Teaching Skills for Technical Experts

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@not_unambitious

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Agenda

▶ Intro

▶ Why I'm Even Here Right Now

▶ Educational Philosophy: Two Things You Should Know

▶ What's A Curriculum (And Why Should You Care)?

▶ Always Be Assessing

▶ Audience Management

▶ Disclaimer

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About Me

- ▶ Integrations Specialist @ OnShift, Inc
  - ▶ I love a good API
  - ▶ Gimme dat JavaScript plz
- ▶ Legit an art historian
  - ▶ MA History of Art (merit), University College London
  - ▶ I wrote a 70-page paper on Nazi newspaper photos with original German-English translations for my dissertation
- ▶ Cleveland, OH >> Portland, ME >> Cleveland, OH >> London, UK >> Cleveland, OH
- ▶ Has a cat named Linus Torvalds
- ▶ Once accidentally adopted 12 chickens
- ▶ Afraid of colors that aren't black
- ▶ Like, my entire family is teachers, it's really insane

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It starts with a story…

Q: The guy running this workshop is dropping so many buzzwords that I'm just writing them down to look up later! I'm familiar with all the concepts, he's just not stringing them together in a coherent way. It's like a cross between a lecture and a follow-along and he didn't really commit to either one… Tori, why don't you give a workshop on how to teach, because I swear so many people are not good at it?!?!

A: Challenge accepted.

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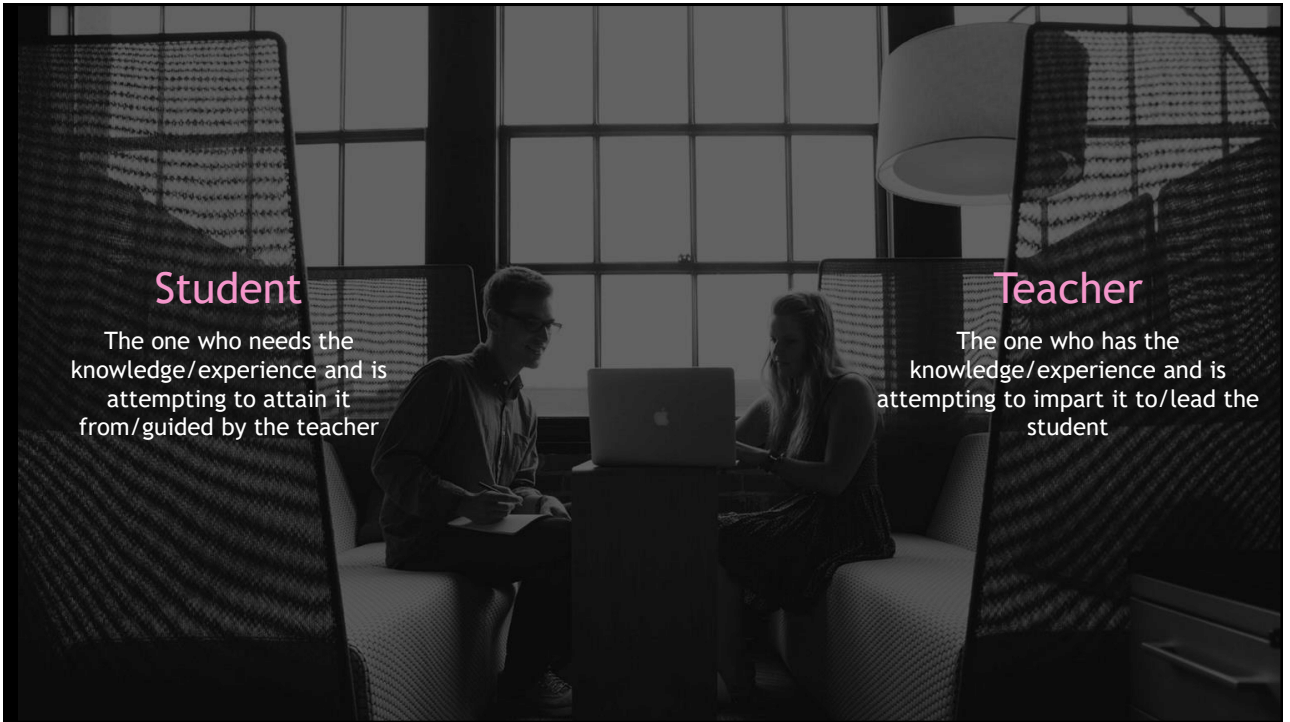
Student

The one who needs the knowledge/experience and is attempting to attain it from/guided by the teacher

