



EMPLOYEE TRAINING *and* DEVELOPMENT



Training Evaluation Chapter 6

6th Edition
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Objectives

- Explain why evaluation is important
- Identify and choose outcomes to evaluate a training program
- Discuss the process used to plan and implement a good training evaluation
- Discuss the strengths and weaknesses of different evaluation designs

Objectives

- Choose the appropriate evaluation design based on the characteristics of the company and the importance and purpose of the training
- Conduct a cost-benefit analysis for a training program
- Explain the role of workforce analytics and dashboards in determining the value of training practices

Introduction

- **Training effectiveness:** Benefits that the company and the trainees receive from training
- **Training outcomes or criteria:** Measures that the trainer and the company use to evaluate training programs

Introduction

- **Training evaluation:** The process of collecting the outcomes needed to determine if training is effective
- **Evaluation design:** Collection of information, including whom, what, when, and how, for determining the effectiveness of the training program

Reasons for Evaluating Training

- Companies make large investments in training and education and view them as a strategy to be successful; they expect the outcomes of training to be measurable
- Training evaluation provides the data needed to demonstrate that training does provide benefits to the company
 - It involves formative and summative evaluation

Formative Evaluation

- Takes place during program design and development
 - It helps ensure that the training program is well organized and runs smoothly
 - Trainees learn and are satisfied with the program
- It provides information about how to make the program better; it involves collecting qualitative data about the program
- **Pilot testing:** Process of previewing the training program with potential trainees and managers or with other customers

Summative Evaluation

- Determines the extent to which trainees have changed as a result of participating in the training program
 - It may include measuring the monetary benefits that the company receives from the program (ROI)
 - It involves collecting quantitative data

Summative Evaluation

- A training program should be evaluated:
 - To identify the program's strengths and weaknesses
 - To assess whether content, organization, and administration of the program contribute to learning and the use of training content on the job
 - To identify which trainees benefited most or least from the program

Summative Evaluation

- To gather data to assist in marketing training programs
- To determine the financial benefits and costs of the program
- To compare the costs and benefits of:
 - Training versus non-training investments
 - Different training programs to choose the best program

