



# ***Understanding the Costs Associated with Interventions to Improve High School Completion***

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# Nuts and Bolts



- Benefits of cost analysis
- Weaknesses of cost analysis
- Analytic techniques
- Cost ingredients and cost framework
- Measurement issues
- Cost effectiveness analysis
- Cost benefit analysis

# Common phrases



*Anything we can do to help the kids is worth the cost!*

*I didn't get into education to worry about budgets!*

*Cost analysis is something only finance people can and should do!*

*I know this intervention could work, but I need to know more about its cost!*

# Benefits for cost and economic analysis



- Allows us to make comparisons for decisions and tradeoffs
- Allows us to pinpoint major sources of costs
- Allows us to realize the real costs of most projects are higher than originally anticipated
- Allows us to shape budgets rationally – that is, to cut budgets that are least cost effective, and invest in areas that are more cost effective
- Adds information to decision-making beyond political compromises

# Weaknesses of cost and economic analysis

- Creates expectations of precision and exactness that is not always present
- May be perceived as too complicated by both producers and consumers of the report
- Difficulties in measurement and lack of reliable data
- Reliant upon many assumptions and differing models
- Costs of cost-assessment

# Analytic techniques



- Costs (Ingredients)
- Cost feasibility
- Cost-effectiveness
- Cost-benefit
- Cost-utility

# Ingredients Approach



“By focusing on ingredients, this approach begins not with a budget, but with the intervention and its resource requirements.”



- Valuing ingredients
- Common categories
- Cost distribution/perspectives
- Setting up a cost analysis framework

# Why can't you just use budgets?



- All contributed amounts are not in budgets
- Other agency budgets usually aren't included
- Facility and other capital expenditures are often treated differently from operating budgets
- Budgets are estimates going forward, not true expenditures
- Budgets are a strategy for moving forward.

# Ingredients approach



- Identify all the things you need, then assign values/costs.
- Use various sources of information
  - Program documents
  - Discussion with people involved (both program and administrators)
  - Direct observation
- Don't sweat the small stuff!
  - Estimate if necessary!

# How do we value ingredients?



- Total program costs vs. annual costs
- One-time costs, capital costs
- Costs of sub-programs/marginal costs

# Ingredients and audiences/perspectives



	TOTAL =	Program +	Students/ Families +	Public/ Taxpayers
Personnel				
Facilities				
Equipment				
Technology				
Supplies				
Other?				
TOTAL				

# Common ingredient categories



- Personnel (Salaries + fringe benefits)
- Facilities
- Equipment and materials
- Technology
- Supplies
- Other inputs
- Common/Administrative overhead
- Required client inputs
- Non-quantifiable costs (non-monetary)



# Measurement Issues

# Fixed, Variable, and Average Costs



## Working Definitions

**Fixed Costs:** A cost that remains more or less unchanged regardless of output level.

**Variable Costs:** A cost that varies depending upon output level

**Average Cost = Cost / Number of units**



# **Cost Effectiveness Analysis**

# Definition



**Cost Effectiveness Analysis** is designed to compare the costs and effects of two or more alternatives with similar objectives. The measure of effectiveness should reflect the main objectives of the alternatives.

# Measures of Effectiveness



Objective	Measure
Improve reading skills of illiterate adults	Test of Adult Basic Education
Improve 4 <sup>th</sup> grade mathematics achievement at a school in Minnesota	Math MCA, NWEA MAP, locally developed math test, Iowa Test of Basic Skills
Increase number of high school graduates in Minnesota	The number of students who graduate from high school
Reduce student obesity	
Improve teacher quality	

# Good measures are key!



## Measurement Issues

- Intermediate vs. final outcomes
- Difficulties in making casual statements
  - Nonequivalence (Selection Bias)
  - Attrition
  - Maturation
  - Repeated Testing
  - Different instrumentation (different forms, different observers, etc.)
  - Regression to the mean

# Evaluation Designs



**Experimental**— Utilizes a treatment and control group and the strongest designs include random assignment

- Used to make strong causal statements
- Often not feasible

**Quasi-Experimental**— Uses a comparison group. Goal is that it initially is like the treatment group

- Often uses matched pairs/groups
- Includes regression-discontinuity designs

**Correlational Studies**— Nonexperimental Design

- Data collected after treatment begun
- Many regression analyses (input-output, production function)
- Statistical procedures can help control for threats to nongroup equivalence

# Drop-out Example



Drop-out Prevention Program 1: \$10,000

Drop-out Prevention Program 2: \$ 6,000

# Drop-out Example



Drop-out Prevention Program 1: \$10,000

drop-outs prevented: 200

Drop-out Prevention Program 2: \$ 6,000

drop-outs prevented: 100

# Cost-Effectiveness Ratio (CER)



$$\text{CER} = \frac{\text{C}}{\text{E}}$$

Where:

C= Costs of a given alternative

E= Measures of its effectiveness

	Program 1	Program 2
Cost	\$10,000	\$6,000
Drop-outs prevented	200	100
CER	50	60

# Summary and Considerations



- *Establishing the framework*
  - *Is the problem carefully defined?*
  - *Are the relevant alternatives under consideration delineated?*
  - *What analytical technique will be used (cost-effectiveness, cost-benefit)*
- *Evaluating costs*
  - *Are the ingredients for each alternative carefully laid out?*
  - *Are the methods used for costing appropriate?*
  - *If necessary are cost appropriately annualized? . . . Discounted?*
- *Evaluating effects or benefits*
  - *Is the evaluation design sufficient to ensure that the results are internally valid?*
  - *Are the benefits appropriately discounted across time?*

Adapted from *Cost-effectiveness Analysis* (Levin)

# Resources



*Levin, H.M. & McEwan, P.J. (2001). Cost Effectiveness Analysis: Methods and Applications-2<sup>nd</sup> Edition. Sage Publications.*

*Woodhall, M. (2004). Cost Benefit Analysis in Educational Planning-4<sup>th</sup> Edition. UNESCO. Available at:  
<http://unesdoc.unesco.org/images/0013/001390/139042e.pdf>*

## *Present Value (Discounting)*

- *functions embedded in Excel*
- *Present value formulas and calculator available at numerous online sites. For example, Finance Formulas:  
<http://www.financeformulas.net/index.html>*

*PowerPoint slides adopted from Sheryl Lazarus & Lincoln Kallsen, Nuts and Bolts of Cost Analysis, MN Evaluation Studies Institute Conference, March 11, 2015, University of Minnesota*