



SESSION #305: AUTOMATED WEB-BASED EVALUATION: ACCOUNTABILITY FROM LEVEL ONE TO ROI AND BEYOND

Desired Knowledge or Experience: Limited knowledge of and experience with basic evaluation concepts

Objectives: By the end of this session, you'll know how to:

- Formulate the evaluation framework.
- Use the computer infrastructure to analyze evaluation data.
- Report and sell results.

Your Presenters: Deborah Stone, CPT, is President and CEO of DLS Group. She has received 17 professional Awards of Excellence, including Microsoft's Outstanding Product Award, for work in performance technology, Performance Support Systems, and technology-based training geared to managers. A frequent author and presenter at Training, the Training Directors' Forum, TechKnowledge, ISPI, and many corporations, Deborah completed her graduate work in instructional technology at San Francisco State University. She was ISPI's 1991-93 Vice President of Technology Applications and the co-developer of ISPI's first HPT Institute. Deborah also co-authored the chapter on PSS that appears in the second edition of the Handbook of Human Performance Technology.

Steven W. Villachica, Ph. D., CPT Steve is Chief Learning Officer (CLO) for DLS Group, where he specializes in applying cognitive research and assessment to technology-based delivery platforms. A frequent presenter at international conferences and member of ASTD, Steve also co-authored the chapter on PSS appearing in the second edition of the Handbook of Human Performance Technology. A two-time winner of ISPI's Outstanding Systematic Approach award, he completed his doctorate in educational technology at the University of Northern Colorado.

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Automated Web-Based Evaluation

Accountability from Level One to ROI and Beyond

Session
305



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DLS Group, Inc. Denver, CO
www.dls.com

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1

Problems with High-Level Evaluation

What types of problems have you encountered conducting high-level evaluations?

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Story Seven Blindfolded People Meet an Elephant



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Agenda

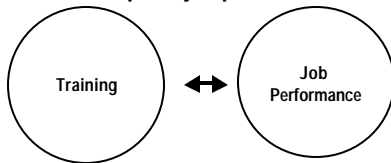
- ✓ Formulate an evaluation framework.
- Matrix the evaluation effort.
- Create the computer infrastructure.
- Analyze evaluation data.
- Report and sell results.
- Discussion.

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The Question

What is the relationship between training and subsequent job performance?



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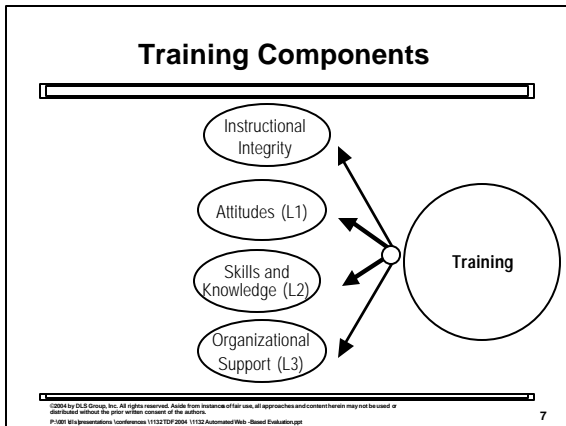
The Answer

It's all about TRANSFER.



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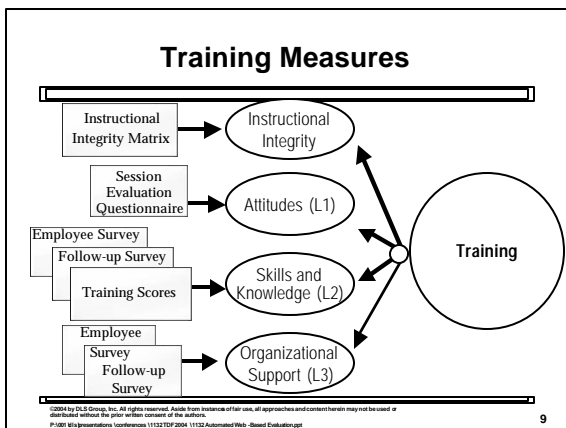


