## Cost-Benefit/Effectiveness Analysis for Continuing Education

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The Journal of Continuing Education in Nursing; Jul/Aug 1981; 12, 4; ProQuest

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by Travis Shipp

The need for some systematic method of assessing the worth or impact of an educational program has led to the development of a Cost Benefit/Effectiveness model for continuing education. The model classifies costs and results as: monetarily quantifiable, nonmonetarily quantifiable, and nonquantifiable. By arranging the costs and results systematically and by making the appropriate comparisons, it is possible to determine the relationship between costs of C/E and monetary payoffs and between participation in C/E and changes in job performance as well as the intangible but socially desirable outcomes of a C/E course or offering. The value of this type of evaluation is apparent to the nurse continuing educator who must be prepared to choose among several alternatives and defend those choices.

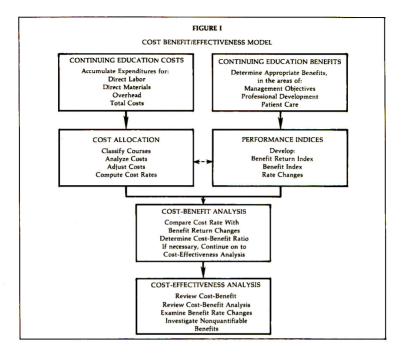
uring the past decade, continuing professional education has become more complex as new techniques and requirements have evolved. Continuing education, as an interdisciplinary field, has both benefited and suffered as the various contributing disciplines have progressed. One of the latest developments in continuing education is the use of accounting methods drawn from the world of business. Managers in business have contributed cost-benefit and cost-effectiveness analysis. These techniques recently have been the subject of much discussion and trepidation among those involved in continuing education for nurses.

The agitation created by the requirement to show a return on investment is not caused by a fear that continuing education does not pay off in measureable terms, but rather stems from a lack of formal training in cost accounting techniques and a normal hesitation to plunge into the unknown. Anyone who has survived the complexities of nursing school or other college curricula will have little to fear from the relatively simple concepts in cost-benefit effectiveness analysis. Indeed, the continuing educator who becomes familiar with the techniques will find that they are valuable evaluative techniques that focus attention on five crucial questions, the answers to which not only help justify effective programs, but also help improve the operation of the continuing education department.

The questions addressed by cost-benefit/effectiveness analysis are:

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Volume 12, Number 4, 1981



- 1. What service will continuing education provide for the institution?
- 2. What resources will continuing education require to accomplish the goal?
- 3. How effective is continuing education in assisting in the accomplishment of organizational objectives?
- 4. How efficiently is continuing education utilizing resources?
- 5. What areas may require additional attention in the future?

That most useful of analytic tools, the systems approach, readily can be applied to learning the concepts of cost-benefit and cost effectiveness. The Cost-Benefit/Effectiveness Model presented in Figure 1 depicts the major components and their interrelationships. The left side of the model is concerned with the cost or institutional inputs to continuing education while the right side deals with the benefits or outcomes. The following sections discuss each

of the components of the model, their interrelationships, and the uses of the final product.

In financial accounting, the term cost is defined as the sacrifice made in order to obtain some good or service. The sacrifice may be measured in money expended, property transferred, service performed, etc. This is a widely accepted definition in financial accounting, but in continuing education it may be necessary to arrive at operational definitions of the various types of costs. The operational definitions will be consistent with the accepted definition and will help the continuing education administrator understand the costs of producing continuing education offerings, control those costs, and make informal decisions about the program. (A glossary of terms is included in Figure 2.)

The continuing education process, from an accounting viewpoint, is one of producing a continuing education program. The course/of-fering is measured in terms of hours of

# FIGURE 2 GLOSSARY OF TERMS

Course-hours — One hour of instruction in either a course (for academic credit) or an offering (not for credit).

Direct Labor — Fees, honararia, etc., that are incurred as a direct result of conducting a course/offering.

Indirect Labor Costs — Labor costs that are associated with program production but are not incurred as a direct result of conducting a specific course/ offering.

Indirect Materials Costs — Materials costs that are associated with program production but are not incurred as a direct result of conducting a specific course/offering.

Overhead — Costs of operating the institution.

Unassigned Costs — Either labor, material, or institutional overhead costs that are associated with departmental activities other than program production.

instruction. By contrast, a manufacturing operation is the process of producing a product measured in units of that product (cars, widgets, etc.). In either case, the cost of the final product — cars or course/offering hours — is made up of three basic constituents: direct labor, direct materials, and overhead.

