

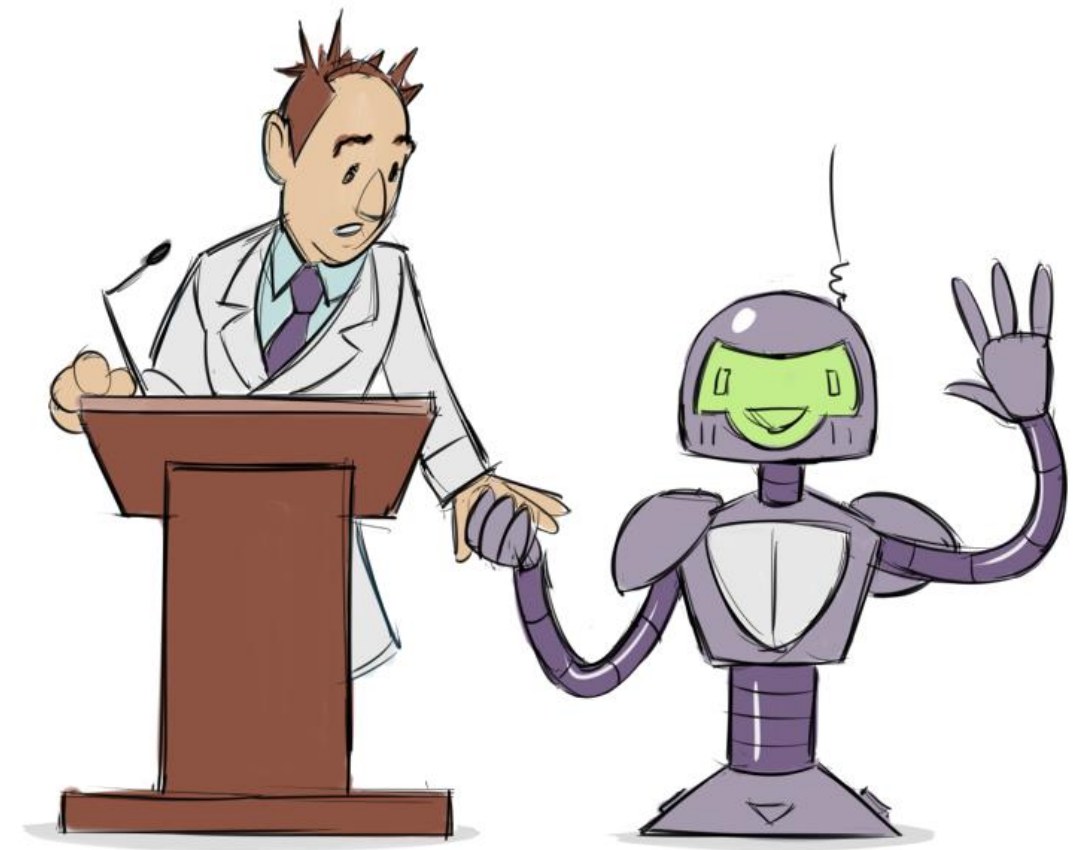
Design and Deliver Successful Training

Dieter Schlaepfer

Principal Learning Content Developer
Autodesk, Inc.

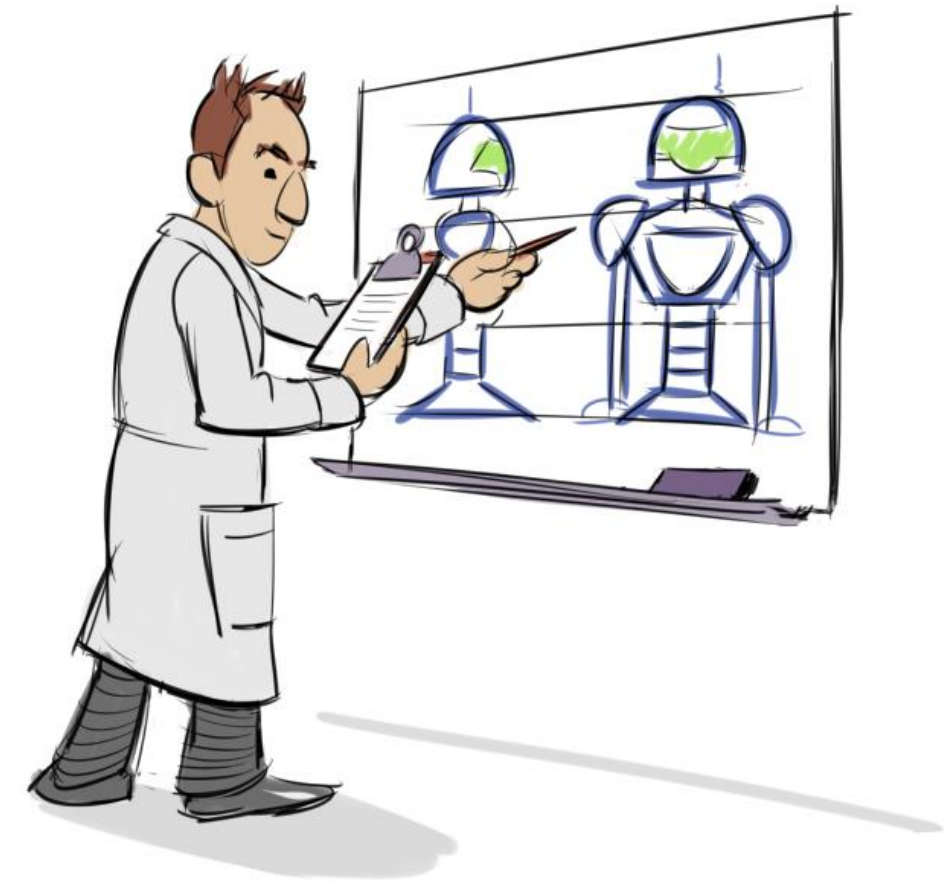
Class summary

Learn how to design and deliver effective and successful instruction to technical professionals.



Objectives

- Describe the difference between learning and training
- Identify the most important factors for relevance and retention
- Separate the components of instructional design
- Recognize what doesn't work well and why



Objectives

- Describe the difference between learning and training
- Identify the most important factors for relevance and retention
- Separate the components of instructional design
- Recognize what doesn't work well and why



Part I – The Big Picture

Part II – Practical Application

Symptoms of training deficiencies

- I've learned lots of facts, but I can't put them together
- I don't even know what to ask
- I don't really understand the terms
- I'm confused by the tools and the workflow
- I don't feel like I'm ready to start
- I'm stressed out and frustrated



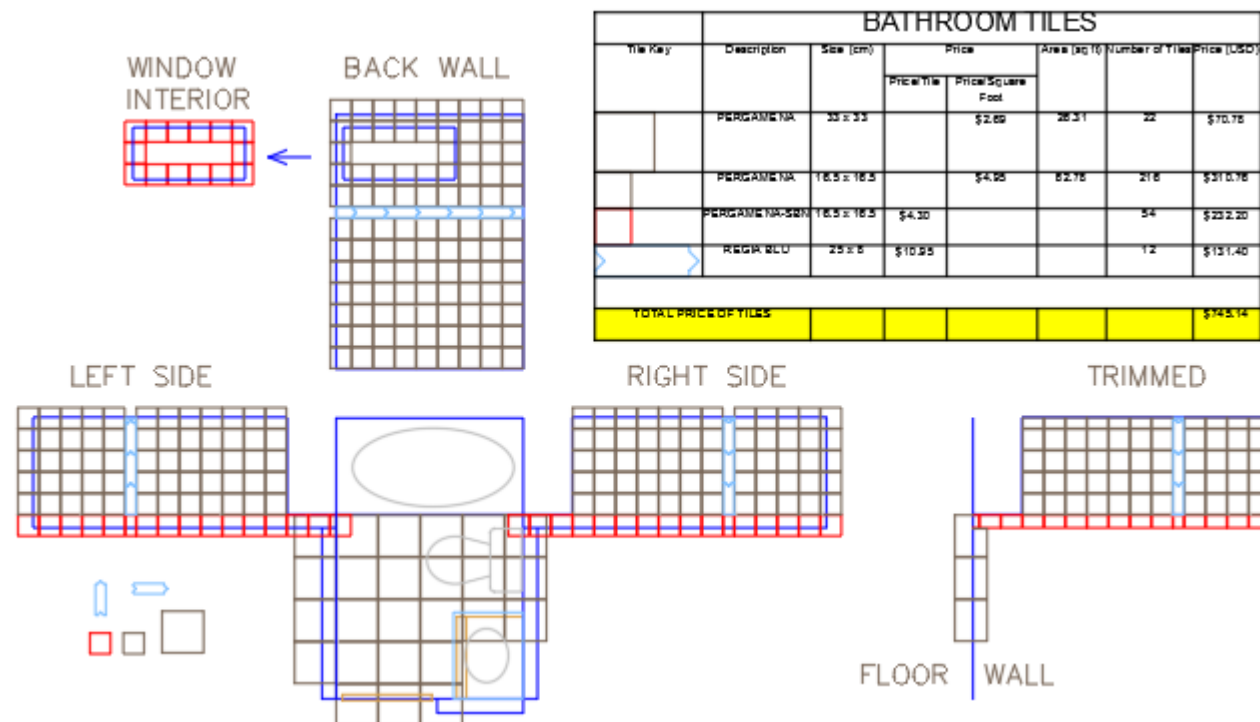
Has this ever happened to you?

A story about a feature

- The need
 - Schedules
 - Bills of materials
 - Quantity take-offs

A story about a feature

- The need
- The solution
 - Table objects
 - Bidirectional data links to Excel



Commands for Tables

Commands

- DATALINK (Command)
- DATALINKUPDATE (Command)
- FIELD (Command)
- TABLE (Command)
- TABLEEDIT (Command)
- TABLEEXPORT (Command)
- TABLESTYLE (Command)
- TINSERT (Command)
- UPDATEFIELD (Command)

System Variables

- CTABLESTYLE (System Variable)
- DATALINKNOTIFY (System Variable)
- FIELDDISPLAY (System Variable)
- TABLEINDICATOR (System Variable)
- TABLETOOLBAR (System Variable)

A story about a feature

- The need
- The solution
- The response
 - Was underwhelming
 - Any ideas why?

Commands for Tables

Commands

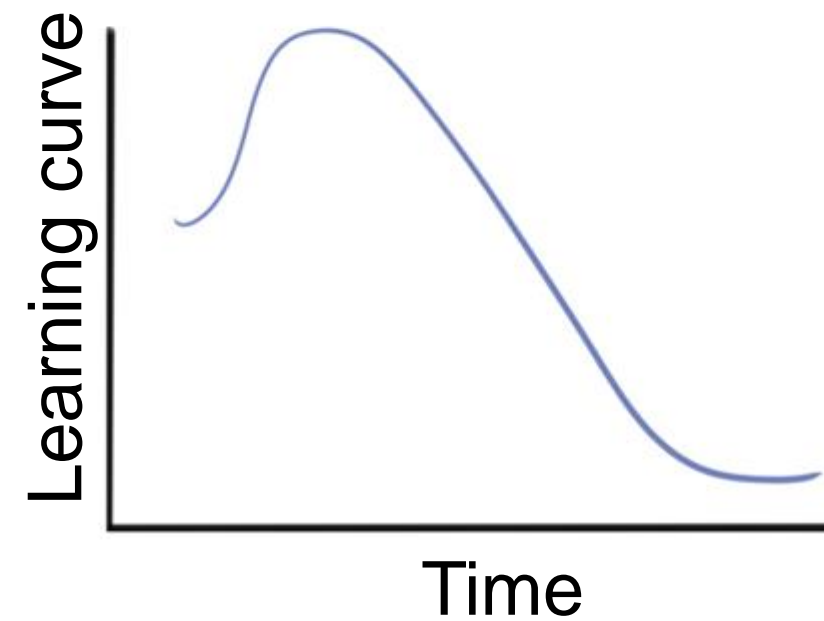
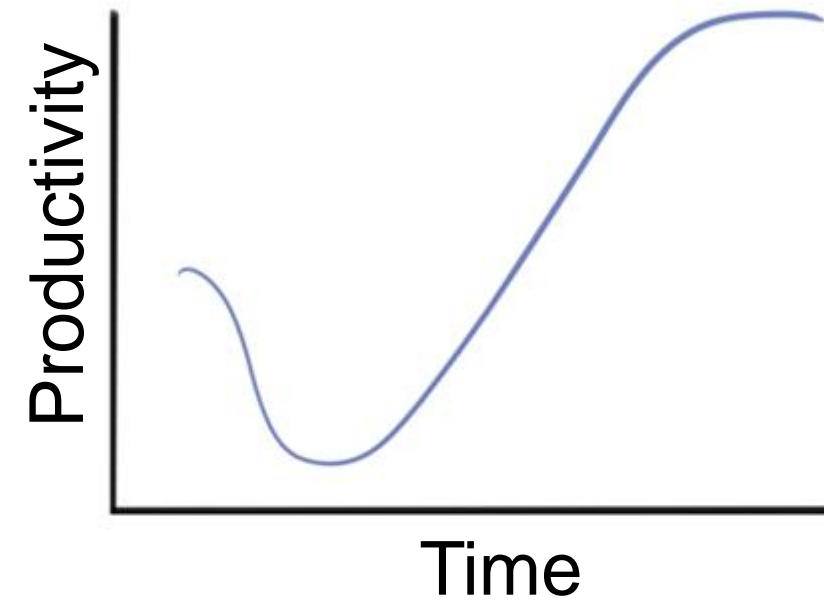
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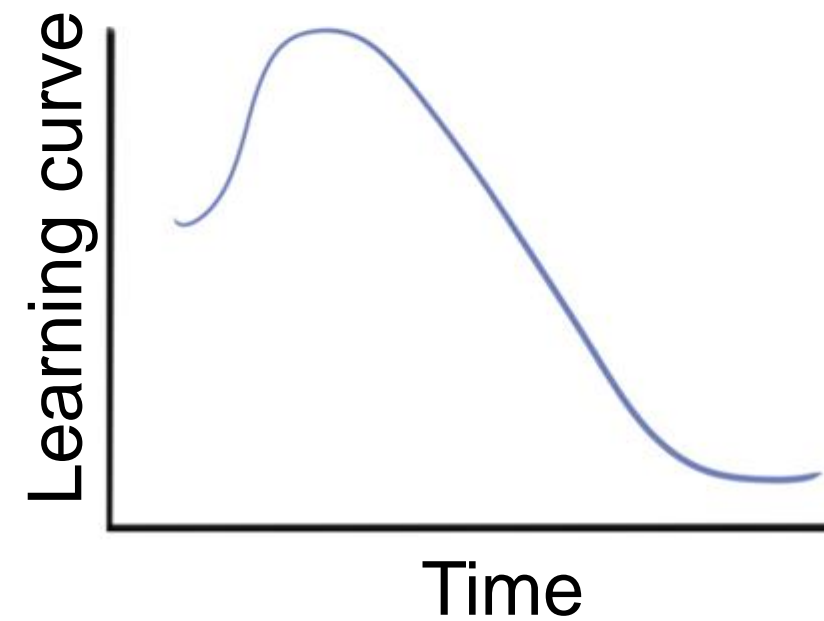
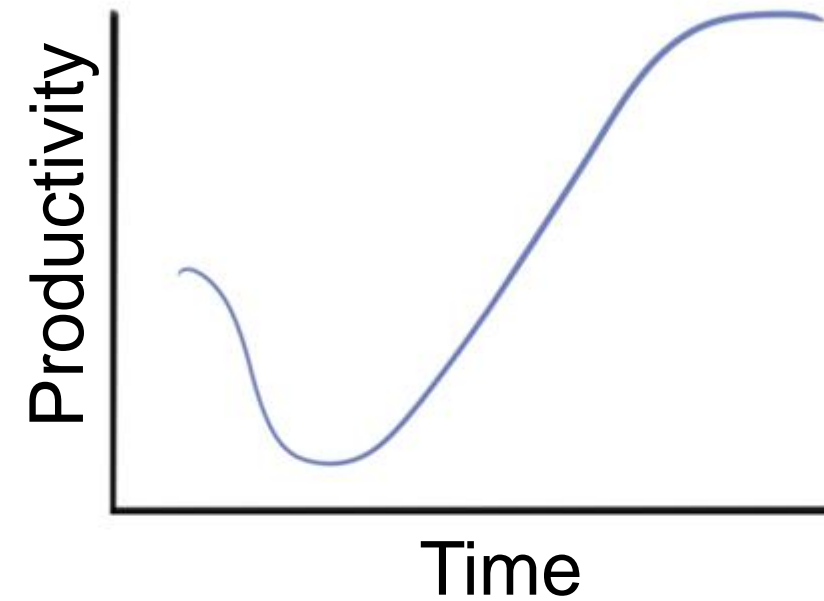
A story about a feature

- The need
- The solution
- The response
- The reasons
Among other factors . . .