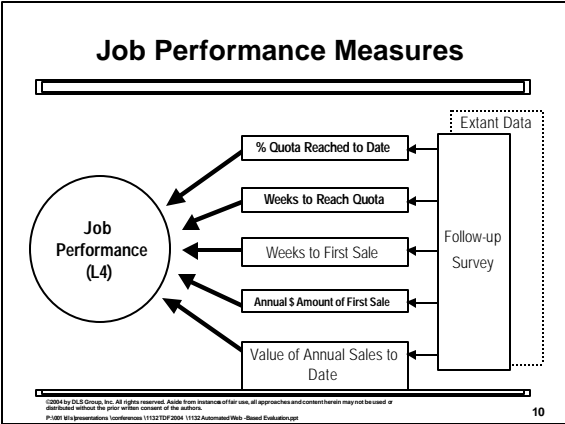
Why “Organizational Support?”

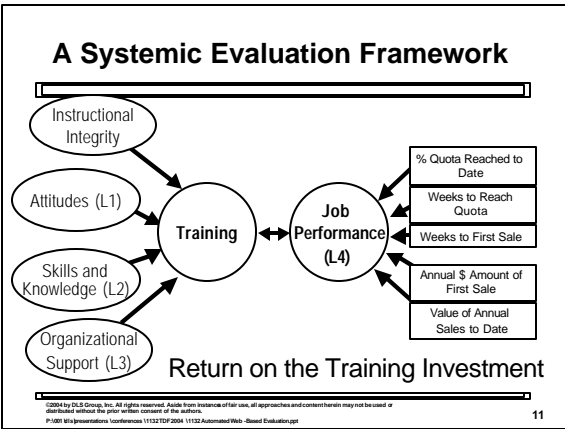
- Information technology that aims to empower individuals by obliterating social organization ignores ways in which social context adds meaning to information.
—Brown & Duguid, 2000
- There is a tendency to largely ignore social networks, as well as the reciprocity and trustworthiness they require. *—Putnam, 2000*

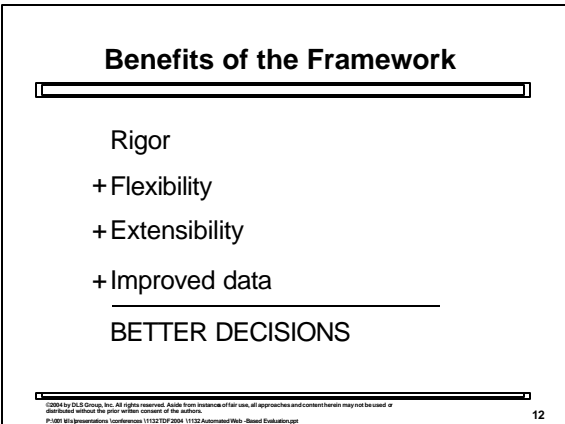
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Cost Efficiencies within the Framework

- Web-based surveys.
- Automated computer-2-computer data collection scripts.
- Automated “grunt-level” data analysis and reporting.



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What We Learned about Frameworks

- Make the framework modular.
- Build the framework incrementally and iteratively.
- Modify the framework based upon the data you collect.
- The framework should accommodate a broad range potential evaluation questions.
- Revisit the framework frequently.

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Evaluation Matrix Description

- Equivalent of an evaluation design containing a detailed scope of work.
- Relates evaluation levels, questions, measures, data sources, and data analyses.
- Obtains stakeholder and client-side project management buy-in early in the process.

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Evaluation Matrix The Tool

- Evaluation Question.
- Evaluation Level.
- What the Question Means.
- Measures Used to Answer the Question.
- Data Types.
- Data Collection Instrument(s).
- Unit of Analysis.
- Population Size.
- Sample Size.
- Data Source(s).
- Confounds
- Approaches to Control the Confounds
- Data Format(s).
- Statistical Test(s).

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Types of Analyses

- Exploratory factor analysis.
- Chi-square test of independence.
- Multiple linear regression.
- Univariate analysis of variance (ANOVA).
- Multivariate analysis of variance (MANOVA).
- Discriminant analysis.
- Structural equation modeling.
- Qualitative analysis of comments.

