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ABSTRACT

The first of two related pamphlets, this guide provides information on how to conduct cost-outcome analyses, with an emphasis on measuring costs. After an introduction that delineates the purpose of the two-part series, the pamphlet is divided into six major sections. The first section, "definitions and rationale," introduces cost-outcome analysis and describes the differences between four primary types of cost-outcome analyses. The second section, "assessing political and pragmatic readiness," is designed to help determine the readiness of organizations for a cost-outcome analysis. The third section, "measuring program costs," explains how to collect resource data and how to figure costs, while the fourth section discusses assessment of the reliability and validity of the cost data. The fifth section highlights possible uses of the data in terms of cost feasibility analysis. Two appendixes are included: an example of listing of resources, and a sample cost distribution chart. (TE)

EVALUATION GUIDES

Guide Number 2

COST-OUTCOME ANALYSIS: MEASURING COSTS

Jana K. Smith

Major topics discussed include:

- Purpose of this Cost-Outcome Guide Series
- Definitions and Rationale
- Assessing Political and Pragmatic Readiness
- Measuring Program Costs
- How Costs Are Figured
- Evaluating the Reliability and Validity of the Cost Data
- Using the Cost Data: Cost Feasibility Analysis

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In this world three things are certain: Death, taxes, and program budgets considered too small by those conducting the program.

Poor Halcolm's Almanac (Patton, Practical Evaluation, p. 99.)

PURPOSE OF THIS COST-OUTCOME GUIDE SERIES

This guide series was developed in response to evaluators' reported need for information on how to conduct cost-outcome analyses. A recent study on the use of cost-outcome analyses by state education agency (SEA) evaluators (Smith, N. L. & Smith, J. K., 1984) and local education agency (LEA) evaluators (Smith, J. K. 1984) showed

1. in the next five years, 60 percent of all SEAs expect to be asked to conduct cost-outcome analyses,

2. 71 percent of metropolitan LEAs expect to be asked to conduct cost-outcome analyses, and

3. one of the primary impediments to the conduct of cost-outcome analyses is the absence of useful guides and resources.

To assist these and other evaluators in conducting cost-outcome analyses, two "how-to" guides were developed. Although several texts currently exist on cost-outcome anaysis, they tend to be written in technical language or do not give sufficient attention to collection of outcomes as well as costs. This guide series supplements the existing texts by providing concise, readable explanations on how to conceptualize and conduct cost-outcome studies for program evaluation.

This first guide introduces four types of cost-outcome analysis, directs the collection of cost data, and explains how to select the most appropriate cost-outcome anlysis to answer an evaluation question. The second guide describes how to design an outcome study and outlines procedures for collecting outcome data.

When Should This Cost-Outcome Guide Series Be Used?

Cost-outcome analyses can be applied in a variety of contexts to answer many different evaluation questions. The procedures are appropriate for evaluating mental health, health, and education programs located in community mental health centers, hospitals, schools, businesses, or any type of service program.

Because of the wide range of possible applications, it was necessary to focus these guides on certain applications. This guide was written specifically for those evaluation studies that

- are conducted at the local or state level,
- use experimental or quasi-experimental methods,
- are conducted to compare two or more programs,
- measure program outcomes.

The guides are intended to assist the state or local level evaluator conduct a cost-outcome analysis for the purpose of programmatic improvement. For example, those interested in conducting a large-scale national study should consult the reference list of this guide for more technical information (see Levin, 1983; Sugden & Williams, 1978; Thompson, 1980).

Introduction to This Guide

This guide is organized into six major sections. The section entitled "Definitions and Rationale" introduces cost-outcome analysis and describes the differences between four primary types of cost-outcome analyses. The second section, "Assessing Political and Pragmatic Readiness," is designed to help determine the political and practical readiness of organizations for a cost-outcome analysis. The third section, "Measuring Program Costs," explains how to collect resource data and how to figure costs, while the fourth section discusses the assessment of the reliability and validity of the cost data. The fifth section highlights possible uses of the data in terms of cost feasibility analysis.