## **Continuing Education Costs**

Direct Labor

Those labor costs directly associated with the production of continuing education course/of-ferings are defined as direct labor. The labor costs of a carpenter would clearly be a part of the cost of building a house as, likewise, the fee paid an instructor hired only to teach one course/offering would be part of the direct labor cost of that offering.

There is little problem in classifying as direct labor the costs of instructors and others who are paid specifically to do one job and who would not be paid if that job was not performed; but what of the labor costs for those who are paid regularly and who work on many course/offerings and other tasks during the year? Adequate information may be provided if those costs are treated as indirect labor when part of the cost is obviously related to production of continuing education offerings.

Indirect labor costs are those costs that are incurred in program products but are impossible or uneconomical to relate to specific units of production. The costs of the director of continuing education, secretarties, and others assigned to the department accurately may be associated

with the production of course/offering hours even though they are paid independently of course/offering production. The departmental administrative labor costs are too large in relation to the other department costs to simply include them in the institutional overhead. Assignment of the departmental indirect labor costs is a two-phase process. The first phase is the ascertaining of the percentage of time to be assigned to course production. The following section describes a technique used to determine how one spends one's working time.

## Work Sampling

This useful tool from industrial engineering is an efficient, economical method of determining how individuals spend their work time. Since it requires only observations of what a person is doing at randomly selected times over a representative work period, it is unobtrusive and requires a minimum of paperwork, unlike the more tedious and obtrusive time-log methods. An excellent discussion of the practical aspects of conducting a work sampling study may be found in the Industrial Engineering Handbook edited by H.B. Maynard.

## Indirect Labor Costs

The percentages of time spent on different components of a job are used in the second phase of assigning departmental indirect costs to the direct labor category. The computations are not difficult, being simply the percentage of labor costs spent on course production by each person in the department (all costs are on an annual basis). This indirect labor cost represents that portion of the total departmental labor costs associated directly with producing the continuing education program. It does not include the costs of other administrative activities

Since all of the costs of operating the continuing education department ultimately must be borne by the courses and offerings in the program, it will be convenient to begin the process of relating costs to some base common to all course/offerings. Time (in hours), the quantifiable element common to all course/offerings, is suggested as the most likely base for computation and for comparison of costs and benefits. To reduce the assigned indirect labor cost data to a cost per course hour,\* it is only

<sup>\*</sup>The term "course hour" will be used for both credit courses and noncredit offerings rather than the more accurate but awkward "course/offering hour."

necessary to divide the total annual assigned indirect labor cost by the total number of hours of courses/offerings for the year. The indirect labor cost per course hour is then a standard hourly labor cost that will be applied to the determination of the total cost of any course/offering produced during the year. If, for example, a departmental budget included as administrative salaries, a director at \$20,000/year and a secretary at \$12,000/year, a work sampling study shows that the director spends 50% time on program production and the secretary devotes 25% time to program efforts. Assume also that the department produces 1400 coursehours each year. The assigned administrative costs would be computed as follows:

Director assigned costs = 50% x \$20,000/year = \$10,000/year
Secretary assigned costs = 25% x \$12,000/year = 4,000/year
Total assigned administrative costs = \$14,000/year
or \$14,000/year ÷ 1400 course-hours/year = \$10/course-hour

A course/offering of six hours duration therefore would have \$60 of administrative costs assigned to it (plus any assigned costs for indirect materials and institutional overhead). The remainder of the director's and secretary's salaries will be dealt with later.

The value of being able to account for costs as precisely as possible is apparent to any administrator who has had to anticipate rising costs and control expenditures, and to make informed decisions about future programs. For this reason the departmental administrative labor costs must be assigned as exactly as economically feasible.

## Unassigned Labor Costs

Those departmental administrative labor costs that are incurred for activities other than program work are not assigned directly to the cost of course/offering production. The unassigned labor costs are calculated by a process identical to that used to determine the indirect labor costs, the difference being that the time classifications are those that reflect the amount of time spent on general administration, committee work, and other nonprogram activities. The costs of those activities must be determined and eventually must become part of the costs of producing the program. Since the unassigned labor costs do not fit the definition of direct

labor cost stated earlier, and every attempt has been made to assign costs to program production, it is appropriate to treat the unassigned costs similarly to overhead. At this point, it is only necessary, however, to compute and record the unassigned administrative labor cost. Later this figure, along with unassigned costs in other categories, will be used to determine an unassigned cost allocation rate to apportion these costs equitably.

