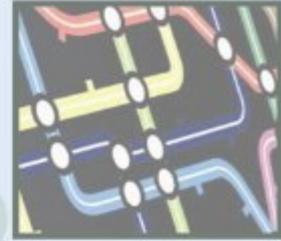


# Training for New Technologies

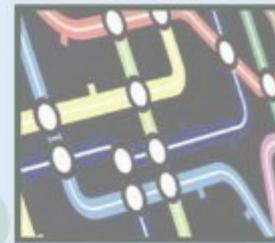


Be prepared when your organization meets the pressures of implementing new technologies.

Panelists will discuss lessons learned when designing, developing and implementing training for new technologies.

***Training should not be an afterthought.***

# Training for New Technologies



## PRESENTERS:

Anthony Forcina

Executive Director – Positive Train Control  
MTA, Metro-North Railroad

Julie Deibel-Pundt

Program Manager of Instructional Design  
Transportation Learning Center

Joe Brosseau

Director, Communications and Train  
Control (C&TC)

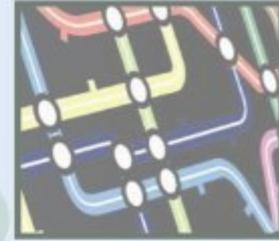
Transportation Technology Center, Inc.

## MODERATOR:

Melvin Clark

Rail System Safety & Regulatory Compliance Officer  
Capital Metro, Austin TX

# Training for New Technologies

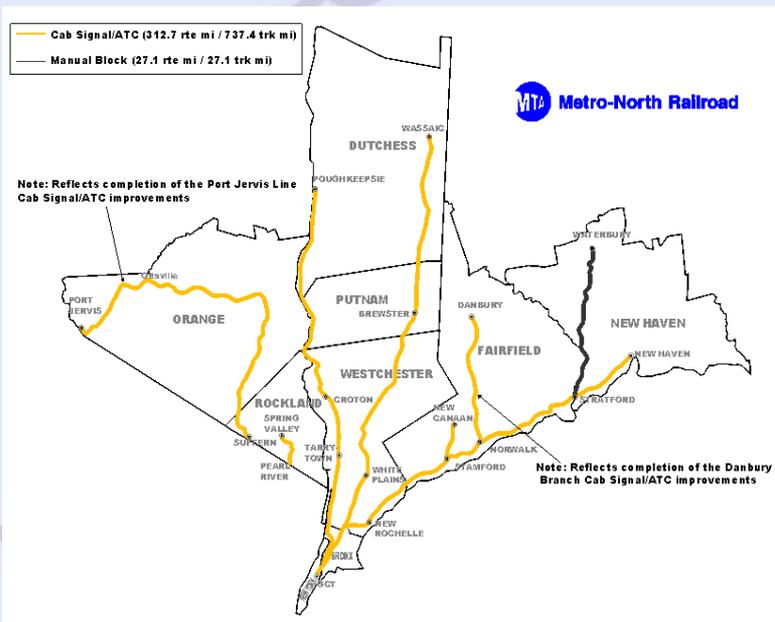


Anthony Forcina

Executive Director - PTC

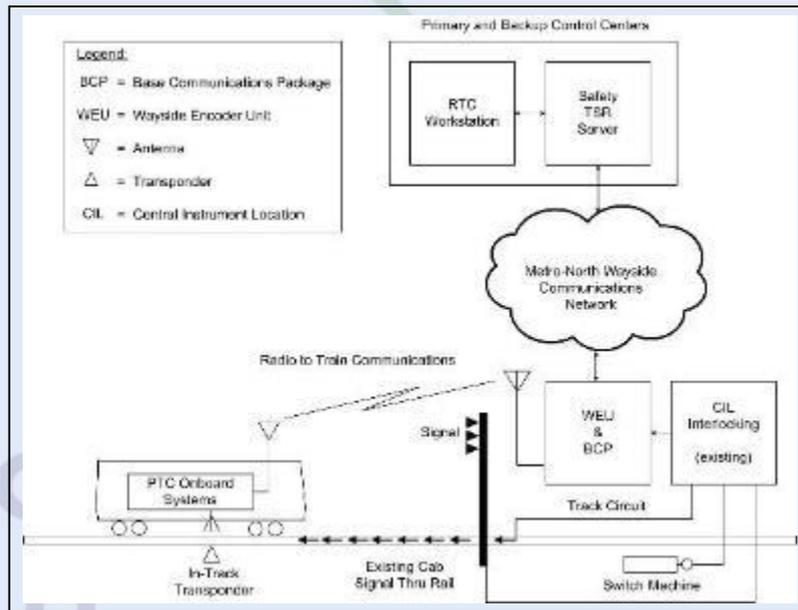
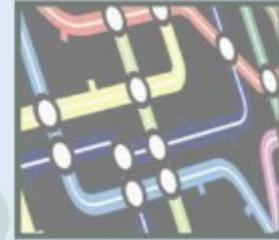
MTA, Metro-North Railroad

