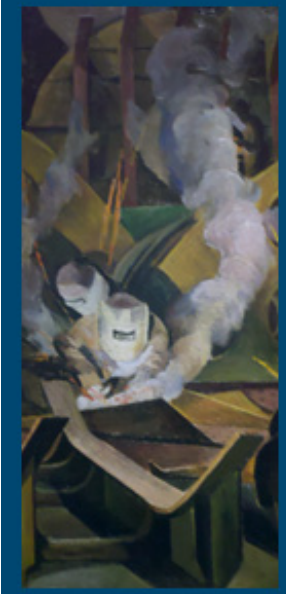

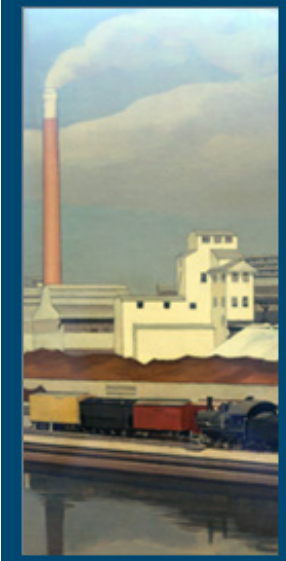

E-Learning Evaluation: Did they like it, did they learn from it, did they change?

Thomas C. Ouimet MBA MPH CIH CSP

Yale University & OEHS^2

This presentation will:

- Describe how E-learning can be integrated into a training curriculum
- Describe some tools that subject matter experts can use to create E-learning
- Review how the Kirkpatrick four levels of evaluation apply to E-learning
- Offer some practical tips on E-learning evaluation (levels 1-3)

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Challenge Question

How have most safety and health professionals evaluated the effectiveness of training in the past?

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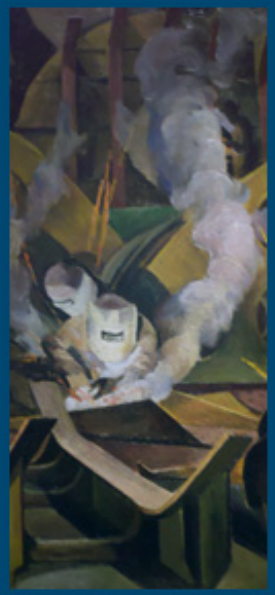

Challenge Question

Radiation Safety Part II Code: RRRSO	**Instructor: Tammy Stemen**
Date: Wednesday, September 12, 2012 Time: 1:30pm-3:00pm	**Location: EHS Training Room LL15**

PLEASE PRINT ALL INFORMATION COMPLETEY AND LEGIBLY

Name	NET ID	WORK PHONE	PRINCIPAL INVESTIGATOR	WORKED WITH RADIOACTIVITY BEFORE?	SIGNATURE
Fink, Kathren Louise	KLF43				
Andres, Wells Seldes	WSA4	203-558-8388	Ron Duman	No	
Jin, Huiyan	HJ227		Diane Krause	NO	
Schwan, Jonas	JS2626		Humphrey, Jay	No	
Li, Huabing	HL495	203-785-5383	Flavell, Richard A		
Taylor, Ben	BT87	203-200-2167	Joann Sweasy	yes	
Cama, Cara Ann	CC52	203-737-1217	Diano, Sabrina	no	
Kim, Jung Dae	JK886	203-737-1217	Diano, Sabrina	yes	
Impellizzeri, Daniela	DI43	203 938 95 64	Diano, Sabrina	NO	
Kraehling, Jan	JK942	203-435-7481	Sessa, William C.	YES	
Sawaki, Yujin	YS384	203-737-4457	De Camilli, Pietro	NO	
Hashemi Zonouz, Taraneh	THZ2	203-688-8428 e	Liu, Yi-Hwa		
Fine, Rebecca Sharon	RSF2	203-737-6201	Stevens, Hanna E	no	
Dajani, Rana	RD456	203-737-4189	Park, In-Hyun	No	
Hwang, David Yi-Gin	DYH8	203-785-5281	Greer, David	No	
Kreuder, Anna - Elisabeth	ak837		Sohia Tavoulari	Yes	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Dan Lou	DL565		Yarbrough, Wendell	Yes	
Chen Zhao	CZ94		[illegible]	No	Chen Zhao
Yuying Dong	yd85	203-[illegible]737-5753	Narendra Wajapeyee	No	Yuying Dong
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Jae Hun Shin	JS2595	203-435-5523	[illegible]	Yes	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Cynthia D'Imico	CD459	203-785-7172	Rich Carson	No	
FORLONI MATTEO	MF482	203-224-0491	Wajapeyee Narendra	Yes	
Daniel Moonan	DWM43		rotation w/ Breaker	NO	

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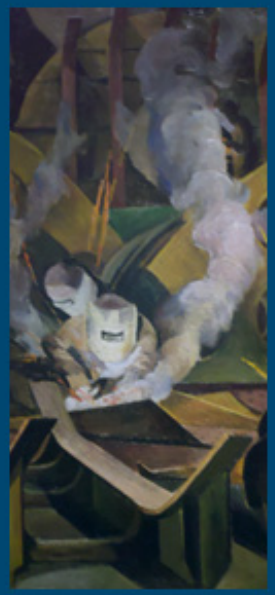
Challenge Question



Radiation Safety Part II Code: RRRSO	Instructor: Tammy Stemen
Date: Wednesday, September 12, 2012 Time: 1:30pm-3:00pm	Location: EHS Training Room LL15

