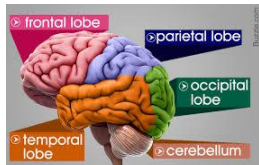


Masterclass Part I: Ultra-Engaging Learning With Technology: Introducing the TEC-VARIETY and R2D2 Models

Curtis J. Bonk, IST Professor

Indiana University

cjbonk@indiana.edu; <http://curtbonk.com/>



1

Needed: New Models of Motivation and Engagement



2

October 22, 2019 Indian students wear boxes on their heads during exam to prevent cheating

Jessie Yeung, CNN

<https://amp.cnn.com/cnn.ampproject.org/c/a/amp.cnn.com/cnn/2019/10/21/india/student-box-cheating-intl-hnk-scl/index.html>



3

March 20, 2015 Bihar cheating scandal: What parents in India will do for good grades

Kunal Sehgal, CNN

<https://www.cnn.com/2015/03/20/asia/india-cheating-parents-school-tests/index.html>

Bihar cheating scandal: What parents in India will do for good grades

By Kunal Sehgal, CNN

Published 7:29 PM CDT, 19 March 2015

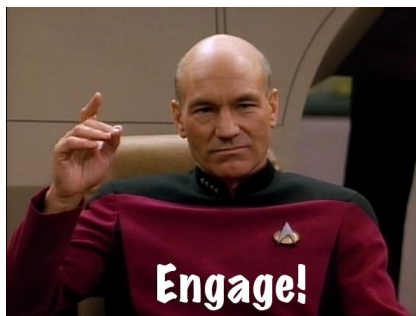


Indian parents make new heights to help kids cheat (CNN)

One father, desperate to get his daughter to all her exams, asked her to hide inside his mobile phone to cheat.

4

Poll: What did Jean-Luc Picard say?



5

Motivation Research Highlights (Jere Brophy, Michigan State University)

1. **Supportive**, appropriate **challenge**, **meaningful**, moderation/optimal.
2. Teach **goal** setting and self-reinforcement.
3. Offer **rewards** for good/improved performance.
4. Novelty, **variety**, **choice**, adaptable to interests.
5. Game-like, **fun**, fantasy, curiosity, suspense, active.
6. Higher levels, divergence, dissonance, **peer interaction**.
7. Allow to create finished **products**.
8. Provide immediate **feedback**, advance organizers.
9. Show intensity, **enthusiasm**, interest, minimize anxiety.
10. Make content **personal**, concrete, familiar.



6

Intrinsic Motivation

“...innate propensity to engage one’s interests and exercise one’s capabilities, and, in doing so, to seek out and master optimal challenges
(i.e., it emerges from needs, inner strivings, and personal curiosity for growth)

See: Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. NY: Plenum Press.



7

Part 1: Introducing the TEC-VARIETY Model (Motto: It's better than the "TEC-MONOTONY" Model)

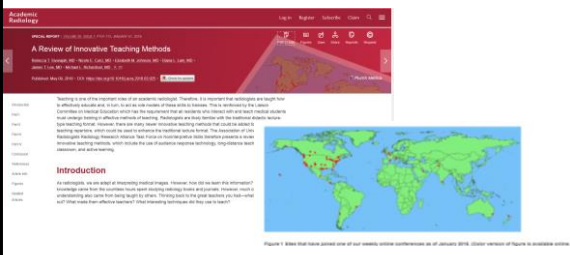
<http://tec-variety.com/>
<http://tec-variety.com/TEC-VARIETY-Chinese.pdf>



8

May 9, 2018 A Review of Innovative Teaching Methods Academic Radiology

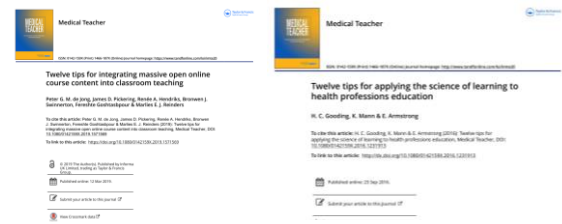
<https://med.nyu.edu/departments-institutes/innovations-medical-education/>



9

March 2019 Twelve tips for integrating massive open online course content into classroom teaching The Medical Teacher

https://www.researchgate.net/publication/331694465_Twelve_tips_for_integrating_massive_open_online_course_content_into_classroom_teaching



10

March 2019 Twelve tips for integrating massive open online course content into classroom teaching MedEdPublish

https://www.researchgate.net/publication/331694465_Twelve_tips_for_integrating_massive_open_online_course_content_into_classroom_teaching



11

2019 Rachel H. Ellaway Technology-enhanced Learning Understanding Medical Education: Evidence, Theory, and Practice, Third Edition. Edited by Tim Swanwick, Kirsty Forrest and Bridget C. O'Brien. © 2019 The Association for the Study of Medical Education (ASME). Published 2019 by John Wiley & Sons Ltd.