- Carries 83 million customers annually (275,000 per weekday).
- 737 Weekday trains (includes Amtrak but not deadheads).
- 104 Interlockings (not including Grand Central Terminal).
- 539 Electric MU's, 68 Diesels, 52 Cab cars.
- 380 Route miles/Over 700 miles of track
- 120 Passenger stations.



# Positive Train Control:

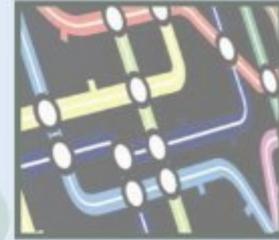
## The Poster Child for Training for New Technologies



- Mandated Technology
- Tight timeline
- Many things happening simultaneously:
  - Design
  - Development
  - Testing
  - Implementation
  - Change in railroad procedures and staffing
  - Meet training requirements

# Positive Train Control:

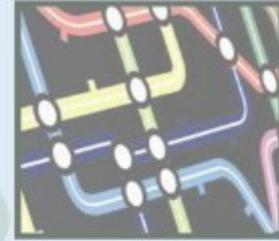
The Poster Child for Training for New Technologies



Background for common understanding for discussion on how to develop training for new technologies

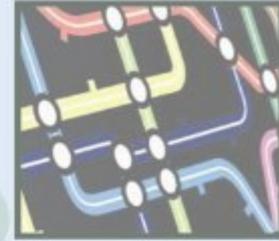
# Positive Train Control:

The Poster Child for Training for New Technologies



- I. Interaction with and between many systems
- II. Impact on Safety Protocols
- III. Impact on workforce

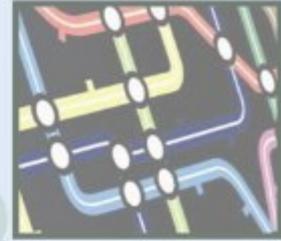
# Cross Interaction



A list of some of the interrelated tasks and processes necessary for PTC deployment:

- Lab test functionality
- Field test brake algorithm
- Field test functionality
- Request FRA permission to conduct track data validation and verification beyond pilot territories
- File test plans with FRA for approval
- File final test reports with FRA
- Design locomotive layout for PTC equipment
- Install onboard equipment
- Test connectivity between locomotive and office
- Commission the locomotive for PTC by conducting post installation check-out tests
- Survey sites and collect data for communications equipment and towers
- Conduct an RF study of site to select best tower location
- Make regulatory filings to FCC for approval of site location
- Create communications frequency plans with other railroads
- Order and ship material for base stations
- Install base station tower
- Develop instructions, procedures, training material for those who install, operate, maintain, repair or test components
- Schedule training for active agreement workforce
- Deliver training
- Commission line segments for implementation day
- Employ PTC methodology to determine footprint
- File PTC Implementation Plan
- Survey line segments for current condition to understand PTC wayside requirements
- Apply PTC signal mapping to design
- Design Line Segments
- Peer or lab Quality Assurance (QA) test wayside design
- GPS validate wayside and base tower locations
- Order Material
- Deploy labor to construct
- Construct PTC location, including tower
- Install equipment at wayside
- Insure connectivity of site to back office through communications links
- Cut-in/in-service test PTC locations
- Update Software Configuration Management Database
- Request FRA permission to conduct field testing
- Validate track database critical features
- Validate wayside interface unit (WIU) indications with TMC
- Validate PTC route for track data
- Lab test functionality