DEFINITIONS AND RATIONALE

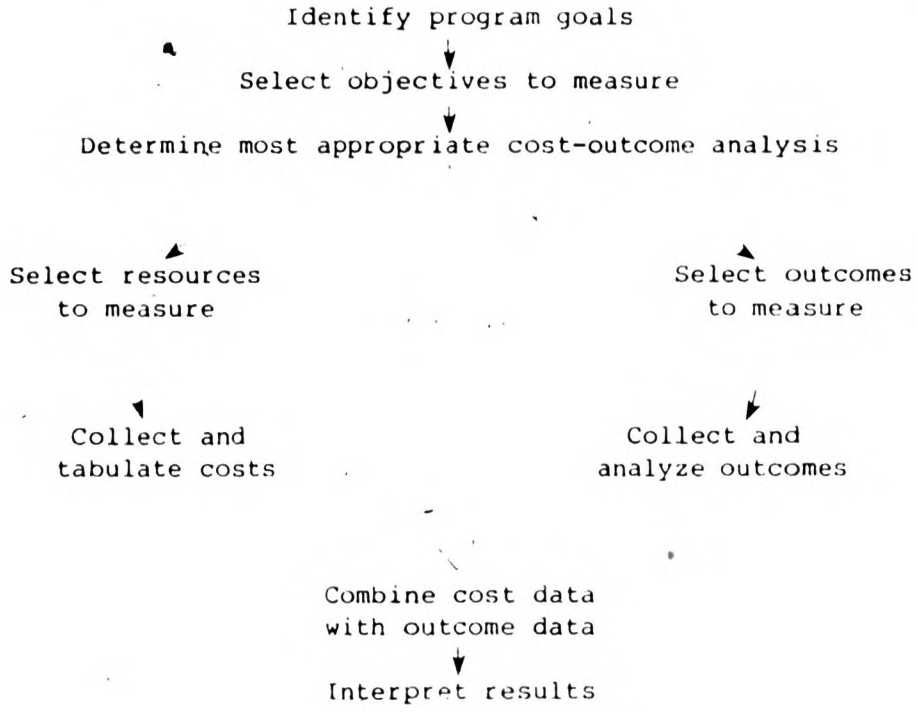
The discussions throughout this guide are organized under a series of questions. These are the questions most frequently asked by participants in cost-outcome analysis workshops, or by evaluators seeking consultation on cost-outcome analysis.

What Is a Cost-Outcome Analysis?

Cost-outcome analysis systematically combines program outcome data with program cost data in such a way as to allow meaningful comparisons between two or more programs. Indeed, a cost-outcome analysis is simply an evaluation study which collects both program cost and outcome data using methods which are very familiar to evaluators.

The programs being evaluated are rank-ordered according to their cost-outcome ratios. This rank ordering, along with other relevant information, can be used to facilitate decision making about programs. A schematic of procedures involved in a cost-outcome study is shown in Figure 1.

Figure 1
Steps in Conducting a Cost-Outcome Analysis



How is Cost-Outcome Analysis Different From Cost-Effectiveness or Cost-Benefit Analysis?

The term--cost-outcome analysis--describes a group of four different analyses which differ only with respect to the type of outcome measure collected. One method, cost-feasibility analysis, does not collect outcome data. This method is included in the guide because our research has shown it to be the most widely applied cost-analysis method. Further, each cost-outcome analysis includes a cost-feasibility assessment, since cost-feasibility merely refers to the collection of cost data for comparison to budgetary constraints. The other three analyses

build upon the cost-feasibility analysis by adding outcome measures. The three other cost-outcome analyses are as follows:

- Cost-utility analysis compares the cost of the program with
  - the outcomes of programs which are estimated rather than directly measured.
- Cost-effectiveness analysis compares the cost of the programs with
  - the outcomes of programs as measured in standard effectiveness units, such as test scores or satisfaction indices.
- Cost-benefit analysis compares the cost of the program with
  - the outcomes of programs as measured monetary units, such as increase in income.

Figure 2 displays the major differences among the four methods in terms of the outcome measures they use and the comparisons they facilitate.