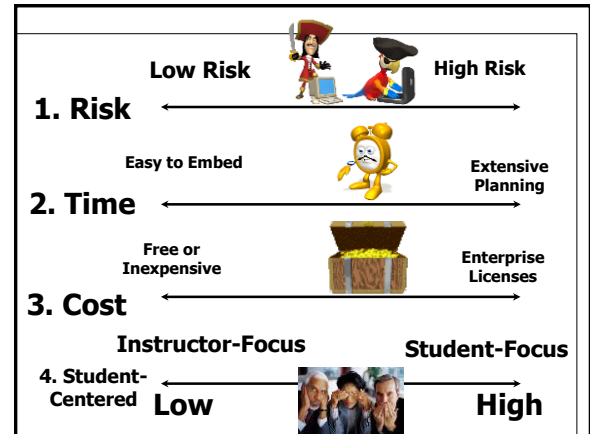
Technology-enhanced Learning 141		
BOX 10.1 Learning activity types and associated mediating technologies		
	Example activities	Examples of mediating technologies
Content activities	Read, explain, reflect, remember, synthesise	Knowledgebases such as Wikipedia, eBooks, note taking and mind mapping tools
Abstraction activities	Presentations, storytelling, analogies, tours	PowerPoint, YouTube, podcasts, podcasts
Design activities	Practice, discovery, games, simulations	Case-based simulations, virtual patients, games, e-learning, virtual task trainers
Search activities	Finders, pit falls, research, original work	eHealth systems and tools, bibliographic databases, decision support tools
Social activities	Discuss, collaborate, observe others, reflect on own ability	Discussion boards, Twitter, blogs, wikis, social media
Test activities	Challenge, perform, assess, evaluate, provide feedback	Quizzes, test banks, summative games, simulations
Collection activities	Logging, tracking, storing, organising, reporting	Evidence logging, portfolios, CVs, analytics, professional development management systems

Source: Adapted from Horton [5].

