A project plan for formulation of evaluative objectives and performance criteria for measurement

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A Project Plan for Formulation of Evaluative Objectives and Performance Criteria for Measurement

A Project
Presented to the Department of Mexican-American Graduate Studies (ISSPA)
San Jose State University

Prepared in Partial Fulfillment of the Requirements for the Degree of Master of Arts

Prepared by
GUADALUPE G. ALMARAZ
May 13, 1978
DEDICATION

A special dedication to my parents Victor and Marcelina and also to my twelve brothers and sisters: Irene, Victor Jr., Vito, Josephine, Irma, Lorenzo, Ruth, Arthur, Lucia, Patricio, Mary, and Antonio.

May all of you be as proud of me for completing this project as I am in being a member of this great family.
ACKNOWLEDGEMENT

I'd like to thank the following people for their assistance in making the final completion of this project possible:

Dr. Felix Garcia; Professor Jose Carrasco; Mr. Humberto Garza; and Mr. Mauro Chavez.
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INTRODUCTION

Sound authority in the formulation of objectives for social service programs exist in many forms. One of these forms is the services to the aged program that emphasizes the needs of the Spanish-speaking elderly. For example, one of these programs is the Eastside Community Center (ECC). The six program functions that compose the ECC services to the aged are:

1. Counseling Services
2. Escort/Outreach
3. Information and Referral
4. Nutrition
5. Recreation Activity
6. Transportation

According to the policy of the Eastside Community Center: "The immediate object of concern is human suffering, injustice and oppression as these are currently and concretely manifested in our society."

The policy further states that: "The area of concern is human needs of all people, especially the disadvantaged."
In this policy statement, the senior citizens are categorized as disadvantaged. For this reason, programs have been initiated to meet social, recreational, and emotional needs of senior citizens in the San Jose area. Additionally, the program evaluation of formulated objectives depends upon measurement and observation. In turn, the evaluation determines the effectiveness of the senior citizen program of the Eastside Community Center.

In exploring the problem, this evaluative objective formulation dealt with an interplay between benefits and detriments. The following conflict ensued:

Benefit: Why is the effectiveness, for program goal evaluated by the degree of goal and objectives attainment for the senior citizen program at the ECC?

Detriment: Why is there a lack of formulated measureable and observable goals and objectives for the senior citizen program at the ECC?

Conflict: Why is there a lack of formulated measureable and observable goals and objectives for the senior citizens program at the ECC when the effectiveness for program goal achievement is evaluated by the degree of goal and objective attainment?
The interplay formed conflict between the lack of goals and objectives for senior citizens programs and the evaluation of program effectiveness in the delivery of services to the Spanish-speaking elderly in the San Jose area. Consequently, program planning to meet social, recreational, and emotional needs of the senior citizen cannot be evaluated.

In this report, the researcher assumed that the relationship between formulation of evaluative objectives to performance criteria was to be established in order to test program effectiveness. In planning the formulation of evaluative objectives, a critical analysis was made to determine the formulation process validity in meeting social, recreational, and emotional needs of the Spanish-speaking elderly in the San Jose area.
PROBLEM

Statement of Problem

The problem was to generate a managerial plan to develop evaluative objectives for the Eastside Community Center's Senior Citizens Program. This plan was to determine program effectiveness in terms of performance criteria for program goal achievement.

In the managerial plan the development of objectives comprised a continuous series of events; hence each of which resulted in the successful achievement of the preceding objectives.

This chain of objectives were termed: (1) the immediate, (2) intermediate, and (3) ultimate goals. *Immediate goals* denoted the results of a specific act which someone was momentarily concerned about; the *intermediate goals* denoted activities towards the accomplishment of a specific act; *ultimate goal* denoted the examination and the effect of achieving the intermediate goal.

The major step in the problem was to design a planning subsystem in the form of a project plan consisting of the following components:

1. Work Breakdown Structure
2. Work Flow
3. Time Estimation
4. Schedule and Resource Allocation
5. Cost and Budget Estimation
Moreover, these factors were used for project management in the Eastside Community Center for use in control sub-system.

**Purpose of Project**

The purpose of the project was to develop a planning sub-system formulation of evaluative objective for project management at the Eastside Community Center. The major purpose was to generate a plan to formulate evaluative objectives for the Eastside Community Center's Senior Citizens Program to determine program effectiveness in meeting performance criteria as determined by the project team.

In the project, Cook's Project Management Model was used to prepare the planning sub-system for the project. The plan employed Reddin's Technique termed **Effective Management By Objectives** to establish the evaluative objectives for the senior citizens' program of the Eastside Community Center.

