives:

(1) Standardized pre-testing procedures.

(2) Standardized testing procedures.

(3) Standardized post-testing procedures for developing a learning needs assessment folder.

Criteria for accomplishing objectives.

The primary criterion established by the project manager was that activities for a major objective could not

begin until the previous objective was totally accomplished.

Major end items.

The major end items served to accomplish the overall goal objective of the project. The goal was to generate a proposal plan for the development of standardized client basic learning needs assessment procedures for the Center For Employment Training. The three major end items are listed above under Project Objectives.

End item. The first major end item in the project was the development of standardized pre-testing procedures. The work packages for the project end item consisted of six components;

(1) Selection of test administrator.

(2) Survey of test materials.

(3) Selection of tests.

(4) Establishment of test norms.

(5) Identification of all new students.

(6) Schedule test.

End item. The second major end item in the project was to develop standardized testing procedures. Its components consisted of:

(1) Test administration.

(2) Test scoring.

(3) Compiling record of test results.

End item. The third major end item in the project was to develop standardized post-testing procedures for completing a trainee learning needs assessment folder. Its components

consisted of:

(1) Reviewing results by test administrator.

(2) Reviewing results by trainee instructor.

(3) Recommendations by test administrator and instructor.

(4) Formal summary report.

(5) Editing and typing information into student folder.

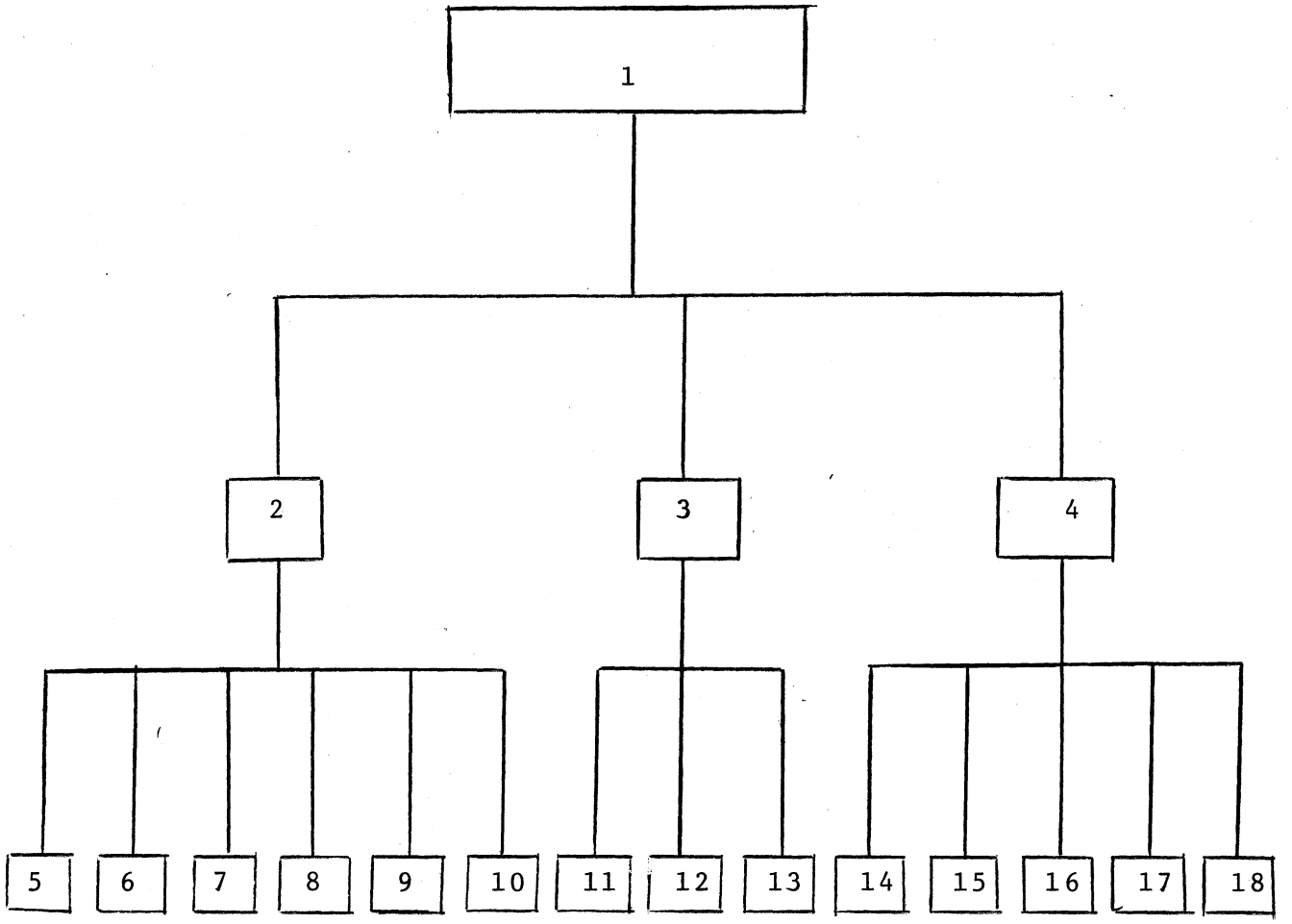
Moreover, the major end items, the components and work packages are illustrated in a work breakdown structure in Figure I.

Responsibility for Work Package Development

The lead instructor/counselor of CET's basic education unit will be responsible for project work package development.