#### Indirect Materials Costs

Some of the materials used in the production of the overall program cannot be linked economically to the production of any specific course/offering. The aggregate annual cost of these items (classified as indirect materials) should be assigned to course/offerings on the same basis as shown previously to assign departmental indirect labor costs. Indirect materials costs are readily assigned by relating total annual indirect materials costs to the total of course/offering hours for the year. This assignment process will produce an indirect materials cost per course hour that may be used as a standard hourly indirect materials cost to be applied to the total cost of each course/offering.

## Unassigned Materials Costs

Residual costs involved in operating the department but not associated with program production cannot be assigned to the cost of any specfic course/offering at this point in the computation process. It is appropriate to determine the amount of the unassigned materials costs (total materials costs less direct and indirect materials costs) and record the amount; this will be used in a later calculation of an unassigned cost allocation rate.

#### Overhead

The third component of the total cost of a continuing education course/offering is overhead, the category that includes all costs related to operating the organization that houses the continuing education department. Overhead refers to costs originating outside the department that are charged back as the department's share of the general organizational costs. Items commonly considered as part of overhead are salaries of the organization's top officers, maintenance of facilities, heat, lights, power, and taxes, if any. Overhead costs are fixed costs and continue regardless of the production level, whereas direct labor and direct materials costs are variable costs, i.e., they vary

directly with the level of production.

The amount of overhead charged to the continuing education department by the parent organization may be calculated several different ways. In most service organizations, including educational institutions, a major part of the overhead costs is allocated on the basis of the departmental direct labor costs. It should be remembered that the direct labor costs used in the determination of overhead will be the departmental salaries, not the course/offering direct labor cost just computed (those costs that are incurred only as a direct result of producing a course/offering). The parent organization seldom considers continuing education courses/offerings or even programs in the overall budget, but rather the budget includes departmental costs only. Overhead allocated on the basis of direct labor generally is expressed as a percentage of direct labor (example: "overhead = 28% D.L."). Other bases for overhead calculation may be the area (in square feet) of the department for allocation of heat, light, and power costs, or some other logical association of a cost and its related departmental activity. Allocation of overhead is an attempt to divide the overall costs of operation among the users of the services of the central administration of the organization.

Few organizations exist only to provide administrative (purchasing, personnel, maintenance, etc.) services. It is logical, therefore, to allocate the costs of those services to the parts of the organization charged with the responsibility of accomplishing the mission of the organization. This is the rationale for the allocation of costs to the mission of the continuing education department, i.e., the production of courses/offerings to assist in the accomplishment of the overall organizational goals.

## Assigned Overhead Costs

The assignment of organizational overhead costs to specific courses/offerings is possible in many instances. If part of the overhead is expressed as a percent of direct labor, then it may be assigned to a specific course/offering the same way that department administrative labor costs are assigned to the direct labor component of the total cost. For example, if the overhead rate were 28% of direct labor, then the overhead cost would be 28% of each individual's annual labor cost (that portion of salary and benefits determined to be part of program production). Of course, the amount of overhead to be

assigned to a specific course/offering would have to be determined first on a cost per course hour basis and then on a cost per course basis for a specific course/offering, depending on the number of course-hours involved. The assigned overhead costs thus determined will become part of the total cost of a specific course/offering and a summation of course/offering costs will provide the total cost of the program.

## Unassigned Overhead Costs

That part of the institutional overhead associated with labor or material costs not associated with program production will be added to the unassigned labor and material costs. Unassigned overhead costs are computed the same as other unassigned costs and will be recorded to be used in the calculation of the cost allocation rate.

#### Cost Allocation Rate

At this stage in the computation of costs, all possible costs have been assigned to the specific courses/offerings, but there still remains a residue of unassigned labor and material costs and their associated overhead expenses that must be charged to the specific course/offerings in some way. A very satisfactory technique is to sum all of the unassigned costs - labor. materials, and overhead — and divide the total by the total annual hours of courses/offerings to get cost allocation rate in cost per course hour. The unassigned costs, actually a form of departmental overhead, can now be assigned to specific courses/offerings by multiplying the cost allocation rate by the number of hours in the course-offering under consideration.

