Return on Investment
Career & Technical Education

Pradeep Kotamraju
& James Stone
“And that, ladies and gentlemen, is the way the ball bounces.”
CTE Accountability and Evaluation Portfolio

- A Tool Kit for Measuring CTE Effectiveness Using Return on Investment and Other Related Techniques
- Technical Skills Inventory Project
- Crosswalks and Common Data Standards Project
- Using the National Center for Education Statistics (NCES) longitudinal and survey data sets, to examine more closely the engagement, achievement, and transition of secondary and postsecondary CTE students.
Why ROI for CTE

• An overarching Concern: Is the federal (and state and local) investment in CTE is paying off?

• To answer this, we need to establish:
  ✓ the *internal efficiency* of CTE by comparing the costs and benefits of implementing CTE using Perkins funds at the local or state levels.

  ✓ Determine whether CTE has a measurable impact beyond itself. This question focuses on *external effectiveness*.
Return on Investment (ROI)

Cost Benefit Analysis (Internal Efficiency)

Net Impact Analysis (External Effectiveness)

Private Benefits

Social Benefits

Private Costs

Social Costs

Benefits

Costs

Net Present Value

Internal Rate of Return

Benefit Cost Ratio
Reflected as a number:

• the *benefit cost ratio* (B/C; a number greater than one implies that the program is justified on both internal efficiency and external effectiveness grounds);

• the *net present value* (NPV; a number greater than zero implies that building the program today is justified instead of waiting for the future);

• and the *internal rate of return* (IRR; when the rate of return obtained from program implementation exceeds the market interest rate; this is the measure used to determine returns from financial investing)
I. Opportunity Cost
II. Time Horizon before benefits accrue
III. The Discount Rate (future costs/benefits to present $)
IV. Monetizing Non-monetary Benefits and Costs
V. Positive and Negative Externalities of CTE

5 Factors to be Calculated
1. Needs Assessment
2. Feasibility Study
3. Process Evaluation
4. Outcome Evaluation
5. Goal Analysis

A. ID Program Gaps?
B. Can program succeed with given constraints?
C. How is Implementation progressing?
D. Were Program Goals Achieved?
E. Was Program Financially worthwhile?
An ROI Logic Model

- Needs Assessment
- Feasibility Study
- Process Evaluation
- Outcome Evaluation
- Cost Analysis

Resources/Inputs → Activities → Outputs → Outcomes → Impact

Costs

Your Planned Work

Benefits

Your Intended Results

Success Measure

Research
3 Approaches to ROI

1. Social Benefits
2. Case Study
3. Common Framework
$4.1 BILLION IN INCREASED EARNINGS

This single class of new graduates would likely earn as much as $4.1 billion in combined earnings in the average year compared to their likely earnings without a diploma.

$536 MILLION IN INCREASED TAX REVENUE

As a result of increased wages and income, the amount of state and local tax revenue within those regions would likely grow by a total of up to $536 million during the average year.

The best economic stimulus package

By the midpoint of their lives, these individuals would likely purchase as much as $10.5 billion in homes and $340 million in vehicles each year.
JFF – ROI In Early College High Schools (2006)

- 4 States, 7 schools
- $1.33 to $2.57 ROI over 15 years

4 Outcomes
- Dropouts
- Persistence
- Graduation rates
- College credits/degrees
THE RETURN ON INVESTMENT (ROI) FROM ADULT EDUCATION AND TRAINING

Measuring the Economic Impact of
A Better Educated and Trained U.S. Workforce

By

Dr. Lennes McLeod, Executive Director,
National Council of State Directors of Adult Education
National Adult Education Professional Development Consortium

and

Debra Jones
California Director of Adult Education
Chair, NAEPDC Research Workgroup

and

Mitch Rosin, MA, MS, MS, Editorial Director,
McGraw-Hill School Education Group
Approach to ROI
Framework
Common
Four Preconditions
- Sound Data Administration
- Expertise
- Institutional Capacity
- Integrated Conceptual Framework

Highly Connected Systems
Why will this be difficult?

- Standardization of inputs, process measures, outputs, and outcomes has been limited in scope
- No common data system
- Treating accountability and evaluation synonymously
- Weak connectivity between data and measurement; accountability and evaluation; and, research
- Institutional research capability limited
- Absence of a set protocols
Conducting Return on Investment Analyses for Secondary and Postsecondary CTE: A Framework

Kevin M. Hollenbeck, W.E. Upjohn Institute for Employment Research
But wait, there are more... Challenges

- The treatment (CTE) defined to capture a sizable group of program participants (not too general).
- Data must be available for a group who are reasonable source of cases for a comparison group.
- Outcome data must be available for both the treatment and comparison groups.
- The time periods of observation and treatment for program participants and the comparison group must be reasonably close to each other.

Hollenbeck, 2011
This technique requires, at a minimum, the explicit linking of education and workforce databases to measure the impact of a particular investment on both direct and indirect beneficiaries.
$E[Y_i(1) - Y_i(0) | X, W_i = 1] = E(\Delta Y | X, W = 1) = E[Y(1) | X, W = 1] - E[Y(0) | X, W = 1] - E[Y(0) | X, W = 0] - E[Y(0) | X, W = 0] = (X) - (X) + BIAS$

where $(X), k = 1, 0,$ are the outcome means for the treatment and comparison group samples, respectively, and BIAS represents the expected difference in the $Y(0)$ outcome between the comparison group (actually observed) and the treatment group (the counterfactual.)
A common protocol for ROI for CTE has to address the following nine components:

1. Perspective on goals
2. cost analysis;
3. comparators;
4. program effects;
5. outcome measures;
6. distributional consequences;
7. time effect analysis;
8. sensitivity analysis;
9. decision rule.

Hummel-Rossi & Ashdown (2002)
• Begin with the case study technique, testing each separately. Begin with Program Level Analyses.

• Build to social benefits analysis combining results from case studies

• Finally, both the case study and the social benefit approaches give rise to data and information that can be linked to one another placed into a single comprehensive data system.

Then apply the common framework approach to ROI
Go and have fun in the meadows...
Yeah, fine. But one day, you'll make a mistake - and I'm gonna be there!

\[
\begin{align*}
\bar{x}_1 &= \frac{138}{10} = 13.8 \\
\bar{x}_2 &= \frac{90}{10} = 9.0 \\
S_p^2 &= \frac{10(2608) - (138)^2}{10} = 78.18 \\
S_p^2 &= \frac{(10 - 1)(78.18 + 10 - 1)}{10 - 1} \\
S_p &= \sqrt{\frac{51.65 + 51.65}{10}} = 3.21 \\
\text{S.R.} &= \frac{(13.8 - 9.0) - 0}{3.21} = 1.50
\end{align*}
\]

At the Statistics Smackdown House