Teacher

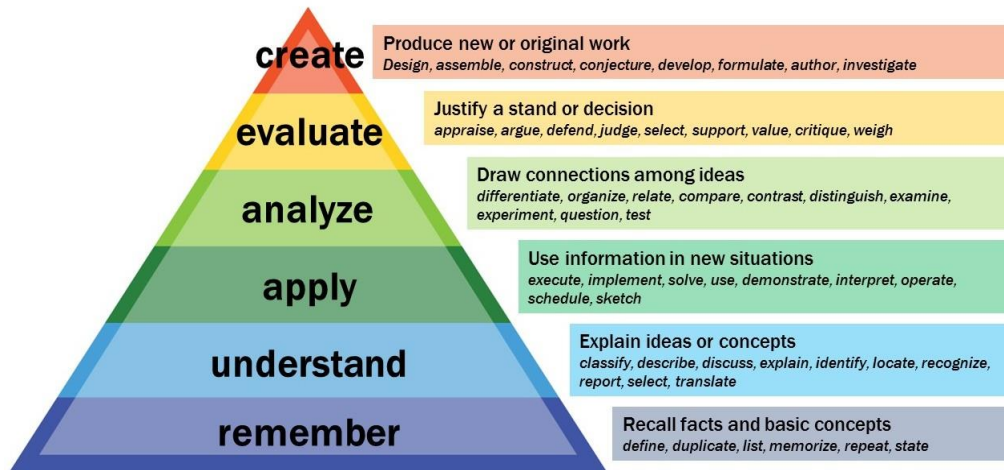The one who has the knowledge/experience and is attempting to impart it to/lead the student

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Educational Philosophy

Bloom's Taxonomy and Gardner's Theory of Multiple Intelligences

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Bloom's Taxonomy

create — Produce new or original work
Design, assemble, construct, conjecture, develop, formulate, author, investigate

evaluate — Justify a stand or decision
appraise, argue, defend, judge, select, support, value, critique, weigh

analyze — Draw connections among ideas
differentiate, organize, relate, compare, contrast, distinguish, examine, experiment, question, test

apply — Use information in new situations
execute, implement, solve, use, demonstrate, interpret, operate, schedule, sketch

understand — Explain ideas or concepts
classify, describe, discuss, explain, identify, locate, recognize, report, select, translate

remember — Recall facts and basic concepts
*define, duplicate, list, memorize, repeat, state*

*This is the revised taxonomy; the first edition is slightly different!

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Bloom's Taxonomy

► A system of categorization based on cognitive tasks and the type of knowledge involved, *or:*

► A classification of understanding and knowledge application

► Commonly used to create test questions and tasks to measure student knowledge

► Lower-order tasks require less cognitive load (mental effort), but higher-order tasks provide greater understanding and in-depth learning opportunities

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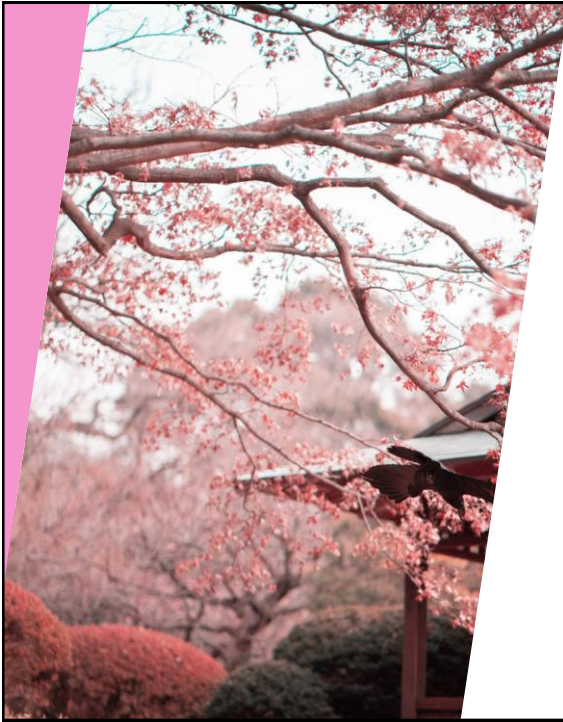
Bloom's Taxonomy

- ▶ "How many syllables are in the first line of a haiku?"
  - ▶ *remembering*
- ▶ "What is a haiku?"
  - ▶ *understanding*
- ▶ "What are the similarities between a haiku and a sonnet?"
  - ▶ *analysis*
- ▶ "Please take five minutes and write your own haiku."
  - ▶ *creation*

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Gardner's Theory of Multiple Intelligences

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Gardner's Theory of Multiple Intelligences

- ► No real empirical basis but has yet to be disproven, so…

- ► Gardner held that there are *multiple* types of intelligence for any individual, as opposed to *one* universal kind of intelligence

- ► Mostly used by educators; Gardner approached it as "learning theory" rather an a measure of ability

- ► For general intelligence theory, look at Charles Spearman and 2-factor intelligence (more widely accepted for psychology)

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Misconception: there is only one way we learn "best" and students need to be taught in their own "intelligence"

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Reality: teaching a topic in 2-3 different ways makes information more likely to "sink in" and be remembered/applied

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What's A Curriculum?