PLEASE PRINT ALL INFORMATION COMPLETEY AND LEGIBLY

Fatal Assumption #1: Simple attendance or participation in training means learning is happening

Taylor, Ben	BT87	203-200-2167	[illegible]			
Cama, Cara Ann	CC52	203-737-1217	Diano, Sabrina	no	[illegible]	-66
Kim, Jung Dae	JK886	203-737-1217	Diano, Sabrina	yes	Jung Dae Kim	-66
Impellizzeri, Daniela	DI43	203 938 95 64	Diano, Sabrina	NO	[illegible]	75
Kraehling, Jan	JK942	203-435-7481	Sessa, William C.	YES	[illegible]	-75
Sawaki, Yujin	YS384	203-737-4457	De Camilli, Pietro	NO	[illegible]	91
Hashemi Zonouz, Taraneh	THZ2	203-688-8428 e	Liu, Yi-Hwa			
Fine, Rebecca Sharon	RSF2	203-737-6201	Stevens, Hanna E	no	[illegible]	100
Dajani, Rana	RD456	203-737-4189	Park, In-Hyun	No	[illegible]	66
Hwang, David Yi-Gin	DYH8	203-785-5281	Greer, David	No	[illegible]	66
Kreuder, Anna - Elisabeth	ak837		Sotiria Tavoulari	Yes	[illegible]	-66
[illegible]	[illegible]	[illegible]				
Dan Liu	DL565		Yarbrough Wendell	Yes	[illegible]	-75
Chen Zhao	CZ94		[illegible]	No	Chen Zhao	83
Yuying Dong	yd85	203-[illegible]737-5753	Narendra Wajapeyee	No	Yuying Dong	-66
[illegible]	[illegible]	203-785-7127	Cath Lab	Yes	[illegible]	75 ?
Jae Hun Shin	JS2595	203-435-5523	David Schulz (DGS) BBS	Yes	[illegible]	-75
Hariyat Andargachew	HKa6		Xiao Lab	No	[illegible]	
Cynthia D'Amico	CA459	203-785-7172	Rich Carson	No	[illegible]	-91
FORLONI MATTEO	MF482	203-224-0481	Wajapeyee Narendra	Yes	[illegible]	-66
Daniel Moonan	DWM43		rotation w/ Breaker	NO	[illegible]	-100

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Defining E-Learning

E-Learning is the computer and network-enabled transfer of skills and knowledge

It's just another way to distribute training material… but it does allow for some interesting instructional media and methods

It can be implemented in a synchronous, asynchronous and blended approach

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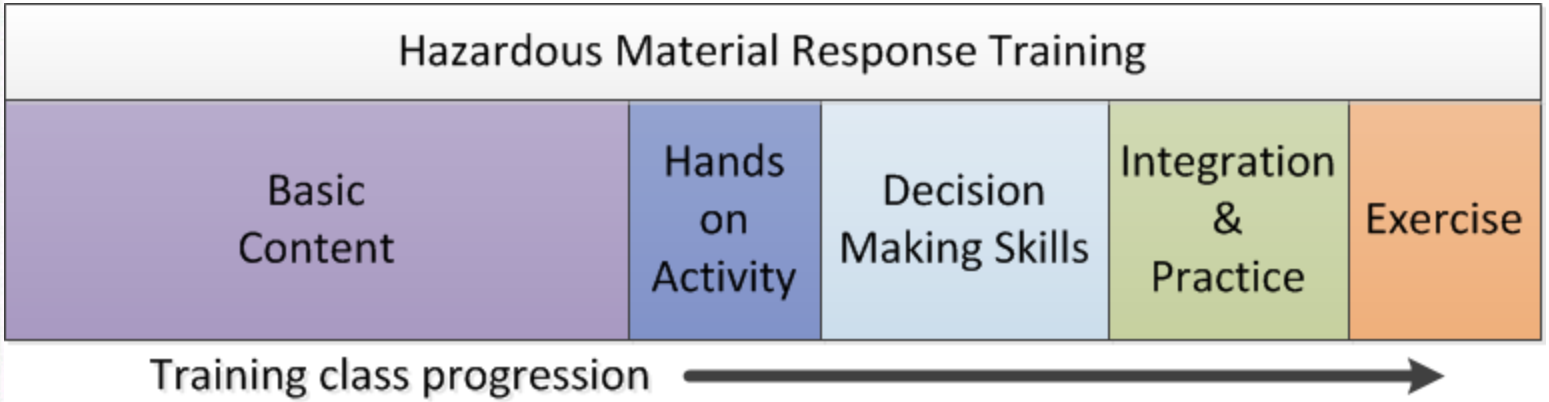
Integrating E-learning into a training curriculum