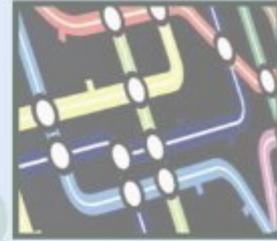
# Cross Interaction



- One change impacts so many other parts of the system
  - Be aware of connections
  - Courseware mapping is critical
- Overarching systems may need their own department
  - When appropriate, involve people from impacted departments



# Impact on Safety Protocols

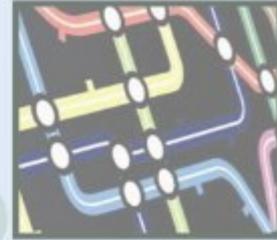


- Roadway Worker Protection
- New Protocols
- Possibly New Hazards
- New technologies to address added hazards
- Workforce must be trained on all these items



# Impact on Workforce:

**It's not the old time railroad, it's the new time railroad**



- Incumbents may be intimidated by new technologies
- Opportunity to attract young people to techy jobs
- Training should be catered to your audience – millennials learn differently

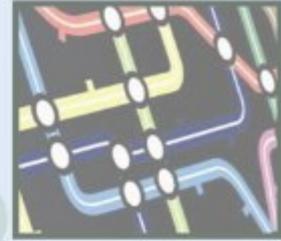


# Training for New Technologies

Joe Brosseau

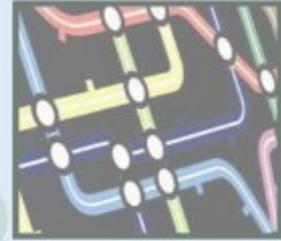
Director, Communications and  
Train Control (C&TC)

Transportation Technology  
Center, Inc.



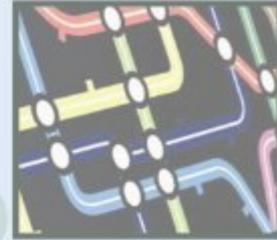
Transportation Technology Center, Inc. (TTCI) is a wholly-owned subsidiary of the Association of American Railroads (AAR) focused on providing customers with highly effective and efficient railway research, testing, training and technical support. TTCI operates the 52-square mile Transportation Technology Center, a federal railway test facility in Pueblo, CO, and serves the AAR and its member railroads, as well as the FRA and other government and commercial customers.

# Training for New Technologies



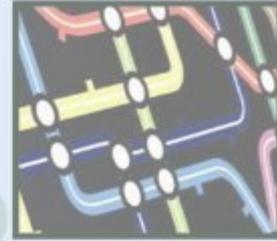
- I. New Railway Technologies
- II. Challenges with New Technologies
- III. New Technology Training Must-Haves

# New Railway Technologies



- PTC is just the beginning...
- TTCI is researching the next generation of new technology for the railway industry
  - Next generation train control
  - Machine vision-based inspection systems
  - Automated ultrasonic wheel defect detectors
  - Improved rail flaw detection technology
  - Fiber Optic-based Acoustic Detection Systems
  - Drone-based technology

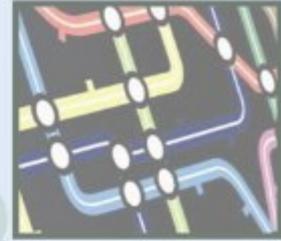
# The Fallacy of New Technology



- New technology that is not well understood can be seen as the “silver bullet” to solve everything
- PTC is a perfect example
- It is important to provide training on what the technology does, but also what it does NOT do

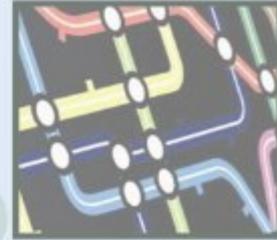


# The Fear of Change



- Many new technologies are seen as a disruption in how workers get their jobs done
- Training must demonstrate how the technology improves their job

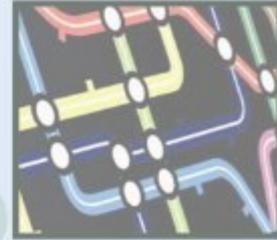
# Training with Tech In Progress...



