Instructional Systems Design Boot Camp

NTI Transit Trainers' Workshop
New Orleans | October 12, 2015

Roll Call - Who are you?

- Name

- Organization

- Title

- Years of Experience in Education and/or Training

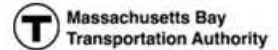- What you want to get out of this workshop

Gaining Attention

2

The Transportation Learning Center

The Transportation Learning Center is a nonprofit organization dedicated to improving public transportation at the national level and within communities. To accomplish this mission, the Center builds labor-management training partnerships that improve organizational performance, expand workforce knowledge, skills and abilities, and promote career advancement.

TRANSPORTATION LEARNING CENTER

Gaining Attention

Training Partnerships in Transit – Location Map
National sponsors and over 40 locations have worked together to build shared solutions

IBEW Local 6 (San Francisco)
IBEW Local 9 (Chicago)
IBEW Local 103 (Boston)
IBEW Local 465 (San Diego)
IBEW Local 1245

SEIU Local 1021 (Sacramento)

TRANSPORTATION LEARNING CENTER

TWU Local 100 (NYC)
TWU Local 208 (Columbus)
TWU Local 234 (Philadelphia)

Who We Are

- Author
- Associate Director of ISD at UMBC
- Professor of ISD
- Apprenticeship Guru
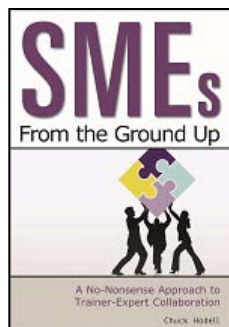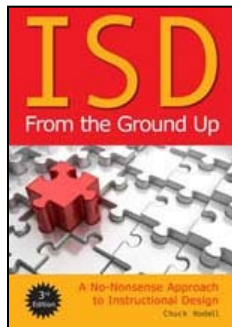
Chuck Hodell, PhD
Senior Advisor for the Center
chodell@transportcenter.org

TRANSPORTATION LEARNING CENTER

Gaining Attention

Who We Are

Jack Clark, Executive Director
jclark@transportcenter.org

- 30 years experience in workforce development
- Former Deputy Director of the Mayor's Office of Jobs and Community Services
- Former senior planner in the Massachusetts Executive Office of Labor
- Current Executive Director of the Transportation Learning Center

TRANSPORTATION LEARNING CENTER

Gaining Attention

Who We Are

Amri Joyner
ajoyner@transportcenter.org

- Instructional Systems Designer

- 20 years experience in designing learning and delivering training.

- Learned Instructional Design "from the seat of her pants."

- Oh the mistakes she made!

TRANSPORTATION LEARNING CENTER

Gaining Attention

By 4:30, You'll Be Able to….

- Recognize general instructional system design terminology

- Draft quality learning objectives

- Identify quality Subject Matter Experts

- List characteristics of Adult Learners

- Apply Gagne's 9 events of instruction to Courseware Development

- Develop a training evaluation plan

TRANSPORTATION LEARNING CENTER

Direction

Today's Outline

I. What is Instructional Systems Design?

II. Overall Process

III. Writing Quality Learning Objectives

IV. Performing a Training Needs Analysis

V. The Courseware Development Process

VI. Evaluation

TRANSPORTATION LEARNING CENTER

Direction

What Do You Already Know?

- Write down one thing you know about each of the following:

  1. ISD

  2. ADDIE

  3. Learning Objectives

  4. Course Evaluation

  5. SME

TRANSPORTATION LEARNING CENTER

Recall 10
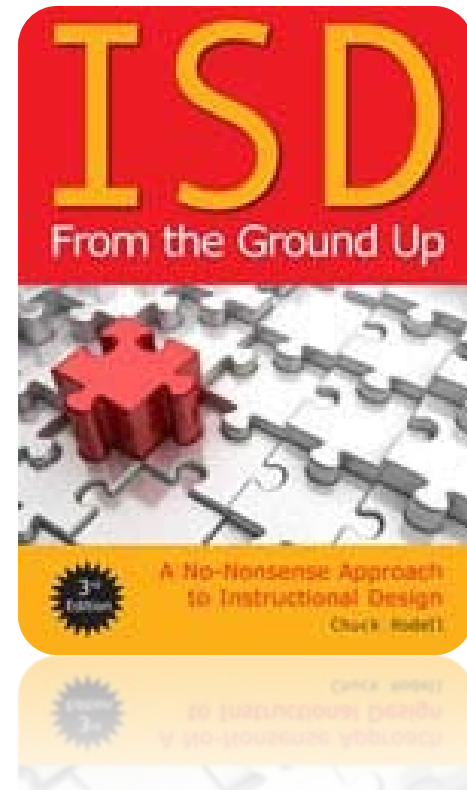
Explain What We Do...

Instructional Systems Design	ADDIE	Learning Objectives	Course Evaluation	SMEs & Instr. Designers
Group #1	Group #2	Group #3	Group #4	Group #5

- Working with your group:

  1. Explain the term to "someone in a waiting room" – what is it?

  2. Use at least one example from your work

- Resources: experiences, ISD book, Flip Charts, Markers,

- Be ready to share in <u>10 minutes</u>

Name Your Team!

TRANSPORTATION LEARNING CENTER

Recall/Content

The Transportation Learning Center's Model

Training Materials
- College Credit
- e-Learning
- Standards-Based Courseware
- Training Standards

Training Delivery
- Hands-on Training Guidelines
- Mentoring Guidelines
- Train-the-Trainer
- Training Gap Analysis
- Skill Gap Analysis

Qualification System
- Skill Validation: Written & Hands-on
- Credential Management System
- Local Apprenticeship
- Labor-Mgmt Training Partnerships
- National Apprenticeship