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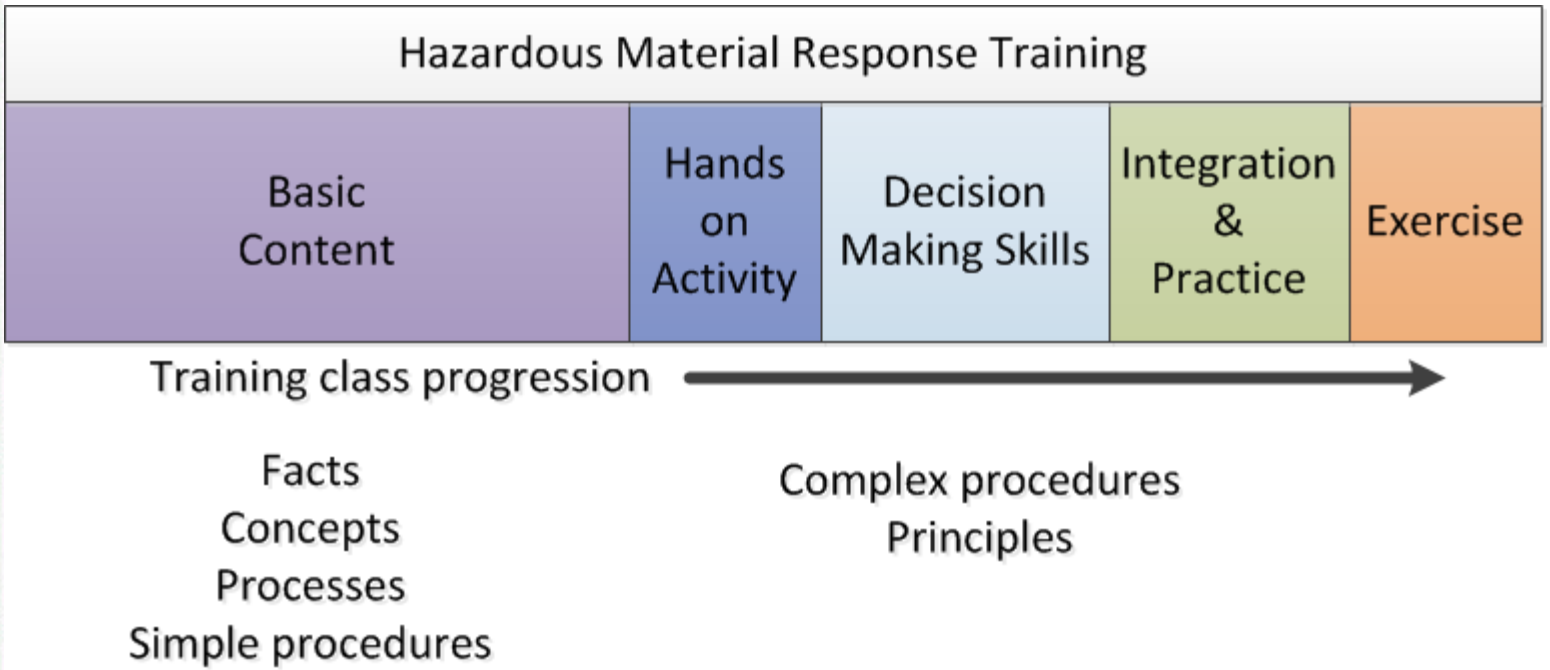
Integrating E-learning into a training curriculum



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Integrating E-learning into a training curriculum

Hazardous Material Response Training				
Basic Content	Hands on Activity	Decision Making Skills	Integration & Practice	Exercise

Training class progression →

Blended Approach #1	
Very easy for a SME to create E-learning with authoring tools	In class on site

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Integrating E-learning into a training curriculum

Hazardous Material Response Training				
Basic Content	Hands on Activity	Decision Making Skills	Integration & Practice	Exercise

Training class progression →

More Advanced Blended Approach				
Very easy for a SME to create E-learning with authoring tools	In class on site			
	Hands on Activity	Decision Making Skills	Integration & Practice	Exercise
	Simple simulations & E-learning case studies		Immersive Simulation	Exercise

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E-learning Training Course Authoring Tools

- Adobe Captivate
- Articulate Suite (Studio, Presenter, Quizmaker)

- Special-purpose tools for creating e-learning courses
  - **Incorporate templates, all types of media and user interactions, navigational features, linking of documents and websites, quizzing, interaction with databases and reporting functions**

E-learning Training Course Authoring Tools

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Noise and Hearing Conservation

Facilities Operations

- Administrative Staff
- Custodial
- Drivers
- Grounds Maintenance
- Physical Plant Trades
- Power Plants
- Project Planners and Managers
- Utility Distribution
- Warehouse/Stock
- Yale Fire Inspectors and Mechanics

Overview

Long-term exposure to high noise levels can cause hearing damage, and is a leading but largely preventable occupational injury. Here on-campus, Yale Environmental Health and Safety manages the University's Noise and Hearing Conservation program. Employees with high noise exposure must be enrolled in this program and wear hearing protection. Extensive noise monitoring conducted on campus has identified certain trades, work functions, and activities on campus with the potential for over-exposure to noise, and are therefore included in this Program. The link at right identifies work areas and operations with recognized high noise exposures. A link is also provided to the University's Noise and Hearing Conservation program which describes all aspects of this program.

Scope and Application:

This document applies to all employees who may be exposed to high noise levels, regardless of the source, while performing their jobs. A high noise exposure is considered equal or exceeding and 8-hour time-weighted average sound pressure level of 85 decibels (dBA).

Standards:

The federal Occupational Safety and Health Administration (OSHA) has established a specific noise standard (29 CFR 1910.95) to help protect workers from hearing loss associated with high noise exposures. However, the American Conference of Governmental Industrial Hygienists (ACGIH) advocates for a more protective exposure limit, which the University follows. Yale uses the ACGIH limit of 85 decibels (dBA) for an 8-hour time weighted average.

Responsibilities:

Managers and supervisors are responsible for:

- Contacting Environmental Health and Safety if new equipment or process changes in your work affect noise levels, or if you have any other concerns about noise exposures.
- Ensuring exposed personnel are trained according to this document and participate in medical surveillance as necessary.