Figure I

Work Breakdown Structure of a Proposal Plan for the Development of Standardized Basic Learning Needs Assessment Procedures at the Center For Employment Training



Key:

1. Standardized Learning Needs Assessment Procedures Proposal Plan
2. Pre-Testing Procedures
3. Testing Procedures
4. Post-Testing Procedures for Developing Learning Needs Folder
5. Selection of Test Administrator
6. Survey of Test Materials
7. Selection of Tests
8. Establishment of Test Norms
9. Identification of all new Students
10. Schedule Tests
11. Test Administration
12. Score Tests
13. Compile record of Test Results
14. Results reviewed by Test Administrator
15. Results reviewed by Instructor
16. Recommendations
17. Formal Summary Report
18. Edit and type information into Student Folder

WORK FLOW

The function of the work flow sub-system was to develop a graphical representation of the sequence of activities and events necessary to accomplish the objectives identified in the project definition sub-system.

Rules for Work Flow Plan

The project definition was used as the primary basis for network construction by using a backward approach to move from a general to a specific case. This approach involved the identification of major end items and working backwards to reach the eventual starting point.

The type of network used in the project was the event-oriented network. In the event-oriented network, the primary concern was the occurrence of events. Moreover, the identification of events and the order of their occurrence made use of the PERT (Program Evaluation and Review Technique) method.

Milestone Events

The milestone events included the following objectives:

(1) Begin project.

(2) Formulation of standardized pre-testing procedures.

(3) Forumulation of standardized testing procedures.

(4) Formulation of standardized post-testing procedures for developing a learning needs assessment folder.

(5) Completion of the project.

Task and Event Numbering Decisions

In order to reach the milestone events, the tasks or activities included a set of preceding and succeeding event numbers (See Figure II). Moreover, the events and milestone events were indicated by numbers ranging from 1 to 14.

In this project, two milestone events were identified and served to represent the start and completion of the project. Aside from these two milestone events, two other milestone events and ten regular events were identified and represented the points of accomplishment in the network, such as the start or end of activities in the network.

The activities were those tasks or jobs which were accomplished so as to reach the regular and milestone events in the work flow. For this report, attention was given to describing the exact or specific nature of the tasks in Table I. Furthermore, the activity numbers in the network were designated by giving the preceding and succeeding event numbers for each activity a letter (See Figure II). The letters ranged from A to P.

Event Coding System

In order to construct the network for the work plan, some basic symbols were used to represent the milestone events, regular events, interface events and activities. For example:

(1) Milestone events were distinguished from

regular events by special symbols such as squares (☐) or rectangles (▭).

(2) Regular events were represented on the network by a geometric figure such as a circle (○).

(3) An activity, on the other hand, was represented by a solid arrow (⟶).

In this project, there was no connection established between the length of the activity arrow and the amount of time needed to reach an event. Furthermore, at one point in the work flow a logical constraint was placed on the accomplishment of an event. This constraint was designated as a "dummy activity" and represented by a dotted line (-----) in the network.

Event Identification

The following is a list of the overall work flow events for the Network in Figure II and the corresponding event number:

(1) Begin project.

(2) Selection of test administrator.

(3) Identification of new students.

(4) Survey of test materials.

(5) Selection of test.

(6) Completion of pre-testing procedures. This milestone event represents the completion of the following two activities:

a. Establishment of test norms (5 --- 6).

b. Scheduling of test (3 --- 6).

(7) Test administration.

(8) Test scoring.

(9) Compiling record of test results. Testing procedures completed.

(10) Results reviewed by test administrator.

(11) Results reviewed by instructor.

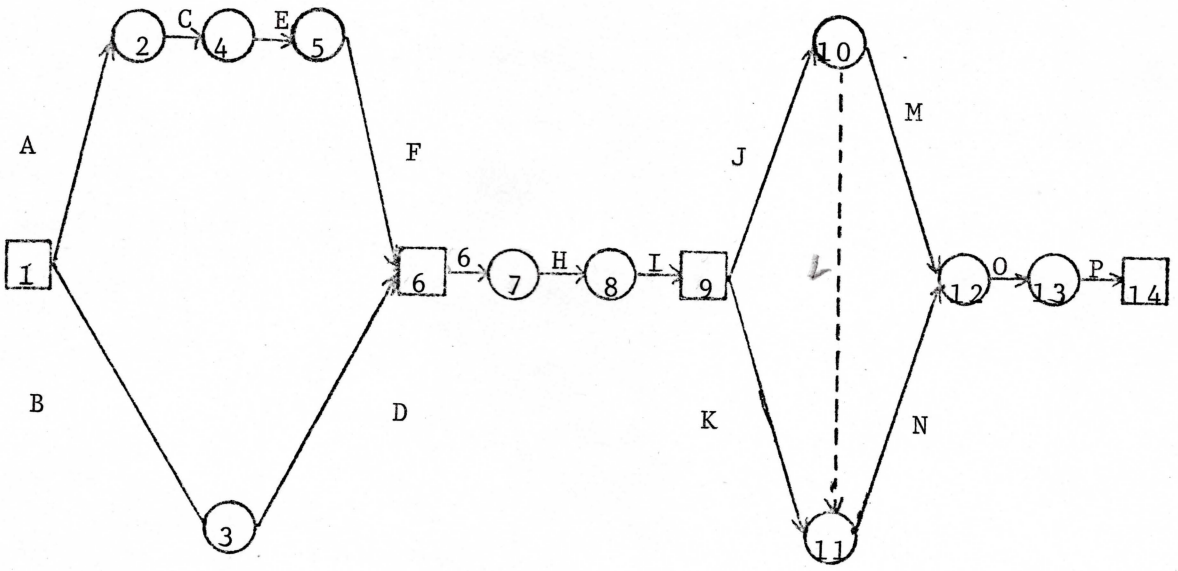
(12) Recommendations made by test administrator and instructor.

(13) Formal summary report.