- Training is a challenge while new technology is still in development
- Ongoing changes as:
  - Bugs are identified
  - Technology is rolled out in new scenarios
  - New features are implemented
- With complex technology, real operational experience is necessary, which requires training
- Balance is needed

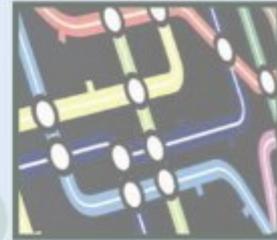


# New Technology Experts



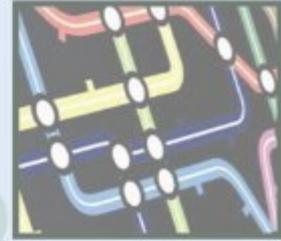
- New technologies require experts to support training development
  - Experts in the how the technology works
  - Experts on each railroads' implementation
- Limited experts are generally available, with ongoing development activities
- Training must be a priority early
  - Start early with awareness training
  - Move into in-depth training as needed
  - Expect change and follow-on training

# New Tech Training Must-Haves



- ✓ Overview of “why” and how each piece fits together
- ✓ Then, detailed training on individual components/frontline workers
  - ✓ Focus on each group – make it relevant
  - ✓ Avoid getting into the weeds (not “all or none”)
- ✓ Hands-on training
- ✓ Explain that things will change
- ✓ Experts in the new technology AND on the specific implementation on your railroad

