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ABSTRACT

As part of a symposium that examined the utility of adapting the techniques of cost-effectiveness analysis for curriculum and program planning in higher education, this paper examines the methodology and procedures of the technique. A checklist outlines some of the problems and potential and some guidelines are suggested for cost-effectiveness analysis. (Author/MLF)

COST-EFFECTIVENESS ANALYSIS PITFALLS

and POTENTIALS FOR PLANNING INSTRUCTIONAL PROGRAMS

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Overview

The instructional planner, depending upon prior education and experience and current context, may owe primary professional allegiance to any number of associations and academic disciplines. Descriptors such as educational researcher, evaluator, economic analyst, instructional designer, operations researcher, curriculum specialist and systems analyst represent some of the monikers used by professionals who perform the instructional planning function.

Regardless of race, creed or professional affiliation, planners making or informing decisions must consider issues related to costs and effectiveness. How and when these issues are considered are becoming major concerns in these times of retrenchment and resource reallocation.

The intent of this paper is not to provide an all-purpose recipe for the conduct of cost-effectiveness analysis. Attempts at such a cookbook approach would likely result in something akin to gastronomic distress. What has been attempted in fields outside conventional education contexts is the articulation of cost-effectiveness guidelines that include issues, outlines, examples and references (Doughty, Stern and Thompson, 1976). To date, there is little evidence that Betty Crocker has responded to the challenge.

Ultimately the question is asked: "Where does the planner begin in developing a cost-effectiveness analysis perspective?" This paper will outline several issues that distinguish studies that have incorporated this perspective from those that have not. This is definitely not the first article to suggest that you start by identifying perils and pitfalls of cost-effectiveness thus providing a kind of ten commandments as a springboard. (Kazanowski, 1968; Quade 1976)

One of the major problems is the perception that Cost-Effectiveness analysis does not require any particular technical or professional competence, but that there is a requirement for copious quantities of common sense and sound logic. Considerable and continuing support for this notion is supplied through the proclamations of decision-makers in most every field. Written and verbal utterances such as: "We developed it in a cost-effectiveness manner" or "The benefits were maximized while the costs were cut 20 percent" or "Our benefit-cost ratios prove..." or "The decision was made on the basis of cost-effective reasoning" all serve to perpetuate the illusion of science and truth.

Somewhat farther along this art-science continuum falls a relatively select but growing number of professionals who mask their more sophisticated blunders with verbage and jargon peculiar to their particular field of inquiry. Most of these are the results of errors in logic or falseassumptions. Economic analysts, summative evaluators, cost analysts, program budgeters and operations researchers all have high potential for inclusion in this club. An even more unfortunate situation arises when a quality piece of work is obfiscated by the author in catering to external requirements for specialized language, format or purpose. Such is often the case with parochial professional journals and research oriented rather than decision oriented dissertation committees.

The following checklist outlines many but obviously not all of the issues that should be considered. Each of the issues is discussed in brief sections that follow.

COST-EFFECTIVENESS ANALYSIS SELF-CHECK

Pitfalls for Evaluators, Analysts and Instructional Planners

	That's Us	Maybe	Not Us
A. Evaluative Criteria			
1. Poorly Defined Decision Rules or Criteria	1.		
2. Select Wrong Criteria	2.		
3. Single Criterion	3.		
4. Emphasize Thruput Indicators	4.		
5. Ignore Spillover or Unanticipated Effects	5.		
6. Overquantification	6.		
7. Overgeneralizing Results	7.		
B. Cost Issues			
1. Rely on Jurisdictional Cost Data	1.		
2. Undue Emphasis on Total Dollar Cost Criterion	2.		
3. Include Sunk Costs in Cost Analysis	3.		
4. Assume Unreasonable Depreciation Schedules	4.		
5. Focus Only on Dollar Expenditures	5.		
C. Cost and Effectiveness Relationships			
1. Misuse of Ratios	1.		
2. Failure to Fix Cost or Effectiveness	2.		
3. Assume or Imply Causal Relationships	3.		