Figure 6.1 - The Evaluation Process

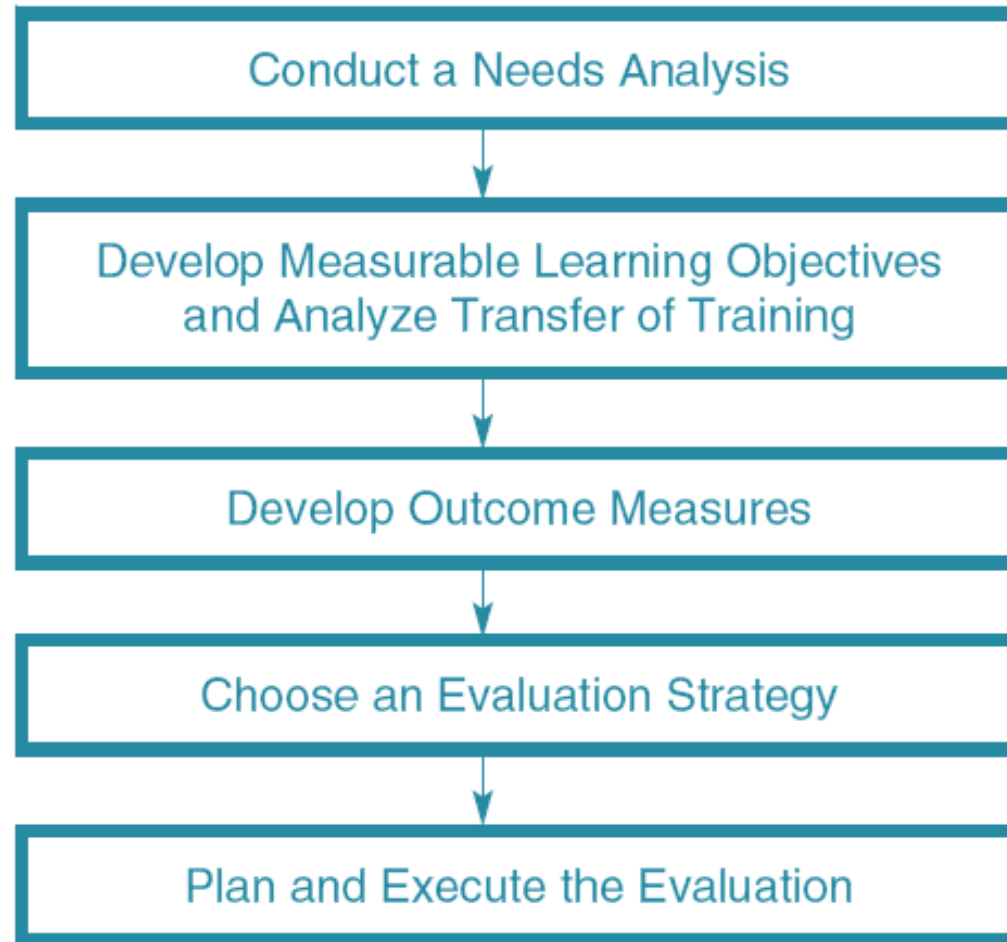


Table 6.1 - Evaluation Outcomes

Outcome or Criterion	Level	What Is Measured	Example	Method of Measurement
Reactions	1	Learners' satisfaction	Comfortable training room Useful materials and program content	Surveys Interviews
Learning or cognitive	2	Principles, facts, techniques, procedures, or processes that the learners have acquired	Electrical principles Safety rules Steps in interviewing	Tests Work samples
Behavior and skill-based	2 or 3	Interpersonal Technical or motor skills or behaviors acquired by learners	Preparing a dessert Sawing wood Landing an airplane Listening	Tests Observations Self, peer, customer, and/ or managers' ratings Work samples

Table 6.1 - Evaluation Outcomes

Affective	2 or 3	Learners' attitudes and motivation	Tolerance for diversity Safety attitudes Customer service orientation	Attitude surveys Interviews Focus groups
Results	4	Payoffs for the company	Productivity Quality Costs Repeat customers Customer satisfaction Accidents	Observation Performance data from records or company databases
Return on investment	5	Identification and comparison of learning benefits with costs	Dollar value of productivity divided by training costs	Economic value

Outcomes Used in the Evaluation of Training Programs

- **Reaction outcomes**
 - It is collected at the program's conclusion
- **Cognitive outcomes**
 - Determine the degree to which trainees are familiar with the principles, techniques, and processes emphasized in the training program
- **Skill-based outcomes**
 - The extent to which trainees have learned skills can be evaluated by observing their performance in work samples such as simulators

Outcomes Used in the Evaluation of Training Programs

- **Affective outcomes**
 - If trainees were asked about their attitudes on a survey, that would be considered a learning measure
- **Results:** Used to determine the training program's payoff for the company

Outcomes Used in the Evaluation of Training Programs

- Return on investment
 - **Direct costs:** Salaries and benefits for all employees involved in training; program material and supplies; equipment or classroom rentals or purchases; and travel costs
 - **Indirect costs:** Not related directly to the design, development, or delivery of the training program
 - **Benefits:** Value that the company gains from the training program