**Importance of Project**

The project was a plan to formulate evaluative objectives for the Eastside Community Center's Senior Citizens Program to discover whether social, recreational, and emotional needs of the Spanish-speaking elderly in the San Jose area were being met as defined by the performance criteria established by the project director. Furthermore, the project provided a more realistic appraisal of the Eastside Community Center's program functions and their direct involvement by the senior citizen participants.
The project was based on the conditional hypothesis:

If the research shows that formulation of evaluative goals and objectives for the Eastside Community Center Senior Citizens Program, is unnecessary to effectively meet social, recreational and emotional needs of the elderly Spanish-speaking people of East San Jose, then the performance criteria is being generated and attained for the senior citizen of the East San Jose area. On the other hand, if the study shows that the senior citizens' program is not effectively meeting social, recreational, and emotional needs of the Spanish-speaking elderly of the East San Jose area, then the establishment of evaluative goals and objectives is necessary to determine the performance criteria for meeting the needs of the Spanish-speaking senior citizen in East San Jose.

Delimitation of Project

The project was conducted at the Eastside Community Center during the Spring Academic Semester 1978 of San Jose State University and was concerned with formulating evaluative objectives for six program functions of the senior citizens program. These six functions were:

1. Counseling Services
2. Escort/Outreach
3. Information and Referral
4. Nutrition
5. Recreation Activities
6. Transportation

In this project, each function was examined and analyzed to establish relationships for overall program evaluative objective setting.
DEFINITION OF TERMS

Counseling

The term Counseling denoted one of the six program functions of the senior citizen program at ECC. Furthermore, counseling was restricted to the professional services the staff social worker provided to help the elderly in coping with personal problems which threatened personal health and social functioning.

Moreover, the counseling function was inter-related to the other five program functions of the ECC Senior Citizens Program.

In this project, the counseling function was measured for program goal achievement by using Reddin's Technique in the planning sub-system to formulate evaluative objectives to determine program effectiveness in meeting performance criteria for the ECC Senior Citizens Program.

Emotion

The term Emotion denoted all mental or physical assistance provided to the elderly to secure and maintain maximum independence and dignity. Furthermore, the removal of social barriers to economic and personal independence for older persons was an objective of emotional assistance. Moreover, the emotional assistance was limited to the mental and physical assistance provided for by the staff of the ECC.
Additionally, all six program functions of the ECC Senior Citizens Program were utilized for the purpose of providing mental or physical assistance to the elderly in order to measure program goal achievement.

Escort/Outreach

The term Escort/Outreach denoted one of the program functions of the senior citizens program at the ECC. Furthermore, investigation of program effectiveness centered on the Escort/Outreach Service at the same center.

Moreover, in accordance with contractual agreements with the Council on Aging of Santa Clara County, "Escort" has been defined as: "Taking physically or mentally disabled senior persons to and/or from:

1. Doctor's Appointments
2. Dentist Appointments
3. Hospital
4. Grocery Shopping
5. Drug Store
6. Social Security Office
7. Medi-Care Service
8. Nutrition Site

"Outreach" has been defined as: "Seeking out isolated senior persons who live alone and assisting them in utilizing available services within the community."
In this project, the Escort/Outreach function was inter-related to the other five program functions and was measured for program goal achievement by using Reddin's Technique in the planning sub-system to formulate evaluative objective to determine program effectiveness in meeting performance criteria for the ECC Senior Citizens Program.

Evaluative Objective

The term Evaluative Objective denoted the various steps or actions that make up a total program. While these steps usually comprised a continuous series of events, for evaluation purposes it was essential to subdivide them into some discernible hierarchy of sub-goals, each of which was the result of the successful achievement of the preceding goal and, in turn, a precondition to the next high goal.

This chain of objectives was often trichotomized in the literature as immediate, intermediate, and ultimate goals. Immediate goals refer to the results of the specific such as feeding ninety senior citizens daily; the intermediate goals were means toward the accomplishment of the specific act, e.g., providing an opportunity to eat a well balanced nutritional meal; the ultimate goal then examined the effect of achieving the intermediate goal upon the health status of the senior citizens, e.g., the case of under nourishment.
The evaluative objective was, furthermore, applied to each program function for the purpose of measuring program effectiveness as prescribed by the performance criteria in the planning sub-system to determine program goal achievement for the ECC Senior Citizens Program.

**Information and Referral**

The term *Information and Referral* denoted one of the program functions of the senior citizens program of ECC. Furthermore, the Information and Referral Program was limited to the assistance the community workers of the Eastside Community Center that informed the elderly of the opportunities and services which were available and to assist them to take advantage of those services by helping them identify the types of assistance needed, placing them in contact with appropriate services, and providing follow-up to determine whether services were received and met the needs identified.

Moreover, the Information and Referral function was inter-related to the five other functions comprising the ECC Senior Citizen Program.