A. Evaluative Criteria

1. Poorly Defined Decision Rules or Criteria: Studies conducted to aid decision making oftentimes are well conducted and reported but fail to have any discernable impact. More often then not, the public and private criteria used by key decision makers have not been determined nor used as primary components in the initial design. Of course, at times it is not in the interest of an individual or an institution to divulge some decision rules. In these instances, the analyst's role and potential impact are considerably weakened.

2. Select Wrong Criteria: It is often tempting for analysts to select criteria that can be easily defined and/or quantified, but are irrelevant to the decision. On the other hand, criteria are also selected because of their obvious potential impact, but they too may be the wrong or educationally insignificant ones. Dollar cost measures are as likely to be improperly or insufficiently reported as are outcome measures or indicators.

3. Single Criterion: How often have we reviewed studies that report results of no significant difference when in fact there were highly significant differences in other variables or criteria? No differences in dollar costs to an institution for instance may ignore a requirement for the expenditure of extensive out-of-class time by learners. To rely upon a single criterion, however encompassing it may be, places considerable faith in the analyst to select or create the ultimate-all purpose measure or indicator that communicates to all.

4. Emphasize Thruput Indicators: In the absence of utlimate criteria, based upon needs, job analysis, performance requirements or whatever, proxy measures are oftentimes used as indicators or substitutes. This is of course acceptable practice. However, misleading conclusions are often drawn when thruput indicators such as cost-per-student-credit-hour data are used as primary evidence of quality or efficiency rather than as idiosyncratic, uncomparable ratios of thruput.

A. Evaluative Criteria continued

5. Ignore Spillover or Unanticipated Effects: A myopic fixation on established criteria excluding consideration of other direct evidence may not identify the alternative that compares favorably on selected criteria but excells or fails miserably in some additional area. Comments such as: "Learners came in apprehensive and left hostile" or "The reading instruction system was very efficient. Isn't it a shame the students are no longer interested in going to the library?" provide insights into effects that may impact on systems well outside the one being considered. Obviously consideration of attribution and causality issues is always required but to ignore "other effects" shows evidence of limited vision.

6. Overquantification: In the quest to demonstrate the science of Cost-Effectiveness analysis, many individuals and disciplines require that all criteria be quantified in some fashion. Never mind the concern that in so doing, the analyst has now become decision-maker by providing standards of value and worth and utility rather than reserving those perogatives for the consumer(s).

7. Overgeneralizing Results: As generally applied, Cost-Effectiveness studies are not designed to generate universal or broadly generalizable results. Studies are conducted to inform and perhaps influence organizational behavior, or at times, invididuals. Expectations of theory driven, empirically validated generalizable models of cost-effectiveness analysis are unrealistic given the purpose and focus of this process.

B. Cost Issue

1. Rely on Jurisdictional Cost Data: Most primary sources of dollar cost information aggregate and report those data according to "authority

B. Cost Issue continued

1. areas" or "domains of responsibility" which oftentimes do not represent program, system or result areas. Jurisdictional costs provide accounting information to ensure budgetary compliance but rarely do they directly relate to outcomes or program goals. Generally speaking, program or functionally related cost data are not available from existing records and must be collected or projected by the analyst.

2. Undue Emphasis on Total Dollar Cost Criterion: A false assumption often made or implied in reports is that the total dollar cost of an alternative, including design, development, implementation, and lifetime operation, represents the total spectrum of the negative dollar costs. For instance, it may be the case that the salary of a master instructor, skillful programmer, or competent manager can be accurately reflected, it is another issue entirely to assume that simply listing such salaries ensures their availability. In addition, reporting only total system costs does not permit scrutiny of cost-time phasing issues such as high front-end loading vs. more costly continuing operational expenditures.

3. Include Sunk Costs in Cost Analysis: When comparing feasible alternatives, one option may well be to continue an existing system that has already been implemented. In this case, an equitable analysis would only consider the future costs of operating and maintaining that system, not the sunk costs that were allocated in the past. In their attempt to be comprehensive, overzealous analysts often include such costs rather than limiting the data to those that relate to future expenditures and outcomes.