Print Document

Tools

- High Noise Locations and Operations
- Signs for demarcating high noise areas
- Noise handout/poster
- Decibel Comparison Chart

Training

- Fitting Foam Ear Plugs
- Demonstration of hearing loss
- Web-based Training

Programs and Policies

- Yale Noise and Hearing Conservation Program

Additional References

- OSHA Noise Standard
- OSHA Web Resource
- ACGIH Noise Criteria

The Keys to a Good Evaluation

What you need to know?

- The purpose of the evaluation
- Who is it for
- What exactly do they need to know

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The Keys to a Good Evaluation

What you need to know?	Possible Answers
• The purpose of the evaluation	To determine if the training worked
• Who is it for	The designers and presenters
• What exactly do they need to know	If the learning objectives were mastered, and learning applied to the job Was course completed and experience enjoyed

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Kirkpatrick's classic four levels of evaluation

Level of evaluation		What it measures
1	Response	Did learners like the training? Did they complete it?
2	Learning	What skills and knowledge did they acquire?
3	Performance	How much has job performance improved? What can learners apply to their jobs?
4	Results	How well did the organization meet its business goals? Was the result profitable?

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Kirkpatrick's classic four levels of evaluation

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4	Results	How well did the organization meet its business goals? Was the result profitable?

Why is this model relevant?

Kirkpatrick's model concerns itself with results rather than the mechanisms used to accomplish those results

Level 1 – Reaction surveys

What does Level 1 tell us?

What does a response evaluation really measure?	When is this knowledge useful?
Did training meet the expectations of learners?	When determining learners comfort level and confidence in their ability to take an E-learning course
Did learners find the learning experience emotionally and intellectually satisfying and feel they personally benefited from the training?	When trying to recognize and defuse potential frustrations of learners (what worked well or not well)
Was the style of presentation (displays, interactions) acceptable to learners?	When assessing if the style of presentation (displays, interactions) acceptable to learners?

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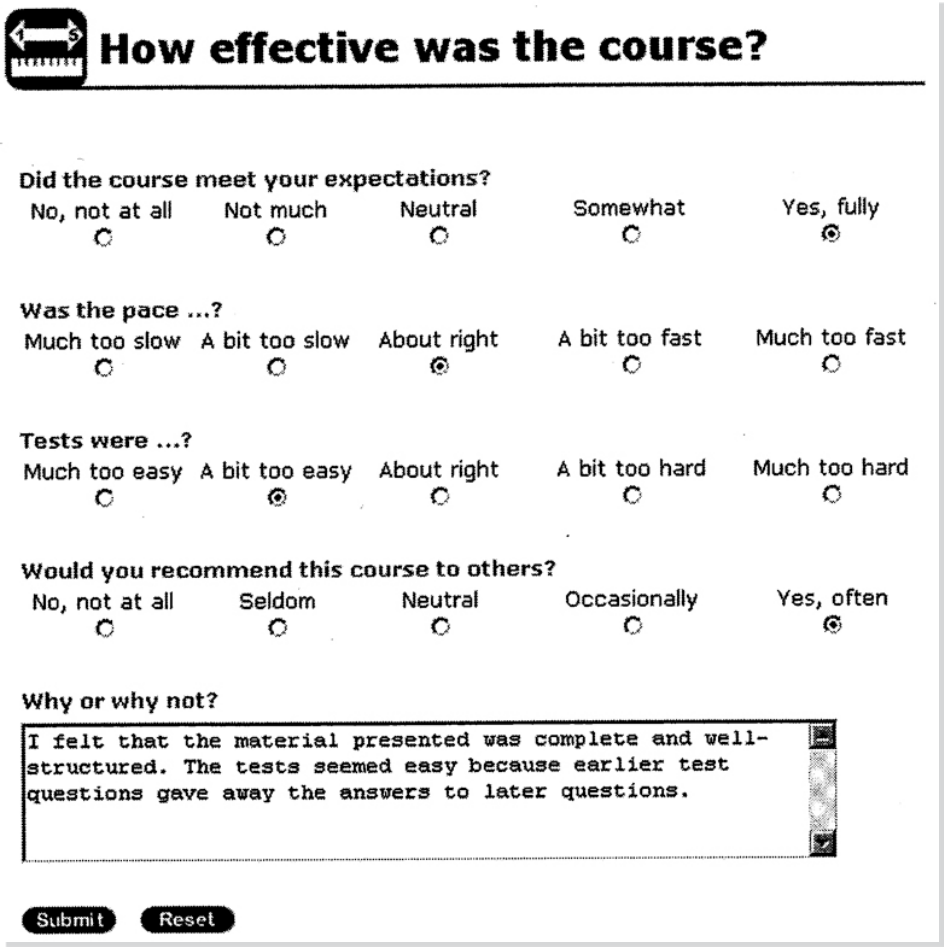
Level 1 – Techniques

- Gather opinions through questionnaires



How effective was the course?

Did the course meet your expectations?

No, not at all	Not much	Neutral	Somewhat	Yes, fully
○	○	○	○	◉

Was the pace ...?

Much too slow	A bit too slow	About right	A bit too fast	Much too fast
○	○	◉	○	○

Tests were ...?

Much too easy	A bit too easy	About right	A bit too hard	Much too hard
○	◉	○	○	○

Would you recommend this course to others?

No, not at all	Seldom	Neutral	Occasionally	Yes, often
○	○	○	○	◉

Why or why not?

I felt that the material presented was complete and well-structured. The tests seemed easy because earlier test questions gave away the answers to later questions.