In this project the Information and Referral function was measured for program goal achievement by using Reddin's Technique in the planning sub-system to formulate evaluative objectives to determine program effectiveness in meeting performance criteria for the ECC Senior Citizen Program.
The term Nutrition denoted one of the program functions of the senior citizens program at the ECC. The purpose of the Nutrition program is defined in Title VII of the Older Americans Act of 1965:

Title VII of the Older Americans Act of 1965 has demonstrated the effectiveness of, and the need for, permanent nationwide projects to assist in meeting the nutritional and social need of millions of persons aged sixty or older. Many elderly persons do not eat adequately, because: 1) they cannot afford to do so; 2) they lack the skills to select and prepare nourishing and well-balanced meals; 3) they have limited mobility which may impair their capacity to shop and cook for themselves; and 4) they have feelings of rejection and loneliness which obliterate the incentive necessary to prepare and eat a meal alone. These and other physiological, psychological, social, and economic changes that occur with aging result in a pattern of living which causes malnutrition and further physical and mental deterioration. Besides promoting better health among the older segment of our population through improved nutrition, such a program would reduce the isolation of old age, offering older Americans an opportunity to live their remaining years in dignity.

Moreover, the Nutrition function was inter-related to the five other program functions comprising the senior citizens program of the ECC.

In this project, the Nutrition function was measured for program goal achievement by using Reddin's Technique in the planning sub-system to formulate evaluative objectives to determine program effectiveness in meeting performance criteria for the ECC Senior Citizens Program.
Older Americans Act of 1965

The term Older Americans Act of 1965 denoted the public law enacted on July 14, 1965, by the Senate and House of Representatives of the United States of America and its subsequent amendments of 1967, 1969, 1972, 1973 and 1974. Furthermore, the act states, "To provide assistance in the development of new or more improved programs to help older persons through grants to the States for community planning and services and for training, through research, development, or training project grants, and to establish within the Department of Health, Education, and Welfare an operating agency to be designated as the Administration on Aging."

Moreover, the Older Americans Act was utilized in each of the six program functions of the ECC Senior Citizens Program so that guidelines would be followed in the implementation of program functions and its subsequent measurement of program goal achievement using Reddin's Technique in the planning sub-system for the formulation of evaluative objectives. The purpose of the formulation of evaluative objectives was to determine program effectiveness in meeting performance criteria for the ECC Senior Citizens Program.
Performance Criteria

The term Performance Criteria denoted the evaluation criteria by the degree of success of Senior Citizens program at the Eastside Community Center. Furthermore, the criteria measured the results of effort rather than the effort itself relative to formulated evaluative objectives. The criteria required that the evaluative objectives be clear and direct. For example, some questions were:

1. How much is accomplished?
2. Is there change?
3. Was the change intended?

Moreover, the performance criteria was restricted to the performance of ECC personnel in their efforts to implement program functions for the purpose of measuring program effectiveness utilizing Reddin's Technique in the planning sub-system to formulate evaluative objectives in order to determine program goal achievement?

Planning Sub-System

The term Planning Sub-System denoted one of the component parts of Cook's model system for planning and controlling of projects. The planning component provided the data and information base to be used by project management in the development of a control system for project operation.
Moreover, in its operational framework, the planning sub-system consists of the following components or sub-system functions:

1. Project Definition (work breakdown structure)
2. Work Flow
3. Time Estimation
4. Schedule and Resource Allocation
5. Cost and Budget Estimation

In this project, the terms planning sub-system, planning system, and plan were used interchangeably.

Program Effectiveness

The term Program Effectiveness denoted the actual performance of the ECC Senior Citizens Program. In this context, Program Effectiveness is the program's ability to carry out its purpose.

Moreover, in this project the six program functions were combined to determine the overall program effectiveness.

Additionally, the program functions were measured for program goal achievement by using Reddin's Technique to the planning sub-system to formulate evaluative objectives to determine programs ability to carry out its purpose as prescribed by the performance criteria for the ECC Senior Citizens Program.
Program Goal Achievement

The term **Program Goal Achievement** denoted the end result or mission of a process which involved the development of an explicit statement of the program's primary objective and the necessary sub-objectives to reach the major goal of the program. Furthermore, the program definition is a general to specific procedure which ensures that the entire program will be fully and properly related to the total program objective.

Moreover, the Program Goal Achievement will be established in a mission statement which contains the major goal of the program and a recognition of limits and constraints important to the program. For example: "To meet social, recreational, and emotional needs of the Spanish-speaking elderly in the San Jose area."

In this project, the six program functions of the ECC Senior Citizens were combined for the purpose of measuring Program Goal Achievement. Additionally, Reddin's Technique was used in the planning sub-system to formulate evaluative objectives to determine program effectiveness in meeting performance criteria for the ECC Senior Citizens Program.

Recreation Activity

The term **Recreation Activity** denoted one of the program functions of the Senior Citizen Program at the ECC. Furthermore, investigation of the program's effectiveness was limited to the recreation activities provided for by the ECC.
Moreover, the objective of the recreation activities was to foster
the physical, emotional, and social well-being of individuals through
social interaction and the satisfying use of leisure time.