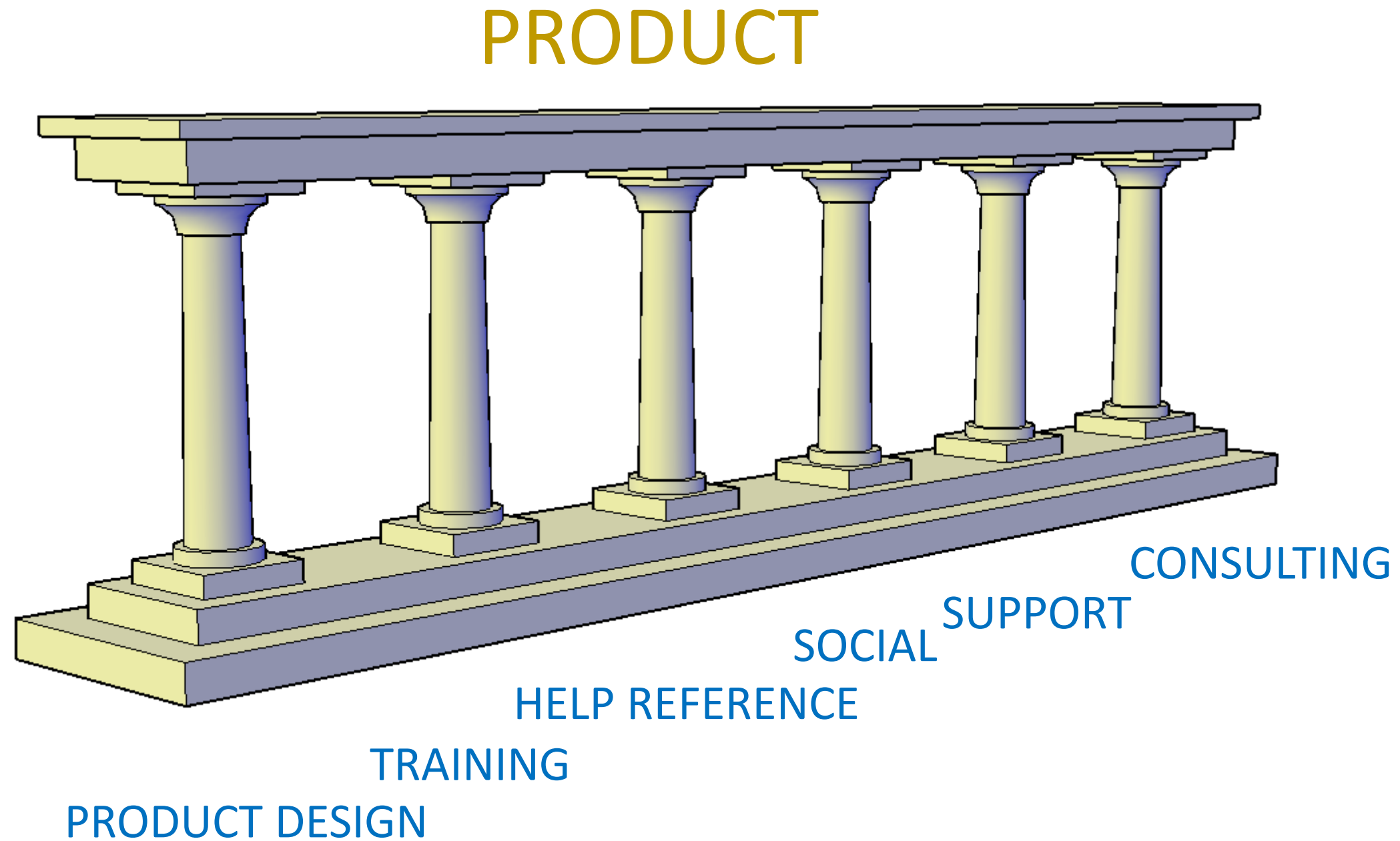


A story about a feature

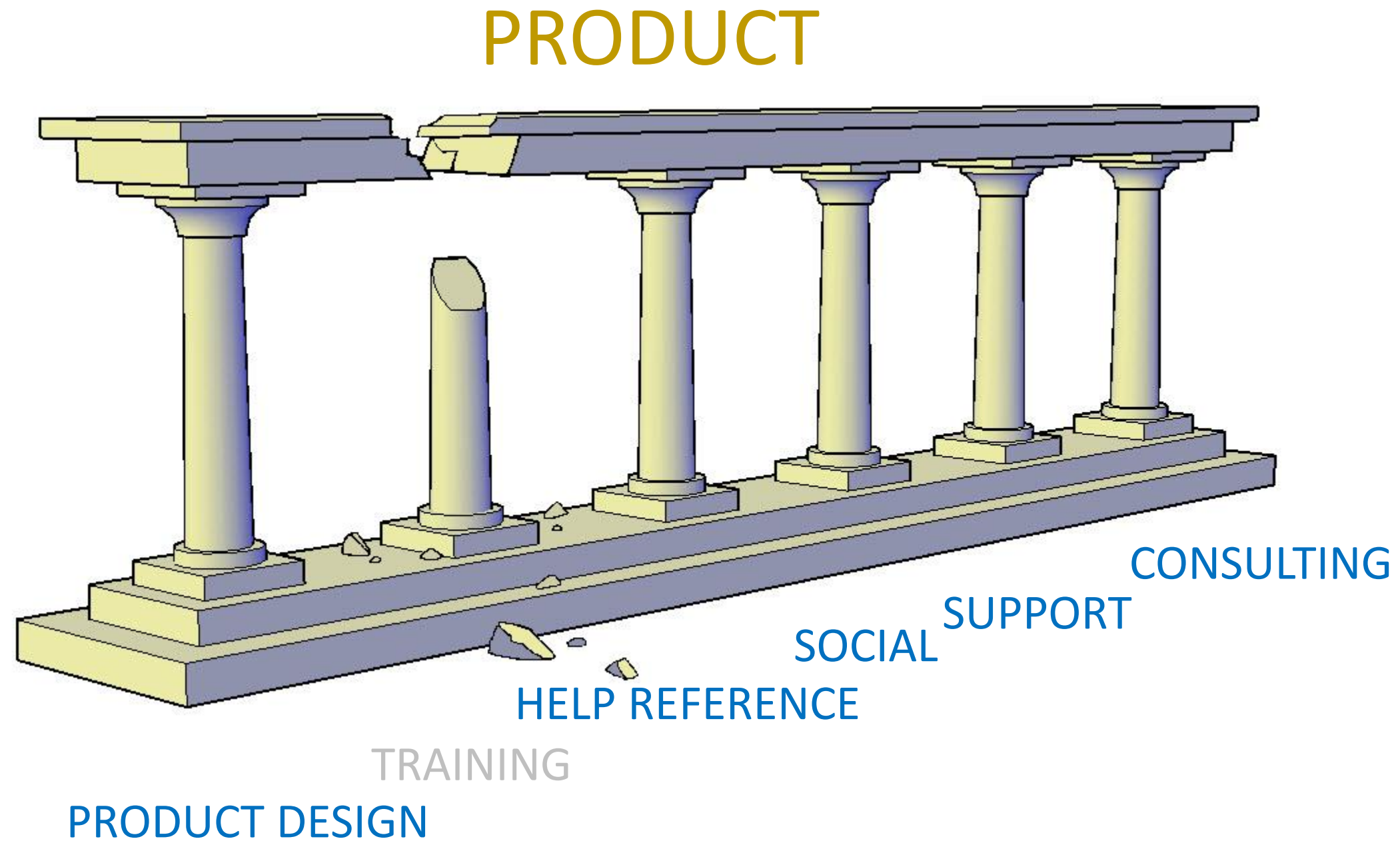
- The need
- The solution
- The result
- The reasons
- The remedies



Where does training fit in?



Where does training fit in?



What is learning?

- Definition of learning

What is learning?

- Definition of learning

Acquiring knowledge or skills through experience, practice, study, or by being taught.

What is learning?

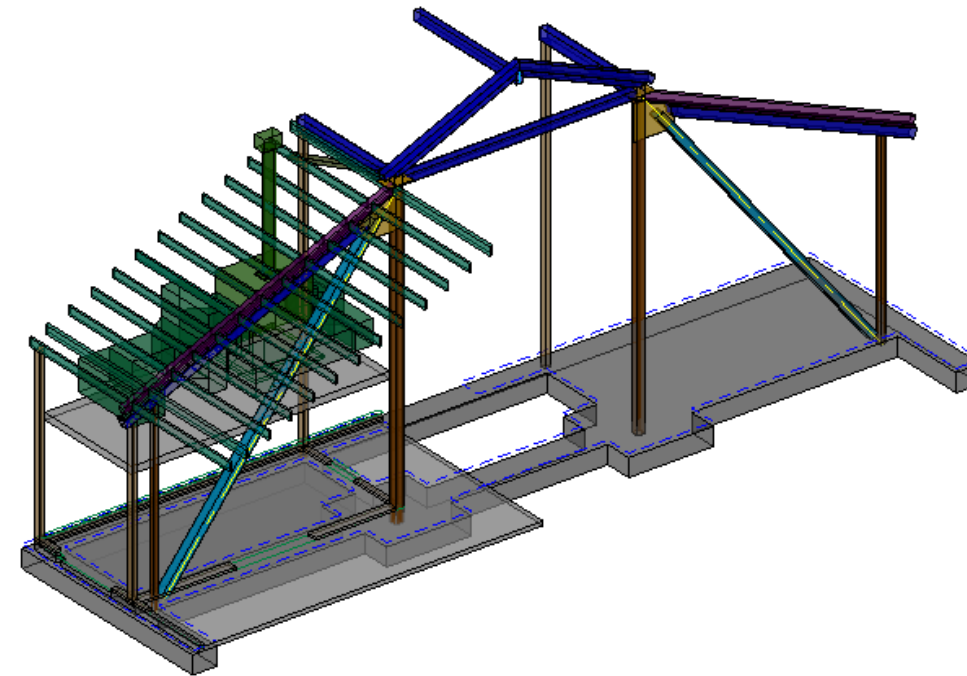
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Acquiring knowledge or skills through experience, practice, study, or by being taught.

Doing
Reading
Watching
Listening
Experimenting
Imagining
Questioning
Discussing
Analyzing
Abstracting
Dissecting
Comparing
Problem Solving

What is learning?

- Definition of learning
- Acquiring a conceptual framework



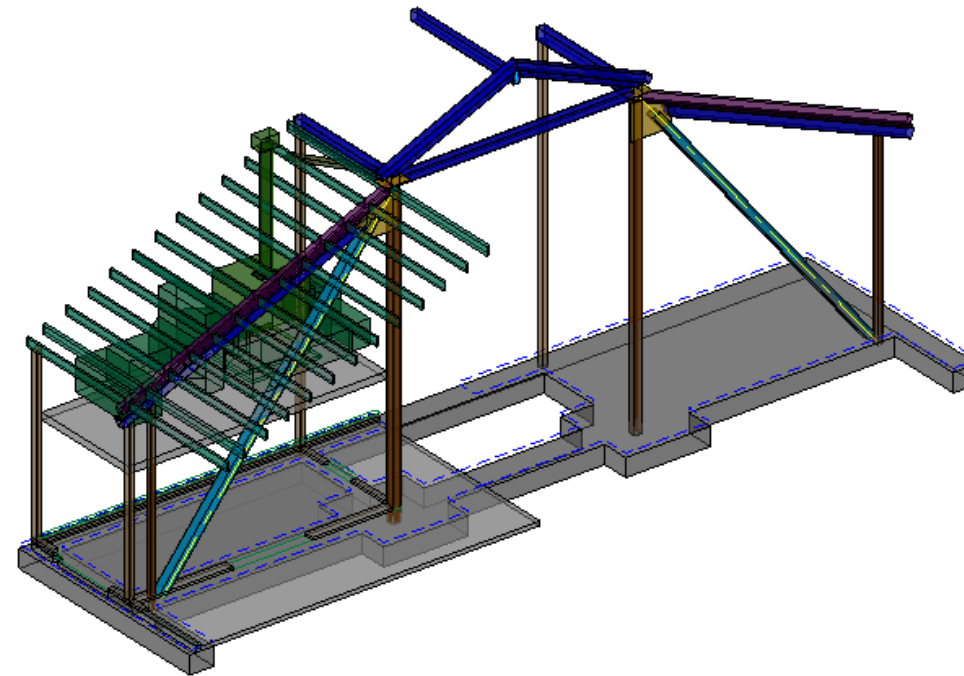
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Why?

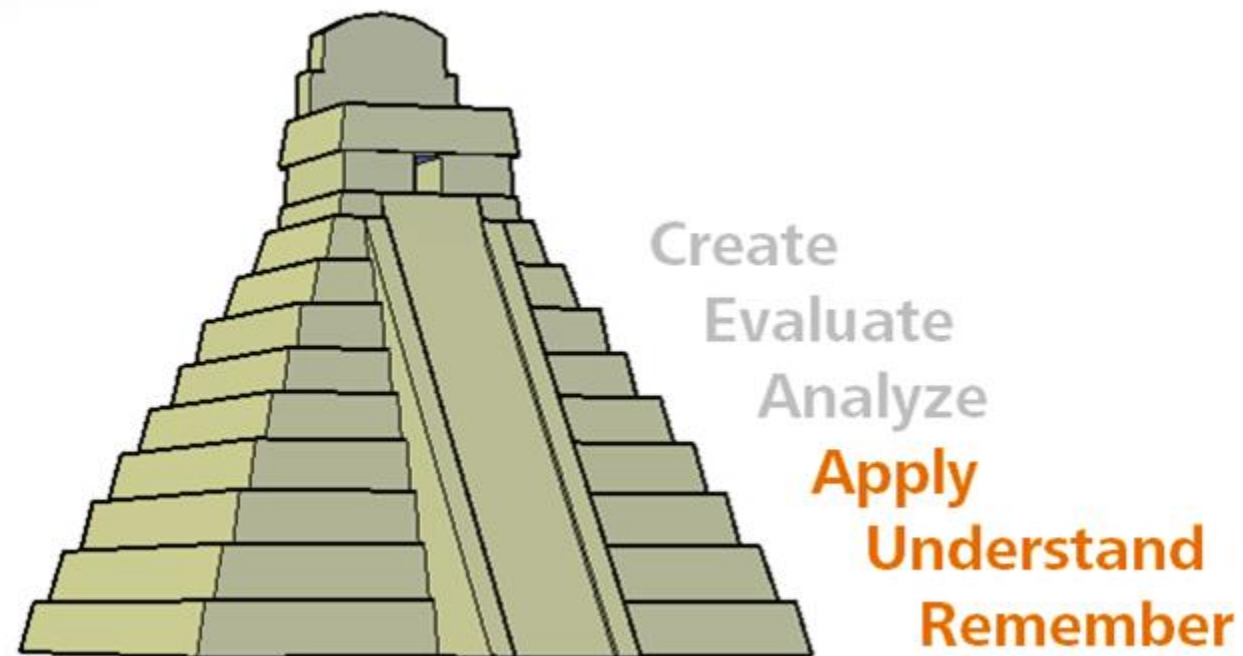
- Provides principles
- Adds context
- Sets expectations
- Defines scope
- Helps integration
- Aids future learning



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What is learning?