"The subjects comprising a course of study in a school or college."

-Oxford English Dictionary

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Curriculum Development

- ▶ What do you want the student to learn?
  - ▶ Not too broad
  - ▶ Concrete learning objectives
  - ▶ Small, digestible lessons
- ▶ Two magic questions…
  - ▶ Why?
  - ▶ What is…?

- ▶ How do you plan on teaching it?
  - ▶ Environment
  - ▶ Gardner's Theory
  - ▶ Work backwards from your summative assessment
- ▶ How do you plan on assessing learning?
  - ▶ Always Be ~~Closing~~ Assessing
  - ▶ Types of Assessment
  - ▶ Bloom's Taxonomy

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The What…

🗒	Don't make learning objectives too broad
🌐	Provide "real world" examples
🧠	Keep in mind what the student *doesn't* know
⚒	Break information into chunks

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Information Chunking & Attention

- ▶ Cognitive psychology
- ▶ Themed "chunks" of info are easier to remember
- ▶ The average adult sustained attention span is 10-20 minutes
- ▶ Kids? More like 5-10 minutes
- ▶ Attention ability drops when tasks are not enjoyable or when the subject is new to performing the task

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Arrays

- ▶ Data structure
- ▶ A collection of things
- ▶ Used instead of multiple individual variables
- ▶ Each thing in the array has a unique identifier and can be accessed individually
  - ▶ Usually a number (incremental)
  - ▶ Starts at 0 instead of 1
- ▶ Access an individual thing by the name of the collection and the unique identifier
  - ▶ solar_array[0]
  - ▶ solar_array[1]
  - ▶ solar_array[2]

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The How…

Big picture vs. small lessons

Lessons for Multiple Intelligences

The difference between "using" and "understanding"

Teaching Environment

Assessment

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EDGE Method

▶ **Explain**
  ▶ Explain what you will be doing
  ▶ Use visual aids
  ▶ Gauge student understanding
▶ **Demonstrate**
  ▶ Show how to do it using actual materials
  ▶ Describe as you go
▶ **Guide**
  ▶ Have students practice the skill
  ▶ Observe and coach
▶ **Enable**
  ▶ Let students practice the skill without intervention

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EDGE-y Arrays

- ▶ Explain (Lecture)
  - ▶ An array is a collection of things
- ▶ Demonstrate (Live Coding)
  - ▶ Create an array while students watch
- ▶ Guide (Practice Tutorial)
  - ▶ Students create an array in a practice exercise
- ▶ Enable (Student Project)
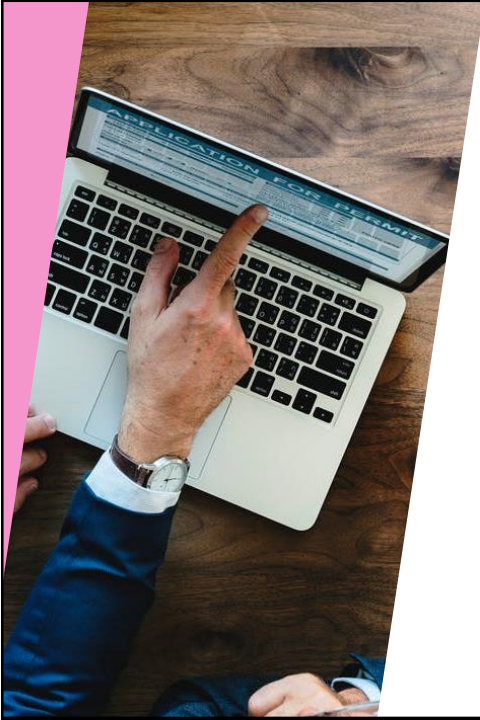 - ▶ Assign student a project which implements an array

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What's The Deal With Assessment?

"Assess [verb, with object or clause]: Evaluate or estimate the nature, ability, or quality of."

-Oxford English Dictionary

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Types of Assessment

▶ Pre-Assessment
  ▶ Prior to instruction
  ▶ Establishes a baseline of the student's knowledge
▶ Formative Assessment
  ▶ During instruction
  ▶ Real-time feedback
▶ Summative Assessment
  ▶ After instruction
  ▶ Measures student achievement after learning

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Formative Assessment

Why is it useful?