Recreation activities included:

a) Dancing
b) Arts and Crafts
c) Trips and Tours
d) Pool
e) Games
f) Bingo
g) Bowling
h) Parties
i) Cards
j) Singing

Additionally, the recreation function was inter-related to the
other five program functions of the ECC Senior Citizens Program.

In this project, the recreation function was measured for program
goal achievement by using Reddin's Technique in the planning sub-system
to formulate evaluative objectives to determine program effectiveness
in meeting performance criteria for the ECC Senior Citizens Program.
Reddin's Technique

The term Reddin's Technique denoted the managerial techniques utilized by the researcher for the formulation of evaluative objectives for the ECC's Senior Citizens Program. Furthermore, the technique consisted of key elements established to secure the effectiveness standard for each formulated objective. The elements included in the technique were:

1. Measurability - achievement is measured by degree of attainment:
   a. Time = how soon?
   b. Quantity = how many?
   c. Quality = how well?
   d. Cost = how much?

2. Level of Objectives:
   a. Motivation - competence - resources - tied to corporate plan
   b. Experience - training - skill - capability

3. Priority - prioritization by numbers

4. Test of Soundness:
   a. Measurability (quantitative)
   b. Specific
   c. Results - output
   d. Time - bounded

Moreover, Reddin's Technique was employed in the formulation of each evaluative objective for the ECC's Senior Citizens Program functions for the purpose of measuring program goal achievement by determining program effectiveness in meeting performance criteria.
Senior Citizen

The term Senior Citizen denoted those persons who participated in the programs offered at the Eastside Community Center. Furthermore, in order for a participant to qualify for programs he/she must meet the qualifying age of 55 years or older as mandated by the Older Americans Act of 1965. In addition, if the spouse has reached qualifying age, both are deemed qualified. Moreover, in this project, the terms Senior Citizen, the elderly, the aged, and older American were used interchangeably.

In this project, the Senior Citizens program functions were measured to determine program goal achievement by using Reddin's Technique in the planning sub-system of formulating evaluative objectives.

Transportation

The term Transportation denoted one of the program functions available to Senior Citizens at the Eastside Community Center. Furthermore, the transportation program was limited to the transporting of older persons to and from Eastside Community Center for the purpose of applying for and receiving services, reducing isolation or otherwise, promoting independent living.

Moreover, the Transportation function was inter-related to the other five program functions of the ECC Senior Citizens Program.

In this project, the transportation function was measured for program goal achievement by using Reddin's Technique in the planning sub-system to formulate evaluative objectives to determine program effectiveness in meeting performance criteria for the ECC Senior Citizens Program.
ANALYTICAL DEFINITIONS

The following functional propositions were used to symbolize the relationship between functions of evaluative objective formulation.

Analytical Statement

The function of Counseling is related to the function of Evaluative Objective formulation.

1. Translation of analytical statement into symbols:
   a. Counseling Services = C
   b. Function = F
   c. Related = R
   d. Evaluative Objective = EDF Formulation

2. Analytical Formula:
   f(C) R f(EDF)

Analytical Statement

The function of Escort/Outreach is related to the function of Evaluative Objective formulation.

1. Translation of analytical statement into symbols:
   a. Escort/Outreach = EO
   b. Function = F
   c. Related = R
   d. Evaluative Objective = EOF Formulation
2. Analytical formula:
\[ f(EO) \bowtie f(EOF) \]

**Analytical Statement**

The function of Nutrition is related to the function of Evaluative Objective formulation.

1. Translation of analytical statement into symbols:
   a. Nutrition = N
   b. Function = F
   c. Related = R
   d. Evaluative Objective Formulation = EOF

2. Analytical formula:
\[ f(N) \bowtie f(EOF) \]

**Analytical Statement**

The function of Recreation Activities is related to the function of Evaluative Objective formulation.

1. Translation of analytical statement into symbols:
   a. Recreation Activities = RA
   b. Function = F
   c. Related = R
   d. Evaluative Objective Formulation = EOF

2. Analytical formula:
\[ f(RA) \bowtie f(EOF) \]
Analytical Statement

The function of Transportation is related to the function of Evaluative Objective formulation.

1. Translation of analytical statement into symbols:
   a. Transportation = T
   b. Function = F
   c. Related = R
   d. Evaluative Objective Formulation = EOF

2. Analytical formula:
   \( f(T) \) R \( f(EOF) \)
RESEARCH QUESTION

From the aforementioned analytical statements, the following research questions were formulated:

1. What is the functional relationship between the Counseling function and the formulation of evaluative objectives to determine program effectiveness in meeting program performance criteria?

2. What is the functional relationship between the Escort/Outreach function and the formulation of evaluative objectives to determine program effectiveness in meeting program performance criteria?

3. What is the functional relationship between the Information and Referral function and the formulation of evaluative objectives to determine program effectiveness in meeting program performance criteria?