4. Assume Unreasonable Depreciation Schedules: One way to distribute the cost of large initial hardware expenditures is to depreciate them over some specified number of years. Combining the notions of technological and content obsolescence with time or use-based depreciation is also

B. Cost Issue continued

4. legitimate and recommended. Problems arise, however, when analysts make unwarranted assumptions about lifespans of computer and video systems or course content thus making it easier to justify high front-end expenditures. This is one area where careful judgment and public assumptions are basic requirements. A different but related issue concerns the assumptions made about the number of cycles an instructional program or system will be offered as well as the number of learners or participants served during the projected lifetime of an alternative. These items have tremendous, almost overpowering impact on decisions related to judging economy of scale. Judicious estimates with supporting rationale help offset the healthy skeptism decision makers have about such data.

5. Focus Only on Dollar Expenditures: Economists are quick to point out that costs are not simply negative consequences of a decision. There are, however, many decisions or alternatives that have cost implications of some kind for a variety of audiences. Negative benefits such as low student and faculty morale, study time diverted from other courses, and professional time diverted from other scholarly endeavors are examples of the broad range of costs that are not represented by balance sheets and voucher records.

C. Cost and Effectiveness Relationships

1. Misuse of Ratios: Some analyst argue that the ultimate in scientific approaches to Cost-Effectiveness analysis is to quantify the criteria, preferably in dollar terms, so that benefits to cost ratio comparisons can be made. This approach combines the overquantification pitfall with a more fundamental problem - the lack of attention to the size of magnitude of the numerators and denominators. Most decision-makers are capable of selecting betting odds of 3 to 1 over a ratio of 5 to 2.

C. Cost and Effectiveness Relationships continued

1. Of course what wasn't considered was the additional information that 3:1 was actually $30 to $10 and the 5:2 indicated a benefit with 5 million dollars for a capital investment of 2 million dollars. In this case, not only did the ratios dictate the decision, the initial selection was likely the wrong one.

2. Failure to Fix Costs or Effectiveness: Literature from many fields abounds with the notion that cost-effectiveness analysis is a process that identifies the alternative which requires minimal resources and provides maximum effectiveness. It can be argued that this is based upon the assumption that if you search hard enough or design creatively then you will eventually discover the alternative that provides infinite effectiveness for zero cost. Briefly, a more tenable guideline reads as follows: a) identify a desired level of effectiveness and then examine the cost of alternative means of achieving that level, or b) specify a budget level and examine the level(s) of effectiveness that might be achieved through different alternatives. Seldom is either of these represented in the literature. As a minimum gesture, analysts should underscore the considerable problems associated with comparing alternatives with unlike resource requirements and levels of effectiveness.

3. Assume or Imply Causal Relationships: To specify, measure, and report resource requirements, process descriptions and system outcomes is a legitimate responsibility of the analyst. However, to imply or assume that direct causal relationships exist between these variables requires a technical and conceptual leap well beyond current Olympic standards. Cost-Effectiveness reports should always contain caveats concerning correlation, causality, and attribution.

Next Steps

Instructional planners interested in pursuing Cost-Effectiveness issues and procedures are likely to be initially encouraged and then dismayed. Many Cost-Effectiveness related studies, articles, and texts have been published in the past six to seven years. None of them proclaim to be the comprehensive guide for instructional or educational planners. In addition, considerable translation of terminology and concepts is required. Explanations and examples contained in the following publications are particularly relevant, require less translation than most, and merit consideration.

1. Doughty, P. & Beilby, A. Cost Analysis and Teacher Education: A Comment on Relevant Relationships, A Review of Existing Models. Syracuse University, 1974. (Monograph).

2. Doughty, P., Stern, H. & Thompson, C. Guidelines for Cost-Effectiveness Analysis for Navy Training and Education. Navy Personnel Research and Development Center, San Diego, California. July, 1976.

3. English, J. Morley (ed.) Cost-Effectiveness: The Economic Evaluation of Engineered Systems. New York: John Wiley & Sons Inc., 1968.

4. Kazanowski, A. D. "Cost-Effectiveness Fallacies and Misconceptions Revisited" in English, J. Morley (ed.).

5. Levin, Henry M. "Cost Effectiveness Analysis in Evaluation Research" in Guttentag M. and Struening E. Handbook of Evaluation Research. Beverly Hills: SAGE Publications, 1975.

6. Quade, E. S. Analysis for Public Decisions. New York, American Elsevier, 1976. (especially Chapter 20 - "Pitfalls and Limitations").