▶ Provides practice opportunity for students
▶ Checks for student understanding during instruction
▶ Allows teacher to adjust instruction immediately based on student response

Quick & Easy Assessments:

▶ Strategic questioning
  ▶ "**Why** is the existing code breaking in this situation?"
  ▶ "**How** would you use this design pattern?"
▶ Pair programming/debugging
▶ Rubber Duck Debugging (with the teacher as the duck)
▶ Self-Rating Understanding
  ▶ "On a scale of one to five, how well do you understand what we just did?"
▶ Online Tools for Classrooms

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Online Assessment Tools

➢ Uses the instructor computer and student computer or mobile phone for assessment & feedback

➢ Quick, easy & free*

• Kahoot!
• Poll Everywhere
• Socrative

*mostly
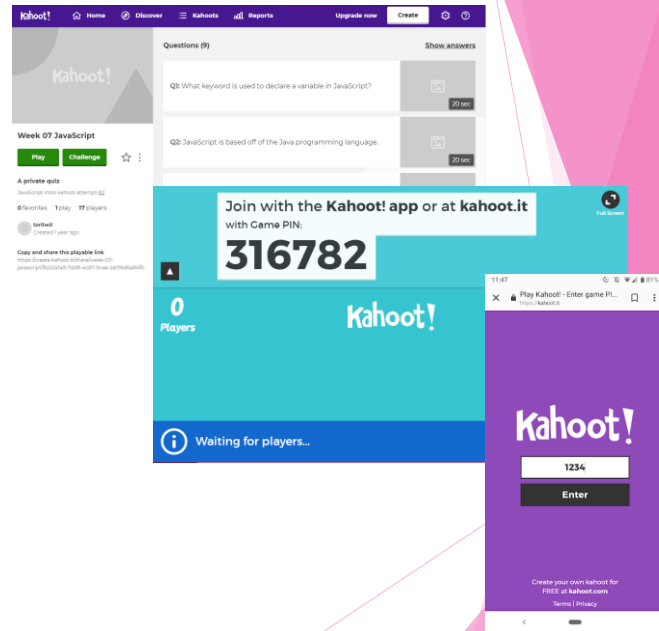
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Audience Management

Tips for speaking to large groups vs. mentoring one-on-one

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Ahead-Of-Time Considerations

👪	Group size	1-5 students? 20+ students?
🏠	Environment size/resources	Whiteboards, projectors, microphones, workstations, etc.
📚	Environmental factors	After lunch food coma? Last time slot? Temperature? Lighting?
🧠	Attention	Adult focused attention is 10-20 minutes
☺	Lesson simplicity	KISMIF: Keep It Simple, Make It Fun

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Welcome To PowerPoint Hell

SOFTWARE!!!

▶ THIS IS *NOT* THE *time* AND *place* TO SHOW OFF YOUR c r e a t i v e font choices

▶ Your audience is a bunch of nerds who have probably ruined their eyesight with computers and video games (can you folks even read this on a movie screen???)

Shoot 'em with bullet points

- Here is a bullet point
- And another bullet point
- Yet another
- Some more bullet points
- So many
- Many many bullet points
- I spelled bullt wrong in this one
- I hate this slide so much
- Your audience will hate you for this

- Please do not use this many bullet points
- Especially not if you are just saying the same thing over and over in different ways
- Dense bullet point paragraphs are no way to go through life
- Don't be that person
- Nobody wants to be around the person who uses this many bullet points