Figure 2
Differences Among Outcome Measures Used in Cost-Outcome Analyses

Analysis	Unit of Outcome Measure	Typical Outcome Measures	Enables Comparisons Of
Feasibility	- - - - -	- - - - -	all types of programs
Utility	estimates	experts' ratings of effectiveness; effectiveness of similar program;	programs with different goals (e.g., reading vs. math)
Benefit	monetary values	increases in income; value of life saved;	programs with different goals (e.g., reading vs. math)
Effectiveness	effectiveness measures	test scores; behavioral ratings; satisfaction indices;	programs with same or similar goals (e.g., CAI reading vs. peer tutor reading)

Our research has revealed many articles claiming the conduct of cost-effectiveness and cost-benefit analyses, when actually some other type of cost-outcome study, such as cost-feasibility, was conducted. In order to minimize confusion about the differences between the four types of cost-outcome analyses, we will refer to the general class of procedures as cost-outcome, and to the specific methods by their appropriate names.

What Kinds of Evaluation Questions Can Cost-Outcome Analysis Answer?

Cost outcome analysis can provide answers to many evaluation questions posed by the sponsors of an evaluation (e.g., administrators, coordinators, participants, community, legislature). Listed below are just a few examples of the many types of questions cost analysis can provide answers to.

> How much does it cost to produce a unit of outcome in Program A versus Program B?
>
> Which program gives the most outcome for the least money?
>
> Will Program A cost more to run in 3 years than would Program B in the same time?

How Difficult Is It to Conduct a Cost-Outcome Study?

In applied evaluation, it is always a challenge to conduct an evaluation that is both valid and reliable. Fortunately, measuring cost in addition to outcome data does not necessarily complicate that process. Cost information can be readily available in some cases, and all that is required is to complete a table that identifies program resources, and then to figure the cost of the relevant resources. All of the calculations described in this guide can be easily done with a pencil and paper. In most cases, it is far more difficult to obtain reliable and valid outcome data than it is to obtain reliable and valid cost data.

How Long Does It Take to Conduct a Cost-Outcome Study?

This question might be better worded as "How much longer does it take to conduct a cost-outcome study than just an outcome study?" The answer to this question depends upon many variables, including the size of the program, the support of the staff, the state of the financial records, and the time span within which the costs will be figured. Given these variables, Levin (1983) suggests that even the simplest cost-effectiveness or cost-benefit study may take six months to conduct.

How Can You Place Monetary Values on the Types of Outcomes Usually Produced by Social Service Programs?

This is a concern often voiced by people who do not understand the variety of cost-outcome methods available to the evaluator. Only one method--cost-benefit analysis--attempts to place a monetary value on program outcomes. In cost-effectiveness and cost-utility analyses, outcomes are measured or estimated in standard units of effectiveness, such as test scores or behavioral measures. These effectiveness measures are then compared to the cost of the programs. With cost-effectiveness and cost-utility analyses, social service outcomes are not translated into monetary terms.

This section has introduced the types of cost-outcome analysis most frequently used by evaluators. In addition, answers have been provided to questions that evaluators commonly ask about cost-outcome analysis. The next section talks about political and pragmatic issues that affect the conduct of a cost analysis.

ASSESSING POLITICAL AND PRAGMATIC READINESS

There are two categories of factors which should be considered prior to conducting a cost-outcome analysis. The first category is political readiness and the second is pragmatic readiness. The following two questions address these issues.

What Political Factors Should I Consider Prior to Conducting a Cost-Outcome Study?

Is your program or organization ready to support a cost-outcome study, and then to consider the data when making decisions? There are two specific political factors to consider in answering this question: (1) the attitudes of the staff toward the conduct of the study, and (2) the potential utilization of the study results.

With respect to the first factor, you will need access to both the cost and outcome data. In some cases, this will require the assistance of other staff for direction and interpretation. Consider the support of the

- program staff,
- financial or accounting staff,
- administrative staff.

You also need to think about elements affecting the potential utility of the study results. These may be overriding conditions which severely limit the use of the cost-outcome data for decision making. If these conditions are present, then it may not be worth the effort to conduct the study. Some of these conditions are:

- negative attitudes of decision makers toward use of quantitative cost and outcome data,
- legislative or mandated regulations requiring program continuation,
- ethical constraints or community reaction impeding program chance.

