

Advanced Industrial Psychology Industrial Training

Training Evaluation



3/31/2003



1

What We Will Cover in This Section

- What is evaluation?
- The concept of the CRITERION.
- Evaluation procedures.
- Evaluation techniques.



3/31/2003



2

Evaluation

Systematic collection of
descriptive and judgmental
information to make an
assessment of instructional
activities.

3/31/2003



3

General Focus of Evaluation

1. Has change occurred on the job?
2. Was this change caused by training?
3. Will the same change happen to new participants?
4. Will the same change happen in other organizations?

3/31/2003



4

Barriers to Evaluation

1. Management does not emphasize it.
2. People don't have the skills to do it.
3. People don't know what to evaluate.
4. People may fear the results.

3/31/2003



5

Benefits of Evaluation

1. Determine where a program needs to be changed.
2. Evaluate acquisition, retention, and transfer.
3. Identify potential legal issues.
4. Evaluate the trainer.
5. Determine the overall benefit to the organization (UTILITY).

3/31/2003



6

Criterion



A standard for assessing effectiveness, success, or failure of an activity.



3/31/2003



7

Criterion As a Test

- **RELIABILITY**
 - Is the assessment done consistently.
 - Rater reliability.
 - Internal Consistency.
- **VALIDITY**
 - Are we measuring what we say we are measuring.
 - Face Validity.
 - Content validity.

3/31/2003



8

Unidimensional vs. Multidimensional Criteria

UNIDIMENSIONAL CRITERION

Single overall indicator of success.

MULTIDIMENSIONAL CRITERION

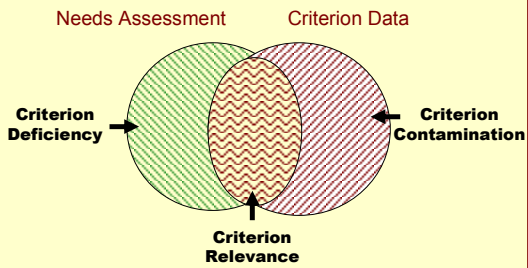
Multiple indicators, factors, or facets of success.

3/31/2003



9

Criterion Model



3/31/2003



10

Criterion Contamination

- **OPPORTUNITY BIAS**
 - People in different groups are treated differently.
- **GROUP CHARACTERISTIC BIAS**
 - Differential opportunities to use KSACs on the job.
- **RATER REACTIVITY**
 - Raters are biased on the basis of their knowledge of a person's training performance.

3/31/2003



11

Levels of Criteria Kirkpatrick, Level I

REACTION EVALUATION

Personal evaluation of the quality of the course and the amount of material learned.

3/31/2003



12

Kirkpatrick, Level II

LEARNING (Acquisition)

An evaluation of the amount of material learned or the skills acquired in the classroom.

3/31/2003



13

Kirkpatrick, Level III

BEHAVIOR (Transfer)

An evaluation of the extent to which the person uses the new KSACs on the job.

3/31/2003



14

Kirkpatrick, Level IV

ORGANIZATIONAL RESULTS

The extent to which the organization benefited from the training.

3/31/2003



15

Types of Measurement



Criterion Referenced Vs. Norm Referenced

- Criterion referenced. There is some absolute standard of performance against which a person's behavior is judged.
- Norm referenced. A person's behavior is measured and judged in relationship to some standard (norm) group.

Objective vs. Subjective Measures

- Objective Criteria There is a clear, unambiguous standard for assessing a person's behavior.
- Subjective Criteria Measurement of the criteria is based on the expert judgment of the rater.

Obtrusive vs. Unobtrusive Measures

- **Obtrusive**
The person is aware of the fact that his/her behavior is being assessed.
- **Unobtrusive**
The person is not aware that his/her behavior is being assessed.

3/31/2003



19

Uses of the Evaluation

- **FORMATIVE**
Evaluate a training program with the goal of improving it before it is implemented.
- **SUMMATIVE**
Evaluation of the overall impact of the final training program.

3/31/2003



20

Evaluation Techniques

3/31/2003



21

Preliminary Decisions

1. Decide on the level at which the evaluation will take place.
2. Decide on the type of measure you will use.
3. Decide on who will do the assessment.
4. Decide on the measurement technique.

3/31/2003



22

1. Simple Survey

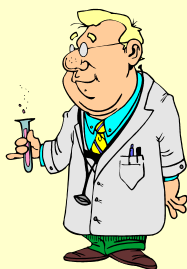
- Used for
 - Reaction
 - Transfer
- Benefits
 - Quick
 - Simple
- Issues.
 - Self-report.
 - Sample.

3/31/2003



23

2. Experimental Designs



3/31/2003



24

Basic Requirements

- Two or more groups.
- Participants randomly assigned to treatment conditions.
- One or more treatment conditions.

3/31/2003



25

Experimental Designs

- Experimental Group
The group that gets the treatment (training).
- Control Group
Reference group that does not get treatment (training).
- Random Assignment of Subjects

3/31/2003



26

True Experimental Designs (1)

- Randomized, Posttest Only, Control Group
 - Experimental group gets training.
 - Control group does not get training.
 - Two groups are evaluated on the criteria after the training.

3/31/2003



27

Basic Design

Treatment Groups	Independent Variable	Dependent Variable
Group 1	Training	Measurement(s) made after the treatments are applied.
Group 2	Something Else	

3/31/2003



28

True Experimental Designs (2)

- Randomized Pretest-Posttest, Control Group.
 - Both groups get a pre-test.
 - Experimental group gets training.
 - Control group does not get training.
 - Both groups are evaluated on the criteria after the training.