# Training for New Technologies



Julie Deibel-Pundt

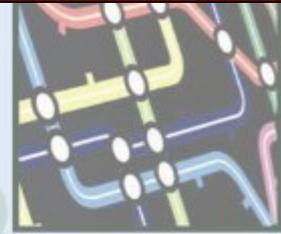
Program Manager of Instructional Design

Transportation Learning Center

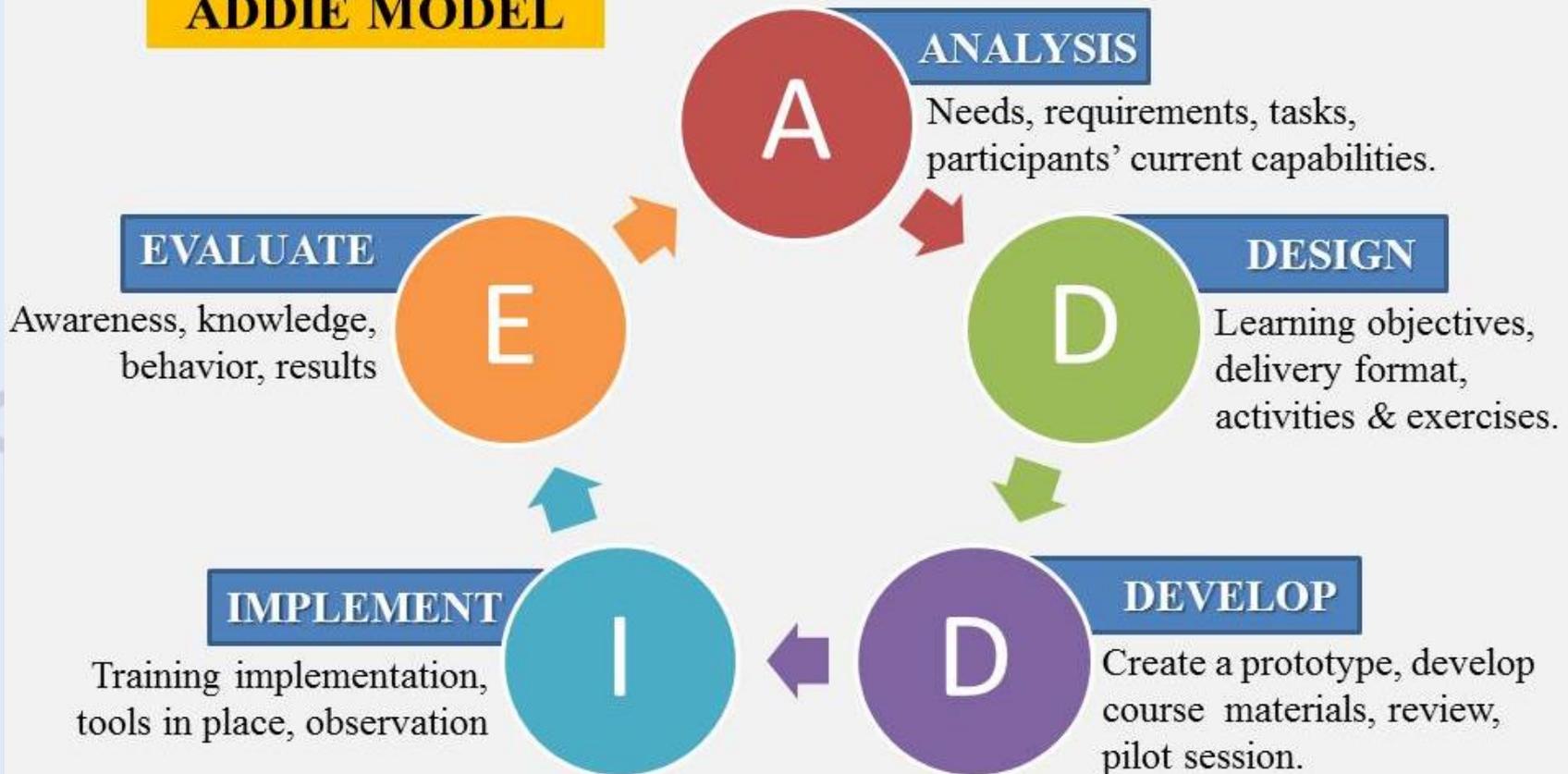


The Transportation Learning Center is a nonprofit organization dedicated to improving public transportation at the national level and within communities. To accomplish this mission, the Center builds labor-management training partnerships that improve organizational performance, expand workforce knowledge,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

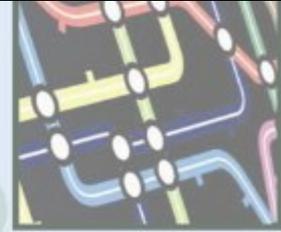
## Usual Courseware Development



### ADDIE MODEL

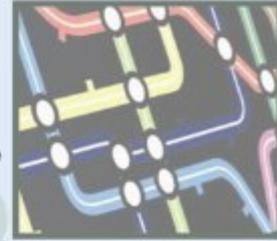


## Courseware Dev't on New Technologies

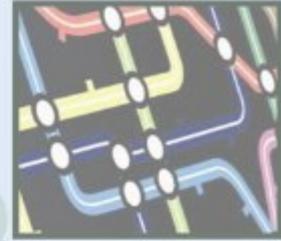


# Changes in Staffing & SMEs

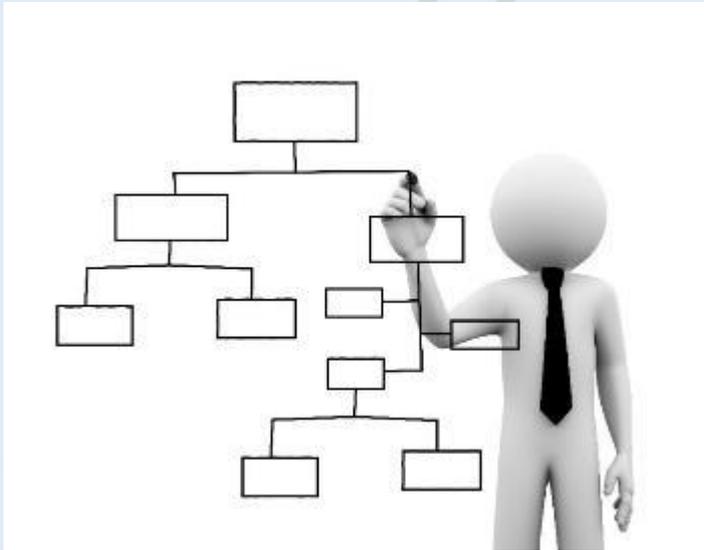
- More Personnel Changes
- Limited pool of experts
  - Competition
  - Burnout
- Knowing the players is especially important b/c tech will be changing constantly
- Communication of design changes must go through multiple (moving) layers