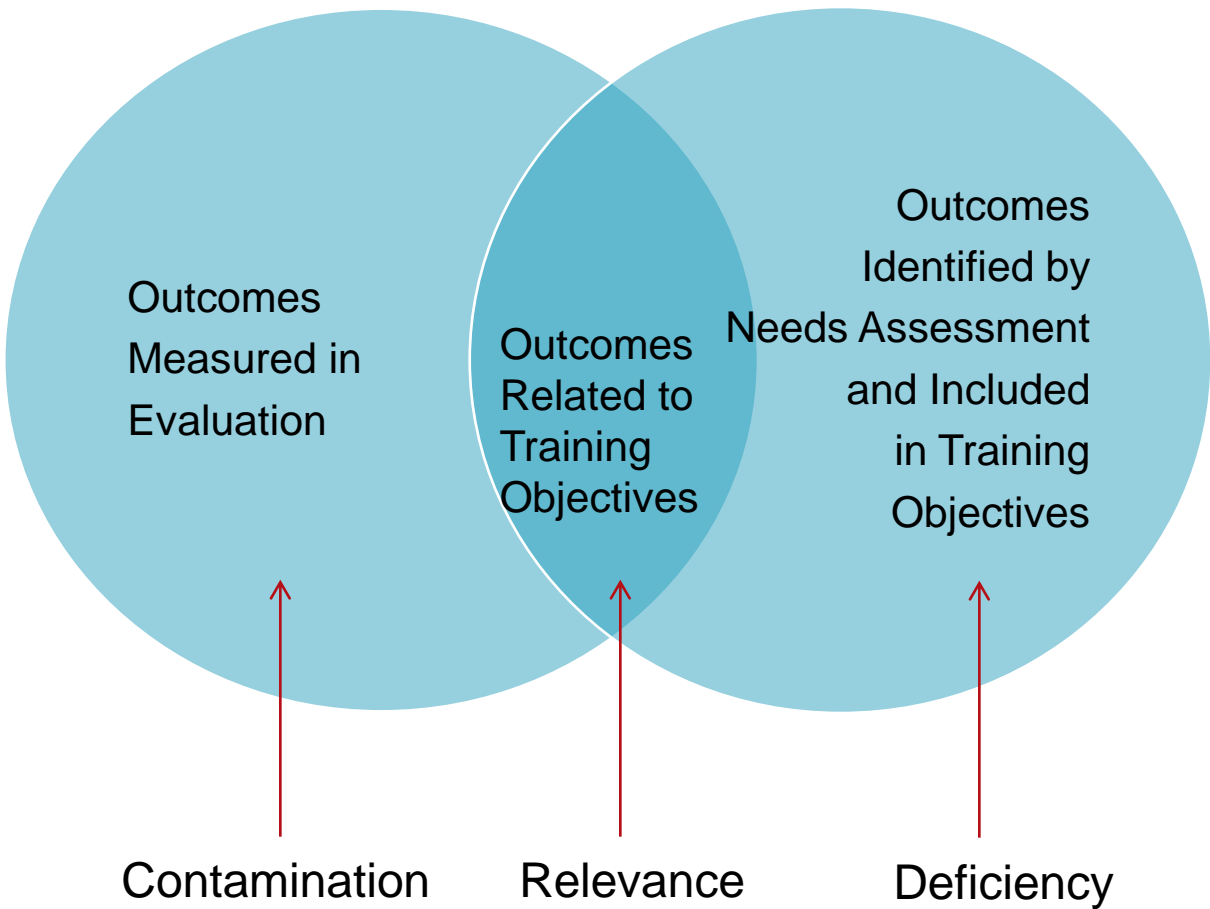
Outcomes Used in the Evaluation of Training Programs

- Training Quality Index (TQI): Computer application that collects data about training department performance, productivity, budget, and courses, and allows detailed analysis of this data
 - Quality of training is included in the effectiveness category

Determining Whether Outcomes are Appropriate

Criteria Relevance	<p>The extent to which training outcomes are related to the learned capabilities emphasized in the training program.</p> <p>Criterion contamination - the extent that training outcomes measure inappropriate capabilities or are affected by extraneous conditions.</p> <p>Criterion deficiency - the failure to measure training outcomes that were emphasized in the training objectives.</p>
Reliability	<p>The degree to which outcomes can be measured consistently over time.</p>
Discrimination	<p>The degree to which trainees' performance on the outcome actually reflects true differences in performance.</p>
Practicality	<p>The ease with which the outcome measures can be collected.</p>