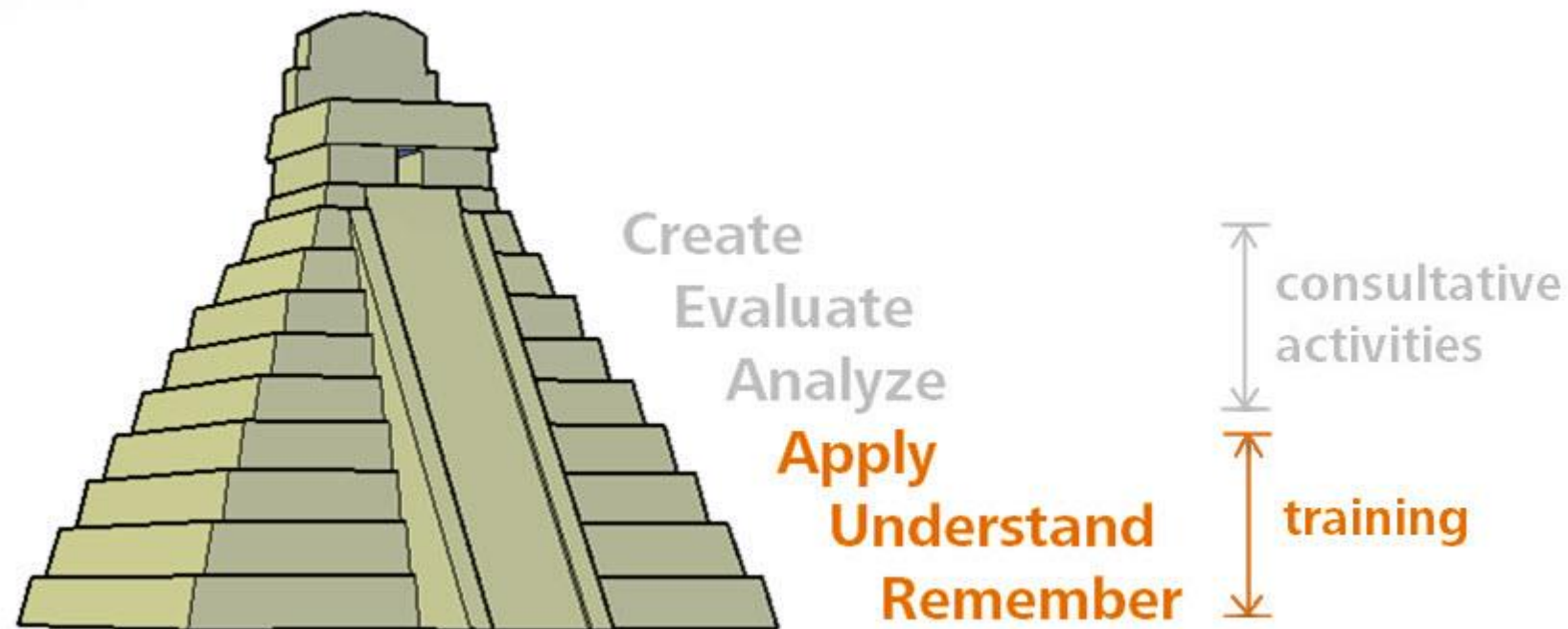
- Definition of learning
- Acquiring a conceptual framework
- Levels of learning: Bloom's Taxonomy (1956, 2000)



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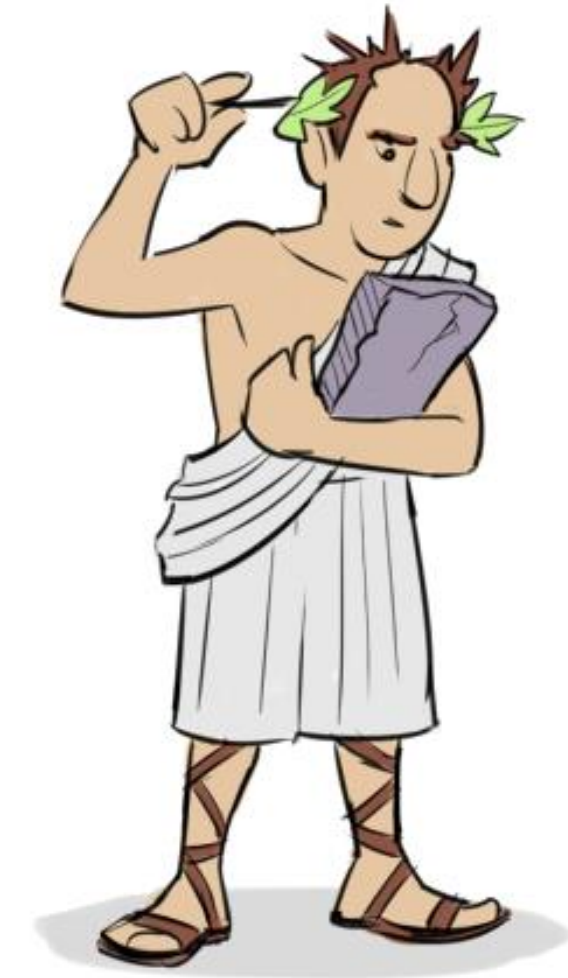
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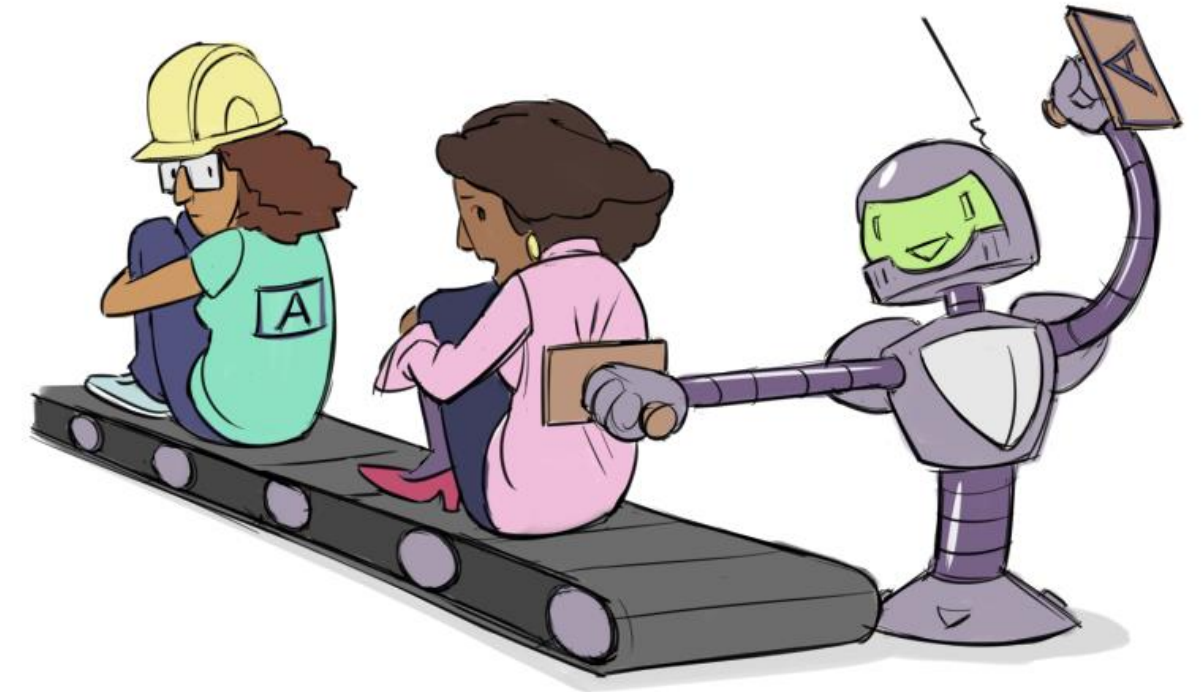
Learning paradigms

- Socratic questioning
- Mass production (industrial revolution)
- Constructivism/Discovery Approach
- Behaviorism (B.F. Skinner) – Behavioral objectives
- Cognitive Load Theory (J. Sweller)



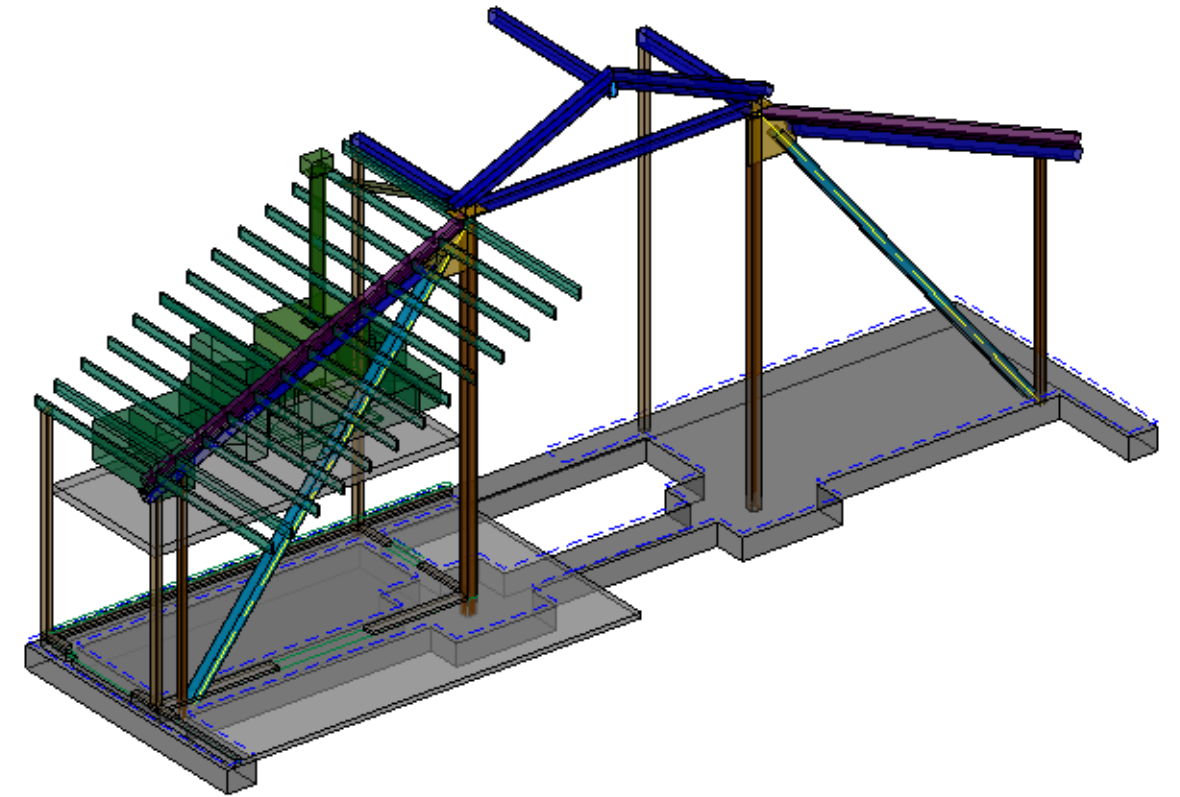
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Learning paradigms

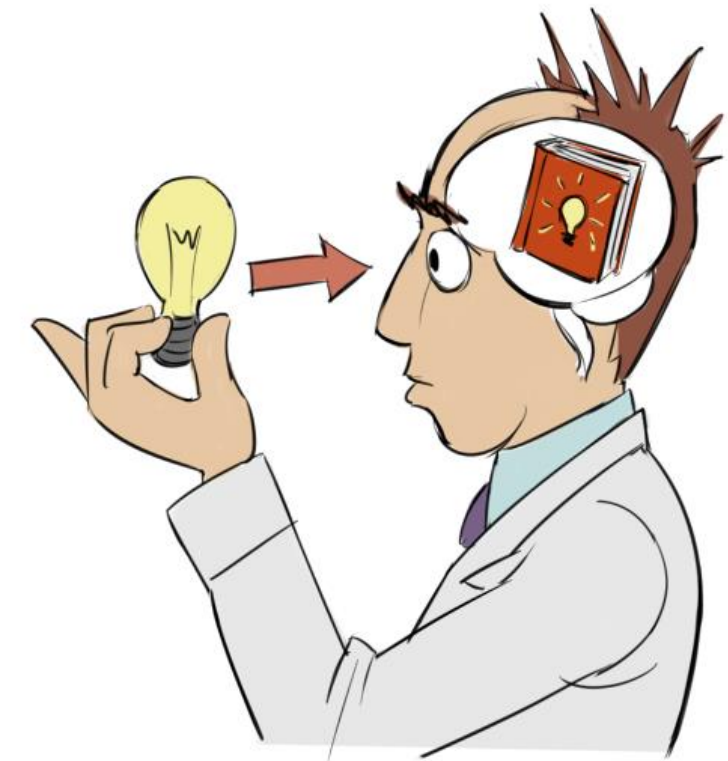
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Learning paradigms

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- Mass production (industrial revolution)
- Constructivism/Discovery Approach
- Behaviorism (B.F. Skinner) – Behavioral objectives
- Cognitive Load Theory (J. Sweller) . . .
 - Controlled experiments and statistical analysis
 - Working memory is limited
 - Remove all extraneous load



Learning paradigms

- Socratic questioning
- Mass production (industrial revolution)
- Constructivism/Discovery Approach
- Behaviorism (B.F. Skinner) – Behavioral objectives
- Cognitive Load Theory (J. Sweller) . . .
 - Working memory -> long term memory
 - Slow-wave sleep, hippocampus
 - Concepts and examples: ex. object snaps



Cognitive load . . . an experiment

See how many of these you can keep in mind before you feel overloaded

1. Document Management metadata

Cognitive load . . . an experiment

See how many of these you can keep in mind before you feel overloaded

1. Document Management metadata
2. Network access management policies

Cognitive load . . . an experiment

See how many of these you can keep in mind before you feel overloaded

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2. Network access management policies
3. Automated workflow notification policies

Cognitive load . . . an experiment

See how many of these you can keep in mind before you feel overloaded

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2. Network access management policies
3. Automated workflow notification policies
4. Process integration with the Cloud

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Cognitive load . . . an experiment

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Cognitive load . . . an experiment

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1. Document Management metadata
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4. Process integration with the Cloud
5. Malware vulnerability and threat analysis
6. Switching from Windows to Linux
7. For a university network in China

What is training?

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The fastest, most efficient transmittal of the *minimum* knowledge needed for immediate productivity, and a solid conceptual foundation for future learning.

What is training?

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The fastest, most efficient transmittal of the *minimum* knowledge needed for immediate productivity, and a solid conceptual foundation for future learning.

. . . but what makes training relevant?

What makes training relevant?

- Understands the audience
 - Experience level
 - Discipline and application
 - Goals and objectives



What makes training relevant?

- Understands the audience
- Matches their requirements
 - Discipline-specific & narrow scope
 - Fast & effective
 - Convenient & accessible



What makes training relevant?