(14) Editing and typing information into student folder. Completion of procedures for developing trainee learning needs assessment folder. Completion of project.

Figure II

Summary Network of a Proposal Plan for the Development of Standardized Basic Learning Needs Assessment Procedures at the Center For Employment Training



TIME ESTIMATION

The primary purpose of this syb-system was to develop a time frame for the individual activities and events within the project. This was done by providing information regarding the estimated total project completion time and the critical path in the work flow (See Table I and Figure III).

Probabilistic Estimating Procedures

This project used probabilistic estimating procedures to generate planning data and information to construct reasonably certain and consistent time, cost and performance estimates. "Probabilistic estimates are based upon the fact that uncertainty ... exists about a particular activity", (Cook 1971, p. 109). Because this project was being conducted for the first time, a reasonable approximate time estimate was made from the present knowledge of individual activities in the network. In addition, it was necessary during the project planning stage to make the adjustments and revisions necessary to obtain better time estimates.

Pre-Planning Rules and Procedures

One of the principle rules in the starting point for time estimation involved the accessibility of work packages and activities in the project. Furthermore, a well defined and logically arranged work flow plan served as a valid basis for calculating the time estimates. In this project, the time estimates were calculated within the work flow primarily on a random basis. According to Cook (1971, p. 109), this

procedure prevents "individuals from adjusting their estimates for activities which come later in the project because of estimates made for tasks that come earlier."

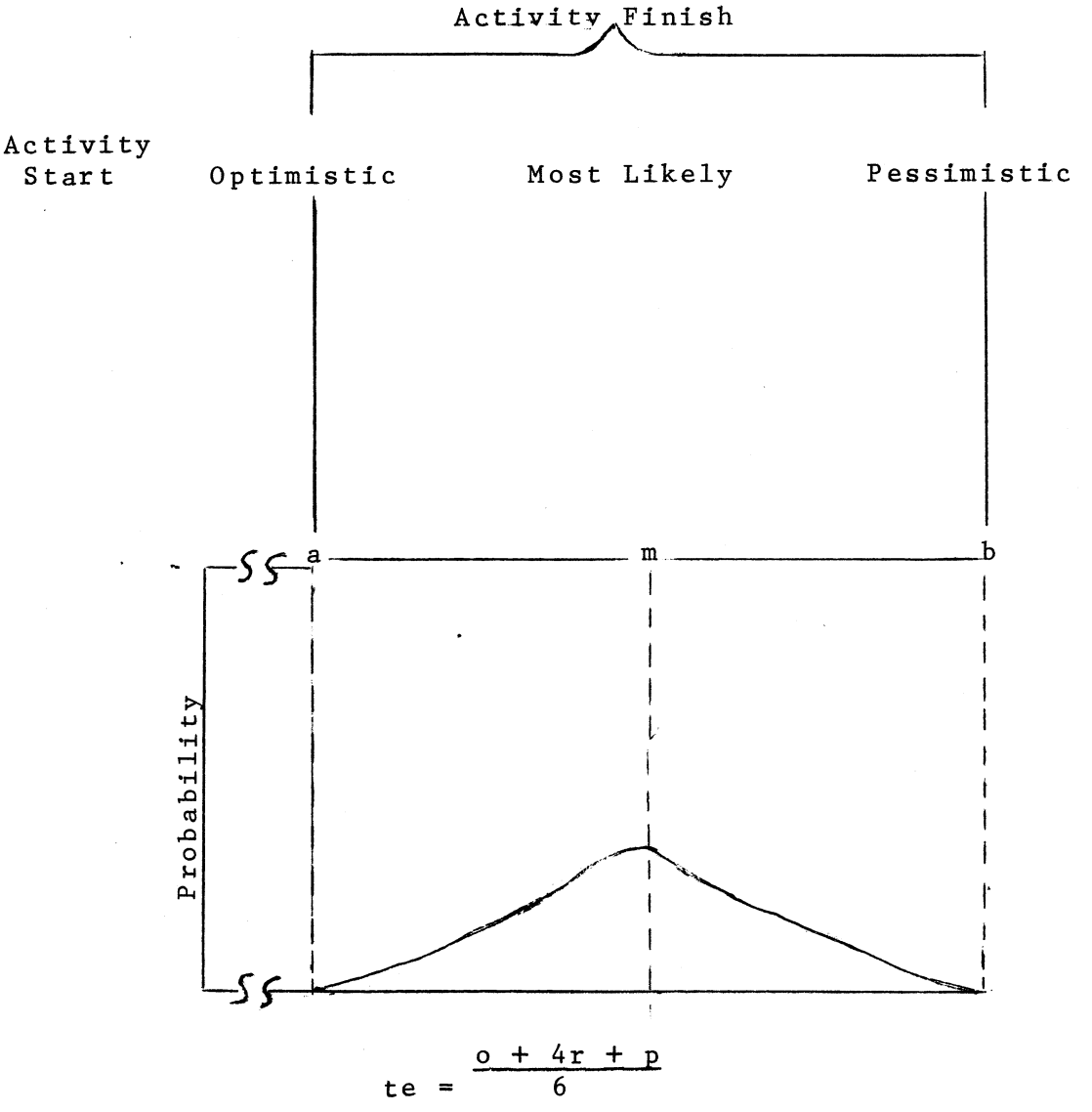
Knowledge of Probabilistic Procedures

In this project, the PERT method was used to determine the activity time estimates. In the PERT method, three estimates of time were usually given for each individual activity. These time estimates were identified as optimistic, most likely, and pessimistic. The optimistic time estimate was symbolized by the small letter (o) and was based on the assumption that an activity could be accomplished or completed if everything went extremely well (Cook, 1971, pgs. 110-111). The most likely time estimate was designated by the letter (r) and was the most realistic estimate of time an activity would take. The pessimistic estimate, designed by the small letter (p), was the longest time an activity would require under the most adverse conditions. When these three individual time estimates were obtained, an expected elapsed time (te) was established for each activity in the work flow. The following formula was used to calculate the time estimates for each activity in the project:

$$te = \frac{o + 4r = p}{6}$$

Moreover, the distribution of time estimates in PERT were obtained through the use of probabilistic procedures referred to as the Beta distribution. For example, the calculation of activity time estimates can be illustrated using

the following procedural model:



$$te = \frac{o + 4r + p}{6}$$

Probabilistic Procedures

The expected elapsed time (te) was calculated by assigning three individual time estimates for each individual activity in the network. By using the formula $te = \frac{o + 4r + p}{6}$ the estimator estimated the performance of each activity where:

o -- was the optimistic time estimate.

r -- was the most likely time estimate.

p -- was the pessimistic time estimate.

te -- was the time that the activity would take if it was repeated many times.

The following values of o, r, and p were assigned for fifteen different activities; dummy activities in the network were not given times. Moreover, for the purpose of this proposal plan, the time estimates for the activities in the network were calculated in terms of hours and minutes, i.e., .5 = thirty minutes.

The expected elapse time was further illustrated by describing the activities in the network and their predecessor and successor events. These activities, events and expected elapse time are shown in Figure III and listed in Table I.

Critical Path

The critical pathway was the most time consuming pathway in the network. The critical path was identified in the flow graph by a double line (See Figure III).

Table I

Tabular Description of Activities, Events, Activity Time Estimates, Manpower and Manpower Hours.

Code	Activity	PE	SE	to	tr	tp	te	mp	MPH
A	Select Test Administrator	1	2	3	5	7	5	2	10
B	Identify New Students	1	3	1	1.50	2.50	1.58	2	3.16
C	Survey Test Materials	2	4	.35	.50	1	.56	1	.56
D	Schedule Tests	3	6	.20	.50	.90	.52	1	.52
E	Select Tests	4	5	2	4	6	4	1	4
F	Establish Test Norms	5	6	.75	1.50	2.50	1.54	1	1.54
G	Administer Test	6	7	.75	2	3.50	2.04	1	2.04
H	Score Tests	7	8	.20	.45	.80	.46	1	.46
I	Compile Record Of Test Results	8	9	.45	.80	1.30	.82	1	.82
J	Results Reviewed by Test Administrator	9	10	.50	.75	1.15	.77	1	.77
K	Results Reviewed by Instructor	9	11	.50	.75	1.15	.77	1	.77
L	Dummy Activity	10	11	-	-	-	-	-	-
M	Recommendations made by Test Administrator	10	12	.75	1.50	2.25	1.50	1	1.50
N	Recommendations made by Instructor	11	12	.75	1.50	2.25	1.50	1	1.50
O	Write Formal Summary Report	12	13	1	1.50	2.25	1.50	2	3
P	Edit and Type Information into Student Folder	13	14	.30	.50	.90	.53	1	.53
		Total		12.50	22.75	35.45	23.09	--	31.17

Key: .25 = 15 Minutes
.50 = 30 Minutes
.75 = 45 Minutes
1.0 = 1 Hour

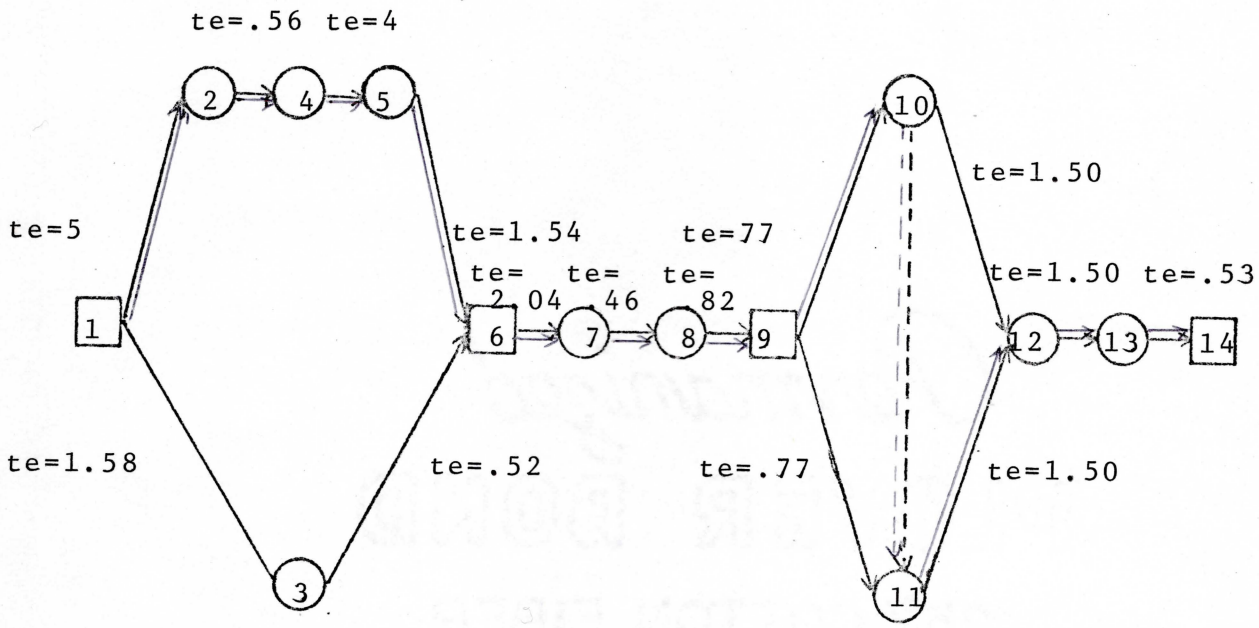
Key: PE = Preceding Event
SE = Succeeding Event
t = time
o = optimistic
r = realistic
p = pessimistic
e = estimated

Key:
MP = Manpower
MPH= Manpower Hours

Formula: $\frac{to + 4r + tp}{6} = t$

Figure III

Critical Path and Expected Elapse Time of a Pro-Posal Plan for the Development of Standardized Basic Learning Needs Assessment Procedures For the Center For Employment Training.