Submit Reset

Taken from, “Evaluating E-learning” (W. Horton) ASTD 2003

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Level 1 – Techniques

- Electronically track access and navigation
  - **Rate of progress through course**
  - **Completion rates**
  - **Participation in online discussions or chats**
- Solicit feedback within course
- Hold focus groups

Level 1 - Tips

- Do level 1 evaluation primarily in development phase of program
- Consider the novelty of E-learning
- Analyze the data to gain insight
- Do not wait for the end of the course for input
- Never underestimate the power of a good lunch

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Level 2 – Learning Evaluation

What does Level 2 tell us?

What does a learning evaluation really measure?

What specific facts, concepts, processes, procedures or principles did learners acquire (learn)?

When is this knowledge useful?

When feedback required as to whether content has been successfully transmitted to trainees both individually and as a group (Job performance depends directly on the specific knowledge learned)

Meaningful, yet economical evaluation is required

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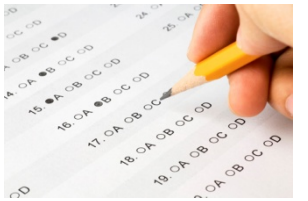
Level 2 – Techniques



- Design tests to evaluate learning

- Remember… your learning objectives inform you what type of evaluation is needed

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Level 2 – Learning Evaluation

Select your learning objective behaviors carefully…

Knowledge	Comprehension	Application	Analysis	Synthesis	Evaluation
Count	Associate	Apply	Order	Arrange	Assess
Define	Compare	Classify	Group	Create	Critique
Draw	Compute	Demonstrate	Analyze	Design	Evaluate
Identify	Describe	Illustrate	Detect	Develop	Grade
List	Estimate	Solve	Explain	Formulate	Judge
Name	Interpret	Utilize	Infer	Integrate	Measure
Recognize	Predict		Summarize	Plan	Rank
Recall			Construct	Prepare	Recommend
State				Produce	
Write				Specify	

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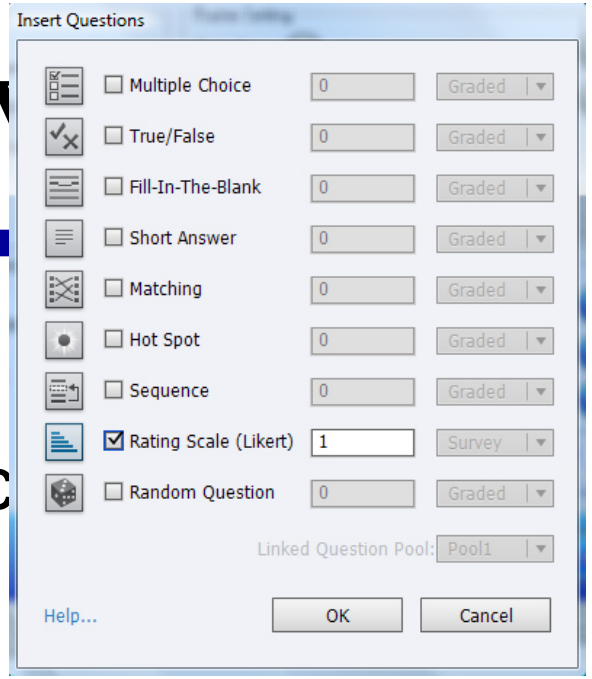
Level 2 – Learning Ev



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behaviors carefully…

Knowledge	Comprehension	Application	Analysis	Synthesis	Evaluation
Count	Associate	Apply	Order	Arrange	Assess
Define	Compare	Classify	Group	Create	Critique
Draw	Compute	Demonstrate	Analyze	Design	Evaluate
Identify	Describe	Illustrate	Detect	Develop	Grade
List	Estimate	Solve	Explain	Formulate	Judge
Name	Interpret	Utilize	Infer	Integrate	Measure
Recognize	Predict		Summarize	Plan	Rank
Recall			Construct	Prepare	Recommend
State				Produce	
Write				Specify	

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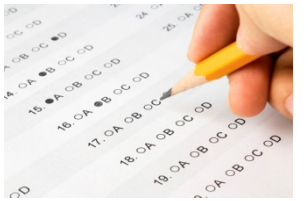
Level 2 – Techniques



- Observe learners behavior during training
  - **online discussion groups/chats; home work**
  - **blended -skills tests, role plays, case studies**
- Challenge learners to perform a hands on activity (blended)
- Simulate tasks, role playing activities case studies (fixed or complex simulations)