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Evaluation Matrix Lessons Learned

- Be specific.
- Try to use the appropriate data sources.
 - Use self-report data for attitudes.
 - Use extant data about performance.
- Work with others.
 - Line managers.
 - Statisticians/research designers.
 - Information technology.
- Obtain stakeholder signoff.

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Evaluation Matrix Lessons Learned (*continued*)

- Matrices aren't fun, but they are necessary.
- Matrices are live, iterative documents.

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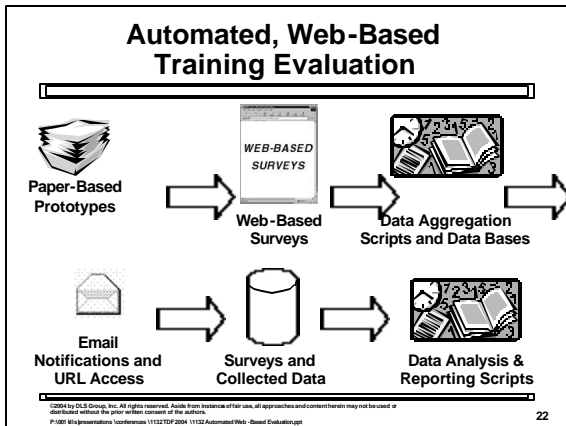
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Agenda


- ✓ Formulate an evaluation framework.
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- ### Create Paper-Based Survey Prototypes
- Prototype 1 (Client Deliverable)
 - Instructions, anonymity message
 - Topics
 - Items
 - Rating scales
 - Prototype 2 (Internal Deliverable)
 - Survey topics
 - Items
 - Rating scales
 - Variable name
 - Variable type (nominal, scaled, text)
 - Variable labels
- 
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- ### Create Web-Based Surveys
- Create HTML style sheet.
 - Copy and paste items into DreamWeaver.
 - Copy and paste variable names and values.
 - Test HTML displays in Netscape and IE.
- 
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Aggregate the Data

- Model the data.
- Build the database.
- Code the ASP scripts that post data to the SQL server.
- Test the web pages, scripts, and database.
 - Specify inputs.
 - Printout before submitting survey.
 - Compare responses.
 - Check appropriate database coding



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Provide URL and Email Access

- Provide URL access to people in classrooms.
 - Collect Level 1 data.
 - Collect email addresses.
- Provide email access to participants who have returned to their jobs.
 - VB scripts.
 - Initial survey invitations.
 - Collect level 3 and 4 data.
 - Reminders.



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Analyze and Report Data

ASP scripts:

- Generate descriptive data and graphs.
- Write data to MS-Word report templates.
 - Final drafts of frequent, descriptive reports.
 - Rough drafts of infrequent reports.



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Evaluation Infrastructure Lessons Learned

- Prototype what you want. Then investigate off-the-shelf survey solutions.
- Automate tasks that are manually intensive and repetitive.
- Make sure the manual process is solid before you automate it.
- Make sure you can justify the cost of any automation.

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Evaluation Infrastructure What We Learned (continued)

- Focus on priorities, not niceties.
- Work iteratively.
- Conduct front-to-back tests using a representative sample of end-user hardware and software configurations.
- Match report formats to what stakeholders (and their managers) want to see.

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Level 1 Results

Session Evaluation Questionnaires (SEQs)

- Instrument based on sound theory.
- Responses are related in expected ways.
- Participants like their training.
 - Median = "5" for 11 of 14 scaled items.
- Beginning work to aggregate quarterly and annually.
 - Quantitative analysis.
 - Qualitative analysis.

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Level 2 Results

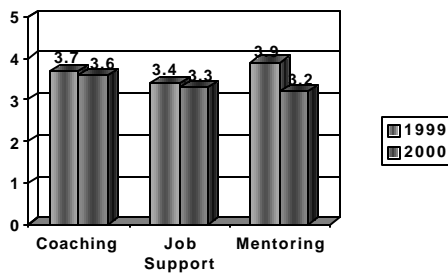
Test Scores

- Courses have been revamped.
 - IDL and classroom components.
 - Online and role play tests.
- All online tests are now situated.
- Moving to integrate level 1 and 2 data in quarterly and annual reports.