# Changes in Staffing

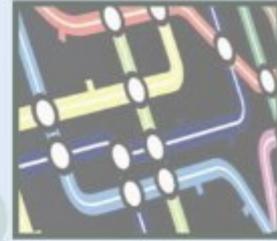


## Solutions



- Collect org charts from everyone (SI, Designer, Agency, Union)
- Attend meetings that aren't directly related
- Get on any email chains that will inform you of staff changes
- Build Relationships to learn of changes sooner, levels of expertise, etc.

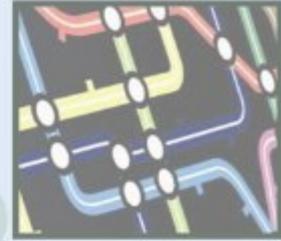
# Your Training is Only as Good as Your Front End Analysis



- What is the ideal state?
- What is the current state?
- What is the **gap**?
- Which **topic areas** need to be covered?
- What will the **length of training** be?
- Who is the **audience**?
- What **resources** are available?
- What **Format** will the training be?  
What is your **timeline**?

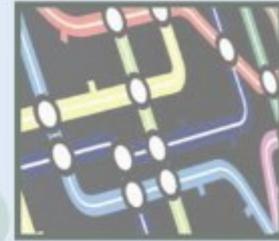


# A Good TNA Can Limit Most Training Problems



- Topic isn't pertinent to me. Why am I here?
- Too Simple → boredom
- Too complex → tuned out
- Not in a medium that works for the audience
- Training is too long, too short

# Training Needs Analysis for New Technologies



How do you answer these questions when the technology isn't even designed?

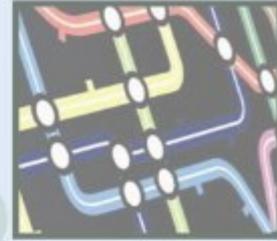
- Who will use the new technology?
- How will they use it?
- What functions will be replaced?
- What processes will change?

# TNA: Possible Solutions

- Open line of **communication** between designers & end users
- Keep **re-evaluating** the TNA
- If hiring an outside firm to develop training:
  - Determine your **needs** beforehand: a course for each audience, shuffled into current training, etc.
  - Clearly state your **expectations** – suggest a cycling TNA process and workforce involvement