Direction

TRANSPORTATION LEARNING CENTER
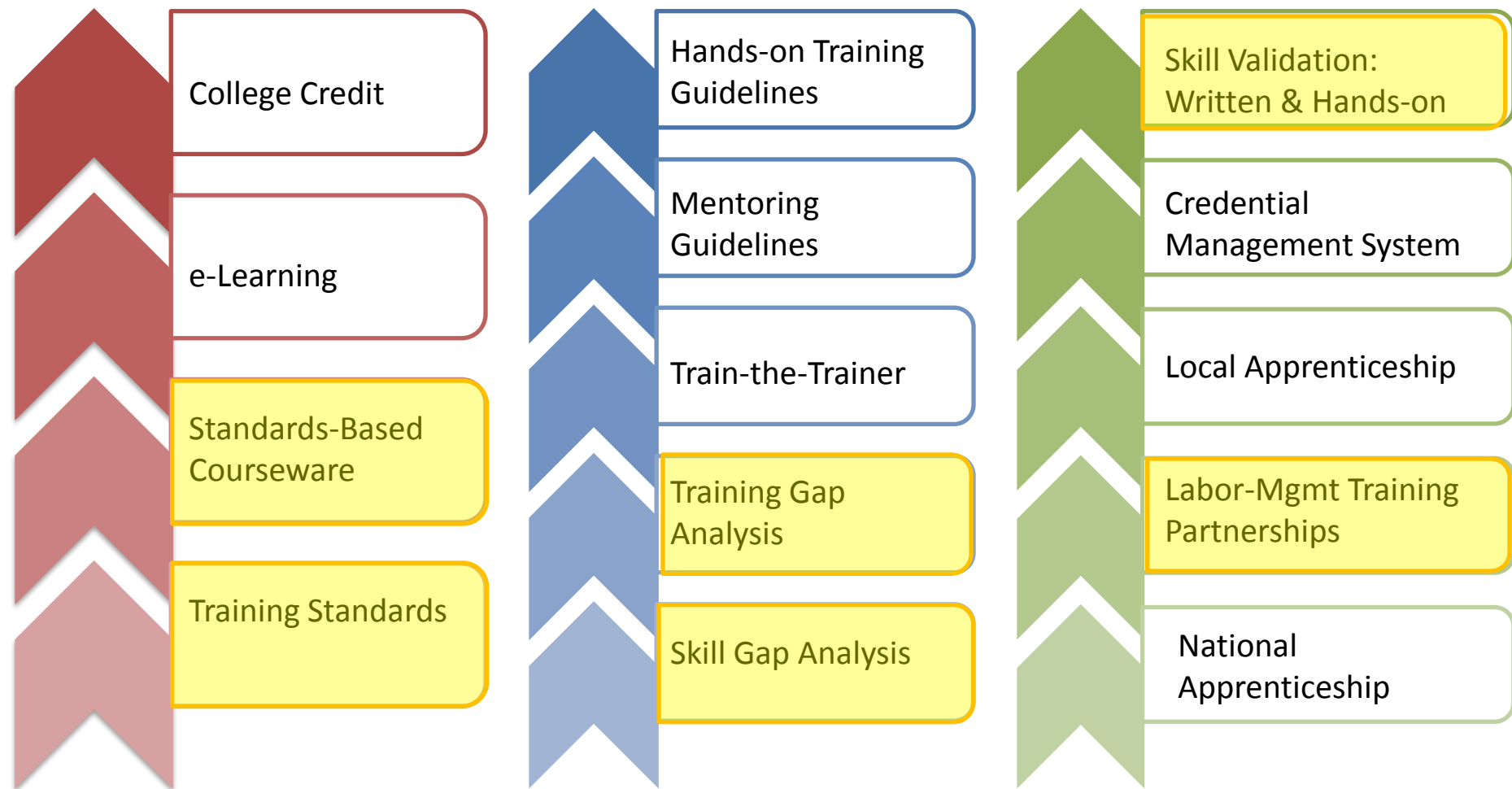
What do we mean by "learning objective"? What does a learning objective include?

TRANSPORTATION LEARNING CENTER
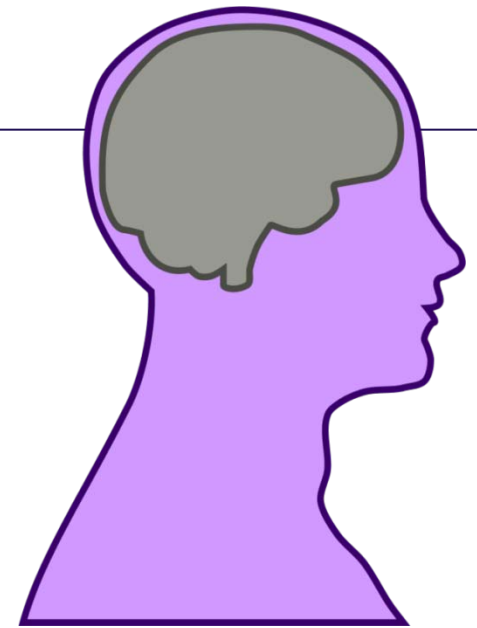
Recall

Learning Objectives

- Rutgers Definition: "A learning objective is an outcome statement that captures specifically what knowledge, skills, attitudes learners should be able to exhibit following instruction"
- The backbone to all instruction
- Must be clear and measurable
- Have four parts (ABCD):
  - Audience
  - Behavior
  - Condition
  - Degree

TRANSPORTATION LEARNING CENTER

Content

Learning Objectives - Example

Given a chart showing common safety labels, the transit elevator/escalator trainee will be able to identify 5 safety labels without assistance or error.

TRANSPORTATION LEARNING CENTER

Content

Audience

Given a chart showing common safety labels, <u>the transit elevator/escalator trainee</u> will be able to identify 5 safety labels without assistance or error.

Content

TRANSPORTATION LEARNING CENTER

Behavior

Given a chart showing common safety labels, the transit elevator/escalator trainee <u>will be able to identify</u> 5 <u>safety labels</u> without assistance or error.

TRANSPORTATION LEARNING CENTER

Content

Condition

Given a chart showing common safety labels, the transit elevator/escalator trainee will be able to identify 5 safety labels without assistance or error.

TRANSPORTATION LEARNING CENTER

Content

Degree

Given a chart showing common safety labels, the transit elevator/escalator trainee will be able to identify <u>5</u> safety labels <u>without assistance or error</u>.
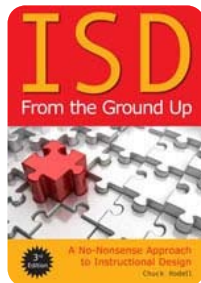
TRANSPORTATION LEARNING CENTER

Content

Team Activity #1 – Learning Objectives

Working with your team, draft **five** or more **learning objectives** related to your topic which:
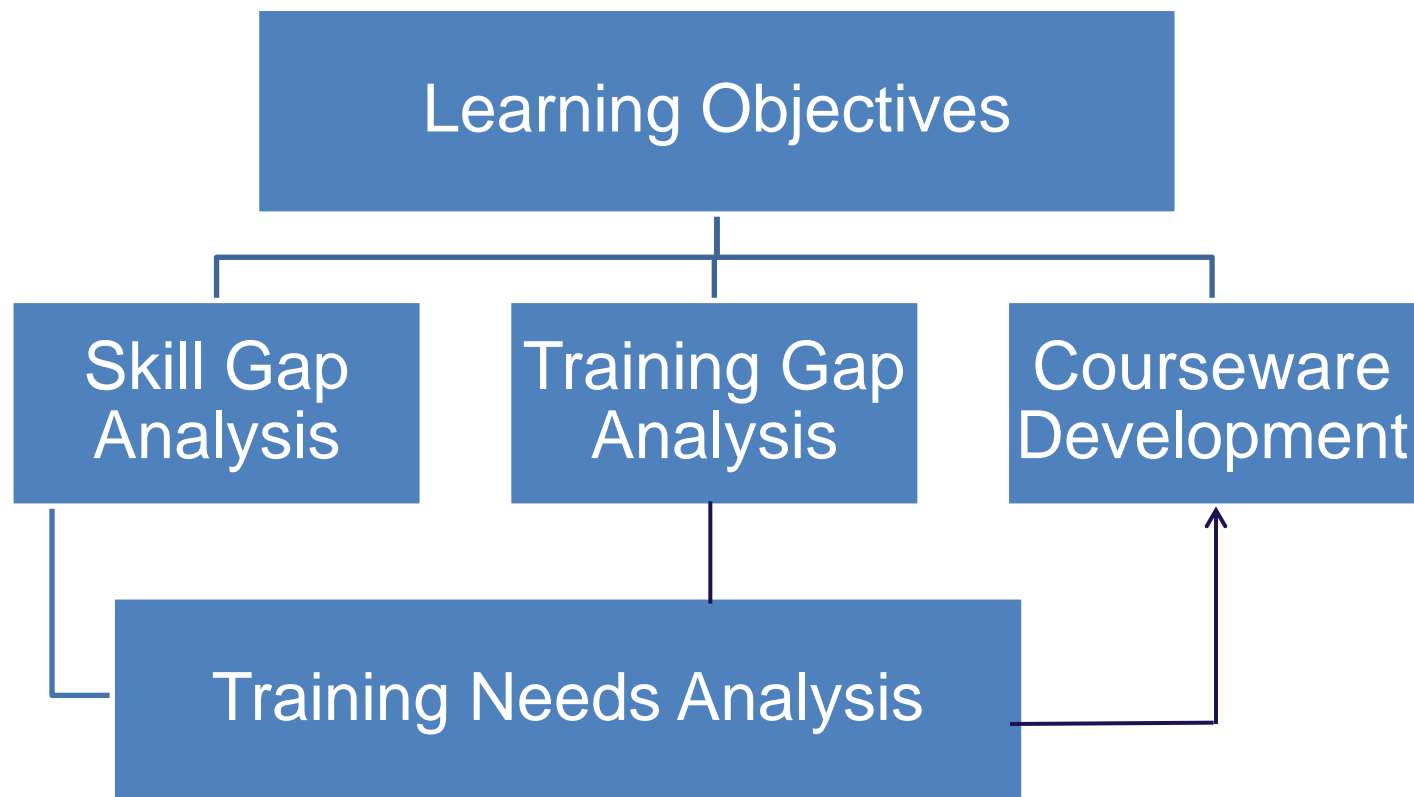
- Consider the **Audience**
- Identify an Observable and Measurable **Behavior**
- Outline the **Conditions** in which the behavior will be performed
- Identify the **Degree** to which this behavior will be mastered