- Understands the audience
- Matches their requirements
- Honors *behavioral modes*, deliverables
 - Explore, assess, and learn
 - Integration into workflow
 - Troubleshoot a problem
 - Production on a deadline



Elements of instructional design

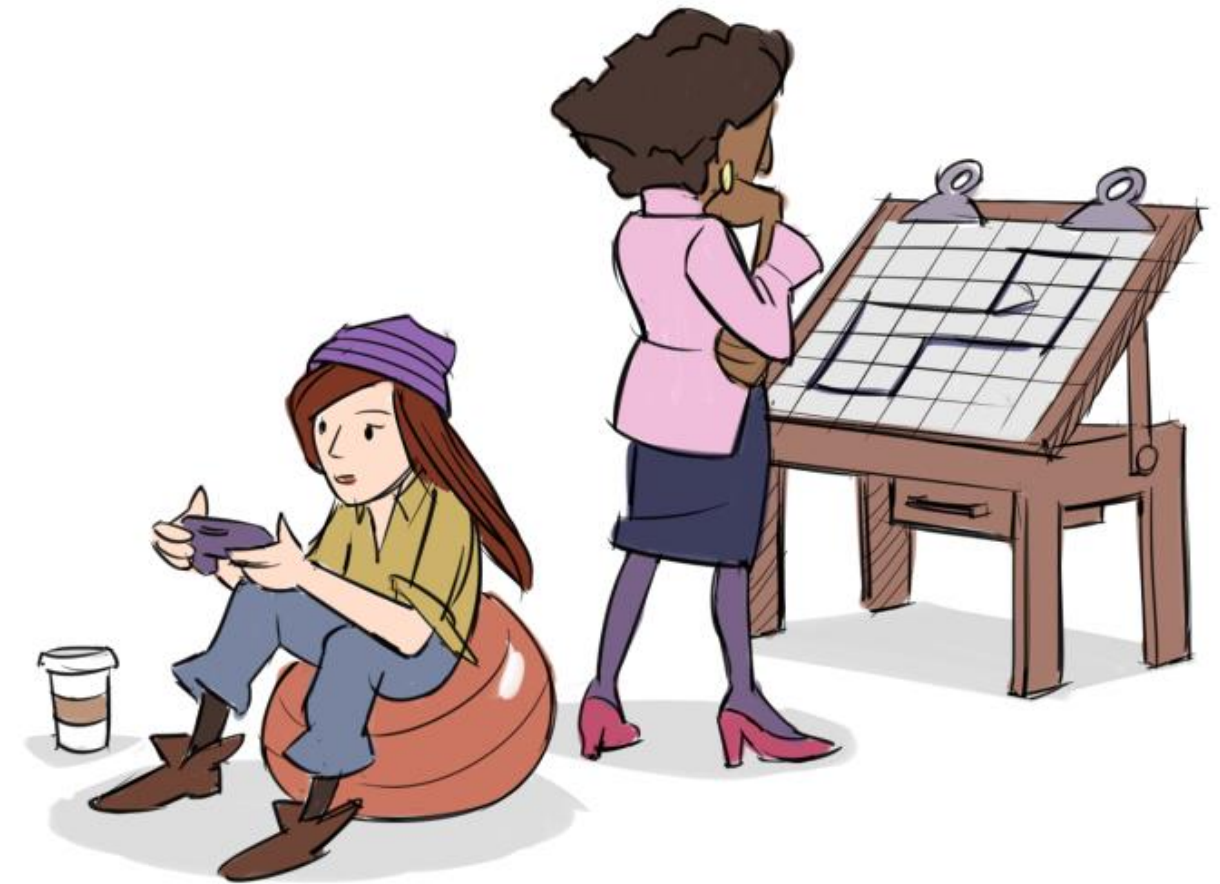
- *Personas*
- Performance objectives
- Course map
- Delivery options and technologies
- Evaluation



How long should this take?

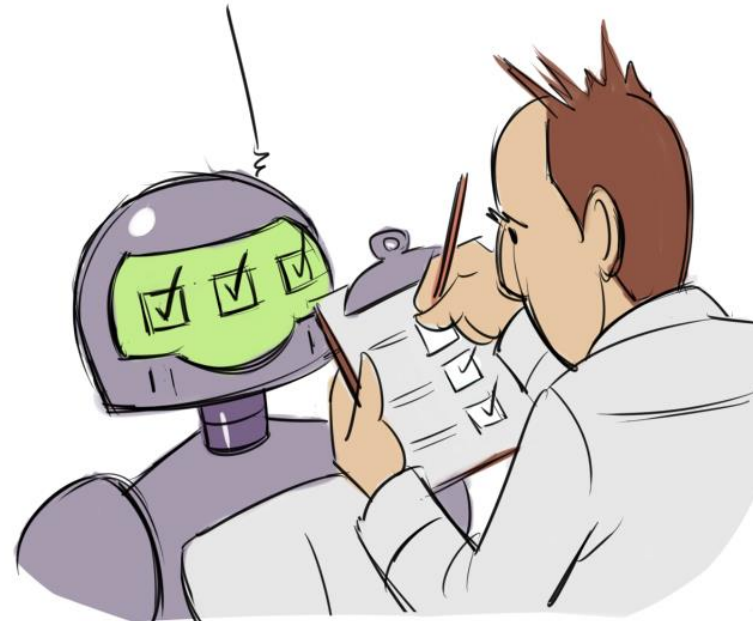
Elements of instructional design

- *Personas*
 - Who is your audience?
 - What are *their* goals?
 - Are they homogenous?



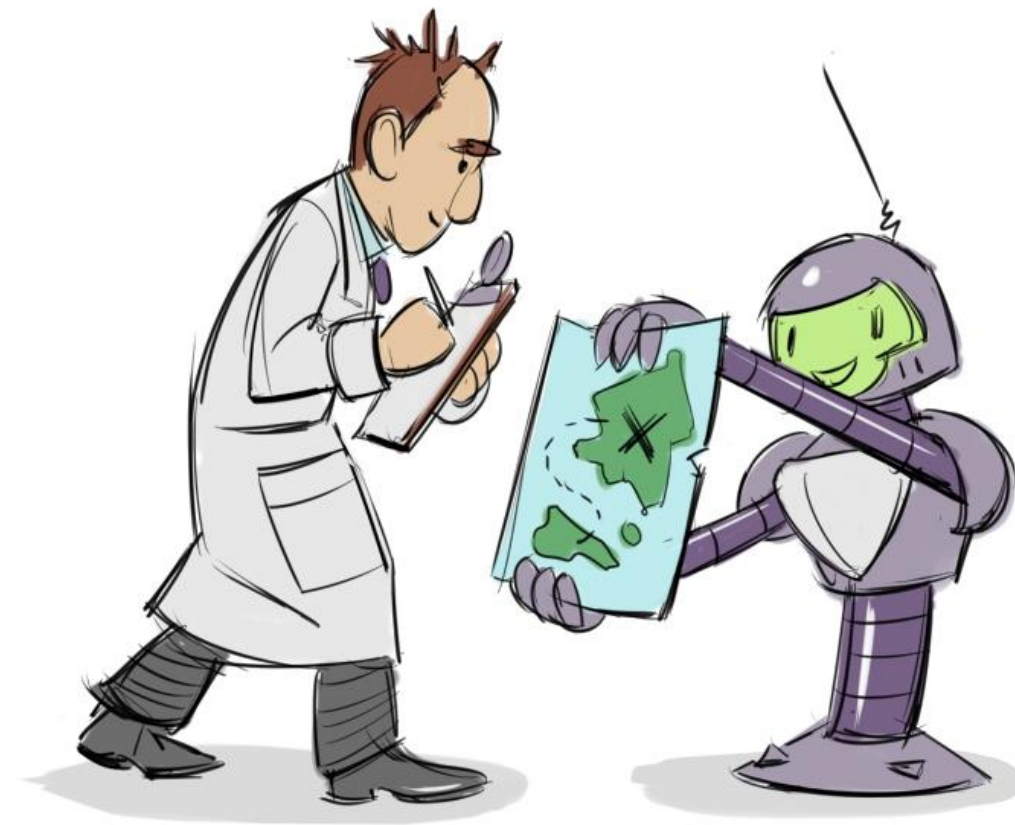
Elements of instructional design

- *Personas*
- Performance objectives
 - Tangible
 - Specific & measurable
 - Realistic
 - Short



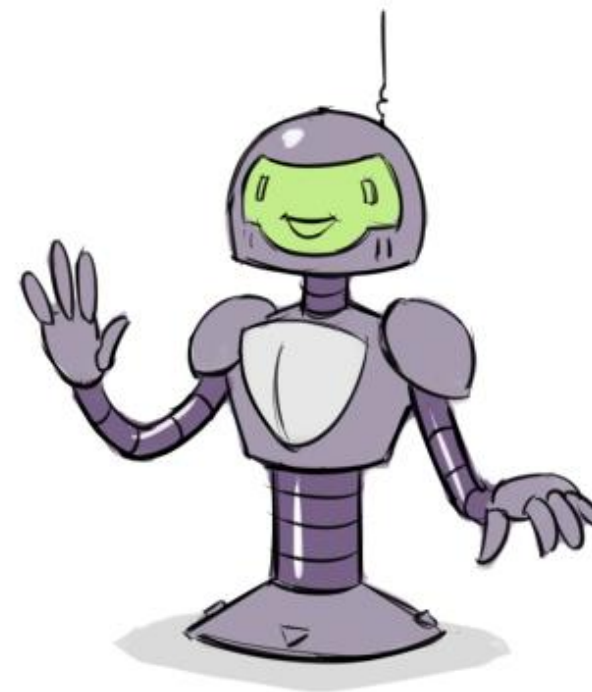
Elements of instructional design

- *Personas*
- Performance objectives
- **Course map**
 - Topic outline: scope & sequence
 - Time: pacing
 - Materials: examples, exercises, quizzes



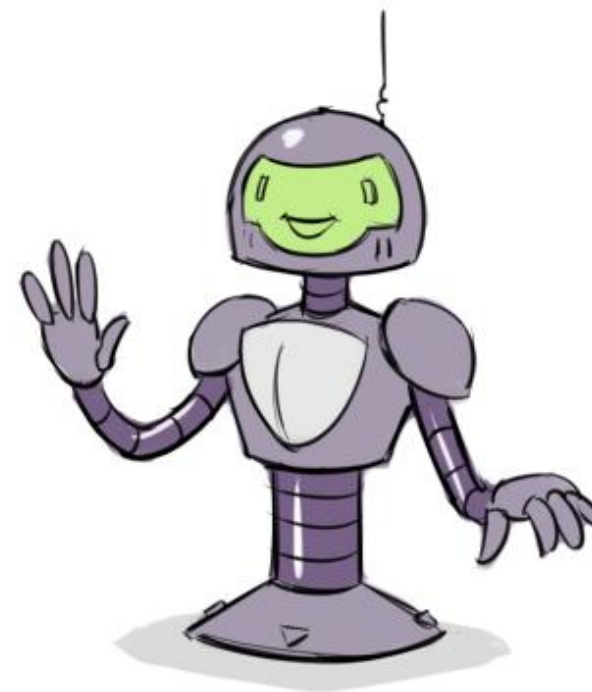
Elements of instructional design

- *Personas*
- Performance objectives
- Course map
- Delivery options and technologies
 - Tutoring
 - Books
 - Videos
 - Classroom



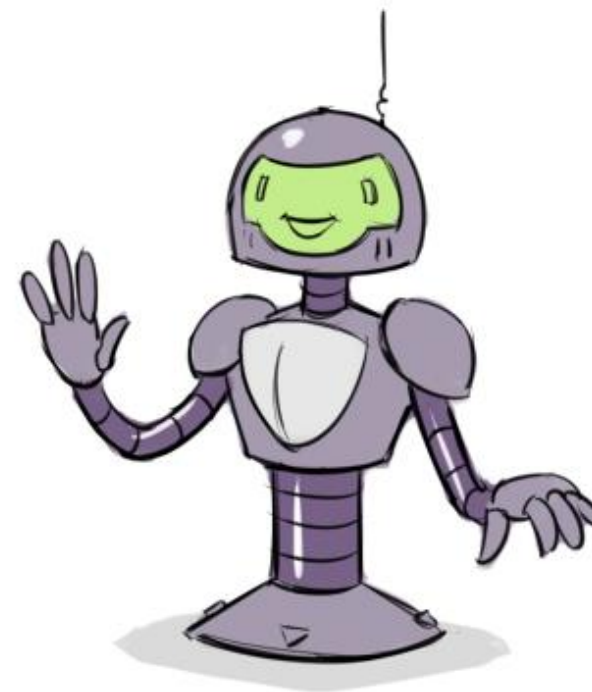
Elements of instructional design

- *Personas*
- Performance objectives
- Course map
- Delivery options and technologies
 - Just-in-time training
 - Patterning / conditioning
 - Stepped (cookbook) tutorials
 - Computer-based instruction



Elements of instructional design

- *Personas*
- Performance objectives
- Course map
- Delivery options and technologies
 - MOOCs & SPOCs
 - Micro-courses
 - Sandbox exercises
 - Gamification?



Elements of instructional design

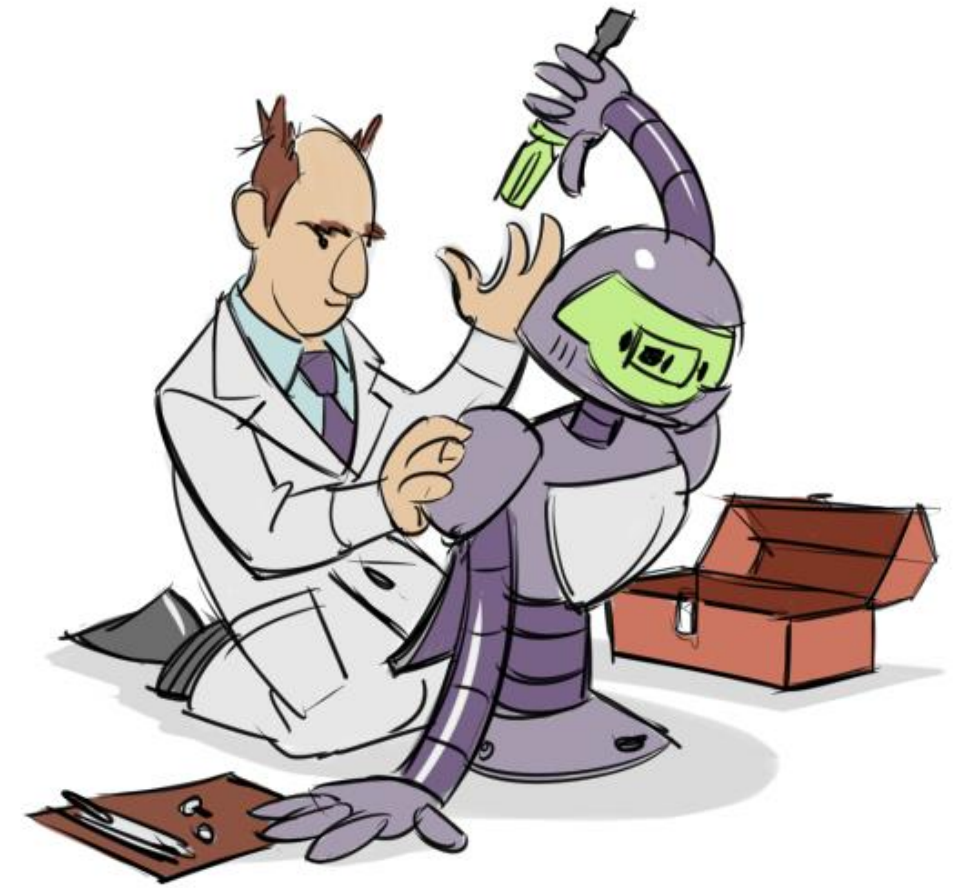
- *Personas*
- Performance objectives
- Course map
- Delivery options and technologies
- Evaluation



What are you measuring?

Elements of instructional design

- *Personas*
- Performance objectives
- Course map
- Delivery options and technologies
- **Evaluation**
 - Effectiveness in achieving the stated objectives
 - Focus on cognitive (performance) domain
 - Analyze and remediate



Fixing the weaknesses

For example . . .

- *Personas* – a team of semi-custom home designers with little or no experience using **layers** in AutoCAD LT

For example . . .