Key:

Critical path = ⟹ = 18.72

time estimate = te

SCHEDULING AND RESOURCE ALLOCATION

The function of this sub-system was to establish a project schedule by translating the planned schedule derived from activity time estimates into specific calendar dates. Furthermore, the start and completion of the project was dependent upon resources available, cost estimations and other known constraints.

Survey of Resources

The concept of Resource allocation was related to the concept of scheduling (Cook, 1971, p. 126). For example, the proposal plan was translated into a schedule by assigning resources to accomplish planned activities. Moreover, a project manager was assigned to perform the work activities.

Schedule Criterion

In order for the project manager to generate a workable schedule, three criteria were considered:

(1) To conduct the project with the minimum amount of time allowed.

(2) To conduct the project with the minimum of cost entered on the network.

(3) To maximize performance in terms of the number of man/days required to complete the project.

Manpower Needs

Completion of the project required one full-time staff and one part-time. The part-time staff would only work in activities A, B, and O.

Loading

Loading was defined as "the assignment of work to an operator, machine or department" and served as the most important feature used to produce a timetable. The loading function required, from the start, a statement of the work required; this was done in terms of man (or machine) hours called "resource-time."

The Load as a Histogram

In this project, it was convenient to represent the load as a histogram -- a vertical bar graph, the length of which was proportional to the load. The simplest way of drawing a histogram was by following the various paths of the network and adding up the manpower requirements. These requirements were than plotted on a histogram as illustrated in Figure IV.

Load Capacity

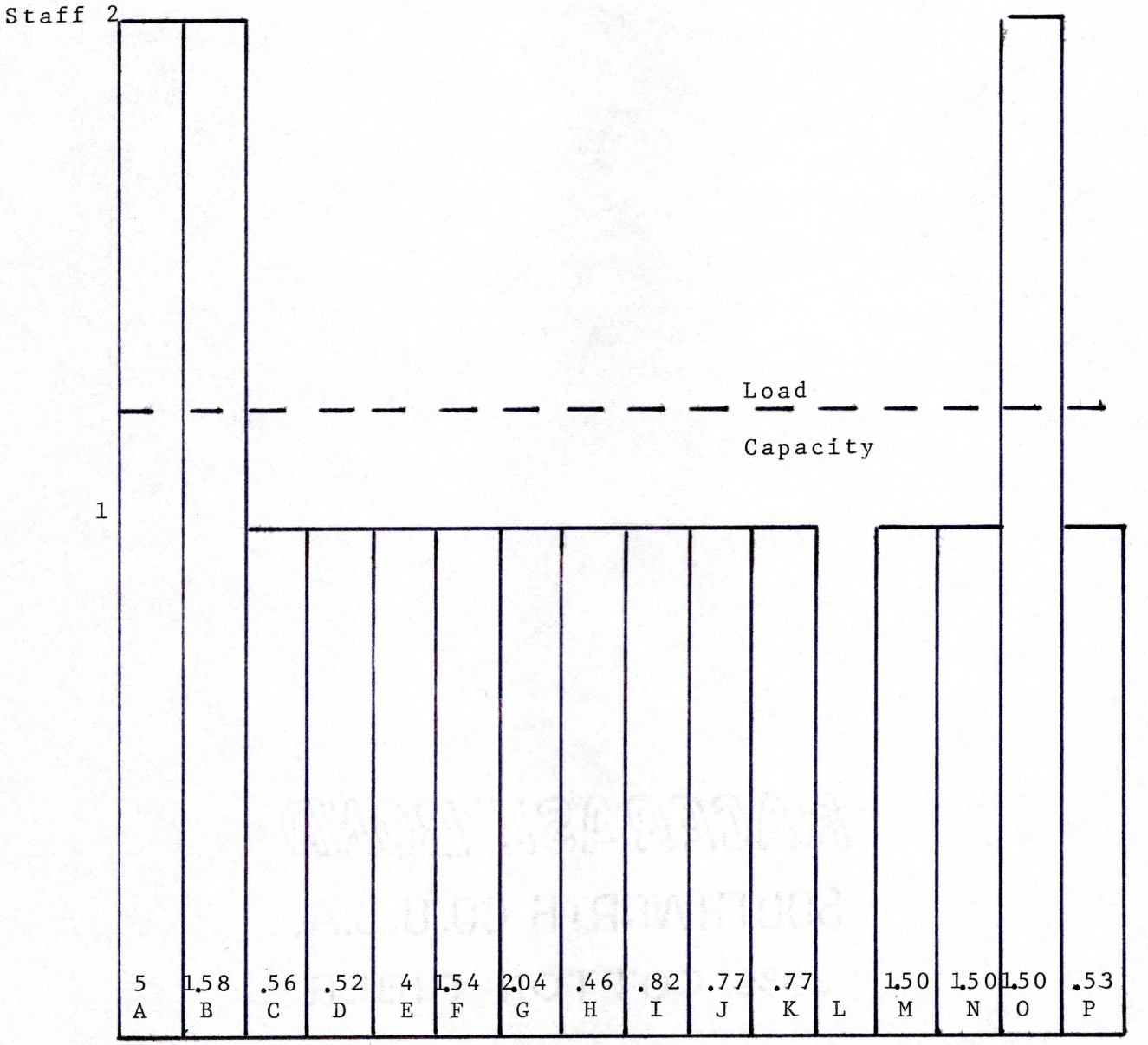
The load capacity was a leveling concept used in the histogram (See Figure IV). It determined how much manpower would be required to complete the project relative to time estimation. The load capacity was determined by dividing the expected elapse time by the critical path time.