4. What is the functional relationship between the Nutrition function and the formulation of evaluative objectives to determine program effectiveness in meeting program performance criteria?

5. What is the functional relationship between the Recreation Activities and the formulation of evaluative objectives to determine program effectiveness in meeting program performance criteria?

6. What is the functional relationship between the Transportation function and the formulation of evaluative objectives to determine program effectiveness in meeting program performance criteria.
HYPOTHESIS

From the research question, the following qualitative hypotheses were formulated:

1. There is a functional relationship between the Counseling Program and the formulation of evaluative objectives to determine program effectiveness in meeting program performance criteria as revealed by Reddin's Technique for project management.

2. There is a functional relationship between the Escort and Outreach function and the formulation of evaluative objectives to determine program effectiveness in meeting program performance criteria as revealed by Reddin's Technique for project management.

3. There is a functional relationship between the Information and Referral function and the formulation of evaluative objectives to determine program effectiveness in meeting program performance criteria as revealed by Reddin's Technique for project management.

4. There is a functional relationship between the Nutrition function and the formulation of evaluative objectives to determine program effectiveness in meeting program performance criteria as revealed by Reddin's Technique for project management.

5. There is functional relationship between the Recreation Activities functions and the formulation of evaluative objectives to determine program effectiveness in meeting program performance criteria as revealed by Reddin's Technique for project management.
6. There is a functional relationship between the Transportation function and the formulation of evaluative objectives to determine program effectiveness in meeting program performance criteria as revealed by Reddins Technique for project management.
CHAPTER II

REVIEW OF LITERATURE

In researching literature relative to the project plan, the project director found a limited variety of literature directed toward formalizing evaluative objectives and performance criteria for measurement for program functions as those offered by the Eastside Community Center.

The project planner, however, succeeded in encountering literature relative to the primary essential elements within the project.

According to Rossi and Williams (1972, p. 112), in program evaluation, one of the principle tenets is that the first step in the analysis must be to specify the objective of the program.

Mullen and James (1972, p. 40), further added, if the purpose of evaluation is the determination of the accomplishment of program goals, the objectives must be clearly formulated from the beginning or their measurement is impossible.

Reddin (1971, p. 81), defined an objective as a highly specific statement about what is to be accomplished for a particular standard. He further added, an objective is useful only if its attainment is measureable as measurement can determine whether the objective has been achieved.
According to Suchman (1967, p. 51), most programs have multiple objectives. He added, steps or actions that make up a total program usually comprise a continuous series of events, each of which may be the result of the successful achievement of the preceding goal and, in turn, a precondition to the next higher goal.

Smith (1955, p. 389), stated most programs have more than one objective and the first step in conducting an evaluation is to achieve concensus among those responsible for the program as to the order of priority of the multiple objectives.

Suchman (1967, p. 51), labeled, the chain of multiple objectives as the immediate, intermediate, and ultimate goals.

According to Suchman (1967, p. 62), performance criteria measure the result of effort rather than the effort itself. How much is accomplished relative to an immediate goal?

Suchman (1967, p. 62), further stated performance can be measured at several levels.

According to Reddin (1971, p. 99), to increase effectiveness, managers should build situations which have feedback loops. The loops would be a tool for measurement. When the actual events vary from those planned, they provide a means for correcting the deviations.

According to Bernstein and Freeman (1975, p. 19), evaluation is concerned with gauging the extent to which a program effects a change in desired direction.
SUMMARY

In researching the review of literature there was a common opinion on the necessity of specified and measurable objectives for evaluation. According to Rossi and Williams, a principle element in program evaluation is the specifying of the objectives of program goals must be clearly formulated from the beginning or their measurement is impossible. Reddin further added an objective is a highly specific statement about what is to be accomplished. Suchman stated most programs have multiple objectives and he (Suchman) labeled the chain of objectives as the immediate, intermediate and ultimate goals. Smith, likewise, stated most programs have more than one objective and the primary step in the evaluation of any program is to prioritize the multiple objectives. Suchman further added performance measures the result of effort rather than the effort itself and performance can be measured at several levels. Reddin stated managers should build situation loops to be used as a tool for measurement, while Bernstein and Freeman stated evaluation is concerned with the extent of change in the desired direction.
CHAPTER III

PLANNING THE PROJECT

In the preceding chapters the problem was stated, hypothesis were formulated and the literature was reviewed. The succeeding section employed Desmon Cook's project management model to develop a planning sub-system for conducting the research study 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 plan activities.
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 (see Figure 1).
METHOD AND PROCEDURES USED IN SELECTING THE VARIABLES

In this project the attempt was to employ six function variables to determine program effectiveness in meeting program performance criteria. These variables consisted of:

1. Counseling Services
2. Escort/Outreach
3. Information and Referral
4. Nutrition
5. Recreation Activities
6. Transportation

Once these variables were established in the planning sub-system, their performance criteria could be established to test program effectiveness by prior management in a control system.