- *Personas* – a team of semi-custom home designers with little or no experience using **layers** in AutoCAD LT

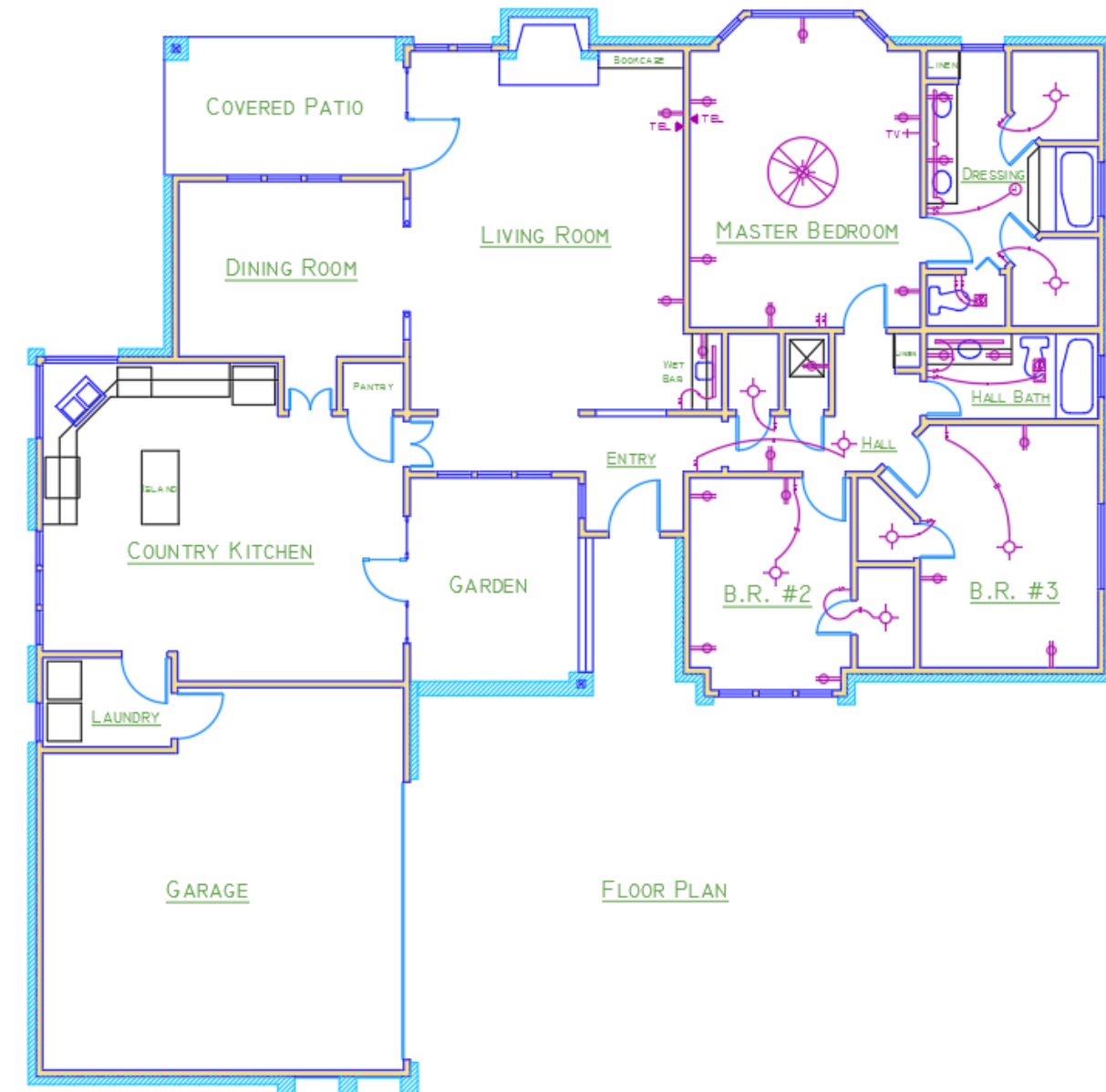
- What are layers?
- How are layers supposed to be used?
- What's meant by the current layer?
- How do you tell what the current layer is?
- How do change the current layer?
- What kinds of controls are available for layers?
- Besides on/off, what else can you do with layers?
- What are layer filters for?
- What are layer groups for?
- What are layer states for?
- How do you manage or standardize layers?
- Why would you use the BYLAYER setting?
- How do layers work within blocks?
- How do layers work within xrefs?
- How do you create new layers?
- How do you change layer names and property settings?
- How do you remove layers?
- How do you verify or change the layer of objects?
- How do you split or merge layers?
- How do layers work in a layout viewport?
- How do layers work when importing or exporting PDFs?
- How do layers work with plotting and plotters?

For example . . .

- *Personas*
- Objectives – After completing this micro-course, participants will be able to do the following tasks with a 95% success rate within 10 minutes:
 - Identify the following terms: layer, current layer, layer properties
 - Identify the current layer, change the current layer
 - Identify, specify, and change the layer of selected objects
 - Identify the standard layers used in company DWGs
- Course map
- Delivery
- Evaluation

For example . . .

- *Personas*
- Objectives
- Course map (micro-course outline)
 - 3:00 Intro to layers – terms, purpose
 - 2:00 Demo – on a sample floor plan, on/off
 - 5:00 Hands on – same floor plan, explore
 - 5:00 Q&A
 - 5:00 Quiz 1 – Ask questions
 - 5:00 Modifying layers – change layers, objects
 - 5:00 Demo – same floor plan, cases
 - 10:00 Hands on with activity sheet
 - 5:00 Q&A
 - 10:00 Quiz 2 – written/hands on, feedback



For example . . .

- *Personas*
- Objectives
- Course map
- **Delivery**
 - Conference room
 - Projector
 - Laptops
 - 1:00 hour brown-bag micro-course

For example . . .

- *Personas*
- Objectives
- Course map
- Delivery
- Evaluation – Check quiz results, find patterns, direct feedback
 - Check quiz results in class
 - Find any patterns in weakness, review & recall
 - Get direct feedback, take notes, bleed a little, heal
 - Determine what changes are needed

Part I – The Big Picture

Part II – Practical Application

In my experience . . .



Alpha Laval, Sweden
Belcan
Coors
Dana Corp
Daimler-Benz
Eastman Kodak
GE Lamp
GE Nuclear
GM Pontiac Motors
GM Truck
Learjet
Ontario Hydroelectric
Peterbilt Motors
Rockwell Engineering
Scott Paper
Trane
US Army Corps of Engineers
US Army NETCOM

What does *not* work well . . .

- Heterogeneous, multi-discipline audience

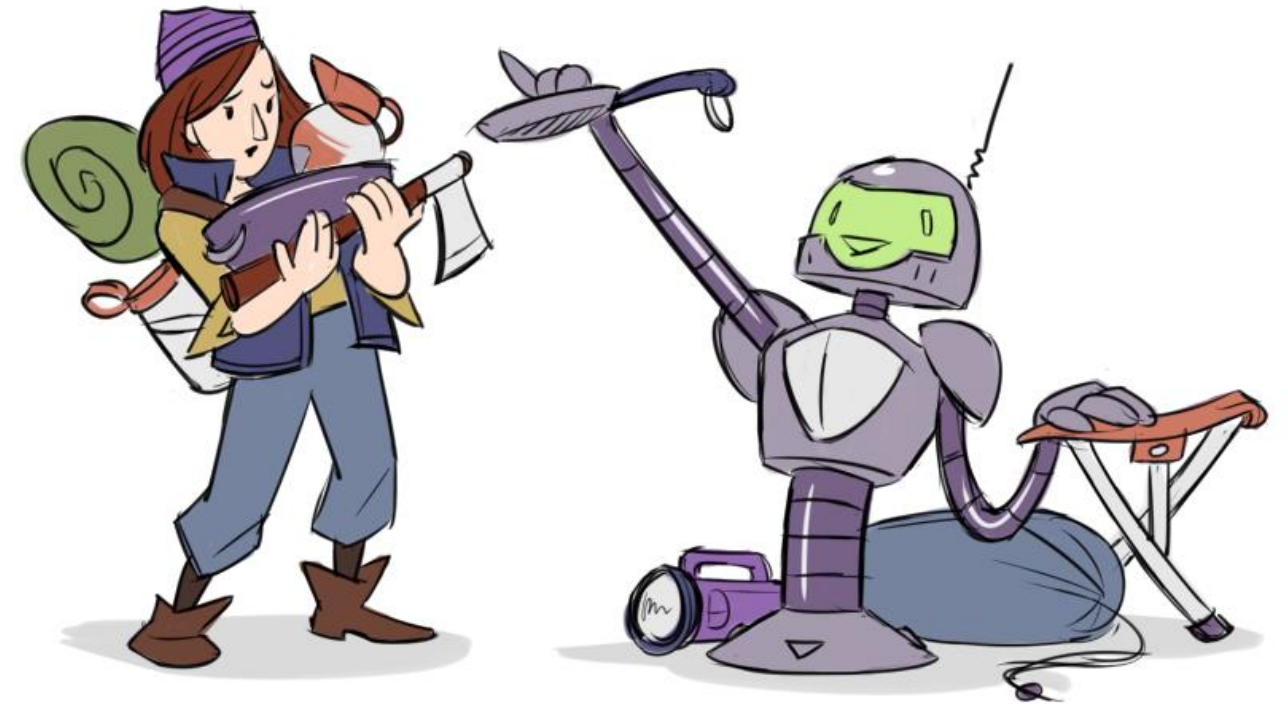


What does *not* work well . . .

- Heterogeneous, multi-discipline audience
- Long lectures, demos without hands on

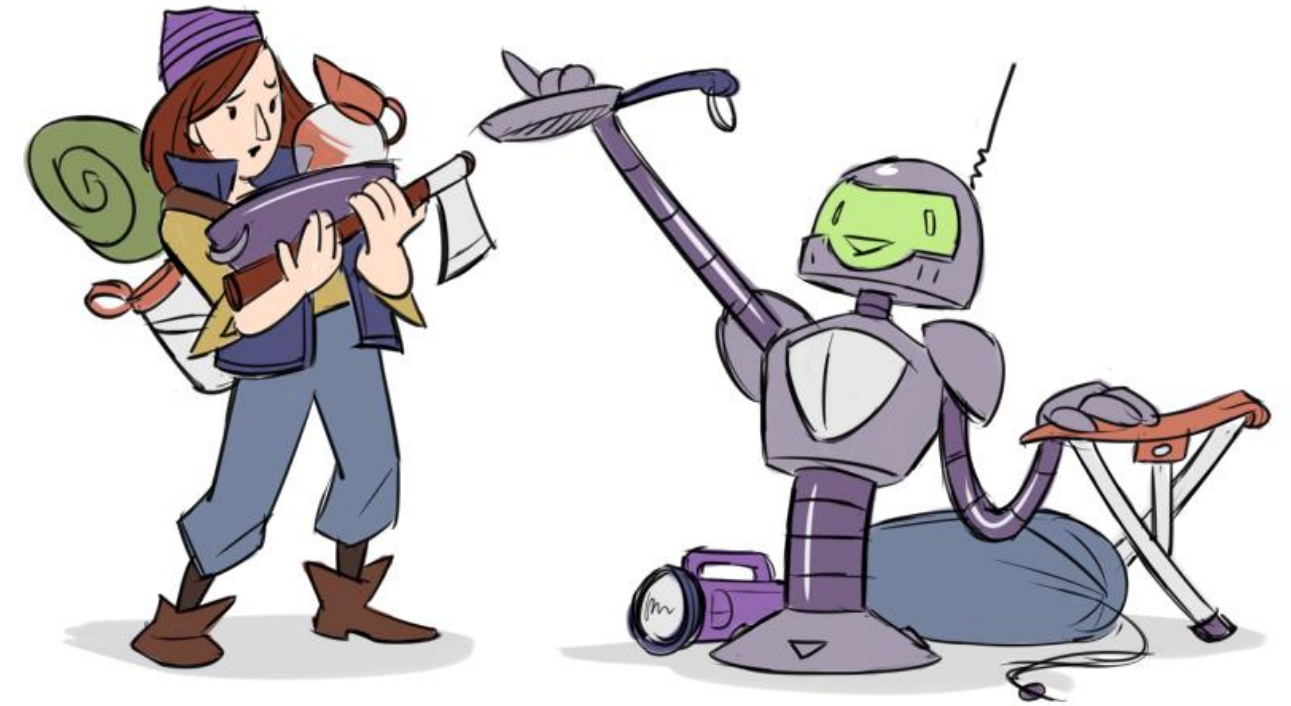
What does *not* work well . . .

- Heterogeneous, multi-discipline audience
- Long lectures, demos without hands on
- Covering too much material too quickly
too much info + too little time = no retention



What does *not* work well . . .

- Heterogeneous, multi-discipline audience
- Long lectures, demos without hands on
- Covering too much material too quickly
- **Competing visual and auditory input**
 - This is termed a *channel conflict*
 - Typically, violations occur during demos



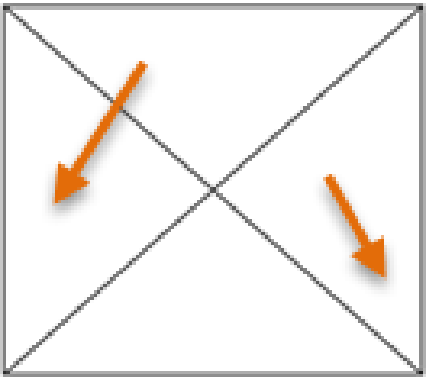
What does *not* work well . . .

- Heterogeneous, multi-discipline audience
- Long lectures, demos without hands on
- Covering too much material too quickly
- Competing visual and auditory input
- Stepped (cookbook) tutorials—yes and no



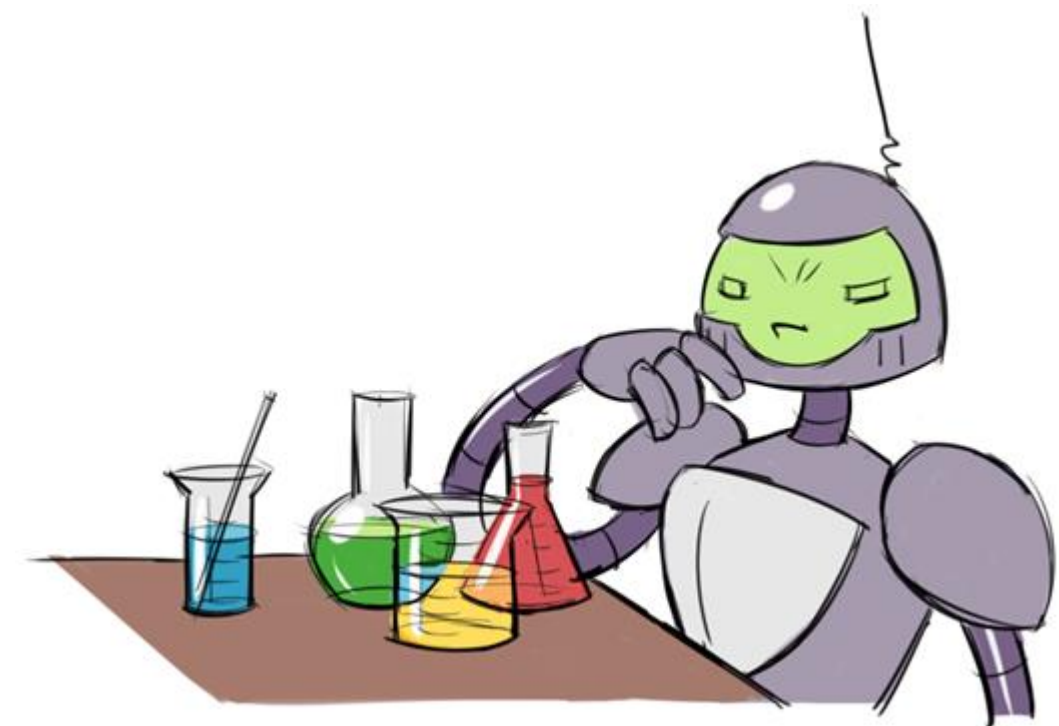
What does *not* work well . . .

- Heterogeneous, multi-discipline audience
- Long lectures, demos without hands on
- Covering too much material too quickly
- Competing visual and auditory input
- Stepped (cookbook) tutorials—yes, if . . .
 - Keep them short
 - Provide several start points
 - Few text interruptions between steps
 - Use color-blind safe colors
 - Not in a competitive setting

Steps	Rationale
<input type="text"/>	
1. . . .	
2. . . .	<input type="text"/>
3. . . .	<input type="text"/>
	<input type="text"/>

What does *not* work well . . .