You have ten minutes to complete this task.

See pages 77-101 for more guidance

TRANSPORTATION LEARNING CENTER

Application/Feedback 2

20

Putting Learning Objectives to Use

TRANSPORTATION LEARNING CENTER

Content/Direction

Performing a Training Needs Analysis

- Compare agreed upon learning objectives to:

    – Training Materials → Training Gap Analysis

    – Skills of the workforce
        → Skill Gap Analysis
        → Assessments (we won't cover these today)

TRANSPORTATION LEARNING CENTER

22

Content/Direction

Training Gap Analysis

- Cross reference listed learning objectives and course content

COURSE 305: CAB & WAYSIDE TROUBLESHOOTING AND REPAIR
MODULE 1: PRINCIPLES OF TROUBLESHOOTING

Module 1

PRINCIPLES OF TROUBLESHOOTING

Outline

1-1 Overview
1-2 Four Steps in Troubleshooting
1-3 Best Practices for Troubleshooting
1-4 Charts and Diagrams in Troubleshooting
1-5 Summary

Purpose and Objectives

The purpose of this module is to provide an overview to troubleshooting signal systems equipment and machinery within the context of general troubleshooting and best practices.

Following the completion of this module, the participant should be able to complete the exercises with an accuracy of 70% or greater:

- Examine the importance of troubleshooting
- Restate the troubleshooting process
- Identify troubleshooting steps
- Identify troubleshooting best practices
- Apply troubleshooting principles to some common signal systems problems and causes.

1-3 FOUR STEPS IN TROUBLESHOOTING

Figure 1.1 illustrates the four-step method for troubleshooting. Some rail transit authorities may have additional or different steps in approaching troubleshooting but, in general, all the principles are captured in these four steps which can be followed when beginning to troubleshoot a problem within transit signal systems. This list is a basic approach or model that the participant can follow.

Figure 1.1   The Four Ds: Steps in Troubleshooting Signals Systems

Step 1 - Define

Identify Symptoms, Investigate Situation, Isolate Problem

In order to define the problem, the Signal Maintainer needs to identify the symptoms of the trouble call by collecting as much information as possible on the reported problem. Some questions the Signal Maintainer may ask are:

- Who may have relevant knowledge about the problem?
- What other local equipment is having trouble? Look at broader, larger picture.

TRANSPORTATION LEARNING CENTER

Content

23

Skill Gap Analysis

- Anonymous Self-Assessments of Workforce Skills
- Results used to prioritize training
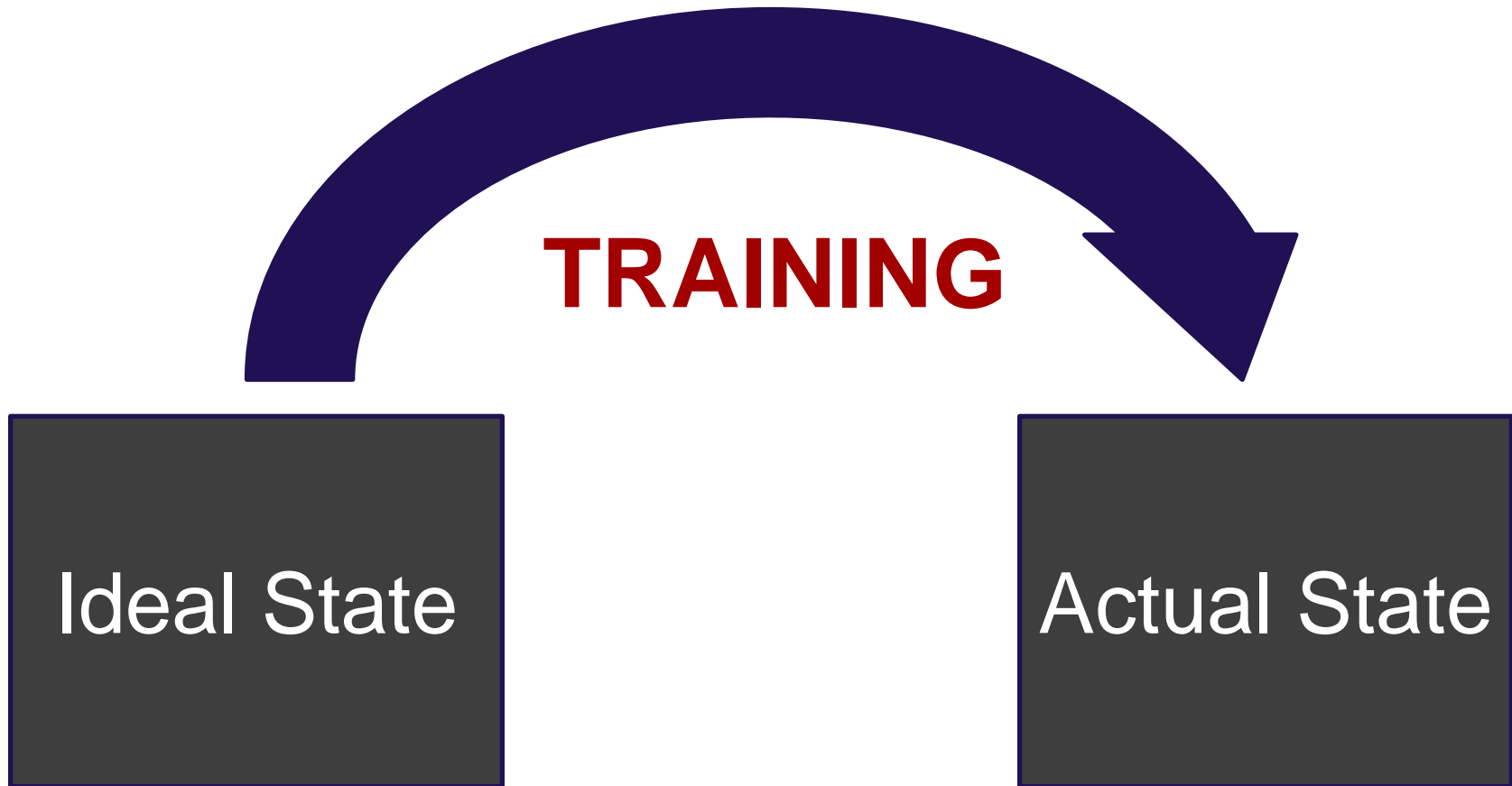
Occupation: _____   Years of Experience: _____