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Level 3 Results

Organizational Support for Training Transfer

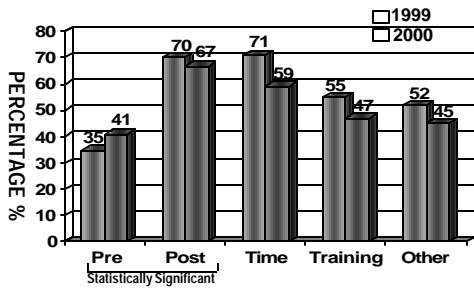


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Level 4 Results Impact without Extant Performance Data

- Estimate performance before training.
- Estimate performance after training.
- Estimate percent of work time spent on tasks.
- Estimate percent of improvement due to training.

Level 4 Results Comparative Impact Data



Level 5 Results Return on Investment

$$ROI = \frac{\text{Training Benefits}}{\text{Training Costs}}$$

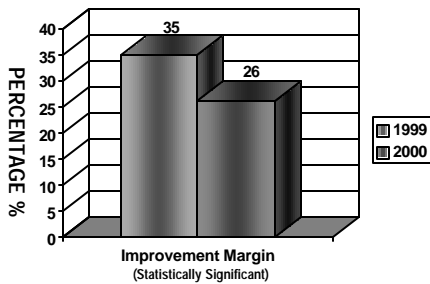
Measuring Benefits

- Estimate performance before training.
- Estimate performance after training.
- Estimate percent of work time spent on tasks.
- Estimate percent of improvement due to training.

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Measuring Benefits



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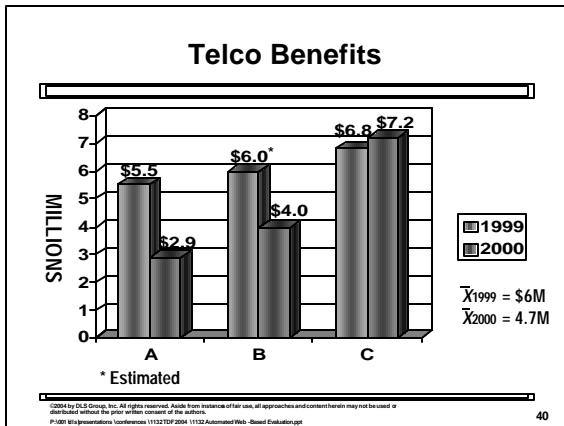
Measuring Benefits

\$ Value of Benefits

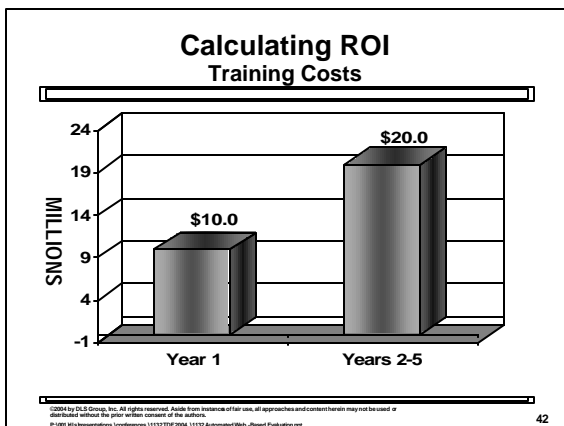
	1999	2000	
			Unit of performance (salary, sales to date, or exemplary revenue)
X	.35	.26	Gain in performance
X	.55	.47	Percentage of performance attributable to initial training
X	.71	.59	Percentage of AE's time spent on tasks requiring training
X	500	500	Number of participants
=			Value of training benefits