Furthermore, a criteria was used to select the variables in the project. The selection of the variables was based on Reddin's effectiveness areas and effectiveness standards for a manager's position as they are converted into objectives. Moreover, the objective is a highly specific statement about what is to be accomplished for a particular effectiveness standard (Reddin, page 81).
PROJECT DEFINITION

The function of this sub-system was to establish the boundaries of the project by developing an ordered structure of major and subordinate objectives that reflect the work to be accomplished by the project manager.

Mission Statement

The overall project goal was to develop a managerial plan to formulate evaluative criteria and objectives for the Eastside Community Center's Senior Citizens Program.

Purpose

The major project goal was to design and develop a managerial plan to formulate evaluative criteria and objectives to determine program effectiveness in meeting performance criteria for program goal achievement for the Eastside Community Center's Senior Citizens Program.

Limits and Constraints

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

In this project, the research process consisted of definition of each program function of the senior citizens program at the Eastside Community Center. Secondly, the research process also involved the collection and analysis of documented data and information related to the formulation of objectives as well as the formulation of evaluative objectives for program functions. Furthermore, this research project focused on six program functions which comprised the senior citizens program of the Eastside Community Center. These functions were:

1. Counseling Services
2. Escort/Outreach
3. Information & Referral
4. Nutrition
5. Recreation Activities
6. Transportation
DEFINITION OF SYSTEM CONCEPTS

Work Breakdown Structure

In Cook's project model, Work Breakdown Structure denoted the product of the project definition phase. The work breakdown structure defines the project tasks, or work to be performed, and establishes a relationship between the tasks and the major project objectives. The work breakdown structure also established the framework for the scheduling and control of the project. It functions to establish a framework for summarizing the schedule and cost status of the project at progressively higher levels of management (see Figure 1).

Work Flow

In Cook's project model, Work Flow denoted a work plan portraying in graphical manner, the inter-relationships and inter-dependency of tasks necessary to accomplish the objectives in the proper definition.

Network

In Cook's project model, Network denoted a graphical representation of inter-related tasks or activities that must be accomplished to reach the intermediate and final objectives of the project.
1. Formulation of Evaluative Objectives and Performance Criteria for Measurements

2. Program Functions and Scope of Service Identified

3. Establish Management by Objective Evaluative Criteria

4. Establish Evaluative Objectives

5. Identify Scope of Service Program Function #1

6. Identify Scope of Service Program Function #2

7. Identify Scope of Service Program Function #3

8. Identify Scope of Service Program Function #4

9. Identify Scope of Service Program Function #5

10. Identify Scope of Service Program Function #6

11. Establish Cost Program Function #1

12. Establish Cost Program Function #2

13. Establish Cost Program Function #3

14. Establish Cost Program Function #4

15. Establish Cost Program Function #5

16. Establish Cost Program Function #6

17. Establish Ultimate Evaluative Objective Program Function #1

18. Establish Ultimate Evaluative Objective Program Function #2

19. Establish Ultimate Evaluative Objective Program Function #3

20. Establish Ultimate Evaluative Objective Program Function #4

21. Establish Ultimate Evaluative Objective Program Function #5

22. Establish Ultimate Evaluative Objective Program Function #6

Figure 1
Time Estimation

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

1. **Earliest Event Time**: This term denoted the earliest expected time an event was completed and was further obtained by moving forward while adding activity time estimate was designated by the symbol (TE) (see Figure 2).

2. **Time Optimistic (TO)**: This term denotes the minimal time which an activity of the conceptual project plan would be accomplished based on the assumption that everything will go well (see Figure 2).

3. **Time Pessimistic (TP)**: This term denotes maximum time in which an activity of the conceptual project plan would be accomplished under the most adverse conditions (see Figure 2).

4. **Time Realistic (TR)**: This term denotes the maximum time in which an activity of the conceptual project plan would be accomplished under normal circumstances, and includes some success and failure in carrying out the activity (see Figure 2).
### TABULAR DESCRIPTION FOR TIME ESTIMATION OF ACTIVITIES FOR THE PROJECT PLAN

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**Figure 2**
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KEY:

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

t = time
o = optimistic
r = realistic
p = pessimistic
e = estimated

FORMULA:

\[
\frac{(1)to + 4tr + (1)tp}{6} = te
\]
Scheduling

In Cook's project model, scheduling denoted the translation of the developed plan into a time table, showing the calendar dates for the start and completion of work.

Resource Allocation

In Cook's project model, resource allocation denoted the translation of the accepted work flow into accomplishing the planned activities. Establishing the needed resource requirements for each activity and the total project is a necessary prerequisite for budget preparation. Resource allocation generally refers to personnel needs, (see Figure 7).