What Pragmatic Factors Should I Consider Prior to Undertaking a Cost-Outcome Analysis?

Even in model programs, the collection of any type of data can be difficult, since data collection efforts may be impeded by time constraints, financial ceilings, ethical considerations, and methodological requirements. Therefore, before proceeding with a cost study, consider carefully the availability of the following:

- cost data,
- outcome data,
- staff to conduct the study,
- administrative support in terms of resources,
- experts for consultation or advice.

If the above factors and conditions are favorable, then collection of cost data can begin. The next section explains how to collect cost data.

MEASURING PROGRAM COSTS

What are the Preliminary Steps in Measuring Program Costs?

The two steps to be taken before collecting cost data are as follows:

1. Select a time frame for the study.
2. Establish whether resources reflect start up or operation costs.

The first step in measuring program costs is to select a time frame for the study. In most cases, the amount of time for the study will define itself naturally, based on the duration of the programs, and will not exceed a year. If, however, the study exceeds one year, then special adjustments must be made to the cost estimates. These adjustments are described in detail in this section. The special cases where the time span of the study may exceed one year include those times when

- a decision is to be made about two or more programs with payment schedules which differ over the course of time,
- the costs are calculated over the multi-year lifespan of the program.

It is important to specify a time span for the study prior to collection of any data, since special adjustments on cost figures are necessary for studies with time spans that exceed a year. These adjustments are described later in this section.

A second step in measuring program costs is to identify whether the cost will be assessed for programs being considered for implementation, or for programs already in existence. The difference between these two situations will cause large differences in the meaning of the cost figures, since the cost of starting up a program is much higher than that of regular operation of a program due to large expenditures at the onset. Although it would not be accurate to compare the cost of a proposed program along with its high start-up expenditures to that of a program currently running, an estimate of the cost of running the proposed program could be compared to the costs of a program currently running.

Can You Use the Budget to Figure Program Costs?

The purpose of gathering cost data in a cost-outcome analysis is to

1. provide a picture of what resources are required to run a program, and
2. calculate the cost of those resources.

Although it would be convenient to use the budget, unfortunately, budgets can be misleading indicators of program resources and their associated costs and are therefore not recommended for use in determining program costs (Levin, 1983). First, budgets may not list all program resources; second, the cost of the listed resources may not be accurate; and third, the budget may not accurately reflect the typical cost of the program.

With respect to providing a total listing of program resources, budgets typically do not include entries for resources such as:

- volunteer services,
- borrowed equipment or materials,
- materials, equipment, or facilities purchased in an earlier fiscal year.

In addition, the costs tabulated in budgets are usually based on planned expenditures rather than on actual expenditures, and therefore may be inaccurate. Finally, since budgets are figured on a yearly basis, they may be inflated spuriously by the purchase of equipment such as computers on a year-to-year basis. That is, one year the budget may be inflated by a purchase, while the next year it underestimates program cost, since no purchases were made.

Why Worry About Resources That Are Not Included in the Budget Since They Obviously Do Not Add to Our Program Costs?

It is important to generate a complete listing of resources, even though they do not represent direct costs for the program. One reason is that decision makers and evaluators alike need access to a total picture of the program resource requirements. For example, an examination of the resource list may point to the need for additional program equipment. It may bring up questions about the continuity of resources currently offered at no charge (e.g., volunteer services). In addition, if program outcomes are vastly different when compared, it may be useful to go back and examine all program resources that contributed to the production of the outcome.

What Are Opportunity Costs?

An opportunity cost is simply an alternative interpretation (not calculation) of program costs. The concept stems from the notion that societal support of a program represents sacrifice of resources that could theoretically be used elsewhere. In order to reflect the opportunity costs to society for supporting a program, all resources, including volunteers', students', and parents' time, should be valued monetarily and included in the total program cost estimate. All costs are opportunity costs, since theroetically the money could be used in an alternative manner.

HOW COSTS ARE FIGURED

Tabulation of costs is carried out in a two-step process. These steps are:

1. listing all the resources involved in running the program, and

2. calculating the costs of the appropriate resources.