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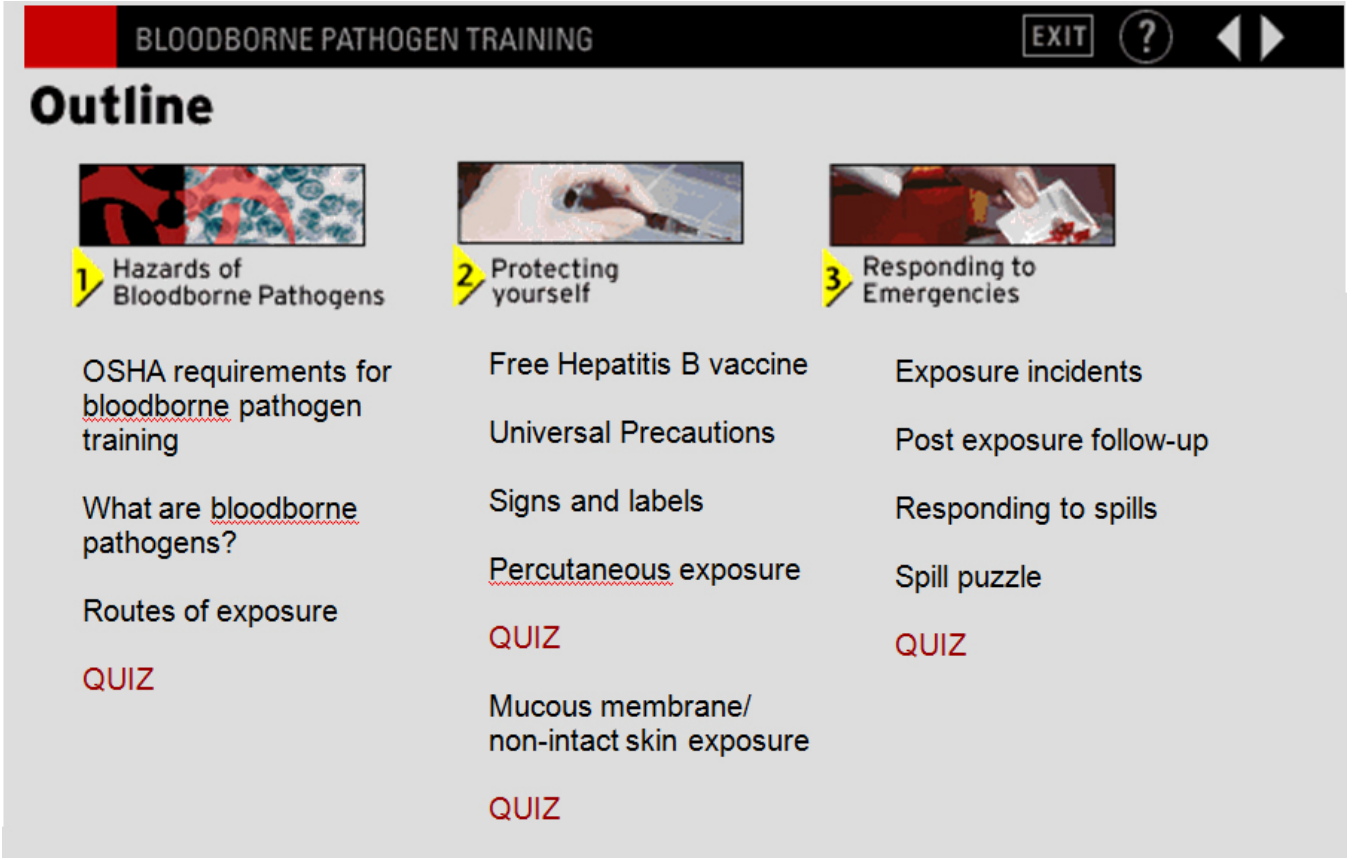
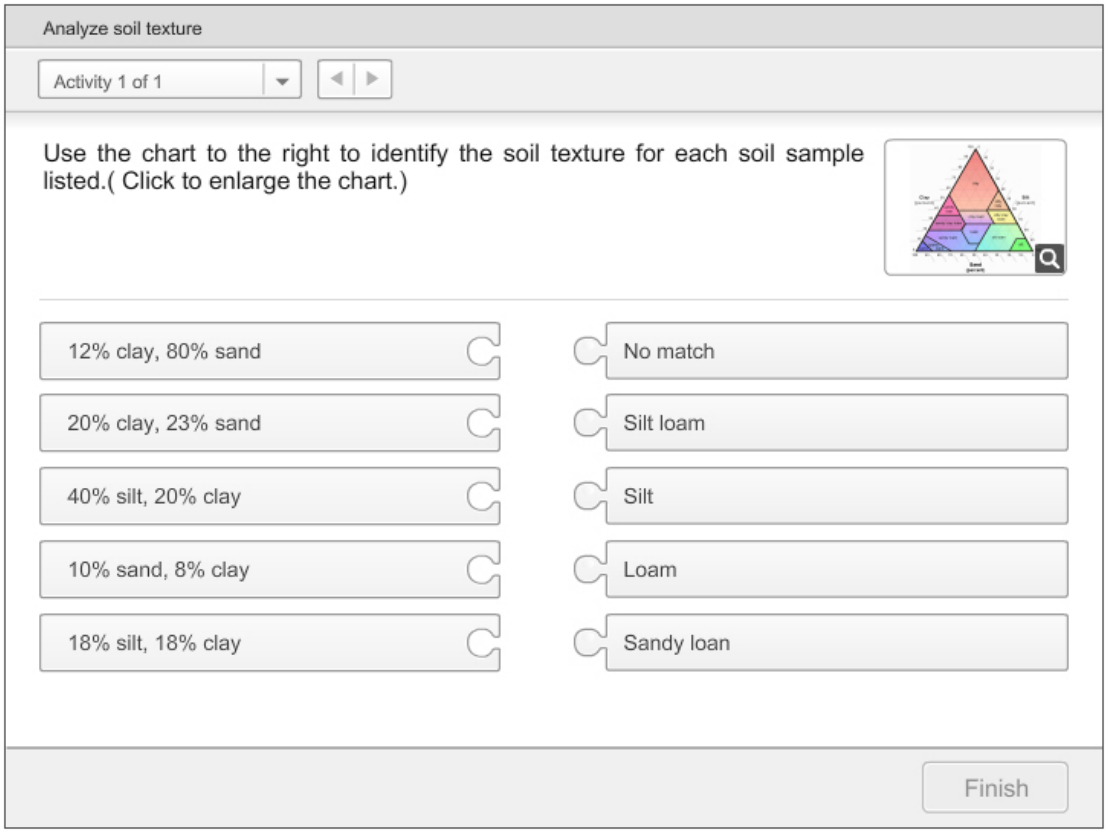
Level 2 - Tips

- When testing integrate your quizzing with the content



Level 2 - Tips

Create questions that reflect skill/knowledge necessary in workplace and ideally require performance similar to workplace.