Cost Estimation and Budget Preparation

In Cook's project model, cost estimation and budget preparation denoted the management plan for operating and financing the project during a specific time period. It is a pre-determined detailed plan of action developed and distributed as a guide to current operations, and used as a partial standard for evaluating performance. In this sub-system, the most common terms used were:

1. Direct Cost: This term denoted those costs that were directly traced to or associated with a particular activity or task in the project.

2. Work Packages: This term denoted the individual components of the work breakdown structure.
The function of the work flow is to develop a graphical representation (flow graph) of the logical sequence of the activities and events necessary to accomplish the objectives identified in the project definition, (see Figure 3).

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 was done by identifying the 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 is the occurrence of events. Moreover, the identification of events and the order of their occurrence made use of the PERT method, (see Figure 4).

Definition of Symbols and Explanation

\[ \rightarrow \] Activities. Activities are the individual tasks or jobs which must be done to reach an objective. An activity represents both the time and work effort needed to accomplish an objective. Activities may represent a process, a task, a period of waiting, mental or physical work, a constraint, or a combination of these things. The accomplishment of an activity should represent the accomplishment of a task in the total hierarchy of work outlined in the project definition.
Events. Events represent points of accomplishment in the network. Consequently, they do not consume either time or resources. An event usually represents the start or end of an activity. An event either exists or does not exist, since it must represent a clearly definable point of occurrence. Events are labeled with terms such as "start" or "complete", "begin" or "end", or any other set of words that denotes the initiation or completion of work.

Milestone Event. A milestone event is a special event which represents the accomplishment of a major piece of work such as the accomplishment of a work package or a major objective.

Critical Path. The critical path represents the most time consuming pathway in the network.

Activity Time Estimation. Represents the time estimate for each activity.
WORK FLOW PERT CHART

(*Refer to Figure 2)

KEY:

- Critical Path Activities
- Activities
- Events
- Milestone Events

TE = Time Estimate

Figure 3
TIME ESTIMATION

The function of the time estimation is to provide information regarding estimated total project completion time. The development of a time frame for the total project and the individual activities and events within the project.

This was done by providing information regarding the estimated individual activity time, total project completion time, the earliest and latest completion time.

Pre-Planning Rules and Procedures

One of the principal rules in the starting point for time estimation involved the accessibility of work packages and the 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 came later in the project because of estimates made for tasks that come earlier."

Moreover, since this project was of long duration, the rule was not to provide details in the network to secure time estimates. Cook, for example, recommended that a project work unit could move through each succeeding work phase and provide additional details in the network as the work progressed.
Earliest Event Time

The calculation of the earliest expected event time for the project, which was designated by the symbol $TE$ to distinguish it from the activity time estimate ($te$), was obtained by moving from left to right in the network, adding the activity time estimates along the various pathways.

The project network showing calculations of earliest event time can be illustrated as follows:

![Project Network Diagram](image)

**KEY:**
- **Critical Path Activities**
- **Activities**
- **Events**
- **Milestone Events**
- $te$ = time estimate

**Figure 4**
SCHEDULING AND RESOURCE ALLOCATION

Given the condition of a set starting date, the function of this section is to establish a schedule for the project by translating the planned schedule derived from the time estimation into specific calendar dates for the initiation and completion of work compatible with resource availability and other known or stated constraints.

The planned schedule, which is generated as an output of the scheduling process, enables the program director to judge event progress and forecast a date of completion.

Additionally, the concept of resource allocation is closely associated with the concept of scheduling. Once the work flow or plan is accepted, it is translated into a schedule by the assignment of resources (personnel) which will accomplish the planned activities.
HISTOGRAM MANPOWER LEVEL CONCEPT

ACTIVITIES - TIME

KEY:

------ = Staff Load Capacity Criterion

Figure 5
HISTOGRAM MANPOWER LEVEL CONCEPT

KEY:

----- = Staff Load Capacity Criterion
HISTOGRAM MANPOWER LEVEL CONCEPT

ACTIVITIES - TIME

KEY:

------ = Staff Load Capacity Criterion
SCHEDULE DEVELOPMENT CHART

KEY: 1-7 = Schedule Operating Hours
1-2-3 = Schedule Operating Days
■ = Critical Path
□ = Non-Critical Path

PROJECT COMPLETE

Figure 6
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KEY:

1 Staff = Project Director  
Yearly Salary = $16,800.00  
Hour Rate = $8.08

6 Staff = Program Developers  
Yearly Salary = $10,800 x 6 = $64,800.00

* Refer to the following page for key categories.
RENT AND UTILITIES

KEY: $10,800.00 rent and utilities per year
1,542.86 rent and utilities per staff per year
.74 rent and utilities cost per hour per person

SUPPLIES

KEY: $2,500.00 supplies per year
357.14 supplies cost per staff per year
.17 supplies cost per hour per person