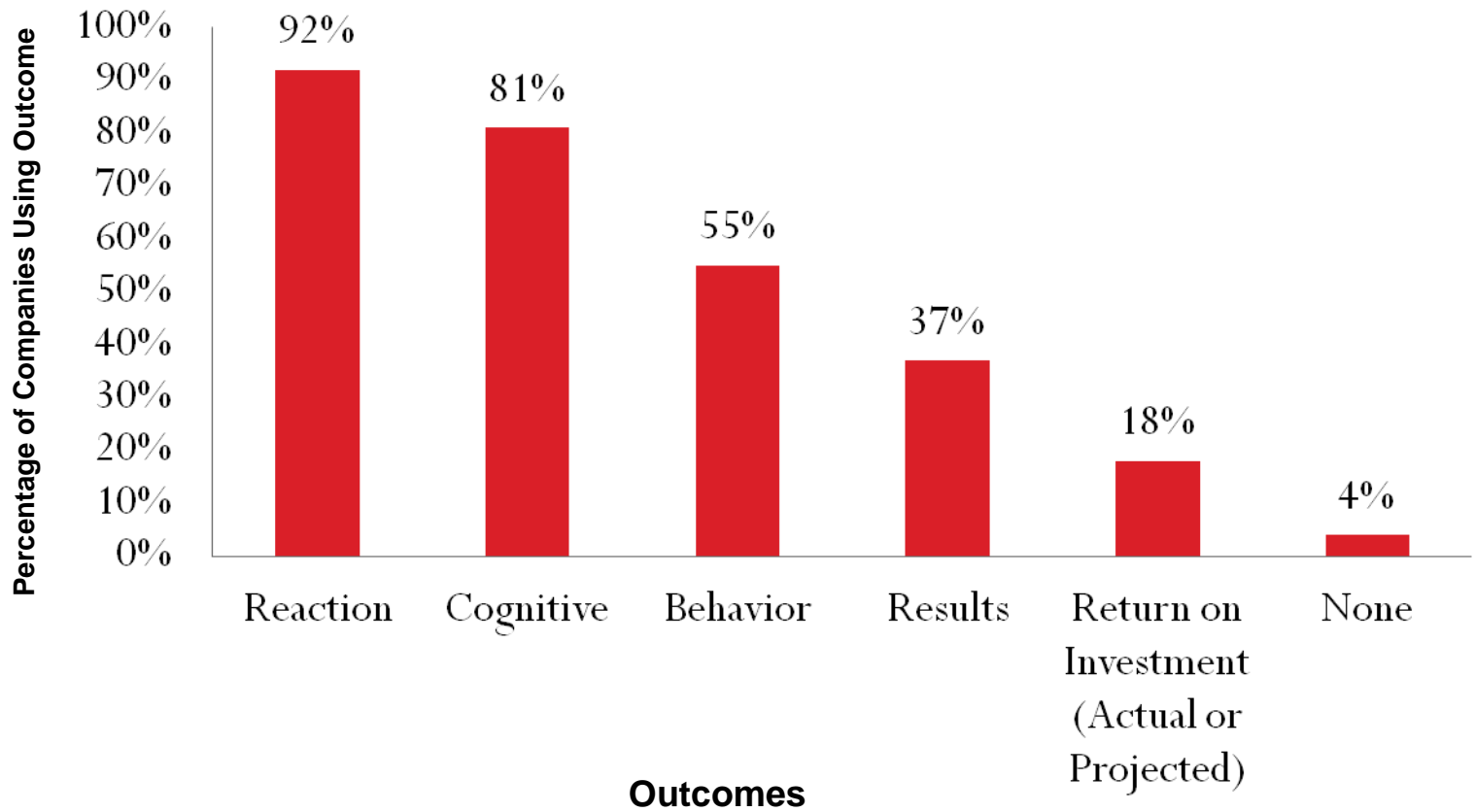
Figure 6.2 - Criterion Deficiency, Relevance, and Contamination



Evaluation Practices

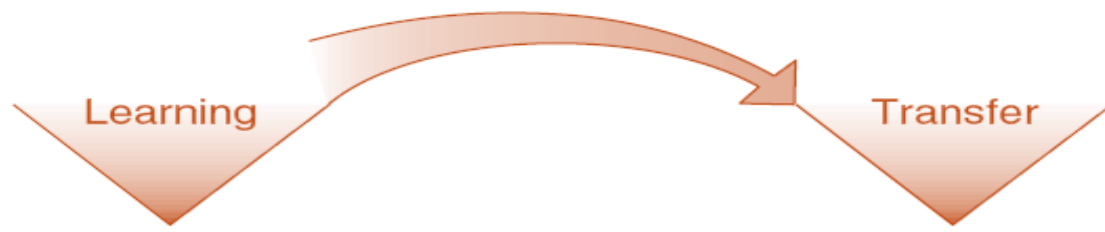
- It is important to recognize the limitations of choosing to measure only reaction and cognitive outcomes
 - To ensure an adequate training evaluation, companies must collect outcome measures related to both learning and transfer

Figure 6.3 - Training Evaluation Practices



Objectives and Their Implications for Evaluation

Objective



Outcomes

Reactions: Did trainees like the program?
Did the environment help learning?
Was material meaningful?

Learning/Cognitive: Pencil-and-paper tests

*Behaviour/
Skill-Based:* Performance on a work sample

Behaviour!

Skill-Based: Ratings by peers or managers based on observation of behavior

Affective: Trainees' motivation or job attitudes

Results: Did company benefit through sales, quality, productivity, reduced accidents, and complaints?