#### Total Cost

At this point, all departmental costs associated with course/offering production are known and the total cost may be computed. Total cost is the sum of the direct labor, direct materials, and overhead — including the indirect and unassigned components of each. This calculation will yield the total cost of a specific course/offering. The total institutional cost may require one further step, however, if the parent organization pays the participants to attend, their labor costs must be added to the total departmental cost since their wages and benefits are part of the continuing education cost incurred by the institution and ultimately will have to become part of the cost-benefit/effectiveness analysis.

The cost of participants may be determined from institutional pay scales quite adequately. It

is seldom feasible or desirable to attempt to ascertain the salary of each participant. The participants' supervisors should be surveyed initially to discover their policy on replacing staff members who are attending continuing education. If participants are not replaced, nor is anyone paid to do their work, then it may be assumed that the institution has incurred no additional expense because of their participation and, therefore, their labor costs need not be considered. If, however, a replacement must be obtained, or coworkers paid overtime (or given compensatory time off) to do the work, the additional labor costs must be considered as part of the total institutional cost.

#### Cost Allocation

Determining the cost of a course/offering as accurately as possible is fundamental to the cost-benefit/effectiveness analysis. The preceding section included descriptions of how actual or historical costs are used in the calculation. The one deviation from actual cost was the use of an estimated or predetermined institutional overhead rate. It is seldom practicable to attempt to be more precise in relating the institution's general operating expenses to specific course/offerings since the overhead rate provides adequate representation of the department's share of those expenses.

Those costs that have occurred historically may be used, when adjusted for known future trends, as a simplified version of standard costs. The use of standards makes it possible to determine what a course/offering should cost, what it actually cost, and the cause of any differences. Standard costs thus serve as a control device for the administrator. For example, the standard cost for a one-day workshop is \$1,500 and it is found to actually cost \$1,700; the factors responsible for the excess cost may be found and corrective measures taken either in cost control or in future budgeting. Standard costs are also helpful in developing fee schedules for those organizations that pass the costs of continuing education on to the participants.

## Classify Courses

It is generally more economical to develop a systematic method of grouping course/offerings in order to avoid the necessity of making an analysis for each individual course/offering. Courses may be grouped together on the basis of the type of instruction utilized, subject matter, number of participants, course objectives, or any other meaningful classification.

Standard costs may be developed, benefits determined, and analysis made for each category.

## Analyze Costs

It is advisable to analyze carefully all cost data in each cost category for each course/offering before developing any standard costs. Sources of wastage, duplications of effort, or other areas where economies may be effected, often become apparent at this state. The cost per course hour should be approximately the same for all courses/offerings in the same group. If there are substantial differences in course/offering cost rates, the cause of the difference must be accounted for before the data are used. Corrections for known or predicted trends are made in the various cost categories before the standard cost computations are completed.

#### Compute Cost Rates

The subject of the discussion in the Continuing Education Costs section was the determination, accumulation, and recording of the various components of the total cost of each course/offering. Total cost information is useful for setting fees, establishing standards, and for a variety of managerial accounting decisions, but is cumbersome to use in cost benefit/effectiveness analysis. A much more convenient and accurate measure is that of a cost per participant hour that will reflect the institutional cost of the course/offering over an estimate of the useful life of the skills or knowledge derived from participation in continuing education. At this point, one must look ahead to the benefit phase in the cost benefit/effectiveness model in order to better estimate the length of time that the institution can expect to receive the benefit (useful life of the benefit) before the skills or knowledge become obsolete or an updating session is necessary. That period will become the base period for the analysis to follow.

Since the total cost of a course/offering is spread over time and shared by each of the participants, and any benefits will accrue over a similar time period and be the result of the efforts of those participants, it is reasonable to select a common base for analysis that will reflect both the number of participants and the time factor. The base common to both the costs and the benefits is the number of students participating in a course/offering multiplied by the number of hours in the relevant base period. If the total cost is divided by the resulting base figure, a cost per participant hour is simply one

person's continuing education cost prorated over the period during which the organization may expect to benefit from that person's participation in that particular course/offering. The same base period usually will be selected for both cost and benefit considerations, but occasionally it may be necessary to use different base periods; if so, the periods must not be too dissimilar (one may not compare a one-week period with a one-year period, even if the figures are reduced to participant-hours) or a caveat should be included. More realistic comparisons will utilize bases as close to one work year (2080 hours per year) as possible.