On a scale of 0-4, rank your ability to perform the following tasks. Number designation meanings are:

0 – I do not know what this task is

1 – I know what this task is but could not perform it

2 – I could perform this task with help

3 – I could perform this task independently
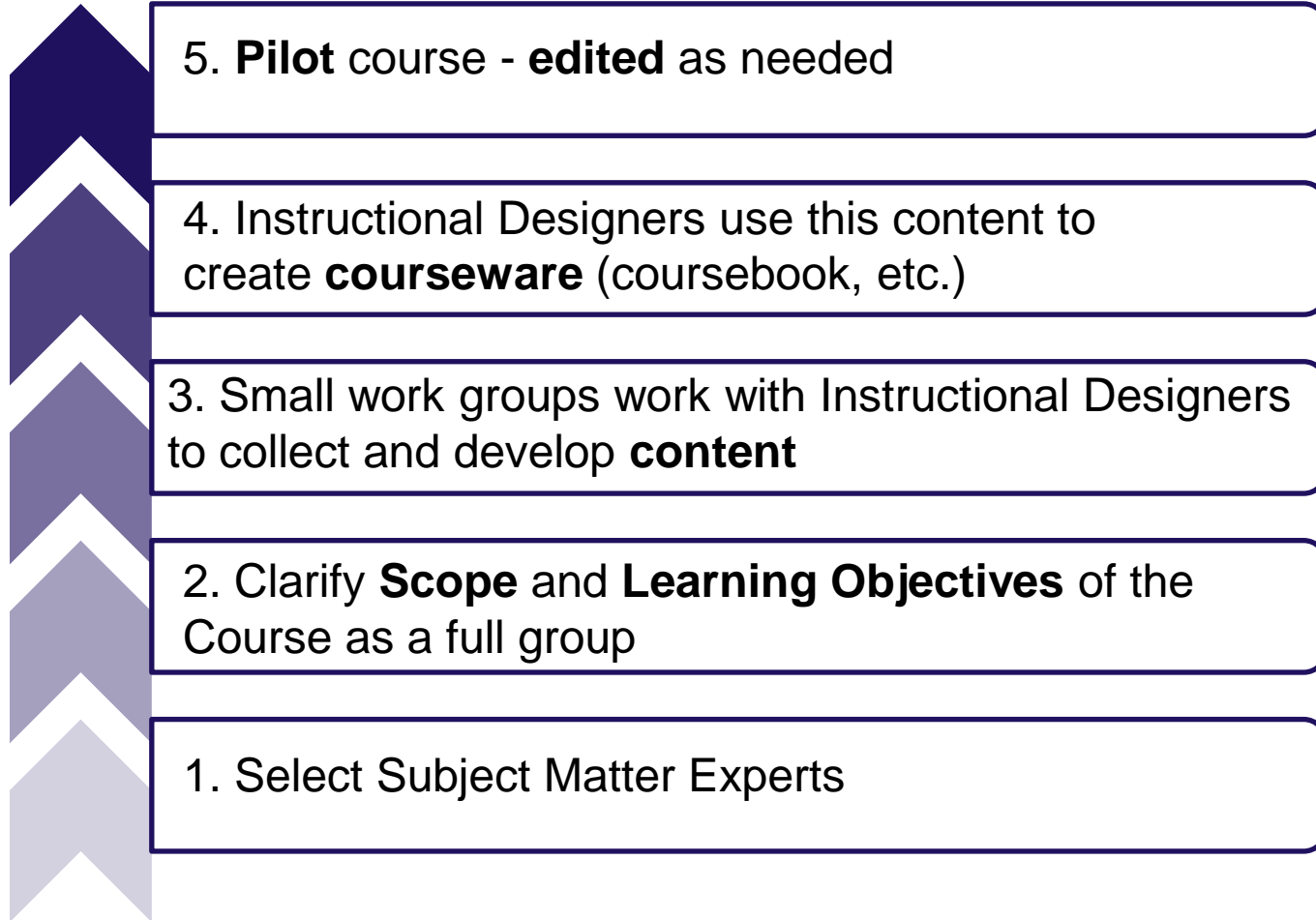
4 – I could teach someone else how to perform this task

   1.) Demonstrate ability to construct a peanut butter and jelly sandwich

   0   1   2   3   4

TRANSPORTATION LEARNING CENTER

24

Content

Bridging the Gap

TRAINING

Ideal State

Actual State

TRANSPORTATION LEARNING CENTER

Direction

Courseware Development Process

5. **Pilot** course - **edited** as needed

4. Instructional Designers use this content to create **courseware** (coursebook, etc.)

3. Small work groups work with Instructional Designers to collect and develop **content**

2. Clarify **Scope** and **Learning Objectives** of the Course as a full group

1. Select Subject Matter Experts

TRANSPORTATION LEARNING CENTER

Direction

1. Picking the Right Subject Matter Experts

- Experience
  - Relevance
  - Depth
  - Timeliness
  - Location
  - Training
  - Frontline

- General Skills
  - Communication
  - Writing Ability
  - Sociability
  - Time Available

SEIU SME Explaining Controller Processes
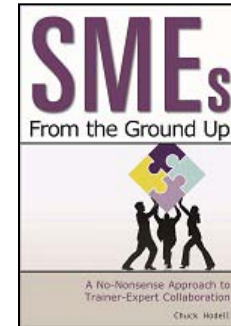

L-M SME group working together to develop content

IBEW SME Delivering Completed Courseware

TRANSPORTATION LEARNING CENTER

Content

27

1. Picking the Right Subject Matter Experts

- Informally
- Systematically
- SMEs are chosen for you

		Possible SME's Names				
		Ex: Joanne				
Experience	Relevance	1				
	Depth	3				
	Timeliness	2				
	Location	1				
	Training/Teaching Exp.	2				
General Skills	Communication	1				
	Writing	1				
	Sociability	3				
	Other applicable skills	3				
	Time Available	2				
	Average:	1.9				

TRANSPORTATION LEARNING CENTER

28

Content

Team Activity #2 – Selecting Quality SMEs
Brainstorm with your group or individually who at your location would be a good Subject Matter Expert on your Topic. Use the worksheet in your packets to identify and rank five possible SMEs to figure out who would be the best pick(s).