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Level 2 - Tips

Create questions that reflect skill/knowledge necessary in workplace and ideally require performance similar to workplace.

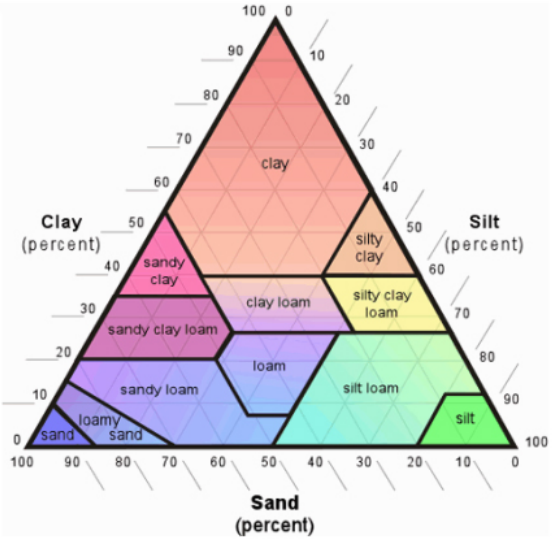
Analyze soil texture

Activity 1 of 1

Use the chart to the right to identify the soil texture for each soil sample listed.(Click to enlarge the chart.)

12% clay, 80% sand	No match
20% clay, 23% sand	Silt loam
40% silt, 20% clay	Silt
10% sand, 8% clay	Loam
18% silt, 18% clay	Sandy loan

Finish



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Level 2 - Tips

- Provide tools rather than testing learners on brain numbing content

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Level 2 - Tips

- Provide tools rather than testing learners on brain numbing content

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Level 2 - Tips

- Provide tools rather than testing learners on brain numbing content

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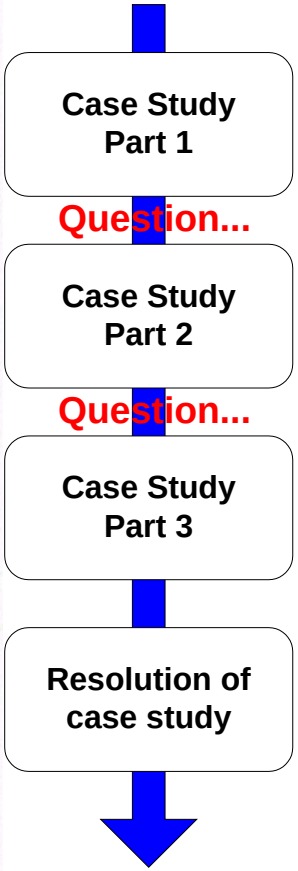
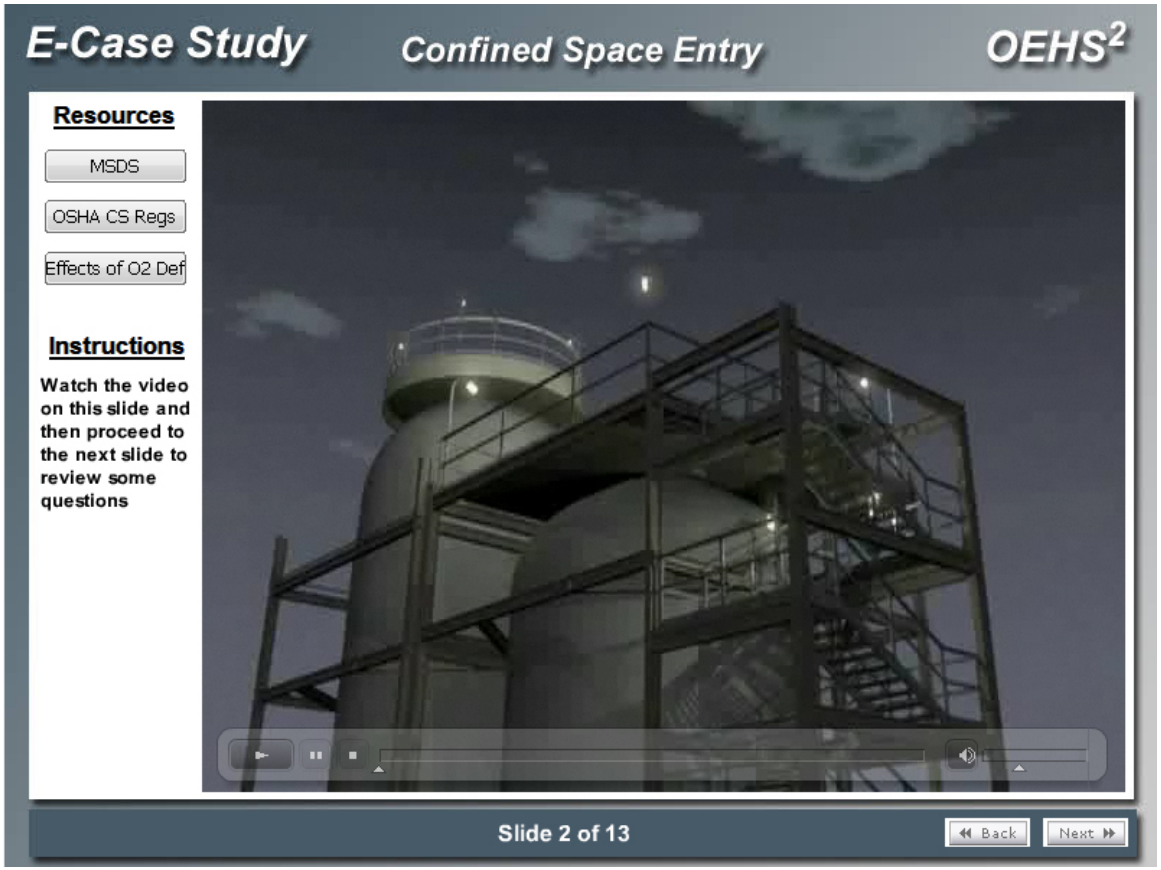
Level 2 - Tips