Scheduling Development

Scheduling development illustrated the progress of the project, relative to calendar dates (See Figure V). All the activities in this project were calculated on an hourly rate the critical path indicated 18.72 hours needed to complete the project. This is illustrated by the solid rectangles in Figure V. All the other activities needed to complete the project were illustrated by the blank rectangles. Since the project would begin at 8:00 on June 6th, it was calculated that the project would be completed by 10:45 on June 8th, as shown in Figure V.

Figure IV

Histogram -- Resource Profile

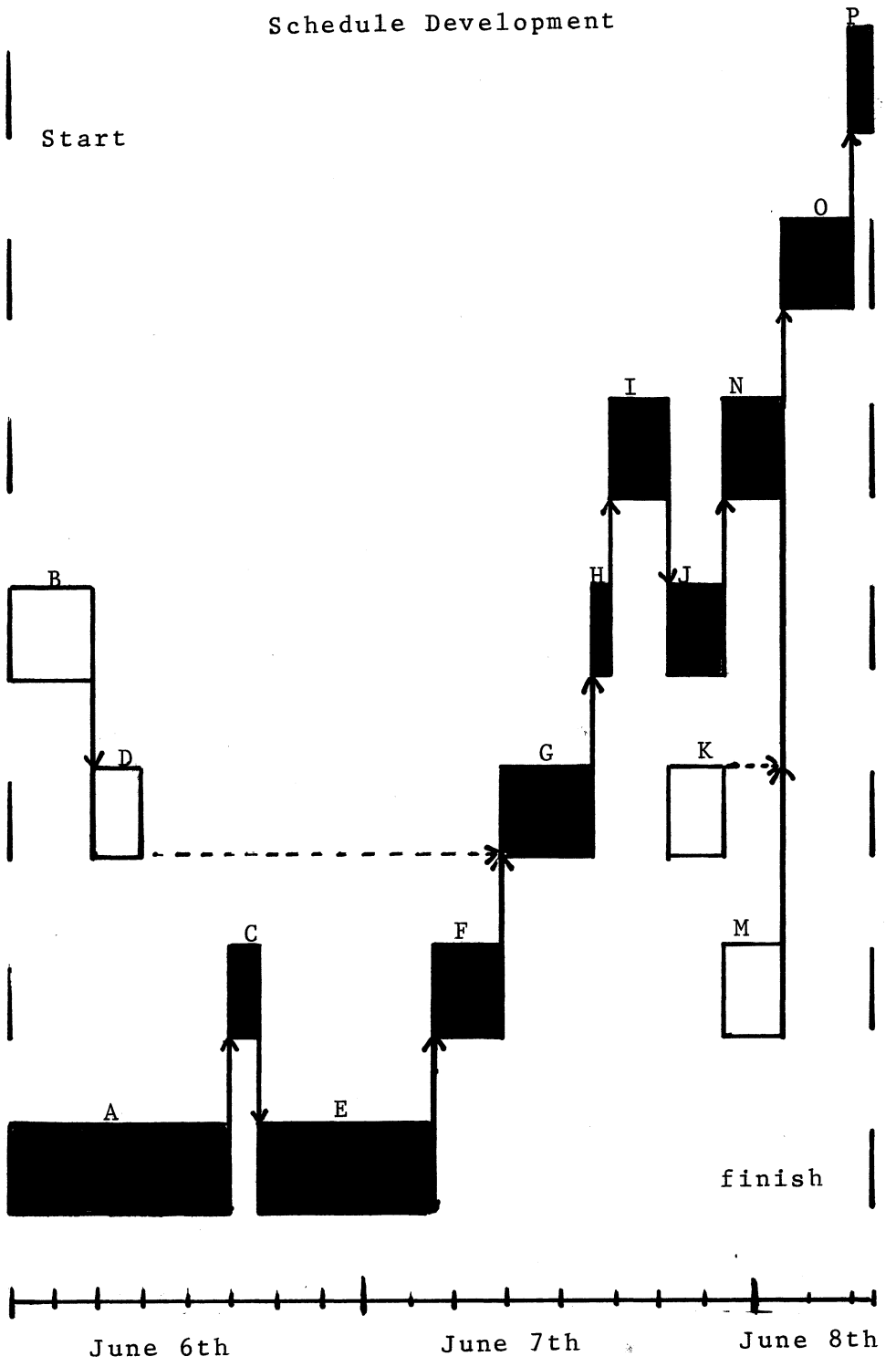


Key: te = 23.09
cp = 18.72

Formula: $\frac{te}{cp}$ = Load = 1.23
Capacity

Figure V

Schedule Development



Key: 1 day = 8 hours
critical path = 18.72 hours

Please Note: Dummy Activity not Included.

COST AND BUDGET ESTIMATION

The function of this sub-system was to generate cost estimates and budget expenditures needed to accomplish the project as outlined in the established time network. In this project, the basic objectives of PERT/Cost were twofold:

(1) To achieve a significantly more realistic and original program cost estimate.

(2) To achieve a marked improvement in control against the original estimate.