- Heterogeneous, multi-discipline audience
- Long lectures, demos without hands on
- Covering too much material too quickly
- Competing visual and auditory input
- Stepped (cookbook) tutorials - yes and no
- More than 5-6 hours of training per day

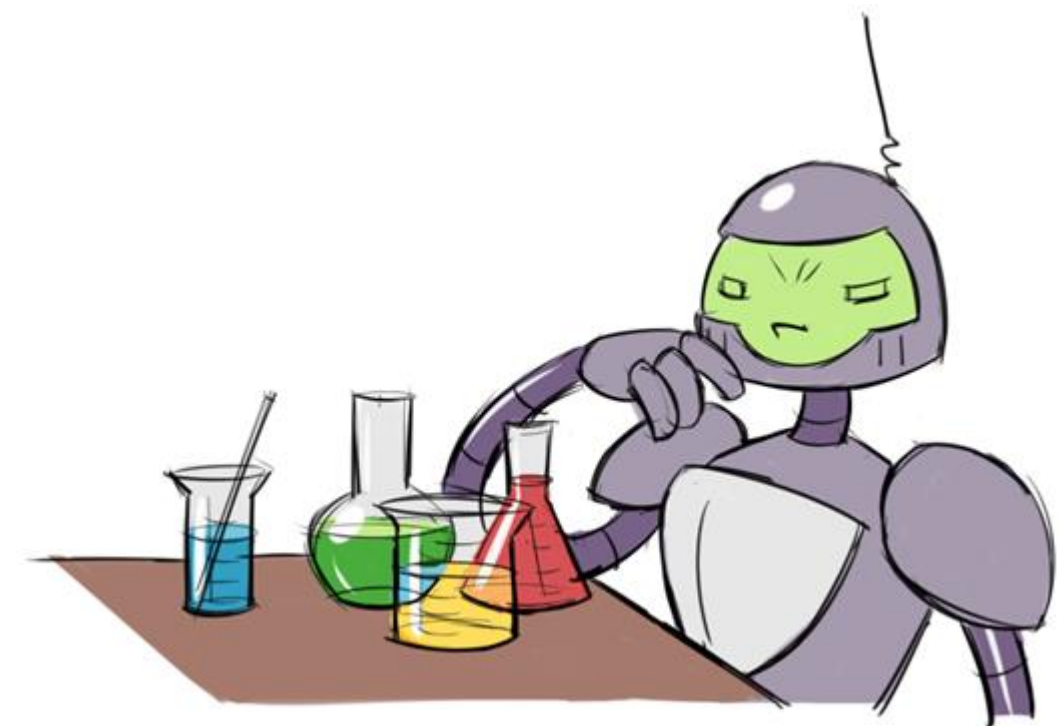


What about *this* AU presentation?

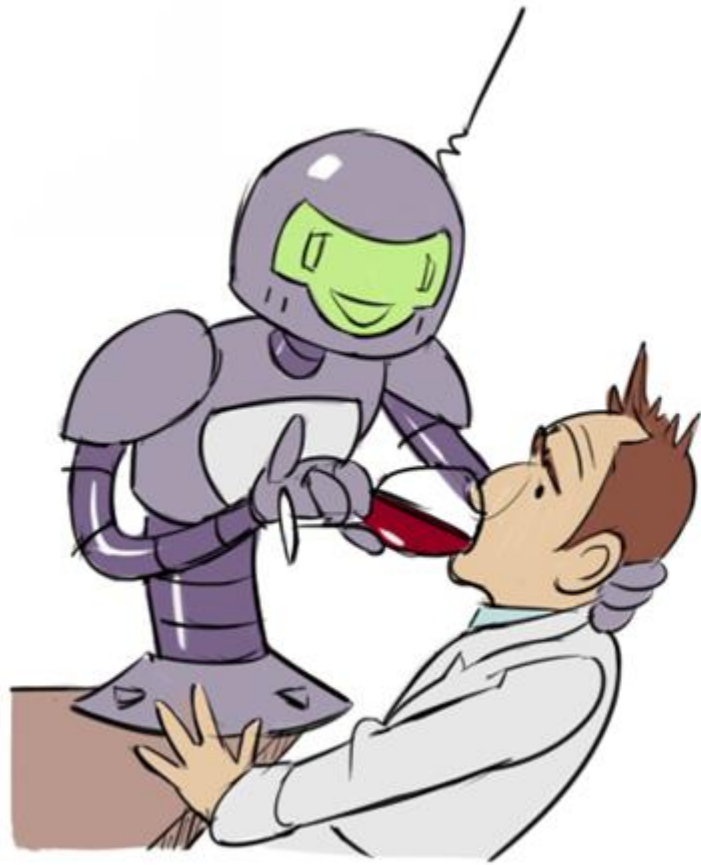
(My sneaky way to insert some review & recall)

- ❑ Heterogeneous, multi-discipline audience
- ❑ Long lectures, demos without hands on
- ❑ Covering too much material too quickly
- ❑ Competing visual and auditory input
- ❑ Stepped (cookbook) tutorials - yes and no
- ❑ More than 5-6 hours of training per day

Sometimes reality intrudes—but look for creative alternatives and mitigations.



In my experience . . . do NOT do this!



Too fast



Too little, too slow



Too much

What *does* work well . . .

- Homogenous participants -> separate tracks
-
-
-
-
-



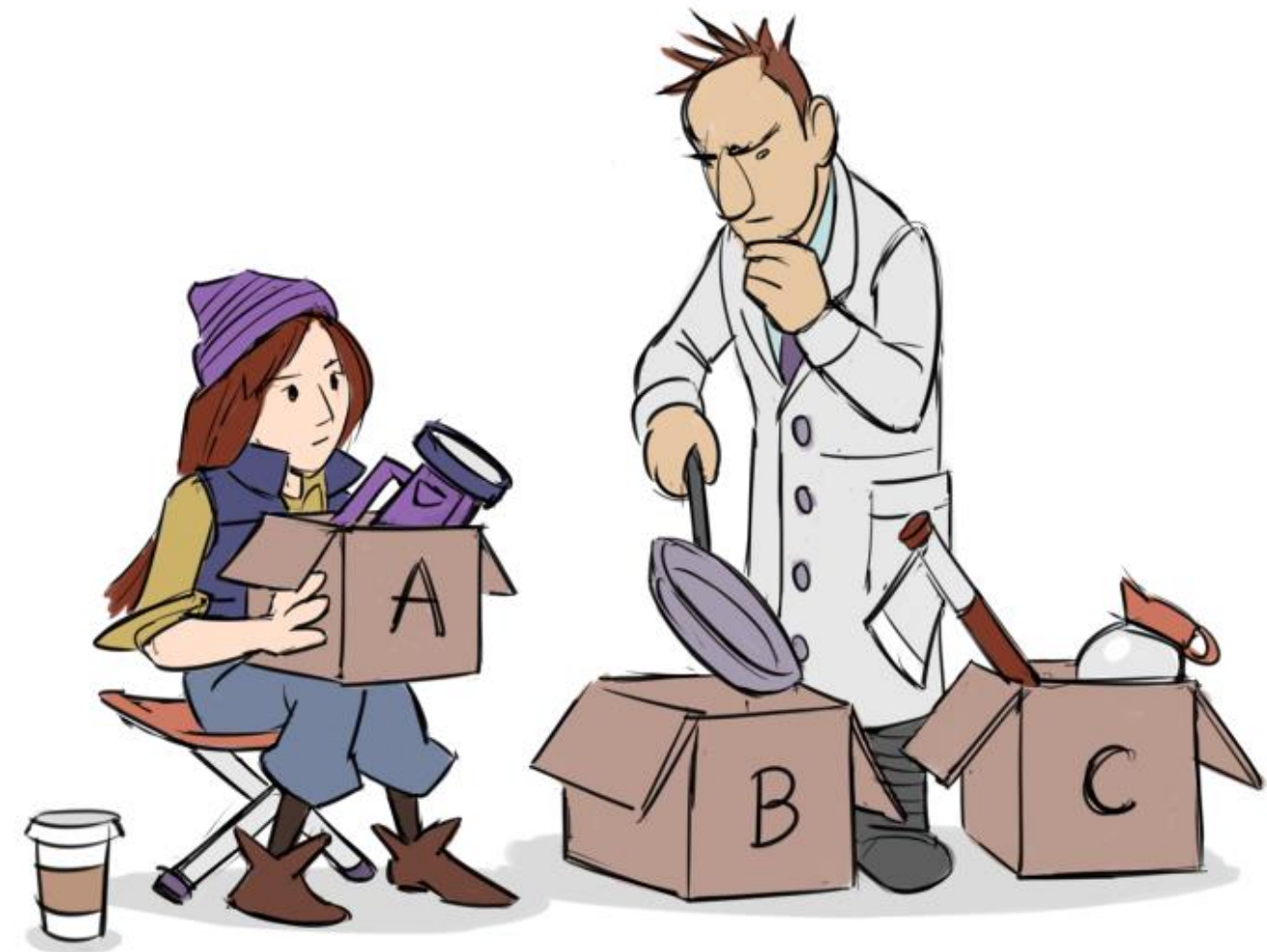
What *does* work well . . .

- Homogenous participants -> separate tracks
- Clear objectives + communicate expectations
-
-
-
-



What *does* work well . . .

- Homogenous participants -> separate tracks
- Clear objectives + communicate expectations
- ABC filter for content
-
-
-



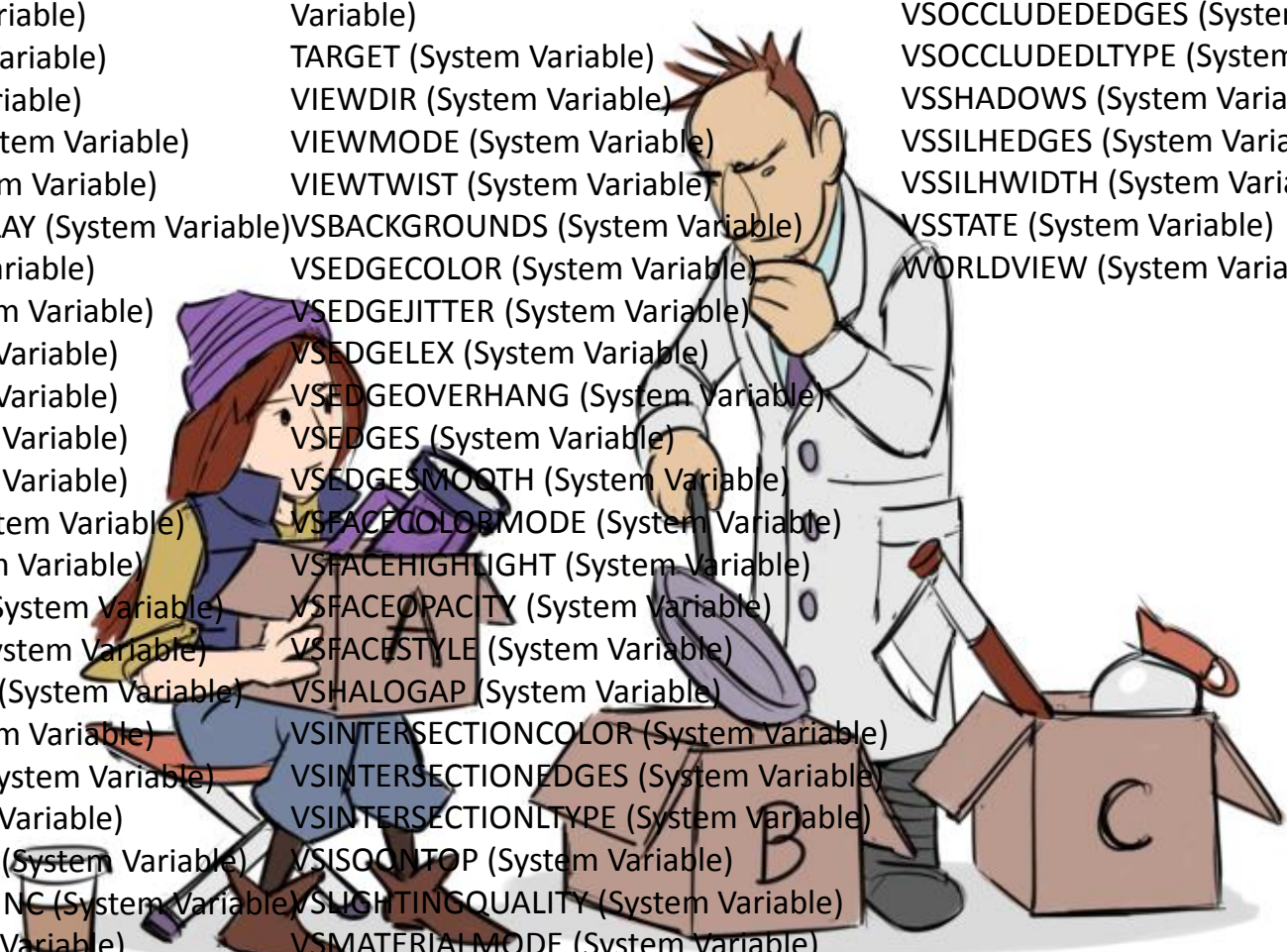
What *does* work well . . . for example

3D Solid Modeling Commands (56+)

3DFLY (Command)	REGION (Command)
3DMOVE (Command)	REVOLVE (Command)
3DORBIT (Command)	ROTATE3D (Command)
3DROTATE (Command)	SECTION (Command)
3DSCALE (Command)	SECTIONPLANE (Command)
3DWALK (Command)	SECTIONPLANEJOG (Command)
BOUNDARY (Command)	SECTIONPLANESETTINGS (Command)
BREP (Command)	SECTIONPLANETOBLOCK (Command)
BOX (Command)	SECTIONSPINNERS (Command)
CONE (Command)	SHADEMODE (Command)
CONVTOSOLID (Command)	SLICE (Command)
CONVTOSURFACE (Command)	SOLDRAW (Command)
CYLINDER (Command)	SOLIDEDIT (Command)
EXPORT (Command)	SOLPROF (Command)
EXTRUDE (Command)	SOLVIEW (Command)
FLATSHOT (Command)	SPHERE (Command)
HIDE (Command)	SUBTRACT (Command)
INTERFERE (Command)	SWEEP (Command)
INTERSECT (Command)	TORUS (Command)
LIVESECTION (Command)	UNION (Command)
MASSPROP (Command)	UCS (Command)
MIRROR3D (Command)	UCSICON (Command)
OFFSETEDGE (Command)	VPOINT (Command)
PLAN (Command)	VISUALSTYLES (Command)
PRESSPULL (Command)	VISUALSTYLESCLOSE (Command)
PROJECTGEOMETRY (Command)	VSCURRENT (Command)
PYRAMID (Command)	VSSAVE (Command)
REGEN3 (Command)	WEDGE (Command)

3D Solid Modeling System Variables (65+)