## **Continuing Education Benfits**

Types of Benefits

Continuing education benefits are defined as the net positive changes in institutional activity that may be associated with participation in a specific continuing education course/offering. The changes may be:

Monetarily quantifiable — measurable in dollar values at two points in time;

Nonmonetarily quantifiable — measurable in other than dollar values, i.e., numbers of occurrences, rates, hours, etc., at two points in time;

Nonquantifiable — not measurable in absolute terms but deemed to be of societal value.

It should be noted that the attainment of an education objective is not necessarily synonymous with an organization benefit. It is seldom defensible to equate a change in the knowledge level of a continuing education participant with a change in the performance of that participant's job. A much sounder approach is to measure changes in the organizational activity that may be associated with knowledge or skill gained through continuing education. For example, if a continuing education course/offering objective is to teach the nurse techniques for the prevention of decubitus ulcers, it would be appropriate to measure the decrease in the incidence of decubitus ulcers (and the associated cost reduction) for the patients of those nurses who have participated in that course/offering rather than simply to test the nurses for a change in knowledge level.

Selection of Benefits

Careful consideration must be given to the selection of relevant benefits, i.e., those ele-

ments of organizational activity that actually may be influenced by continuing education efforts. Random or unplanned improvements in participant behaviors or in institutional operations are not claimed as an outcome of participation in continuing education. Relevant benefits may include the areas of management objectives — improved productivity, decreased wastages, etc.; personal/professional development — promotions, raises, etc.; and patient care — reduced readmission rates, reduced patient complaints, etc. Determination of the direction and amount of the change should be part of the planning process.

#### Indices of Performance

Uses of Indices

Some method of measuring changes in the elements of organizational activity must be developed. In instances where a dollar value may be determined (monetarily quantifiable elements), the problem is less onerous but in those cases where no dollar value can be ascertained, the problem becomes more difficult. In either case, the method must allow for measuring change and must be comparable with the cost rates previously determined. Indices of performances, if properly constructed, meet all of these requirements.

An index is a number or ratio indicating a relationship between variables or sets of data. Indices are constructed by carefully selecting those elements of the organizational activity that may be influenced by a specific continuing education course or program and relating those elements to some common base. The base selected must be the same as the base used for the computation of cost rates so that comparisons are possible, preferably in dollar terms.

## Monetarily Quantifiable Benefits

A Benefit Return Index may be constructed for monetarily quantifiable (those having a dollar value) elements by relating the cost of each occurrence of the element (called an event) to the base as follows:

Benefit Return Index =

## average cost per event x no. of events

no. of student x no. of hours

The number of events is the number of times that the element of organizational activity under consideration occurs during the selected base period. The base period is the number of

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hours of work over which the organization can reasonably expect to receive the benefit of the continuing education course/offering. The base period used in this computation is the same as that used in the earlier calculation of cost rates. The number of students is the number of participants in the course/offering who can be expected to provide the changes in the number of events that will benefit the organization. (The changes may be either an increase or a decrease in the number of events to the desired direction of change must be determined.) The Benefit Return Index relfects the total cost of all the events prorated over the work hours of the participants during the base period.

In order to be able to associate changes in the number of events with participation in continuing education, it is necessary to compare the Benefit Return Index for participants with an index for nonparticipants who are similar in all respects, including their jobs. The difference or rate change is the monetary change per unit of time determined by comparing the Benefit Return Index of participants with that of nonparticipants. The difference in the two indices may be associated with participation in continuing education. The rate change will be expressed in monetary units per unit of time (\$/participant work hour). The rate change may be a result of either a change in the dollar value of the event, a change in the number of events, or a combination of the two.

## Nonmonetarily Quantifiable Benefits

Nonmonetarily quantifiable elements (those for which no dollar value may be determined) also lend themselves to the development of indices. The basic technique is identical to that used to prepare the index for monetarily quantifiable elements except that the average cost of an event is omitted. The formula for the Benefit Index for a nonmonetarily quantifable element is:

Benefit Index =

#### number of events

no. of students x no. of hours

Again, the number of events and the number of hours are those in the same base period as that used for the determination of the useful life of the benefit. Indices must be computed for both participants and nonparticipants so that changes in the number of events during the base period may be determined. The rate changes are the

differences that may be associated with participation in continuing education. It will be observed that the word "return" appears in the index (Benefit Return Index) associated with monetarily quantifiable elements but is omitted from the index (Benefit Index) associated with the nonmonetarily quantifiable one. The reason is the "return" refers to the financial repayment of an investment which, of course, is only possible when the dollar value of an associated element may be determined.