3/31/2003



29

Randomized Pre-test Post-test Control Group

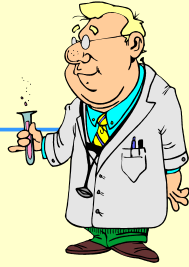
	Pre-test	Independent Variable	Post-test
SS ₁ SS ₂ SS ₃	Measure A	Training	Measure A
SS ₄ SS ₅ SS ₆	Measure A	Something Else	Measure A

3/31/2003



30

Internal Validity



Internal Validity

Can I unambiguously conclude that the independent variable caused a change in the dependent variable.

Confounding

Any variable other than the independent variable that could reasonably have caused changes in the dependent variable.

Confounding Variable: Example

Confounded
by time of
day.

Independent Variable	Dependent Variable
Given orange juice in the morning	Alertness two hours later.
Given distilled water in the evening	

3/31/2003



34

Pre-Experimental And Quasi-Experimental Designs

3/31/2003



35

One-Shot Case Study

	Independent Variable	Dependent Variable
Group	Training Program	Measurement(s) made after the training.

3/31/2003



36

Benefits and Issues

Benefits.

1. OK for preliminary research.

Issues.

1. No comparison group.

3/31/2003



37

One-group Pre-test Post-test

	Pre-test	Independent Variable	Post-test
Group	Measure A	Training	Measure A

3/31/2003



38

Benefits and Issues

Benefits.

1. OK for preliminary research.

Issues.

1. History.
2. Maturation.
3. Regression.
4. Testing.
5. Instrument decay.

3/31/2003



39

1. History

Any event that occurs between the first and second dependent measures that is not manipulated by the experimenter.

Pre-test	Training	Post-test
Pre-test	Control	Post-test

3/31/2003



40

2. Testing

Participation in the pre-test may cause changes in the person.

- Reactivity
- Memory

Pre-test	Training	Post-test
	Training	Post-test
Pre-test	Control	Post-test

3/31/2003



41

3. Maturation

Changes in the individual over time that are not associated with the independent variable.

Training	Delay	Post-test
Control	Delay	Post-test

3/31/2003



42

4. Instrument Decay

Changes in the measuring instrument over time.

- Person gets bored.
- Test becomes obsolete.
- Machine wears out.

Pre-test	Training	Post-test
	Control	Post-test

3/31/2003



43

5. Statistical Regression

Occurs when participants are placed into groups based on extreme scores. Extreme scores tend to move (regress) toward the mean.

Pre-test	Training	Post-test
Pre-test	Control	Post-test

3/31/2003



44

Field Research Example

- In 1984 Pittsburgh National Bank had a problem with their tuition reimbursement program.
- They were paying tuition and fees for employees seeking bachelors degrees.
- Approximately 45% of the people did not want to work in the field in which they majored.
- The bank was prepared to scrap the program.

3/31/2003



45

Evaluation Design

	Independent Variable	Dependent Variable
Experimental Group	342 people who attended workshop	Job posting Applications 70% Promotions: 12% Salary/grade change: 91%
Control Group	450 people who did not attend the workshop.	Job posting Applications 23% Promotions: 3% Salary/grade change: 66%

3/31/2003



46

Non-equivalent Control Group

	Independent Variable	Dependent Variable
Group A	Training	Measure
Group X	Something Else	Measure

3/31/2003



47

Benefits and Issues

Benefits.

1. May be the only alternative in field experimentation.

Issues.

1. Treatment difference is **CONFOUNDED** by group difference.

3/31/2003



48

Interactive Problems

- Diffusion of information.
One group talks to another.
- Intergroup competition.
One group competes with another.
- Demoralization.
One group resents the other group.

3/31/2003



49

Time Series Designs

- Similar to Pretest Post Only design but with multiple preliminary measures.
- No control group.
- Usually have
 - Baseline measurement on dependent variable.
 - Some manipulation or event.
 - Second measurement on the dependent variable.

3/31/2003



50

Interrupted Time Series Design

Baseline
(Pre-test)

Event

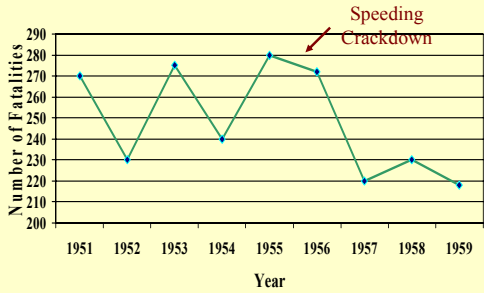
Post
Test

3/31/2003



51

Connecticut Traffic Fatalities



When Used

- Assess the impact of some event.
- Assess the impact of some broad treatment within an existing group.

Utility

Process of showing that the training produces some organizational benefit.

Berkshire Hotels

	Organization	Individual	
Should	86% occupancy	Strong Customer Relations Skills	Authority to make decisions
Gap	5%	Training	Organization change
Is	81% occupancy	Mediocre Customer Relations Skills	No authority

3/31/2003



55

Did It Work?

1. Randomly selected 40 of the 80 hotels for training.
2. Compared the occupancy rates for the 'Trained' hotels against the Control group.
3. Found an increase in occupancy rate of 2 rooms per day.

3/31/2003



56

So What!???

Marketing research, design, consulting, materials, and travel expenses: \$275,000.

2 x \$135 = \$270 additional income each day.

\$270 x 200 workdays = \$54,000 additional annual income per hotel.

\$54,000 x 40 hotels = \$2,160,000 for 40 hotels.

3/31/2003



57