		Possible SME's Names				
		Ex: Joanne				
Experience	Relevance	1				
	Depth	3				
	Timeliness	2				
	Location	1				
	Training/Teaching Exp.	2				
General Skills	Communication	1				
	Writing	1				
	Sociability	3				
	Other applicable skills	3				
	Time Available	2				
	Average:	1.9				

TRANSPORTATION LEARNING CENTER

Application/Feedback 2

29

2. Clarify Course Scope as Full Group

- Identify scope of each course
- Edit/Draft Learning Objectives
- Orient SMEs
- Brainstorm on existing resources

TRANSPORTATION LEARNING CENTER

Content

30

Example of Learning Objectives Drafted & Resources Identified at CDT meeting

217 Elevator-Specific Traction (Electric) Elevators MRL AHJ 02-23-2012 [Compatibility Mode] - Microsoft Excel

	217: Elevator -- Traction (Electric) Elevators	Possible Text References
27	**Module 5: Roping**	
28	**Learning Objectives**	
29	*Describe roping materials, sizes and construction methods*	
30	*Discuss rope handling and safety procedures*	McCain, Elev Maintenance Section 2.3 p. 63-86. Elev 101, p. 79, 83
32	*Discuss the construction methods for installation of roping*	
33	*Discuss proper techniques to maintain sheaves*	McCain, Elev Maintenance p142-144. Page 192-193
34	*Discuss methods of terminating wire ropes (shackles, sockets - wedged or tapered)*	McCain, Elev Maintenance p 67-76
35	**Module 6: Hoistway**	
36	**Learning Objectives**	
37	*Identify areas and associated components of the hoistway*	Pit - Buffers, ladders, guide rails, governor tail sheave, compensating sheave, counterweights, safety / control switches, halfway junction box, lighting, drains, sumps, selector tape, softeners, i-beams, spreaders, numbering, vanes. Dust covers,
38	*Review the safety procedures associated with hoistway inspection and maintenance*	Review 213, Module 1
39	*List common areas in hoistway that require repair and/or replacement*	

TRANSPORTATION LEARNING CENTER
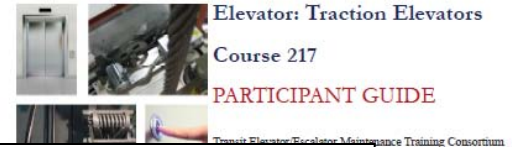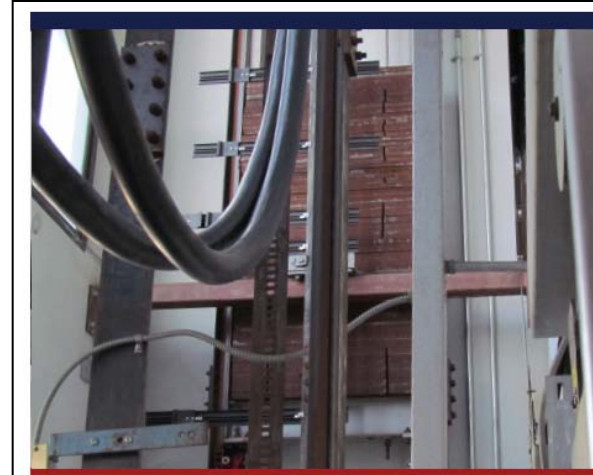
Content

31

3. Collect/Develop Content

- Collect Existing Documents
- Work with Subject Matter Experts:
  - Live Meetings
  - Site Visits
  - Webinars
  - Review of content by peer

TRANSPORTATION LEARNING CENTER

Content

4. Instructional Designers turn Content into Courseware

- Consider Adult Learning Principles
- Frame in a way that enables learning and retention of new information

TRANSPORTATION LEARNING CENTER

Content/Direction

Keys to Adult Learning

A need….

- A clear, applicable goal or purpose to learning

- Room to be self-Motivated/self-Directed

- Room for participation in learning

- To relate new learning to personal experience

- To have previous knowledge recognized

- To see direct application of learning

Individual Activity

While considering the keys to Adult Learning, reflect on two learning experiences:
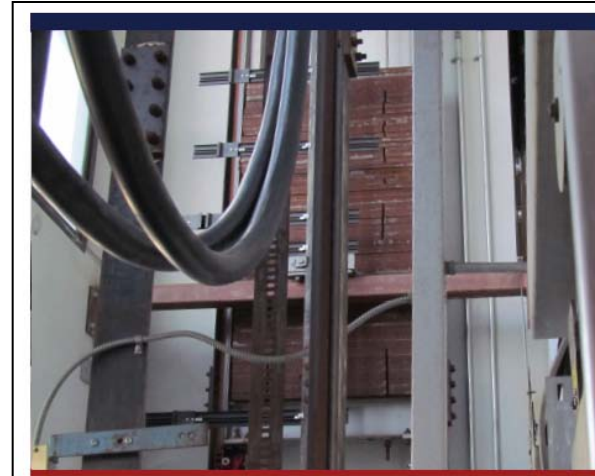
1.) A **beneficial** learning experience – how did the "instructor" incorporate the **keys for adult learners**?

2.) A learning experience that just **didn't work** – knowing what you do now about adult learners, how could the situation have been **improved**?

Be ready to share in 10 minutes.

TRANSPORTATION LEARNING CENTER

Application/Feedback 3

4. Instructional Designers turn Content into Courseware

- Consider Adult Learning Principles
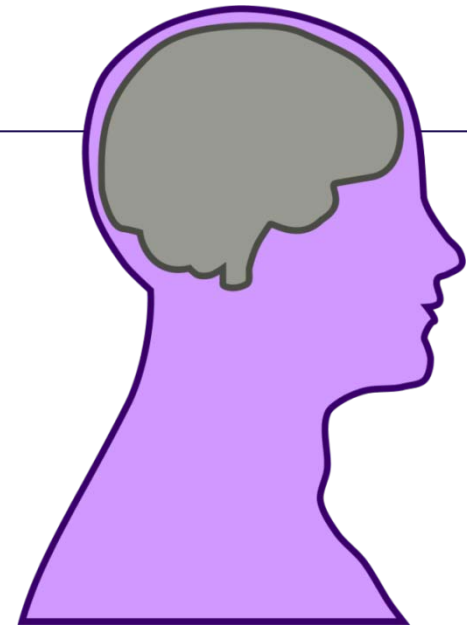- Frame in a way that enables learning and retention of new information

TRANSPORTATION LEARNING CENTER

Direction

36

Has anyone ever heard of "Gagne's 9 Events of Instruction"? What are they?

TRANSPORTATION LEARNING CENTER

37

Recall

Gagne's Nine Events of Instruction

Preparation for Learning		
Gaining Attention	**Direction**	**Recall**

Delivery and Practice of New Material		
Content	**Application Feedback Level 1**	**Application Feedback Level 2**	**Application Feedback Level 3**