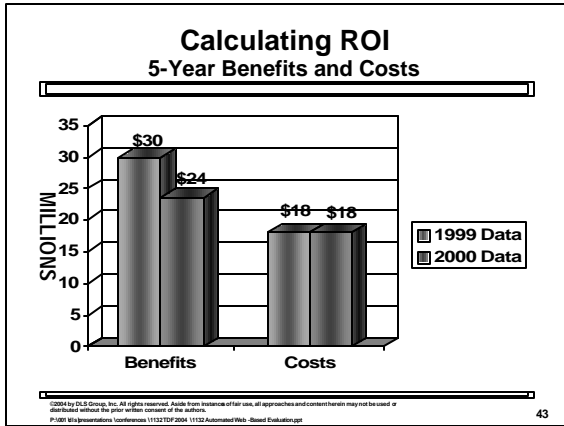
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- ### Calculating ROI Measuring Training Costs
- Number of Students
 - Courses per Year
 - Course Length
 - Number of Participants
 - Employee Pay (Burdened)
 - Instructor Bill Rate
 - Travel Costs
 - Classroom Rental
 - Course Development Costs
 - Course Maintenance Costs
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ROI Calculations

1999	2000	
\$30M	\$24M	Average Training Benefit over 5 Years
\$18M	\$18M	Average Training Costs over 5 Years
\$12M	\$6m	Average Return on Investment (ROI) over 5 Years
Within 1 Year	Within 1 Year	Payback Period
165%	133%	Average Percentage ROI over 5 Years

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- ### Beyond Level 5 Monitoring Performance
- Populations are changing.
 - Attitudes towards training are:
 - Uniformly high.
 - Not affected by instructor, course, media, or region.
 - Some attitudes are very weakly correlated with performance measures.
 - Future correlations are expected as the framework solidifies.
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Selling Results Different Formats



Annual
Evaluation
Report



Weekly SEQs



Quarterly Reports



Quarterly Executive
Briefings

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Selling Results Rules of Thumb

- Evaluation is not always an objective activity.
- Choose stakeholder-approved methods to:
 - Value performance.
 - Handle opportunity costs.
 - Address salary costs.
 - Account for potential confounds.
- Make sure the evaluation is done by stakeholders, not “the evaluation group.”

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Selling Results Rules of Thumb (continued)

- Match the level of detail to the incentives, informational needs, and attention span of the evaluation user.
- Remember that evaluation results can indicate opportunities for improvement and provide rationales for action.

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A GLIMPSE OF THE FUTURE

- “An immense and ever-increasing wealth of knowledge is scattered about the world today; knowledge that would probably suffice to solve all the mighty difficulties of our age, but is dispersed and unorganized. We need a sort of mental clearinghouse: a depot where knowledge and ideas are received, sorted, summarized, digested, clarified, and compared.”

—H.G. Wells (1940)

Open Discussion

Your questions and comments.

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INSTRUCTIONAL INTEGRITY MATRIX

Course: _____ Target Audience(s): _____ Media: _____ Length: _____

Goal of Course: _____

Competency	Objective (Topic)	Bloom's Tax	Post-Test Source	Post-Test Items	Practice Items	Content

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EVALUATION MATRIX

Evaluation Question	Level	What the Question Means	Measures Used to Answer the Question	Data Type	Data Collection Instrument(s)	Unit of Analysis	Population Size	Sample Size	Data Source	Data Format	Statistical Test
1. What is the impact of training on reps' job performance?	4	Does successful completion of the training affect the way that reps perform their jobs?	<ul style="list-style-type: none"> ➤ Percentage of quota reached to date ➤ Weeks to reach quota ➤ Weeks to first sale ➤ Annual dollar amount of first sale ➤ Value of annual sales to date 	Self Report (could have used extant)	SEQ	Individual Students	500	100	Survey	SQL Server download to Excel	
1a. To what extent do student attitudes impact job performance?	1	Is there a correlation between students' attitudes and subsequent on-the job performance?	<ul style="list-style-type: none"> ➤ Confidence ➤ Cognitive load ➤ Percentage of quota reached to date ➤ Weeks to reach quota ➤ Weeks to first sale ➤ Annual dollar amount of first sale ➤ Value of annual sales to date 	Numeric	SEQ FIS	Individual Students	500	100	Survey		Structural Equation Modeling
2. What is the return on investment of the training?	5	What does the organization get for its training investment?	<ul style="list-style-type: none"> ➤ Productivity level before training ➤ Productivity level after training ➤ Work requiring training ➤ Productivity attributable to training ➤ Productivity attributable to coaching, mentoring, and other management practices 	Self Report (could have used extant)	FIS	Individual Students	500	100	Survey	SQL Server download to Excel	Dependent t-test on pre-post productivity levels