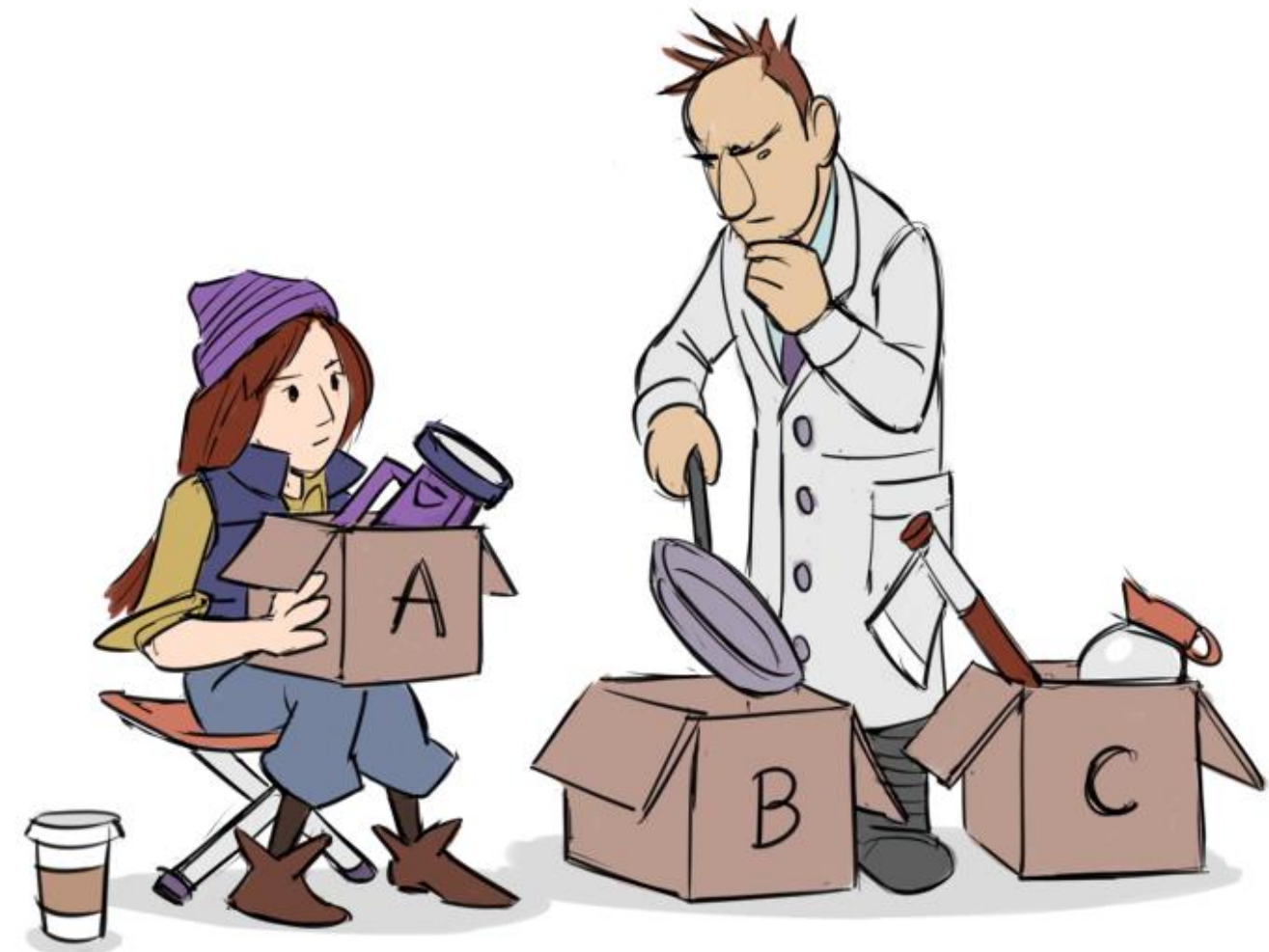
BACKZ (System Variable)	STEPSIZE (System Variable)	VSOBSCUREDEGES (System Variable)
DELOBJ (System Variable)	STEPSPERSEC (System Variable)	VSOBSCUREDLTTYPE (System Variable)
DISPSILH (System Variable)	SUBOBJSELECTIONMODE (System Variable)	VSOCCLUDEDLTYPE (System Variable)
DRAGVS (System Variable)	TARGET (System Variable)	VSOCCLUDEDLTYPE (System Variable)
FACETRES (System Variable)	VIEWDIR (System Variable)	VSSHADOWS (System Variable)
FRONTZ (System Variable)	VIEWMODE (System Variable)	VSSILHEDGES (System Variable)
HIDEPRECISION (System Variable)	VIEWTWIST (System Variable)	VSSILHWIDTH (System Variable)
IMPLIEDFACE (System Variable)	VSBACKGROUNDS (System Variable)	VSSTATE (System Variable)
INTERSECTIONDISPLAY (System Variable)	VSEDEGECOLOR (System Variable)	WORLDVIEW (System Variable)
ISOLINES (System Variable)	VSEDEGEJITTER (System Variable)	
LENLENGTH (System Variable)	VSEDEGELEX (System Variable)	
LOFTANG1 (System Variable)	VSEDEGEOVERHANG (System Variable)	
LOFTANG2 (System Variable)	VSEDEGES (System Variable)	
LOFTMAG1 (System Variable)	VSEDEGESMOOTH (System Variable)	
LOFTMAG2 (System Variable)	VSFACECOLORMODE (System Variable)	
LOFTNORMALS (System Variable)	VSFACEHIGHLIGHT (System Variable)	
LOFTPARAM (System Variable)	VSFACEOPACITY (System Variable)	
OBSCUREDOLOR (System Variable)	VSFACESTYLE (System Variable)	
OBSCUREDLTTYPE (System Variable)	VSHALOGAP (System Variable)	
ORBITAUTOTARGET (System Variable)	VSINTERSECTIONCOLOR (System Variable)	
PERSPECTIVE (System Variable)	VSINTERSECTIONEDGES (System Variable)	
PERSPECTIVECLIP (System Variable)	VSINTERSECTIONLTYPE (System Variable)	
SHOWHIST (System Variable)	VSISQONTOP (System Variable)	
SECTIONOFFSETINC (System Variable)	VSLIGHTINGQUALITY (System Variable)	
SECTIONTHICKNESSINC (System Variable)	VSMATERIALMODE (System Variable)	
SHADEEDGE (System Variable)	VSMONOCOLOR (System Variable)	
SOLIDCHECK (System Variable)	VSOBSCUREDOLOR (System Variable)	
SOLIDHIST (System Variable)		



What *does* work well . . . for example

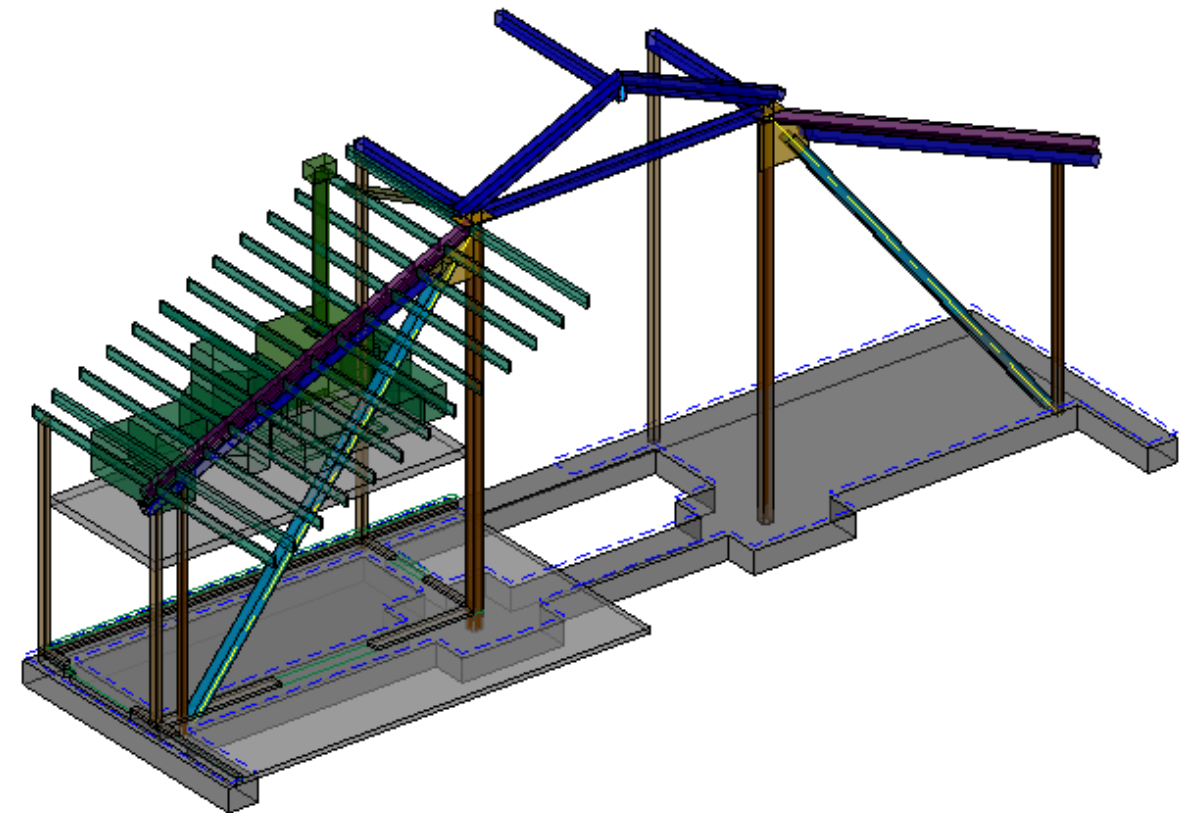
3D Solid Modeling Commands (10)

3DORBIT
EXTRUDE
INTERSECT
PLAN
REVOLVE
SUBTRACT
SWEEP
UCS
UCSICON
UNION



What *does* work well . . .

- Homogenous participants, separate tracks
- Clear objectives + communicate expectations
- ABC filter for content
- Conceptual frameworks (*schemas*)
-
-



What *does* work well . . . for example

3D Viewing

3DORBIT
PLAN

User Coordinate System

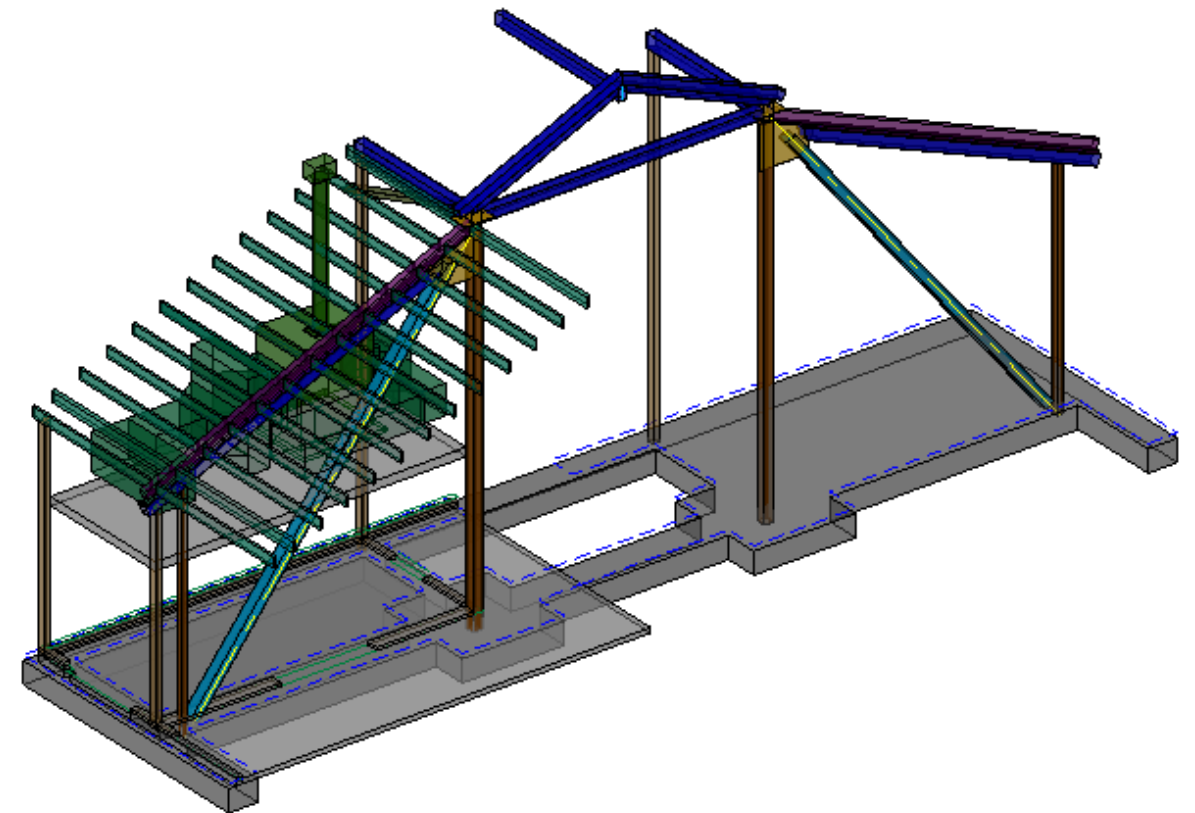
UCS (3P, ZA, W)
UCSICON

Profile Operations

EXTRUDE
REVOLVE
SWEEP

Boolean Operations

UNION
SUBTRACT
INTERSECT



What *does* work well . . .

- Homogenous participants, separate tracks
- Clear objectives + communicate expectations
- ABC filter for content
- Conceptual frameworks (*schemas*)
- Be a subject matter expert, and a consultative partner
-

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- Be a subject matter expert, and a consultative partner
- Relevant examples—do what they do

What *does* work well . . .

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- Clear objectives & expectations
- ABC filter for content
- Conceptual frameworks (*schemas*)
- Be a subject matter expert, and a consultative partner
- Relevant examples—do what they do

AND . . .

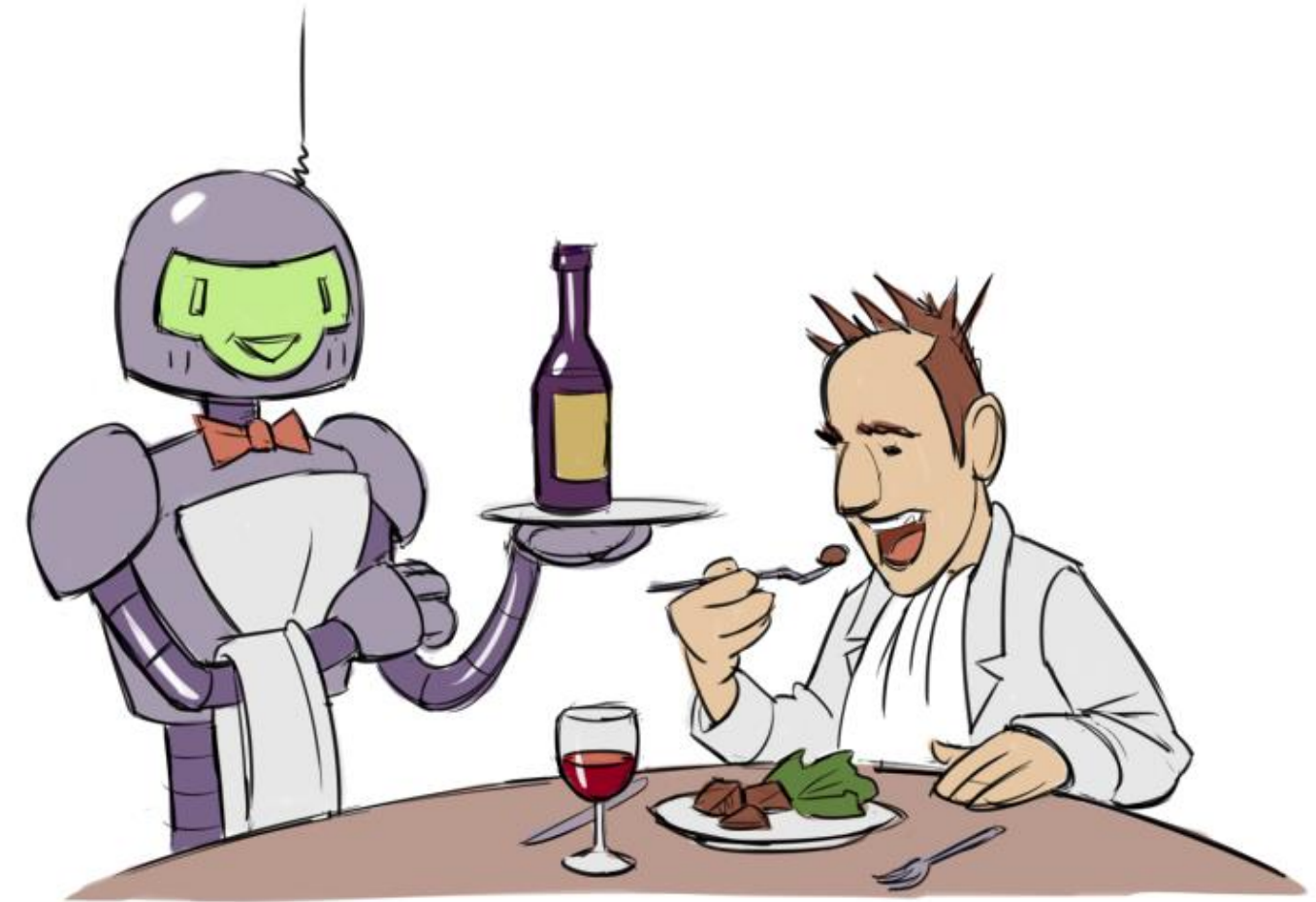
This really works!