Wrap Up	
Evaluation	**Closure**

Content

TRANSPORTATION LEARNING CENTER
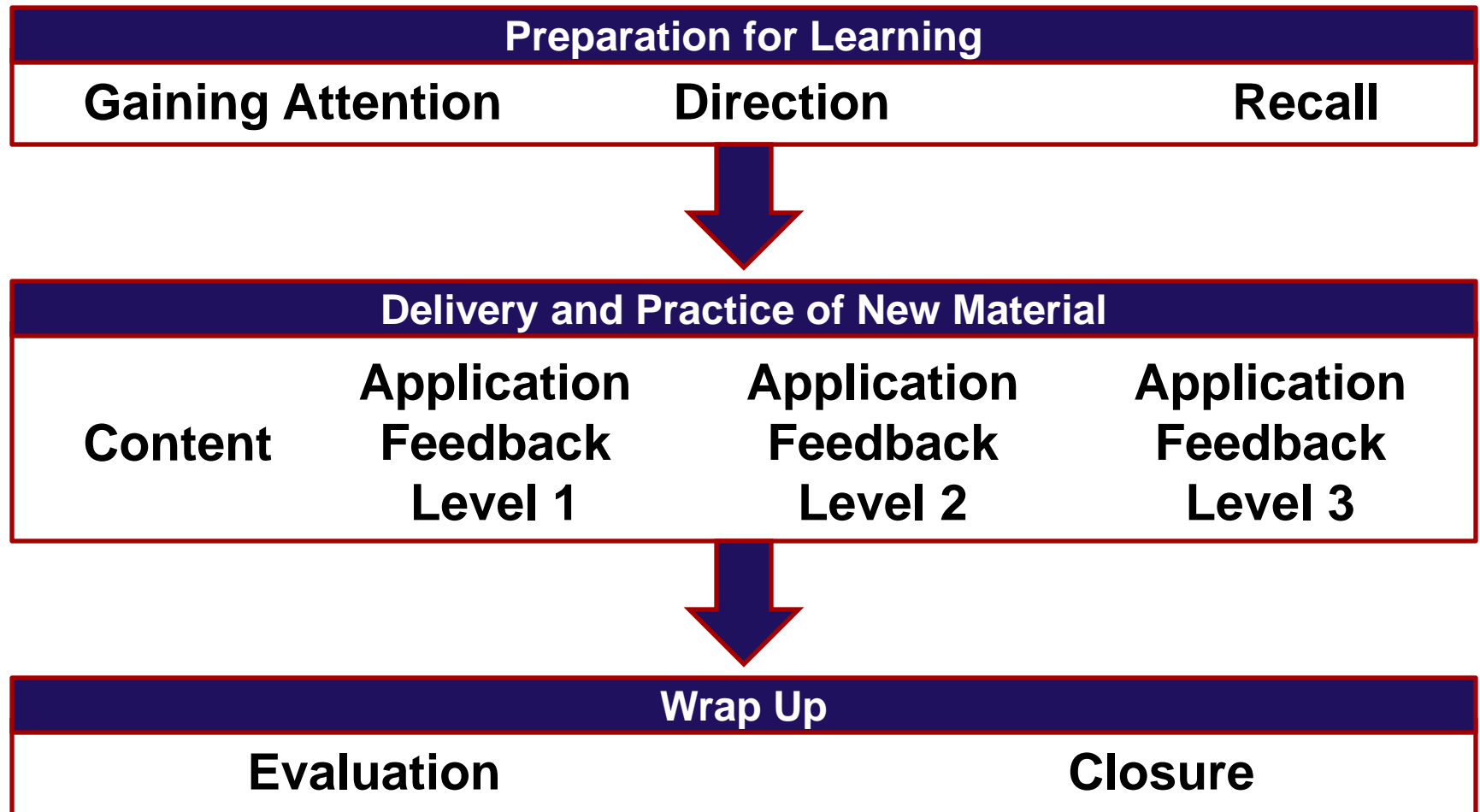
Preparation for Learning

Gaining Attention	Relates to the Subject Matter but is not an attempt to teach new material
Direction	State objectives. This is often done in a less formal way.
Recall	Double check that learners meet the prerequisites.

Content

TRANSPORTATION LEARNING CENTER

Delivery & Practice of New Material

Content	Present the main points of the new material in an organized manner
Application-Feedback 1	The entire group is asked to perform a task/answer a question which shows that they understand the content. The instructor gives feedback
Application-Feedback 2	The learners work as small groups to perform a task/answer a question. Feedback is given by peers and/or instructor.
Application-Feedback 3	The learners illustrate their understanding of the content individually. Feedback is given by peers and/or instructor.

Content

Knowledge Check
What Goes Where?

Application/Feedback 1

Evaluation

Gaining Attention

Application/Feedback 1

Recall

Direction

Closure

Content

Application Feedback 3

Application Feedback 2

Preparation for Learning

Delivery and Practice of New Material

Wrap Up

TRANSPORTATION LEARNING CENTER

Knowledge Check
What Goes Where?

Application/Feedback 1

Evaluation

Gaining Attention

Application/Feedback 1

Recall

Direction

Closure

Content

Application Feedback 3

Application Feedback 2

Preparation for Learning		
Gaining Attention	**Recall**	**Direction**

Delivery and Practice of New Material			
Content	**Application/ Feedback 1**	**Application/ Feedback 2**	**Application/ Feedback 3**

Wrap Up	
Evaluation	**Closure**

TRANSPORTATION LEARNING CENTER
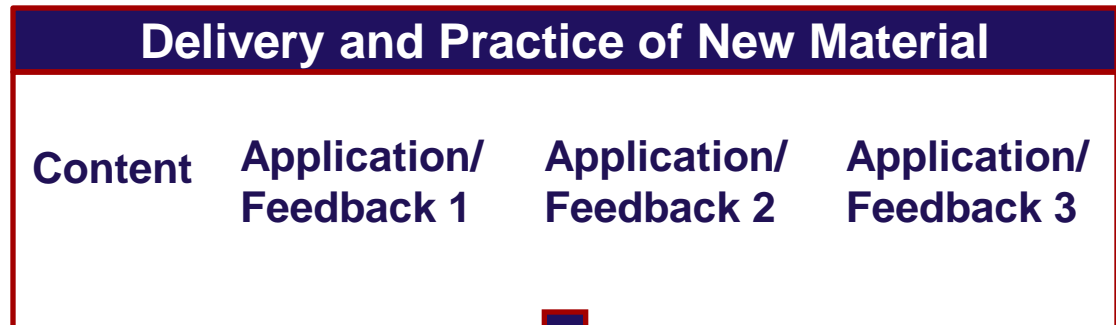
How did this Course Follow The 9 Events?

Instructional Event	Example from Today's Course
Gaining Attention	
Direction	
Recall	
Content	
Application/Feedback 1	
Application/Feedback 2	
Application/Feedback 3	
Evaluation	
Closure	

TRANSPORTATION LEARNING CENTER

Application - Feedback 1

Team Activity #4 – Nine Events of Instruction
Working with your group, pick one learning objective that
you drafted previously. Brainstorm how the learning of
this task could be structured within the "9 events" framework.

Also consider adult learning principles. Be ready to report back in
15 minutes with specific training plans.