COMMUNICATIONS

KEY: $3,000.00 communication cost per year
428.57 communication cost per staff per year
.21 communication cost per hour per person

TRAVEL - LOCAL

KEY: $7,200.00 travel - local cost per year
1,028.57 travel - local cost per staff per year
.49 travel - local cost per hour per person

PUBLICITY AND PRINTING

KEY: $3,500.00 publicity and printing cost per year
500.00 publicity and printing cost per person per year
.24 publicity and printing cost per hour per person
1. Project Title: Eastside Community Center
2. Funding Agency: Catholic Social Services of Santa Clara County
3. Total Time: 158.88 Hours

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COST ESTIMATION/BUDGET PREPARATION

The function of the cost estimation/budget preparation is to generate cost estimates and a budget or future expenditure plan which provides for the necessary funds needed to accomplish the program as outlined and established, and to provide a basis for future decisions as well as control of current expenditures.

An Administrative Approach to Budgeting

With the development of project management systems for the planning and controlling of time in research and development projects, attempts to integrate both time and cost were begun. The integration of cost resulted in a new method of budgeting. The essential feature of the new budgeting procedure is the shift in emphasis from inputs to outputs. The relation of cost to work to be accomplished is now heavily emphasized.

The basic vehicle in the planning and controlling of costs becomes the project definition or work breakdown structure. The work breakdown structure identifies several major components of work leading to the accomplishment of the final objective. Each of these major components is further divided into components called work packages. Direct cost are charged only to work packages. This procedure is related to direct cost, and there remains the question of indirect costs. Several methods can be used to handle indirect costs. The method used in this project was that of determining the direct cost figure and then adding a fixed
percentage for indirect cost. Although, the work package is the basic costing unit, the indirect cost may be totally attributed to the entire project. A more detailed budget is further prepared by identifying the work package and indicating the type of personnel required for the work, using a rate figure for their services and the amount of time they are needed. These two items are multiplied to secure a total cost figure.

A major advantage of the work package and activity costing method lies in its development of an enumerative cost model, various costs are directly related to specific activities and periods of time. This permits the integration of time-cost-relationships in control reports, and gives the project manager a clearer picture of the project's status. The work package costing method also breaks a complex project into units which are easier to visualize.

The estimates of hours and wages required to accomplish the work packages are based on the author's own judgments as developed from his own observations and experience and are not a result of any scientific study or data analysis, but rather are very subjective estimates. For actual application, the author recommends that expert or specialized consultation be sought in determining verifiable and proven estimates of time and cost needed to carry out the work packages.
SUMMERIZATION OF WORK PACKAGE COST ESTIMATES
FOR TOTAL PROJECT COST

$1,468.86

$160.26

$830.76

$477.84


138.46 138.46 138.46 138.46 138.46 138.46

79.64 79.64 79.64 79.64 79.64 79.64

(See Figure 1 for Work Package Identification)

Figure 8
IMPLEMENTATION OF ACTION

The function of this sub-system is to provide a means of implementing administrative decisions, revising plans, and developing modified data/information base.

Once the administrator has decided upon a course of action, it must be communicated to the staff and other members involved in the project. Necessary adjustments should be made in the project definition, work flow, schedule and resource allocation as well as budget.

Finally, management should institute follow-up procedures to ensure that the decision has been incorporated and the necessary adjustments have been made.
CHAPTER IV

SUMMARY AND CONCLUSIONS

This summary reviews the principle points in the preceding chapters and also presents the project planner's 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 formulating evaluative objectives and performance criteria for measurement for six (6) program functions at the Eastside Community Center.

The major steps employed were Cook's Project management model to develop a planning sub-system composed of:

1. Project Definition
2. Work Flow
3. Project Time Estimate
4. Schedule and Resource Allocation Plan
5. Project Cost Estimate
These components served a function in the planning sub-system as follows:

1. The project definition developed an order structure of major subordinate objectives which provided the work to be accomplished by the project administrator.

2. The work flow developed a graphical representation of the sequence of activities and events necessary to accomplish the objectives established in the project definition.

3. The time estimation sub-system provided a time frame for the individual activities and events in the project. In this project the planning calendar showed total project completion time to six (6) days.

4. The scheduling and resource allocation plan served to establish the project schedule which was transformed into specific calendar dates. Furthermore, an estimate of resource availability was made as well as the resource time required to complete each activity of the project.

5. The specific total cost estimate for each work package as well as the total cost estimate for the total project.
PERT Procedures were employed to plan major activities and events in the project plan.

In conclusion, the planning system described in the project plan served as the date and information base for operations in the control sub-system.
RECOMMENDATIONS

The implementation of the project plan will serve to provide an ongoing evaluation of program functions by means of measurement of performance criteria.

The project administrator must monitor the completion of each objective as established in the planning component to measure the effectiveness of each program function. This monitoring of the project plan would identify any deviation from the plan, thus enabling the project administrator to take corrective actions.
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