Performance on work equipment

Evaluation Designs

- **Threats to validity:** Factors that will lead an evaluator to question either the:
 - **Internal validity:** The believability of the study results
 - **External validity:** The extent to which the evaluation results are generalizable to other groups of trainees and situations

Table 6.6 - Threats to Validity

Threats to Internal Validity	Description
Company	
History	Event occurs, producing changes in training outcomes.
Persons	
Maturation	Changes in training outcomes result from trainees' physical growth or emotional state.
Mortality	Study participants drop out of study (e.g., leave company).
Initial group differences	Training group differs from comparison group on individual differences that influence outcomes (knowledge, skills, ability, and behavior).
Outcome Measures	
Testing	Trainees are sensitized to perform well on post-test measures.
Instrumentation	Trainee interpretation of outcomes changes over course of evaluation.
Regression toward the mean	High- and low-scoring trainees move toward the middle or average on post-training measure.
Threats to External Validity	Description
Reaction to pretest	Use of a test before training causes trainees to pay attention to material on the test.
Reaction to evaluation	Being evaluated causes trainees to try harder in training program.
Interaction of selection and training	Characteristics of trainees influence program effectiveness.
Interaction of methods	Results of trainees who received different methods can be generalized only to trainees who receive same training in the same order.

Methods to Control for Threats to Validity

- Pretests and post-tests: Comparison of the post-training and pretraining measures can indicate the degree to which trainees have changed as a result of training
- Use of comparison groups: Group of employees who participate in the evaluation study but do not attend the training program
 - Hawthorne effect

Methods to Control for Threats to Validity

- **Random assignment:** Assigning employees to the training or comparison group on the basis of chance alone
 - It is often impractical
 - Analysis of covariance

Types of Evaluation Designs

- **Post-test only:** Only post-training outcomes are collected
 - Appropriate when trainees can be expected to have similar levels of knowledge, behavior, or results outcomes prior to training
- **Pretest/post-test:** Pretraining and post-training outcome measures are collected
 - Used by companies that want to evaluate a training program but are uncomfortable with excluding certain employees

Table 6.7 Comparison of Evaluation Designs

Design	Groups	Measures				
		Pretraining	Post-training	Cost	Time	Strength
Post-test only	Trainees	No	Yes	Low	Low	Low
Pretest/post-test	Trainees	Yes	Yes	Low	Low	Med.
Post-test only with comparison group	Trainees and comparison	No	Yes	Med.	Med.	Med.
Pretest/post-test with comparison group	Trainees and comparison	Yes	Yes	Med.	Med.	High
Time series	Trainees	Yes	Yes, several	Med.	Med.	Med.
Time series with comparison group and reversal	Trainees and comparison	Yes	Yes, several	High	Med.	High
Solomon Four-Group	Trainees A	Yes	Yes	High	High	High
	Trainees B	No	Yes			
	Comparison A	Yes	Yes			
	Comparison B	No	Yes			

Types of Evaluation Designs

- **Pretest/post-test with comparison group:** Includes trainees and a comparison group
 - Differences between each of the training conditions and the comparison group are analyzed determining whether differences between the groups were caused by training

Types of Evaluation Designs

- **Time series:** Training outcomes are collected at periodic intervals both before and after training
 - It allows an analysis of the stability of training outcomes over time
 - **Reversal:** Time period in which participants no longer receive the training intervention
- **Solomon four-group:** Combines the pretest/post-test comparison group and the post-test-only control group design
 - This design controls for most threats to internal and external validity

Table 6.10 - Factors that Influence the Type of Evaluation Design

Factor	How the Factor Influences the Type of Evaluation Design
Change potential	Can the program be modified?
Importance	Does ineffective training affect customer service, safety, product development, or relationships among employees?
Scale	How many trainees are involved?
Purpose of training	Is training conducted for learning, results, or both?
Organization culture	Is demonstrating results part of company norms and expectations?
Expertise	Can a complex study be analyzed?
Cost	Is evaluation too expensive?
Time frame	When is the information needed?