Step 1: Listing the Resources

Appendix A contains an example of a list of program resources that may be used in a typical social service program. You will notice that the order of the list is from most significant (personnel) to least significant (supplies) resource categories. The significance of a resource category is based upon the amount of money allocated to that category. For example, personnel costs usually represent 65 percent to 85 percent program costs, and so are very significant. In contrast, supplies usually represent only about 5 percent of costs and therefore are not significant. Although this example does not fully describe each resource, there should be enough detail about each listing to provide an accurate picture of the program resource requirements. You will notice that the list includes non-monetary as well as monetary costs. For example, volunteer time for student emotional reactions might be included. For an excellent discussion of non-monetary costs associated with testing programs, see Catterall (1982).

This list can be generated through (1) interviews with program staff and administrators, (2) observations, and (3) reviews of records and files. Further, once the list is generated, it should be cross-referenced with the budget to insure that no resources have been omitted; and it should be reviewed by all relevant staff (e.g., program, financial, and administrators) for thoroughness. These checks help insure that the list provides a valid picture of program resources, an issue discussed more fully later in this guide.

Step 2: Determining the Costs of the Relevent Resources

Determination of the cost of resources is dependent on the anticipated use of the cost data. If the study results will be used within a particular district, then actual expenditures can be used as cost estimates. Haggart (1978) calls this "district-specific" costs. This guide assumes that the results of the analysis will not be disseminated outside the district.

For information on how to calculate costs that can be generalized to other programs, see Haggart (1978) for a description of "program-comparable" costs.

Each resource must be assigned a cost figure. Two recommended methods for calculating the cost of a resource are:

- market pricing--using the current market value of resource,
- shadow pricing--using the current market value of a similar resource.

Levin (1983) suggests using these methods for valuing such categories of resources as the following.

Personnel: If the current personnel are to be retained, then budget figures (which include fringe benefits) may be the best estimate. If new personnel need to be hired, then shadow pricing based on the going rate for staff with similar qualifications is appropriate.

Facilities and equipment: Incorrect assessment of facilities and equipment can either overestimate or underestimate program costs. Any equipment or facilities costs which were paid in previous years may not show up on the budget, but should be included in the cost of running the program, or the estimate will be too low. Similarly, the purchase of equipment or facilities in a given year that is not typical will unfairly elevate the budget for that given year. To estimate the value of equipment or facilities on an annual basis, the recommended procedure is to:

- obtain rental or lease value from market sources (e.g., computer shop or real estate agent) or, if this information is not available,
- calculate annual value by taking account of depreciation and interest on the undepreciated value (see Levin, 1983, p. 67).

Supplies: Supplies represent less than five percent of any typical budget, and so do not affect cost estimates significantly. Therefore, for most analyses, it is sufficient to use budget values or even to omit supplies from the cost estimates, unless for some reason they represent a substantial cost.

Client costs: Client costs are those incurred by program participants. Such costs can include lab fees, transportation charges, equipment costs. Use market value of cost of transportation, equipment, books, or other items participants must purchase.

Appendix B provides an example of a tabulation of the costs for a computer-assisted instruction program and shows how the costs are distributed across several agencies. Assessing the distribution of costs across agencies is discussed in an upcoming question. The cost-per-student can be obtained by dividing the total cost by the number of program participants.

What About the Difference between the Costs of First Implementing Versus Actually Operating A Program?

If you are projecting the costs of a program not yet inplemented or calculating the costs of a first-year program, you should consider the difference between "start-up" costs and operation costs. When the program is being first implemented, its costs will be high due to the initial purchase of equipment and supplies. You can imagine that the purchase of one $20,000-bus would significantly elevate the program costs for a given year. In a situation like this, the annualized value of the bus should be calculated. Levin (1983) provides a table which simplifies the calculation of annualized value (see page 70).

What Adjustments Need to Be Made If The Time Span Exceeds a Year?

Three predominant reasons to consider the cost of a program over a period of several years are that one must

1. take into account the effects of inflation over several years,
2. calculate total costs for running a program over its life span, and
3. figure alternative program costs when payment schedules differ significantly.