# Content is Forever Shifting



## Challenges

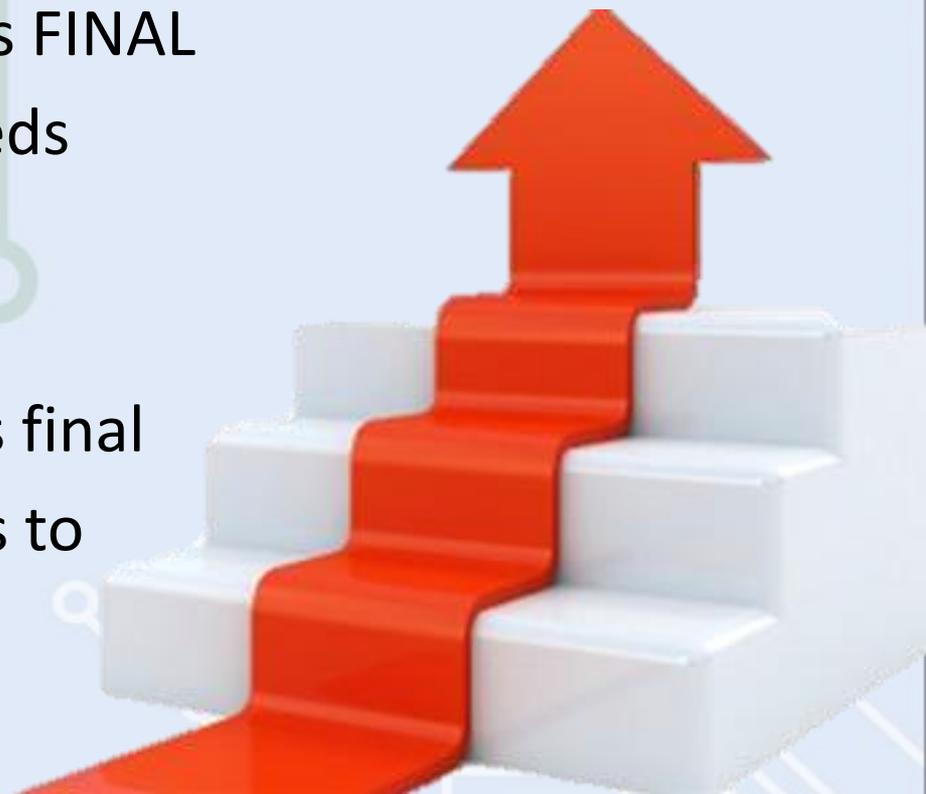
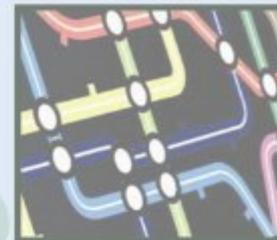
- Information is missing
- Information is changing



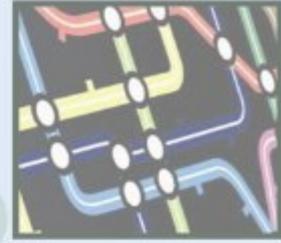
# Content is Forever Shifting

## Solutions

- Ideally wait until technology is FINAL
- Be realistic about training needs
- Possibly train in stages:
  - Broad overview early on
  - More detailed after tech is final
- Establish safe spaces for SMEs to reveal the truth
- Flag areas that will change

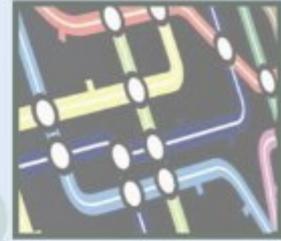


# Three Key Takeaways:



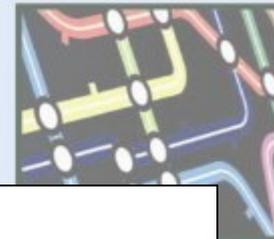
1. Build Trust
2. Be Flexible
3. Approach challenges creatively





# Questions and Answers





# Please, tell us what you think



## Conference Evaluation Afternoon

The Transportation Learning Center would appreciate your comments and suggestions about its annual conference in its continuing effort to improve the event. Thank you!

	strongly agree	agree	neutral	disagree	strongly disagree
<b>Afternoon Plenary Session</b>					
Overall, the plenary session was useful and interesting to me.	<input type="radio"/>				
I learned something in the plenary session that I will use professionally and/or share with colleagues.	<input type="radio"/>				
The plenary session lasted the right amount of time: it was neither too long nor too short.	<input type="radio"/>				
The plenary session lived up to my expectations.	<input type="radio"/>				
I would recommend this session to a colleague.	<input type="radio"/>				

Please tell us more about your experiences in the plenary session and/or how we can make improvements next year.

### Afternoon Workshop

- Which workshop did you attend?
- Prioritizing Training for New Technologies: FTC & Electronic Communications
  - Registered Apprenticeship: The How and the Why
  - Partnerships in Safety and Health

	strongly agree	agree	neutral	disagree	strongly disagree
Overall, the workshop useful and interesting to me.	<input type="radio"/>				
I learned something that I will use professionally and/or share with colleagues.	<input type="radio"/>				
The speakers were knowledgeable and the panel had appropriate diversity and expertise.	<input type="radio"/>				
The workshop lasted the right amount of time: it was neither too long nor too short.	<input type="radio"/>				
I would recommend this workshop to someone a colleague.	<input type="radio"/>				

(Over)