TRANSPORTATION LEARNING CENTER
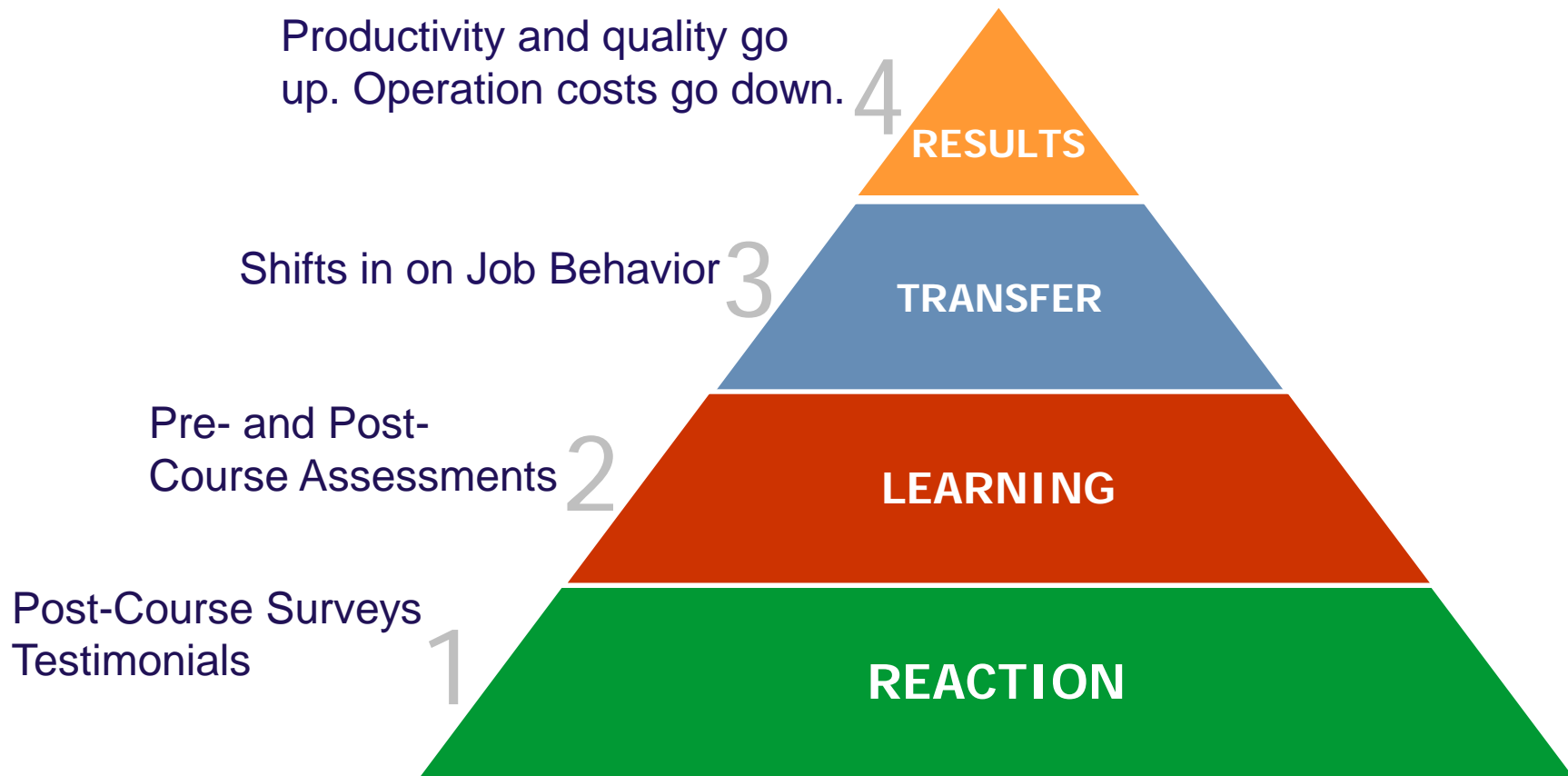
Application/Feedback 2

4. Pilots

- Make sure timing works
- Find any errors
- Identify strengths/weaknesses of course
- Knowledge Gain Illustrated by Pre/Post Test Comparisons

Pilot at NYCT

TRANSPORTATION LEARNING CENTER

Content

Measuring Success: Levels of Evaluation

Productivity and quality go
up. Operation costs go down. 4

RESULTS

Shifts in on Job Behavior 3

TRANSFER

Pre- and Post-
Course Assessments 2

LEARNING

Post-Course Surveys
Testimonials 1
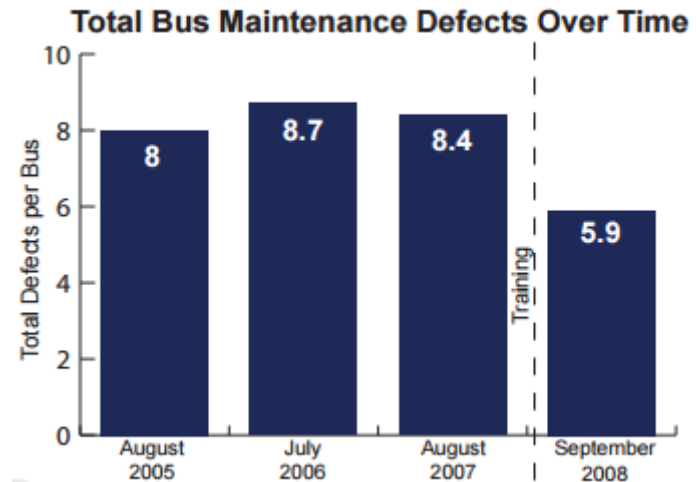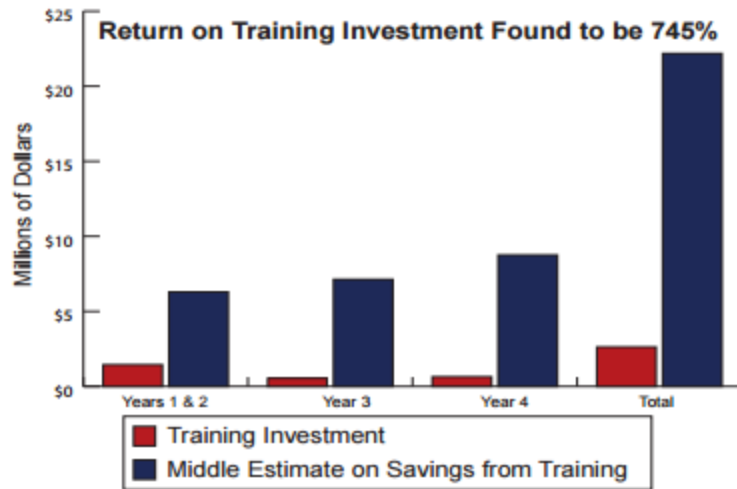
REACTION

TRANSPORTATION LEARNING CENTER

Content

46

Measuring Success: Level 5 - ROI

Return on Investment: concrete financial terms and taking into account the training program's cost.