First, decision makers may be interested in determining whether they can afford to run the programs in five years. Generally, this question is asked with respect to inflation increases. In cost-outcome analysis, however, results are intended to point to differences in ratio rankings between programs. Therefore, since inflation will presumably affect all costs equally, it should not change the ranking of the programs.

Second, if a program were designed to run for three years, decisions makers may wish to know the total costs for all three years. This analysis may need to figure start-up costs, regular operation costs, and the present value of resources which will not be paid for until later years. This concept of present value is described below.

Third, another reason to consider costs over several years would be to measure the differences between programs where each one has its own payment schedule. For example, one program may require payment for equipment in the first year, while another may not require any payment for three years. The money invested for three years prior to expenditure will be earning interest and therefore growing. Economists talk about the "present" value of money which will be spent in the future. The present value is calculated by subtracting the interest earned on the invested money from the total expenditure. For example, suppose Program A had to invest $1,000 today and Program B could defer that same expense for one year and earn 10 percent interest. Program A's actual cost is $1,000, while Program B's is only $900 ($1,000-$100) due to interest earnings. Levin (1983, pp. 96-98) describes how to calculate the present value of future expenditures.

What If Staff, Equipment or Facilities Are Shared Across Several Programs?

Obviously, it would be misleading to include the total cost for building rental on a program cost estimate if the program shares the building with three other programs. In cases like this, the joint cost is easily figured by computing a percentage of building rental based on the use by the program. Using a percentage is appropriate for figuring any cost that is shared or distributed across more than one program.

Can You Determine the Stability of Funding Using Cost-Outcome Analysis?

The stability of funding levels is a function of the funding sources. Basically, this refers to whether funding will be continued from all sources at the same or similar levels over the next few years. Levin (1983) suggests an analysis of the distribution of funding sources as a means of assessing expected continuity of funding. This step breaks down costs according to support provided by the sponsoring agency, other government agencies, volunteers, and clients. This analysis is useful for a complete picture of program costs. An example is located in Appendix B.

Once the cost data is collected, it is important to evaluate the quality of that data prior to combining it with outcome measures. If the cost data misrepresents the true costs of the program, then the cost-outcome ratios would be meaningless. The following section suggests that the cost data be examined for reliability and validity.

ASSESSING RELIABILITY AND VALIDITY OF THE COST DATA

Reliability and validity of data are familiar concepts to evaluators, who routinely consider the accuracy and meaningfulness of data when designing analyses and interpreting results. Resources and cost data should be scrutinized in the same manner. In particular, the validity of the resource listing should be assessed, and the reliability of the cost estimates examined.

How Should You Determine the Validity of The Resource List?

External validity refers to the generalizability of data beyond the present study. The study results may be generalizable to other programs for implementation or planning purposes. Ongoing programs, however, are usually unique and so a resource list should not be assumed accurate for another ongoing program.

Internal validity is important, since it refers to the degree to which the resource listing accurately describes the actual program. This is most relevant to meaningful internal decision making. To assess internal validity, the list of resources should be shared with program staff and administrators to insure that the listing accurately portrays the program resource requirements. Once it has been ascertained that the list is a valid reflection of the program, the reliability of the cost estimates should be considered.

How Can You Tell If a Cost Estimate Is Reliable?

Reliability refers to the stability of the cost figures, given the possibility of error in estimating the costs or changes in actual costs of the resources. The cost estimate for each resource should be examined because several small (or systematic) errors, when combined, can result in a total cost figure that is quite misleading. If these errors in measurement occur for resources representing a large percentage of the total cost,

their effects can be profound. For example, a 5 percent error on the estimate of $500 for supplies would change the total cost by only + - $25. A 5 percent error on the estimate of $60,000 for personnel would change the total cost of + - $15,000.

The reliability of cost estimates can be obtained by

- having program staff evaluate the estimates,
- comparing specific resource costs with their budget figures,
- comparing estimates with those derived in another manner (e.g., comparing lease values with annual values for facilities).

What If The Cost Estimate Is Not Reliable?