Determining Return on Investment

- **Cost-benefit analysis:** Process of determining the economic benefits of a training program using accounting methods that look at training costs and benefits
- ROI should be limited only to certain training programs, because it can be costly
- Determining costs
 - Methods for comparing costs of alternative training programs include the resource requirements model and accounting

Determining Return on Investment

- Determining benefits – Methods include:
 - Technical, academic, and practitioner literature
 - Pilot training programs and observance of successful job performers
 - Observance of successful job performers
 - Estimates by trainees and their managers
- To calculate ROI
 - Identify outcomes
 - Place a value on the outcomes
 - Determine the change in performance after eliminating other potential influences on training results
 - Obtain an annual amount of benefits
 - Determine the training costs
 - Calculate the total benefits by subtracting the training costs from benefits (operational results)
 - Calculate the ROI by dividing operational results by costs
 - The ROI gives an estimate of the dollar return expected from each dollar invested in training

Table 6.11- Determining Costs for a Cost Benefit Analysis

Direct Costs	
Instructor	\$ 0
In-house instructor (12 days @ \$125 per day)	1,500
Fringe benefits (25% of salary)	375
Travel expenses	0
Materials (\$60 × 56 trainees)	3,360
Classroom space and audiovisual equipment (12 days @ \$50 per day)	600
Refreshments (\$4 per day × 3 days × 56 trainees)	672
Total direct costs	\$ 6,507
Indirect Costs	
Training management	\$ 0
Clerical and administrative salaries	750
Fringe benefits (25% of salary)	187
Postage, shipping, and telephone	0
Pre- and post-training learning materials (\$4 × 56 trainees)	224
Total indirect costs	\$ 1,161
Development Costs	
Fee for program purchase	\$ 3,600
Instructor training	
Registration fee	1,400
Travel and lodging	975
Salary	625
Benefits (25% of salary)	156
Total development costs	\$ 6,756
Overhead Costs	
General organizational support, top management time (10% of direct, indirect, and development costs)	\$ 1,443
Total overhead costs	\$ 1,443
Compensation for Trainees	
Trainees' salaries and benefits (based on time away from job)	\$16,969
Total training costs	\$32,836
Cost per trainee	\$ 587

Determining Return on Investment

- **Utility analysis:** Cost-benefit analysis method that involves assessing the dollar value of training based on:
 - Estimates of the difference in job performance between trained and untrained employees
 - The number of individuals trained
 - The length of time a training program is expected to influence performance
 - The variability in job performance in the untrained group of employees

Practical Considerations in Determining ROI

- Training programs best suited for ROI analysis:
 - Have clearly identified outcomes
 - Are not one-time events
 - Are highly visible in the company
 - Are strategically focused
 - Have effects that can be isolated

Practical Considerations in Determining ROI

- Showing the link between training and market share gain or other higher-level strategic business outcomes can be very problematic
 - Outcomes can be influenced by too many other factors not directly related to training
 - Business units may not be collecting the data needed to identify the ROI of training programs
 - Measurement of training can be expensive

Table 6.13-Examples of ROI's

Industry	Training Program	ROI
Bottling company	Workshops on managers' roles	15:1
Large commercial bank	Sales training	21:1
Electric and gas utility	Behavior modification	5:1
Oil company	Customer service	4.8:1
Health maintenance organization	Team training	13.7:1

Success Cases and Return on Expectations

- **Return on expectations (ROE):** Process through which evaluation demonstrates to key business stakeholders that their expectations about training have been satisfied
- **Success cases:** Concrete examples of the impact of training that show how learning has led to results that the company finds worthwhile

Measuring Human Capital and Training Activity

- American Society of Training and Development (ASTD): Provides information about training hours and delivery methods that companies can use to benchmark
- **Workforce analytics:** Practice of using quantitative methods and scientific methods to analyze data from human resource databases and other databases to influence important company metrics

Measuring Human Capital and Training Activity

- **Dashboards:** Computer interface designed to receive and analyze the data from departments within the company to provide information to managers and other decision makers
 - Useful because they can provide a visual display using charts of the relationship between learning activities and business performance data

Table 6.14 - Training Metrics

Expenditure per employee
Learning hours received per employee
Expenditure as a percentage of payroll
Expenditure as a percentage of revenue
Cost per learning hour received
Percentage of expenditures for external services
Learning hours received per training and development staff member
Average percentage of learning activities outsourced
Average percentage of learning content by content area (e.g., basic skills, customer service, executive development, etc.)
Average percentage of learning hours provided via different delivery methods (instructor-led, technology-based, etc.)