5 ROI

4 RESULTS

3 TRANSFER

2 LEARNING

1 REACTION

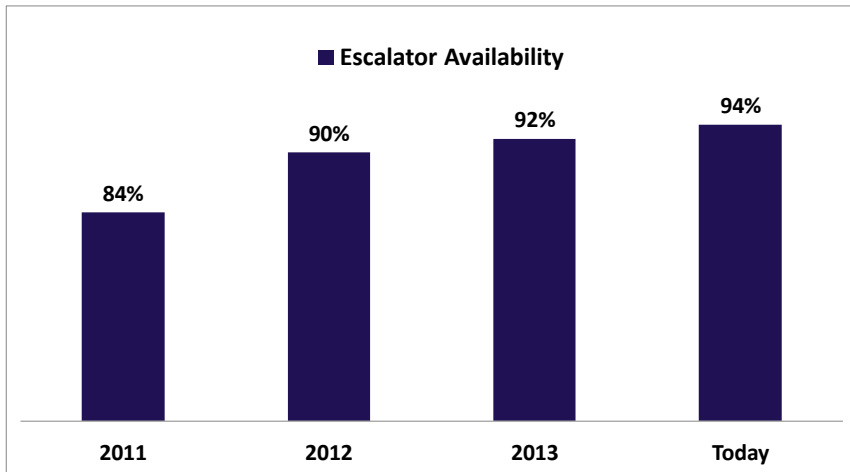**TRANSPORTATION LEARNING CENTER**

Content

47
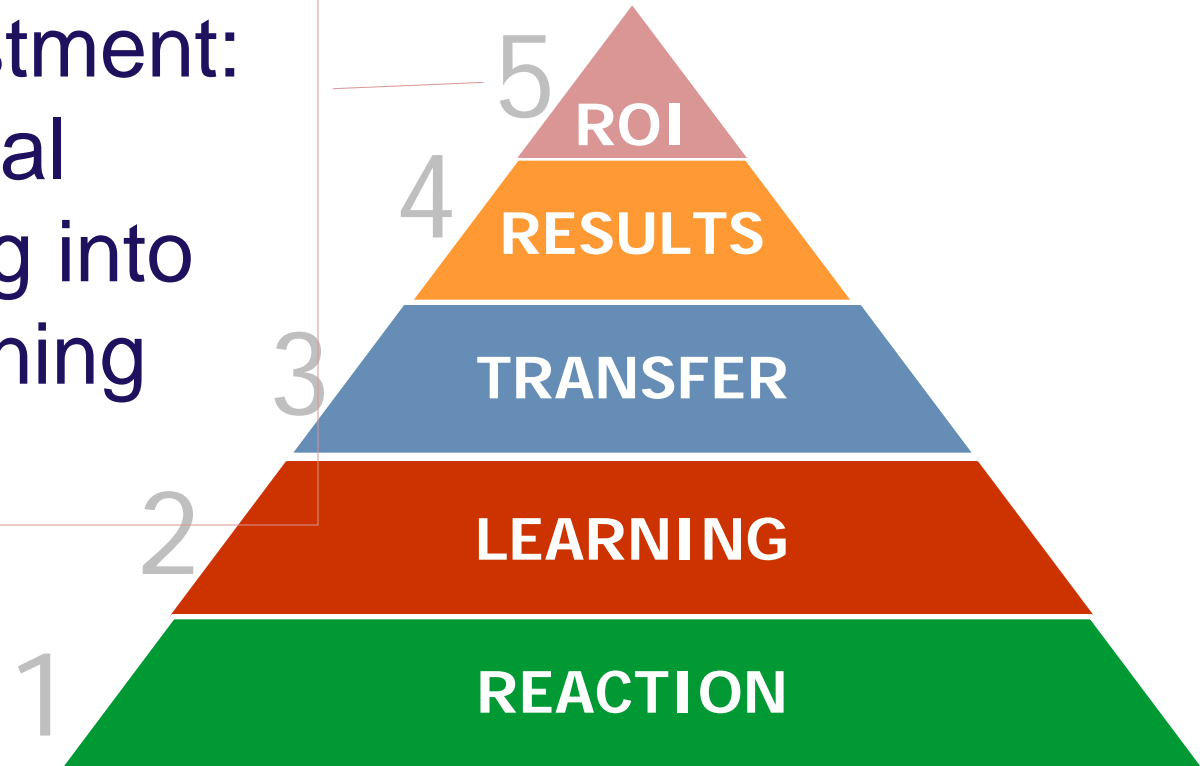
Return on Investment Examples

- ROI Estimates for SEPTA Training Partnership
- Training Investment Pays for Itself Six Times Over
- More information: Metrics of Success – found at http://www.transportcenter.org/resource_center/public ations_reports

TRANSPORTATION LEARNING CENTER

Return on Investment Examples

Escalator Availability chart showing: 2011: 84%, 2012: 90%, 2013: 92%, Today: 94%

Source: WMATA Escalator Status Report

El/Es Maintenance Labor Cost Comparisons External vs. In-house for 2-Technician Crews					
	Estimate	External Contractors (2 person crew)	In-house Specialists (2 person crew)	Hourly Savings (2 person crew)	Annual Savings (based on 20 F/T technicians)
Agency A	Low	$380	$136	$217	**$4,336,000**
	High	$558	$163	$422	**$8,440,000**
Agency B	Low	$400	$130	$270	**$5,400,000**
	High	$550	$130	$420	**$8,400,000**

Source: TLC preliminary analysis based on raw data from two El/Es consortium member organizations

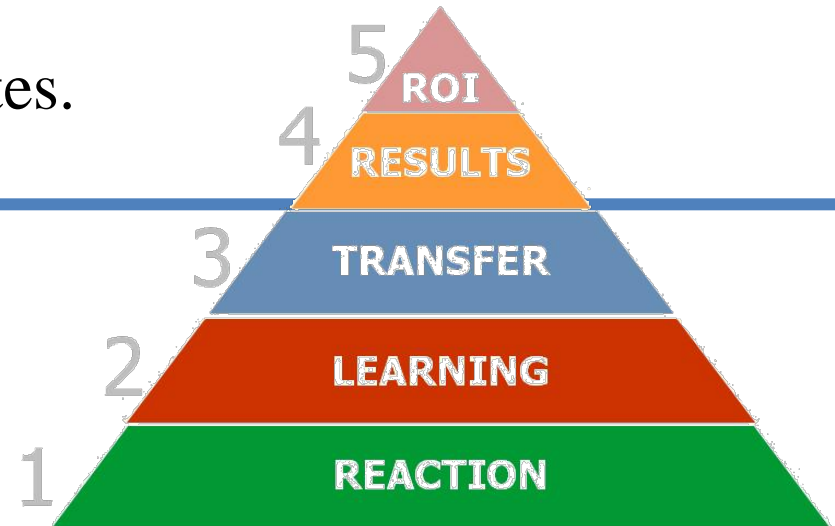## Preliminary ROI Results for the National Transit Elevator/Escalator Training Consortia

TRANSPORTATION LEARNING CENTER

49

Team Activity #5 – Training Evaluation

Recall the learning objective you focused on in the previous exercise. Working with your group, use the evaluation matrix in your packets to brainstorm the type of information that could be collected to evaluate the quality of training at the five different levels.

Be ready to report back in 10 minutes.

5 ROI

4 RESULTS

3 TRANSFER

2 LEARNING

1 REACTION

TRANSPORTATION LEARNING CENTER

Application/Feedback 2

50

Mission Accomplished?

- Recognize general instructional system design terminology

- Draft quality learning objectives

- Identify quality Subject Matter Experts

- List characteristics of Adult Learners

- Apply Gagne's 9 events of instruction to Courseware Development

- Develop a training evaluation plan

TRANSPORTATION LEARNING CENTER

Closure/Evaluation

Questions?

TRANSPORTATION LEARNING CENTER

Additional Resources

Amri Joyner
ajoyner@transportcenter.org
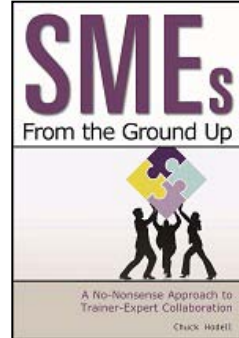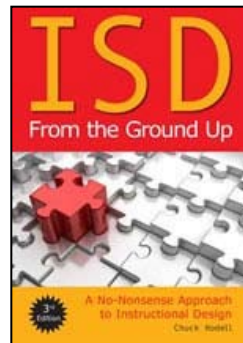
Jack Clark
jclark@transportcenter.org

www.transportcenter.org

Courseware Samples: www.transittraining.net

Observe the next Signals Training Consortium Meeting: Chicago October 26-30

TRANSPORTATION LEARNING CENTER