If there is any reason to suspect the accuracy of a cost estimate, a sensitivity analysis should be conducted. A sensitivity analysis is simply a way of constructing confidence intervals around a cost estimate. Given the range of possible costs for a resource, a low, medium, and high cost estimate can be derived. This procedure should be calculated for all resource estimates with questionable values. The three cost totals can be combined with outcome data. If, when two programs are compared, one program is more cost effective at the low, medium, and high levels than is the alternative program, you can be confident that it is a reliable analysis. Levin (1983) suggests that a sensitivity analyses should be conducted if

- new personnel will be hired at unset salaries,
- a new facility is being constructed,
- the level of interest rate is questionable when calculating present values.

Sensitivity analyses provide a means of dealing with uncertainty in cost estimates so that confidence in the cost aspect of the analysis can be achieved.

After assessing the validity and reliability of the cost estimates, the information can be used to answer questions about program resource requirements. Most often the total cost figures can be used to measure cost feasibility--whether the program or programs are affordable. However, information derived from all steps of the cost analysis can be useful, as shown in the next section.

DETERMINING COST FEASIBILITY

Cost feasibility is the type of cost analysis most frequently conducted in evaluation today. The purpose of conducting a cost-feasibility study is to determine whether it is feasible to either start up or maintain a program given financial constraints. The questions listed below demonstrate how the process of determining costs, as well as figuring the total program cost, can provide important information. For example, from listing resources you can answer these questions:

Which resources are needed to start up a program?
Which resources are needed to run a program?
Which resources might need to be replaced in the near future?
Which resources are least essential to the program?

From figuring the cost of each resource, you can answer these questions:

What makes the program so expensive?
What is the distribution of costs among resource categories?
Where are we spending the most money?
Where could costs be minimized?

From figuring the total program costs, you can answer these questions:

What are the per-student costs?
Which program can we afford?

What Is the Next Step?

Cost feasibility also forms the basis for other cost-outcome analyses, since these other analyses compare various types of outcome data with the cost data just described to form cost-outcome ratios.

The next guide addresses the issues of selecting and measuring an outcome measure (e.g., utility, benefit, or effectiveness) to combine with the cost data in order to form a cost-outcome analysis.

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APPENDIX A

Example of Listing of Resources

(1) Personnel

coordinator (full-time)
teacher aide (full-time)
parent volunteer (half-time)

(2) Facilities

classroom--30 feet by 45 feet
classroom furniture--20 desks and chairs

(3) Equipment

computers--10 Apple IIe total systems (includes printers)
provisions for maintenance of equipment

(4) Materials and Supplies

curricula--software for mathematics and reading for grade 4
supplies

(5) Miscellaneous

energy (heating, lighting, and power)
routine maintenance of classroom
administrative overhead
insurance
inservice training
evaluation services

(6) Client costs

transportation
disks
two hours of parent time weekly
six hours of student time weekly

APPENDIX B

Distributing Costs (Levin, 1984)

Ingredients	Total Cost	Cost to Sponsor	Cost to Other Government Agencies	Contributed Private Inputs	Imposed Student and Family Costs
Personnel					
Coordinator	$31,000	$31,000			
Aide	12,400	6,200		$ 6,200*	
Facilities					
Classroom	6,612	6,612			
Renovations	3,254	3,254			
Materials and Equipment					
Computer	17,250			17,250**	
Printer	528	528			
Terminals	8,732	8,732			
Equipment					
Maintenance	1,852	1,852			
Curriculum	6,528	6,528			
Supplies	1,000	1,000			
Other					
Energy	1,500	1,500			
Routine Maintenance	500	500			
Overhead	1,500	1,500			
Insurance	2,000	2,000			
Training	383	383			
Value of Client Time and Other Client Inputs					
Total Ingredients Cost	$95,039	$72,589		$23,450	
User Fees					
Other Cash Subsidies		-20,000***	+21,000	+ 1,000	
Net Costs	$95,039	$50,589	$20,000	$24,450	

*Volunteer.
**Donated.
***Subtraction based on other subsidies of $20,000 and $1,000.

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9	Microcomputers: Spreadsheet Software
10	Methods of Product Evaluation

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