Budget Categories

The budget categories represented the cost items needed to complete the project (as illustrated in Table II). The following six categories were used in the project:

(1) Personnel cost.

(2) Fringe benefits.

(3) Rent.

(4) Utilities.

(5) Supplies.

(6) Equipment.

Cost Calculation

Calculation of cost was done on an activity per activity basis. The following formulas illustrate how cost was calculated per category.

Manpower Cost = (MPC)

1 full-time instructor ¢6.29 per hour.

1 part-time instructor $4.85 per hour.

Key: Manpower hours x hourly pay rate = personnel cost.

Fringe Benefits = (FB)

Calculated at 25% of salary.

Example: $3.52 x 25% = $.88.

Rent = Rent

48,367 squared feet. Monthly rent $4,700.

yearly rent $56,400. Daily rent $154,52.

hourly rent = $6.43.

Key: $\frac{\text{Hourly rent}}{\text{total squared feet}}$ x 100 squared feet.

Needed for project x te = cost per 100 squared feet per hour.

Utilities = Util

gas $3.00 per month per staff.

electric $5.00 per month per staff.

water $150 per month per staff

total: $9,50 per month per staff.

Key: $\frac{114}{2080}$ x te = cost of utilities per hourly use.

Supplies = Sup

2 note pads $.89 each = $1.78.

1 pen $.20 each = $.20.

typing paper 50 sheets $.016 per sheet = $.80.

total: $2.78

Key: 2.78 total man-power hours x Manpower hours per activity = cost per activity

Equipment = Equip

1 typewriter - rental

$45.00 per month.

$1.50 per day.

$ .06 per hour.

Key: .06 x .53 = .03

Individual Work Tasks of Work Packages

The list of activities shown in Table I of this proposal plan, comprised the work tasks for work packages in the project. Each activity was allocated resources as shown in Table II.

Summarization of Work Packages Costs

The summary of costs upward through the project definition is presented in Figure VI.

Budget Summary

The budget categories for project activities are outlined in Figure VII. This budget summary format is the one used at the Center For Employment Training.

Table II

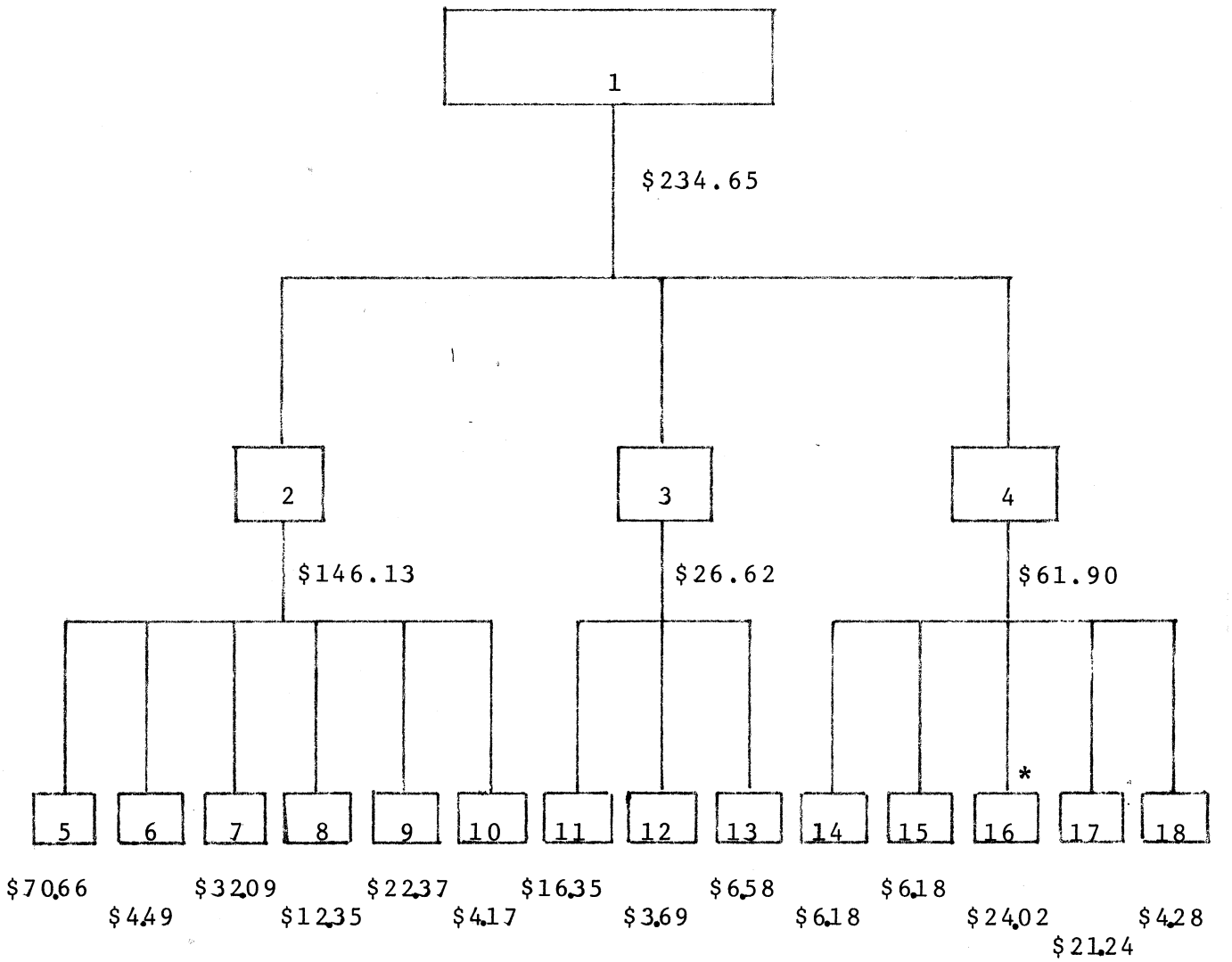
Tabular Description of Total Activity Cost Estimates And Total Project Resource Allocation