- Create case studies with available content





Level 2 - Tips

- Evaluate response to questions to identify any missed frequently
- When training to an awareness level a Level 2 evaluation is probably good enough

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Level 3 – Performance evaluation

What does Level 3 tell us?

What does a performance evaluation really measure?

Can learners apply what they learned to their jobs?

When is this knowledge useful?

When the gap between knowing and doing is critical (Failure to apply knowledge and skills is life threatening)

Putting theory into practice is a high priority

When identifying which learners were the most successful at applying learning

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Level 3 – Performance Evaluation

- Performance on the job occurs outside of the E-learning environment so generally the evaluation at this level does as well – but it can be down with an electronic twist
- Conditions necessary to change:
  - **The person must….**
    - have desire to change
    - know what to do and how to do it
    - work in the right climate
    - be rewarded for change

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Level 3 – Techniques

- Observe learners behavior on the job (look for set of behaviors that demo mastery of learning objectives)
  - **Confined Space Entry; LOTO; Fall Protection**
  - **BL3 Laboratory Operations; Work with organolithium compounds**
- Gather opinions of those that should know (supervisor)
- Consult records (exposure records)
  - **Positron Emission Tomography (PET)**

A Master Worker

Positron Emission Tomography (PET)

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Level 3 – Techniques

- Simulate job performance with a computer simulation that accurately predicts OTJ performance
  - **Realistically mimics the job environment**
    - Same cues for action
    - Same distractions

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Level 3 – Techniques

- Simulate job performance with a computer simulation that accurately predicts OTJ performance
  - **Realistically mimics the job environment**
    - Same cues for action
    - Same distractions

Tom's avatar

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Level 3 - Tips

- This is hard… try observations first
- Always keep an eye out for a master worker and capture/disseminate their knowledge
- Conduct 2-3 months after training

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Level 4 – Results evaluation

What does Level 4 tell us?

What does a results evaluation really measure?

Did the education program accomplish its original organizational goals?

Was the training program cost effective?

What is the rate of return on money invested in training

When is this knowledge useful?

When deciding among training and other solutions to problems

When documenting the benefits of training to those that pay the bills

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Level 4 – Techniques

- E-learning no different than any other type of training
- A simple way is to determine its worth
  - **Describe the change that resulted due to training**
  - **Estimate the value of that change (50K/year)**
  - **Estimate that % of the change due to training (50%)**
  - **Estimate your confidence in the training estimate (75%)**

    Training benefit = 50K/yr x 0.5 x 0.75 = 18.5K/yr

- ROI = (benefits – costs)/costs x100

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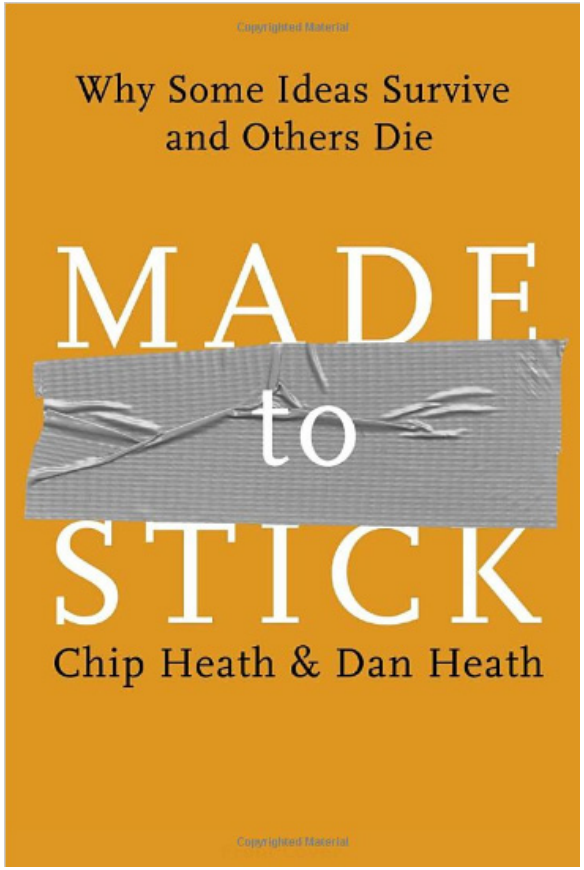
Recommended Reading…

The six principles that make ideas stick:

- **Simple**
- **Unexpected**
- **Concrete**
- **Credible**
- **Emotional**
- **Stories**



Please send me a training book recommendation… (tom.ouimet@yale.edu)

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Questions?

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What I am doing now…

Video Removed

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