- Restaurant analogy
Look, bite, chew, swallow, talk, digest

■

■

■



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Look, bite, chew, swallow, talk, digest
- Structure
Conceptual Intro, Demo, Hands-on, Q&A
-
-

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- Sandbox
Provide relevant samples, learn by doing
-

This really works!

- Restaurant analogy
Look, bite, chew, swallow, talk, digest
- Structure
Conceptual Intro, Demo, Hands-on, Q&A
- Sandbox
Provide relevant samples, learn by doing
- Recall
Review, reinforce, discuss, quiz, question, contests & challenges

Initial planning

If I were asked to create training for AutoCAD tables and spreadsheets, here's what would flash through my mind first . . .

Initial planning

If I were asked to create training for AutoCAD tables and spreadsheets, here's what would flash through my mind first . . .



Context

Audience – ask tons of questions!

Constraints, resources

Frequency

Business objectives

Initial planning

If I were asked to create training for AutoCAD tables and spreadsheets, here's what would flash through my mind first . . .

Context

Audience

Constraints, resources

Frequency

Business objectives

Delivery

Tutoring

Classroom

Tutorials

Micro-courses



Initial planning

If I were asked to create training for AutoCAD tables and spreadsheets, here's what would flash through my mind first . . .

Context

Audience
Constraints, resources
Frequency
Business objectives

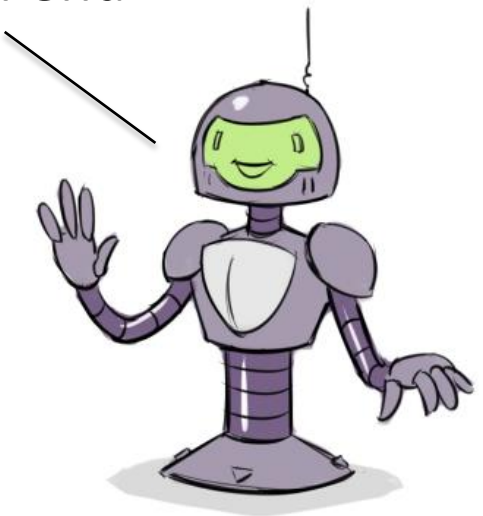
Delivery

Tutoring
Classroom
Tutorials
Micro-courses

Technologies

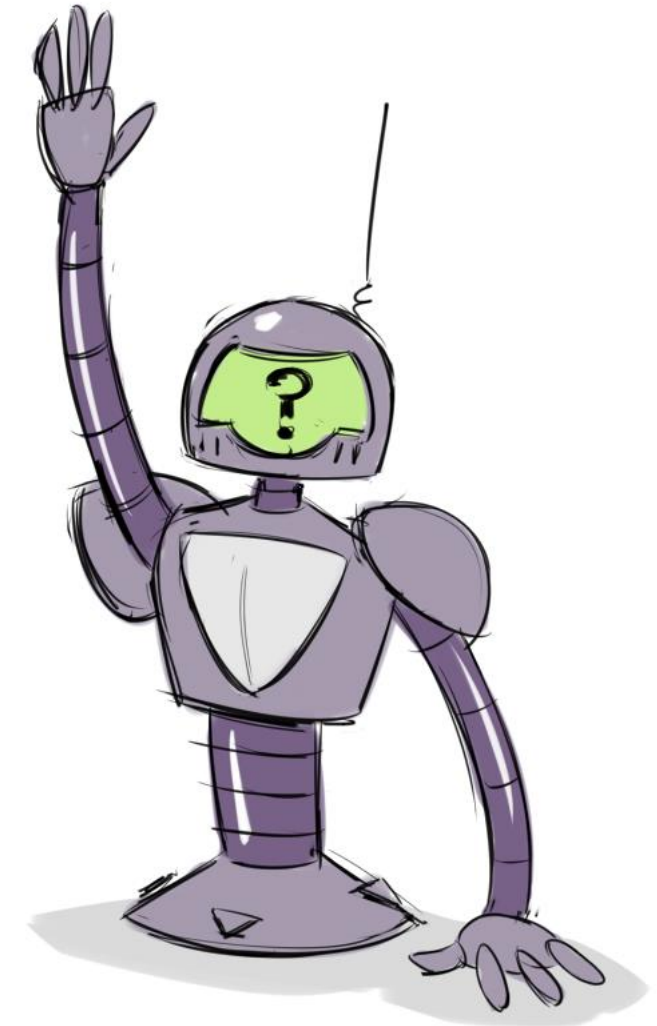
Videos
Computer programs
Internet delivery
iPhone app

Technology is a means to an end



Technology in training

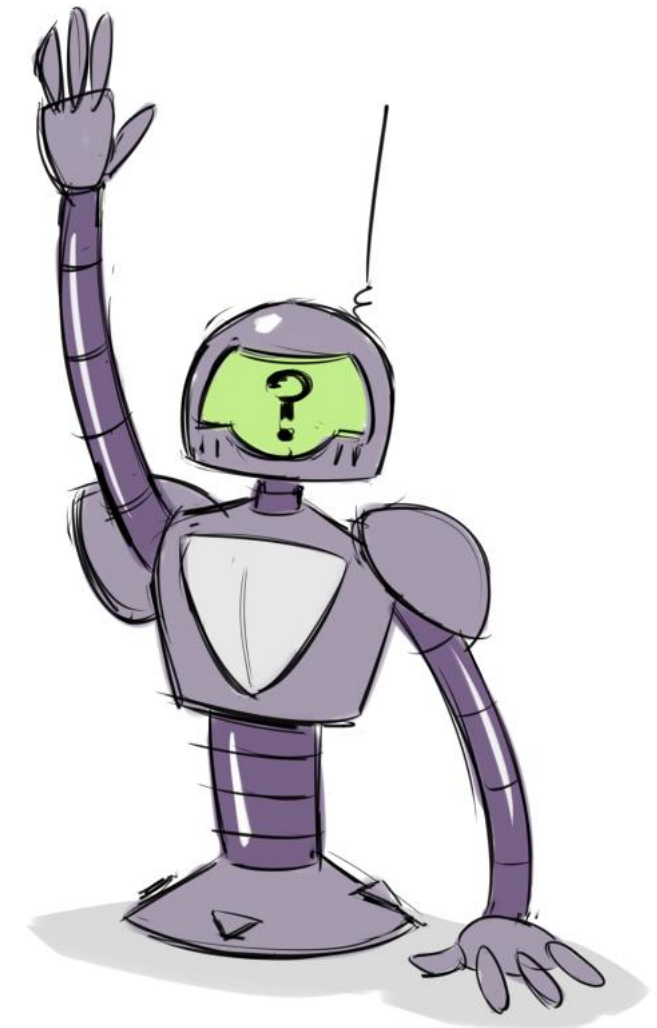
Questions to ask . . .



Technology in training

Questions to ask . . .

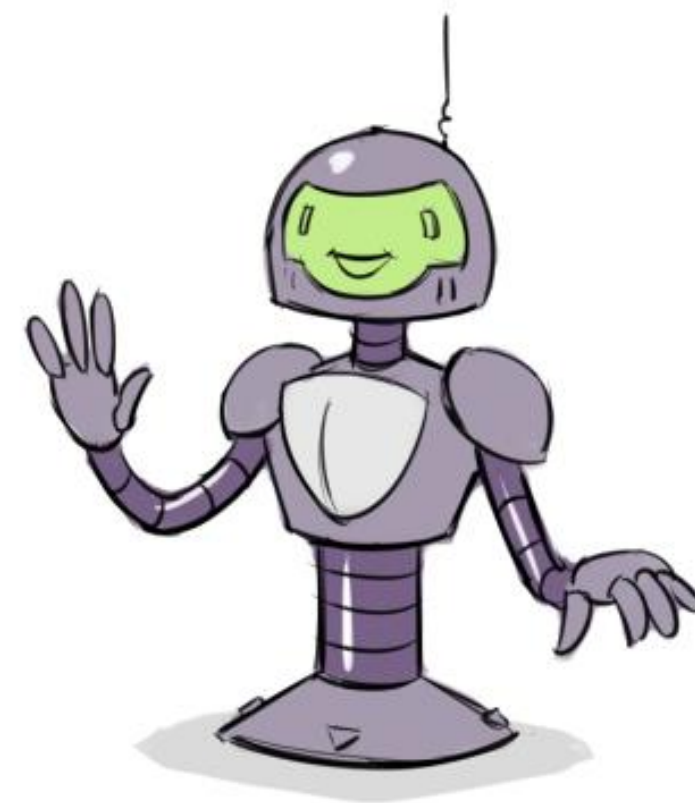
- Can it be maintained?
- Can it be scaled?
- Can it be replicated?
- Can it be extended or customized?
- Can it be automated?



Technology in training

Homework assignment . . . the YouTube experiment

1. Choose a subject in which you have expertise
2. Find a variety of YouTube videos on the subject
3. Evaluate each video—write observations & critique
4. Extract learning principles



My advice to you

- Training is a specialized subset of learning
- Know your audience, deliver value
- Achieve effectiveness by Leaving Stuff Out
- Plan the scope (breadth/depth), sequence, and pacing
- People learn by doing and recalling . . . over time
- Choose the right tools and technologies
- Be a subject matter expert
- Test, evaluate, *bleed*, and refine

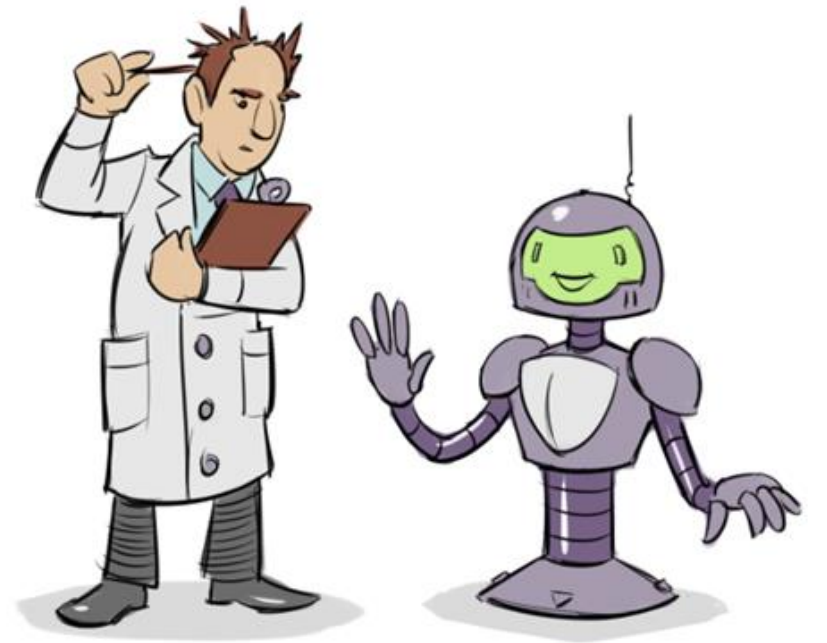
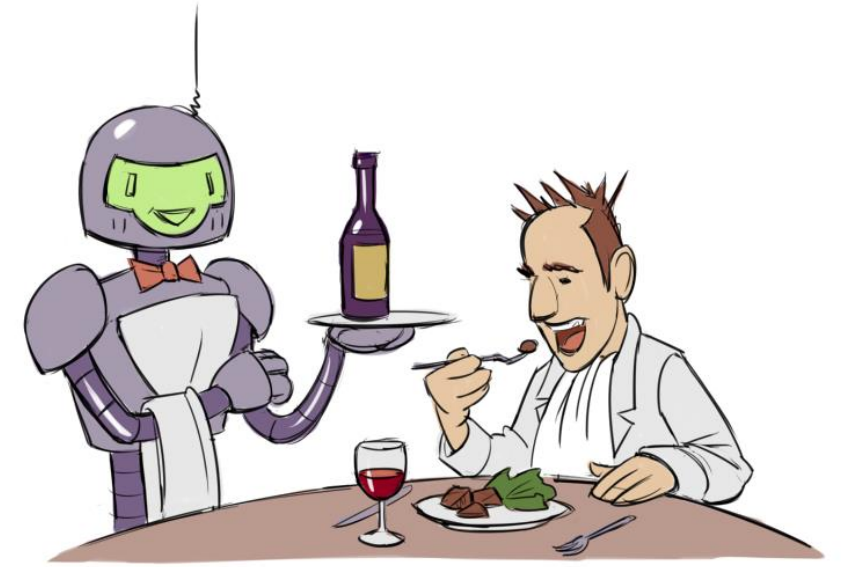
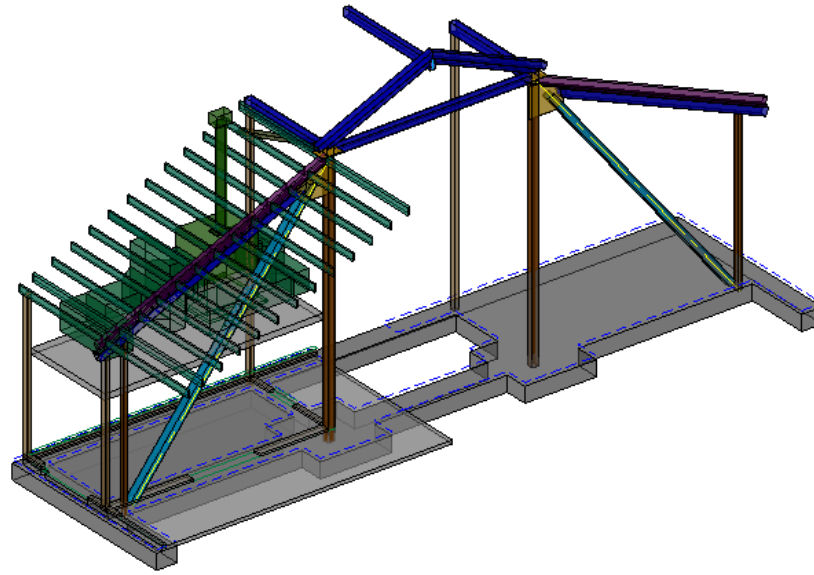
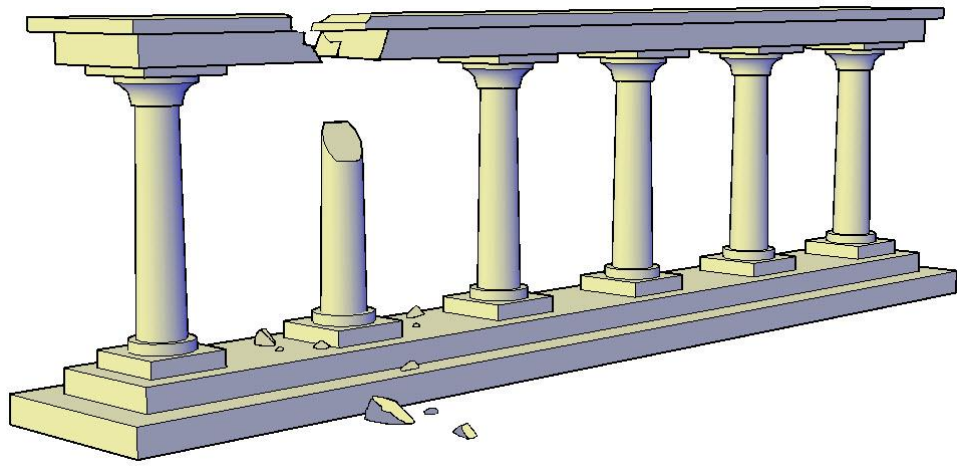


Objectives - recall

Learn how to design and deliver effective and successful instruction to technical professionals.

- Describe the difference between learning and training
- Identify the most important factors for relevance . . . for retention
- Separate the components of instructional design
- Recognize what doesn't work well and why
- **Bonus:** Recognize what does work well

Questions?



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