ITTY BITTY TEENY TINY FONT SO CUTE SO SMALL AWW

business and learning

how is wordart still a thing in 2019

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How To Read A Room

- ► Set the scene
- ► Shut up
    - ► Listen for typing, conversations, etc.
- ► Pay attention
    - ► Gauge engagement from middle of the room
- ► Look around
    - ► Body language & facial expressions
    - ► Make eye contact
    - ► Know when to move
- ► Take control
    - ► Open-ended questions; interactive requests
- ► React (but don't be reactive)
    - ► Acknowledge the mood
    - ► Look for positive engagement and concentrate on it
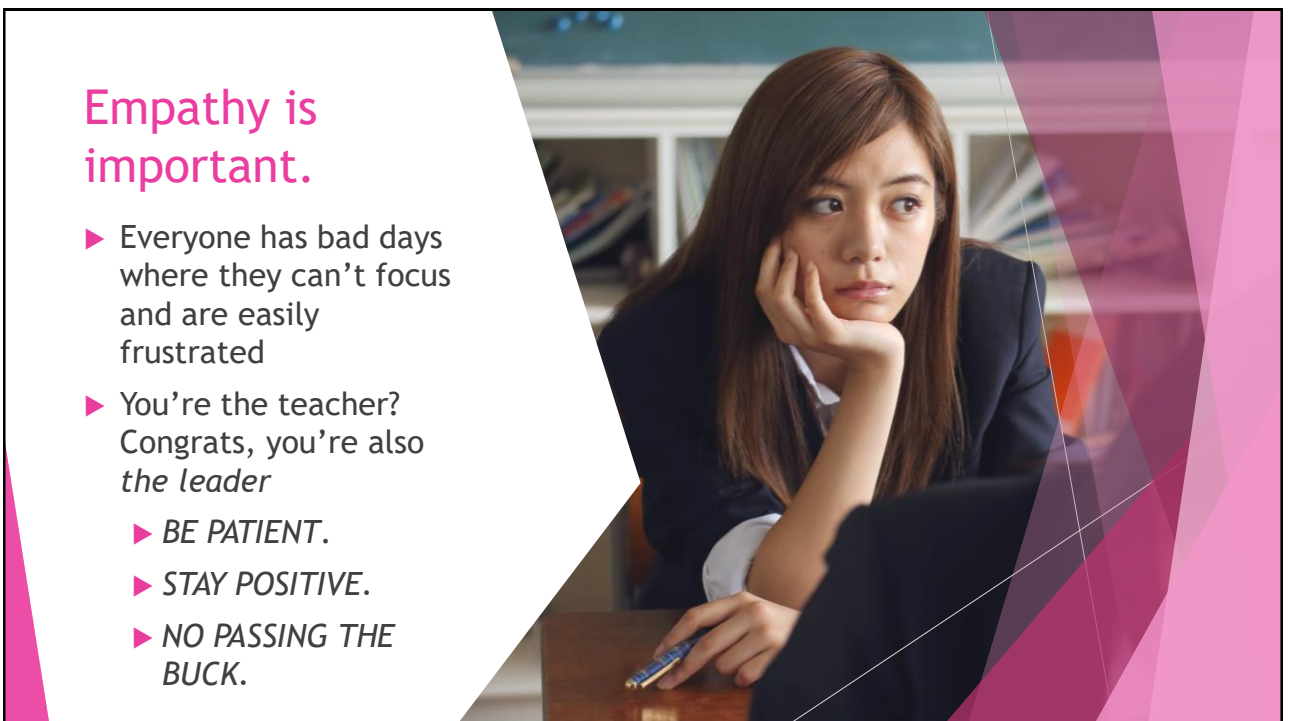
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One-on-One Communication

- ► Active Listening
    - ► Know When to Wait
    - ► No Interruptions
- ► Body Language
    - ► Yours *and* theirs
    - ► Next to, not across from
- ► React (but don't be reactive)
- ► Acknowledge improvements
    - ► Even small ones (especially small ones)

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Students are people, too.

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Empathy is important.

► Everyone has bad days where they can't focus and are easily frustrated

► You're the teacher? Congrats, you're also *the leader*

   ► *BE PATIENT.*

   ► *STAY POSITIVE.*

   ► *NO PASSING THE BUCK.*

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You're the leader…

Be Patient

Your students can tell when you're frustrated and will feel as though they're failing you by not learning quickly enough.

Stay Positive

Rephrase your frustrations as challenges to you, *never* to your student.

Tech is problem-solving, and problem-solving requires persistence.

No Passing The Buck

If you don't know something, find out *with your student*.

Teach your student how to research solutions.

If you are really frustrated, take a break from the teaching session.

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This presentation is a toolkit

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Resources & Further Reading

▶ All stock photos are from Pexels, a royalty-free stock image website

▶ Dodge, Judith. What Are Formative Assessments and Why Should We Use Them?

▶ Cherry, Kendra. Gardner's Theory of Multiple Intelligences, 2019

▶ Persaud, Christine. Bloom's Taxonomy: The Ultimate Guide, 2018

▶ Cuncic, Arlin. How To Practice Active Listening, 2019

▶ Wikipedia: Bloom's Taxonomy and Gardner's Theory of Multiple Intelligences

▶ Kahoot! Learning Games

▶ Poll Everywhere (real-time feedback via mobile phone)

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Thank you!

My name is Tori Brenneison and I'm an Integrations Specialist at OnShift, Inc. in Cleveland, Ohio.

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My Twitter handle is @not_unambitious.

Occasionally, I'll be tweeting at @techgirlgang with some of my friends.

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