It is possible, but not desirable, to construct an index for a group before they have participated in the course/offering and compare it with an index constructed after participation. This "before and after" comparison is less satisfactory than the two-group index method where indices are constructed for a group of participants and a similar group of nonparticipants simultaneously. The "before and after" method associates any change that occurs over time with participation and is less accurate for that reason, but over relatively short periods of time - six months or less - may vield sufficiently accurate results for the determination of either monetarily or nonmonetarily quantifiable benefits.

## Cost-Benefit Analysis

Computations Required

Cost-Benefit Analysis considers all relevant monetary costs and benefits in an attempt to determine associations between continuing education and changes in both the frequency and cost of corresponding elements of institutional activity. Cost-Benefit Analysis emphasizes the monetary aspects of any change that may occur and thus provides answers that are easily converted to annualized financial savings.

In simplified terms, the Cost-Benefit is computed by subtracting the cost rate of a course from the benefit return rate for the element of institutional activity. Cost-beneficial programs are those in which the difference (net cost change) is positive, i.e., benefits exceed costs.

#### Uses of Analysis

Cost-Benefit Analysis is employed in situations in which dollar values may be assigned to both inputs (costs) and outputs (benefits). This characteristic of Cost-Benefit Analysis is both its primary strength and major weakness. A positive result, presented in absolute monetary terms, is a powerful argument for the efficacy

of a continuing education program. Since Cost-Benefit Analysis requires that benefits be assigned a market value, many desirable changes cannot be considered. Improved patient care, for example, is obviously a desirable outcome of continuing education but is not quantifiable in monetary terms. In those instances where Cost-Benefit Analysis indicates that the net cost change is zero or negative, but where there are apparent nonmonetarily quantifiable benefits, a different analytic technique is suggested.

## Cost-Effectiveness Analysis

Uses of Cost-Effectiveness

Cost-Effectiveness Analysis is useful in assessing nonmonetarily quantifiable changes in elements of the institutional activity. It is used in situations in which it is not possible to assign a market value to outcomes (benefits) but in which costs are incurred.

Lack of market value for benefits should not deter efforts to demonstrate the changes in organizational activity that may be associated with participation in a continuing education course/offering. Benefit indices for participants and nonparticipants or "before and after" indices to obtain net changes (expressed in changes in numbers of events/participant hour) are constructed and compared to obtain the net benefit change. When the desired direction of change has been decided upon and the net benefit change computed, it is possible to present a respectable argument for the efficacy of a particular continuing education program. Cost-Effectiveness Analysis can show actual physical or psychological changes, albeit without a corresponding monetary value, that may be associated with a particular continuing education program.

The absence of cost data in Cost-Effectiveness Analysis may tend to weaken the argument from some perspectives but the absence of the monetary requirement also allows greater possibilities for the evaluation of educational efforts. When the institutional goals are concerned with the alleviation of societal problems, Cost-Effectiveness Analysis is particularly well suited to evaluating efforts to attain those goals.

## Nonquantifiable Benefits

Nonquantifiable benefits are difficult to ascertain and equate to participation in continuing education. Those items that appear to have some relationship with continuing education and possess some societal value may be used to support quantifable changes but are seldom accepted as a total justification for the institutional expenditures of time and money.

## Summary

It may be concluded that Cost-Benefit and Cost-Effectiveness Analysis are valuable evaluative techniques for continuing education. Both techniques focus attention on the five aforementioned questions that should be asked of any organizational effort. Both forms of analysis concentrate on input-output measurement procedures. Both are sound arguments for the value of continuing education providing that the basic tenets of research and sound judgment are exercised.

Cost-Benefit Analysis is obviously the stronger argument in that it is a technique of comparing market values of both input and output. A cautionary note is in order at this point concerning the selection of a base period. Money has a time value, that is, last year's dollar does not have the same value as a dollar this year. Inflation, interest rates, and other investment opportunities, to name a few, are factors that account for the change in the value of money over time. It is necessary, therefore, either to correct for the change in value, using managerial accounting methodologies, or to restrict the base period to a relatively short period of time. One year is generally acceptable since the value of the costs under consideration will likely not change too drastically.