BIBLIOGRAPHY

- Gilbert, T. (1978). Human competence. NY: McGraw-Hill
- Hale, J. (1998). The performance consultant's fieldbook. San Francisco: Jossey-Bass.
- Kaplan, R. S. & Norton, D. P. (1996). The balanced scorecard. Boston, MA: Harvard Business School Press.
- Kirkpatrick, D. L. (1959). Techniques for evaluating training programs. Journal of the American Society for Training and Development, 13(11), 3-9.
- Kirkpatrick, D. L. (1994). Evaluating training programs: The four levels. San Francisco: Barrett-Koehler.
- Lamos, J. P., Villachica, S. W., & Stone, D. L. (1991). Is your CBT worthwhile?" CBT Directions, 4, 16-21.
- Lamos, J. P., Villachica, S. W., & Stone, D. L. (1991, April). Measuring CBT effectiveness from start to finish. Paper presented at Weingarten's 9th Annual Computer-Based Training Conference & Exposition. San Antonio, TX.
- Phillips, J. J. (1997). Return on investment. Houston, TX: Gulf Publishing Co.
- Phillips, J. J. (1998). Handbook of training evaluation and measurement methods (3rd ed.). Houston, TX: Gulf Publishing Co.
- Phillips, J.J. How Much Is the Training Worth? Training & Development 50, no. 4, 20-24.
- Phillips, Jack J. ROI: The Search for Best Practices. Training And Development 50, no. 2, 42-47.
- Phillips, Jack J. Was it the Training? Training And Development 50, no. 3, 28-32.
- Robinson, D. G. & Robinson, J.C. (1995). Performance consulting. San Francisco: Berrett-Koehler Publishers, Inc.
- Robinson, D. G. & Robinson, J.C. (1998). Moving from training to performance. Washington, D.C.: ASTD
- Rummler, G. & Brache, A. (1990). Improving performance. San Francisco: Jossey-Bass
- Shrock, S. A., & Geis, G. L. (1999). Evaluation. In H. D. Stolovitch & E. J. Keeps (Eds.) Handbook of human performance technology: Improving individual and organizational performance worldwide (2nd Ed.) (pp. 185-209). San Francisco: Jossey-Bass/Pfeiffer.
- Simpson, L. (2002). What's going on with your company? Training, 39(6), 30-34.
- Spencer, L. M., Jr. (1985). Calculating human resource program costs and benefits. W.R. Tracey (Ed.) Human resource management and development Handbook. NY: AMACOM.
- Spencer, L. M., Jr. (1986). Calculating human resource costs and benefits. NY: John Wiley and Sons.

Stone, D. L., Villachica, S. W., Stark, T. G., & Silber, K. H. (2000, April). Really Doing Web-Based ROI Evaluation for Sales Training: How AT&T actually did it. Paper presented at the annual conference of the International Society for Performance and Instruction. Cincinnati, OH.

Stone, D. L., & Villachica, S. W. (1992, March). Linking CBT with job performance. Paper presented at Weingarten's 10th Annual Computer-Based Training Conference & Exposition. Orlando, FL.

Stone, D. L., Villachica, S. W., & Stark, T. G. (2001, April). A web-based, automated evaluation system: Accountability from Level 1 to ROI. Paper presented at the annual conference of the International Society for Performance and Instruction. San Francisco, CA.

Villachica, S. W. (1994, September). But what's the bottom line? A performance-based approach for measuring training's impact on job performance. Paper presented at the Montreal Chapter of the International Society for Performance and Instruction. Montreal, Canada.

Villachica, S. W., Lamos, J. P., & Stone, D. L. (1991). Linking CBT with job performance. CBT Directions, 4, 14-19.