Activity	MPH	Per Cost	FB	Rent	Util.	Sup.	Equip.	Total $
1 - 2	10	55.50	13.92	.08	.27	.89	-	$70.66
1 - 3	3.16	17.59	4.39	.02	.09	.28	-	$22.37
2 - 4	.56	3.52	.88	.01	.03	.05	-	$ 4.49
3 - 6	.52	3.27	.81	.01	.03	.05	-	$ 4.17
4 - 5	4	25.16	6.29	.06	.22	.36	-	$32.09
5 - 6	1.54	9.69	2.42	.02	.08	.14	-	$12.35
6 - 7	2.04	12.83	3.20	.03	.11	.18	-	$16.35
7 - 8	.46	2.89	.72	.01	.03	.04	-	$ 3.69
8 - 9	.82	5.16	1.29	.02	.04	.07	-	$ 6.58
9 -10	.77	4.84	1.21	.02	.04	.07	-	$ 6.18
9 -11	.77	4.84	1.21	.02	.04	.07	-	$ 6.18
10 -11	-	-	-	-	-	-	-	
10 -12	1.50	9.43	2.35	.02	.08	.13	-	$12.01
11 -12	1.50	9.43	2.35	.02	.08	.13	-	$12.01
12 -13	3	16.70	4.17	.02	.08	.27	-	$21.24
13 -14	.53	3.33	.83	.01	.03	.05	.03	$ 4.28
Total	31.17	184.18	$46.04	$ .37	$1.25	$2.78	$.03	$234.65

Figure VI

Summarization of Work Package Cost

Estimates for Total Project Cost



Key: Please see Figure I.

*Please note that the total for work package number sixteen represents the total for activities M and N. Work package number sixteen is a combination of both activities.

Figure VII

Standardized Client Learning

Needs Assessment Procedures

For C.E.T.

BUDGET SUMMARY

Estimated Time: 23.09 hours.

Dates : June 6th, 1977 to June 8th, 1977.

Category	
1. Personnel	
a. Salaries and Wages	$ 184.18
b. Fringe Benefits	246.04
2. Materials and Supplies	
a. Supplies	2.78
b. Equipment	.03
3. Other Direct Costs	
a. Utilities and Rent	1.62
Total Costs	$ 234.65

CHAPTER IV

SUMMARY AND CONCLUSION

This summary reviews the major points in the preceding chapters and also presents recommendations together with suggestions for future implementation and evaluation of the project plan while in actual operation.

The purpose of the project plan was to design, develop, and conduct a research study of operating principles relative to standardized client learning needs assessment procedures for the Center For Employment Training.

Chapter I established the condition for the project plan by identifying a conflict in the form of a need.

Chapter II reviewed existing literature relative to the hypotheses formulated in Chapter I.

Chapter III employed Desmond Cook's planning sub-system model for project development which detailed the data base for:

1. Project Definition.
2. Work Flow.
3. Project Time Estimate.
4. Schedule and Resource Allocation.
5. Project Cost Estimate.

RECOMMENDATIONS

In order to implement the project plan, a control sub-system must be generated to effectively measure project performance.

This sub-system would serve as a means for effective implementation of the project relative to the proposed time-table and budget. It would provide the control component by which to balance actual performance relative to the project plan.

CONCLUSION

The information outlined in this project plan indicates a strong relationship between client assessment procedures and effective instruction. Furthermore, it would be a benefit to CET clients if such procedures were implemented. They could provide the basis by which to gather information relative to the trainees needs. This information could be used to better plan individualized programs of instruction for all CET clients.

BIBLIOGRAPHY

Books

Block, James H. (Editor). Schools, Society, and Mastery Learning. New York: Holt, Rinehart and Winston, Inc., 1974.

Cook, Desmond L. Educational Project Management. Columbus, Ohio: Merrill Publishing Company, 1971.

DeCececco, John P. Human Learning in the School. New York: Holt, Rinehart and Winston, Inc., 1963.

Di Vesta Francis J., and George G. Thompson. Educational Psychology Instruction and Behavioral Change. New York: Macmillan Publishing Co., Inc., 1976.

Krebs, Alfred H. (editor), The Individual and his Education. Washington, D.C.: American Vocational Association, 1972.

Lembo, John M. The Psychology of Effective Classroom Instruction. Columbus, Ohio: Charles E. Merrill Publishishing Company, 1969.

Lembo, John M. When Learning Happens. New York: Schocken Books, 1972.

Mouly, George J. Psychology for Effective Teaching. Atlanta, Georgia: Holt, Rinehart and Winston, Inc., 1968.

Pucel, David J. and William C. Knaak. Individualizing Vocational and Technical Instruction. Columbus, Ohio: Charles E. Merrill Publishing Company, 1975.

Sawin, Enoch I. Evaluation and the Work of the Teacher. Belmont, California: Wadsworth Publishing Co., Inc., 1969.

Somers, Gerald G. and J. Kenneth Little (editors). Vocational Education: Today and Tomorrow. United States: University of Wisconsin, 1971.

Thorndike, Robert L. Educational Measurement. Washington, D.C.: American Council on Education, 1971.

Torgerson, Theodore L. Measurement and Evaluation. New York: The Dryden Press, 1954.

Article

Gass Maria Hernandez. Unpublished Thesis Project. San Jose: San Jose State University, 1976.