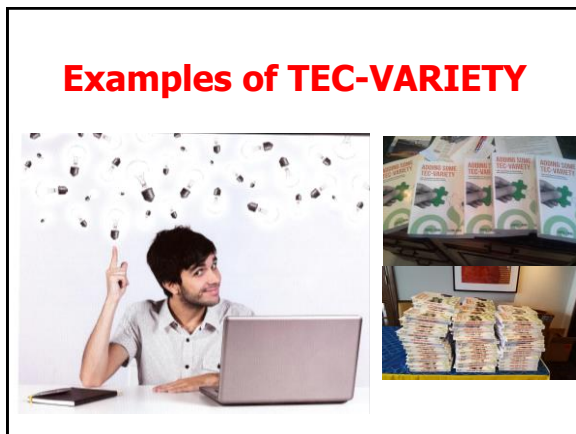
12



13



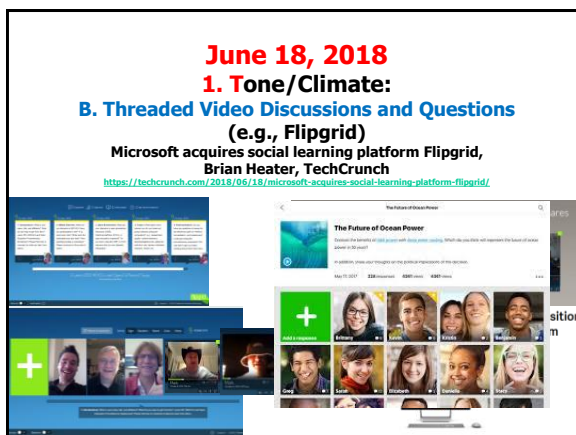
14



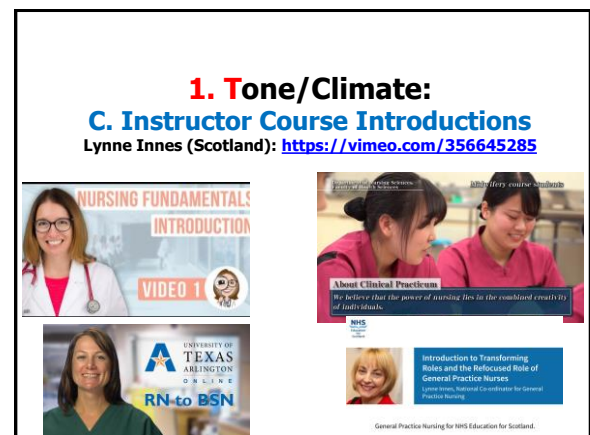
15



16



17



18

2. Encouragement, Feedback:

A. Voice/Audio Feedback

Vocaroo: <http://vocaroo.com/>



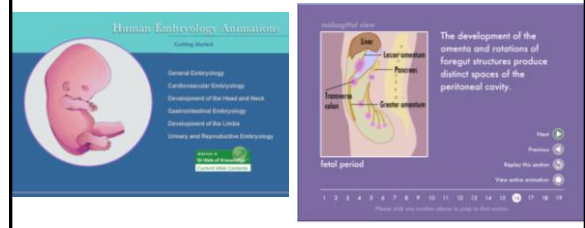
19

2. Encouragement, Feedback:

B. Self-testing Practice Exams

Human Embryology Animations

(Valerie O'Loughlin, Indiana University)



20

2. Encouragement, Feedback:

C. Poll Everywhere

Connect students across campuses

(School of Medicine, Flinders University)



21

3. Curiosity, Intrigue, Unknowns:

A. How dangerous is the Coronavirus?

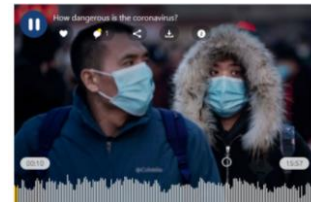
Podcast, Sky News, UK

<https://news.sky.com/story/coronavirus-uk-made-splurge-some-downloads-soar-in-china-amid-virus-outbreak-11915754>

Whole podcast: <http://curtbook.com/coronapodcast.html>

First 2 minutes of video: <http://curtbook.com/corona-2min.html>

First 2 minutes of podcast: <http://curtbook.com/coronapodcast-2min.html>



22

3. Curiosity, Intrigue, Unknowns:

B. This Japanese secret to a longer and happier life is gaining attention from millions around the world

Klen Mogi, CNBC

<https://www.cnbc.com/2019/05/22/the-japanese-secret-to-a-longer-and-happier-life-is-gaining-attention-from-millions.html>

Bppl: <https://www.amazon.com/Little-Book-Little-secret-Japanese/dp/1786489031>



23

3. Curiosity, Intrigue, Unknowns:

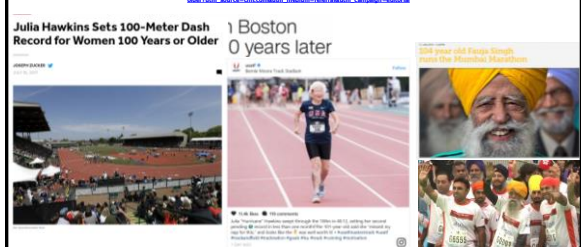
C. 1st woman to officially run Boston Marathon does it again, 50 years later

Emanuella Grinberg, CNN, USA Today

<http://www.cnn.com/2017/04/17/us/boston-marathon-kathrine-svitzer-trnd/index.html>

July 16, 2017

<https://thehill.com/policy/healthcare/350481-julia-hawkins-sets-100-meter-dash-record-for-women-100-years-or-older-july-16-2017>



24

3. Curiosity, Intrigue, Unknowns: D. Multimedia News

(e.g., This may be the oldest surviving Photo of a human, November 7, 2014, CNN, Brandon Griggs; But this image, taken in Paris, France, in 1838)

http://www.cnn.com/2014/11/06/living/oldest-photograph-human-daguerre/index.html?hpt=hp_14_kong



25

January 7, 2016

3. Curiosity, Intrigue, Unknowns: E. Google Cardboard saves baby's life

CNN, Elizabeth Cohen

<http://www.cnn.com/2016/01/07/health/google-cardboard-baby-saved/index.html>

Google Cardboard saves baby's life

By Elizabeth Cohen, CNN Senior Medical Correspondent
Updated 6:08 PM ET, Thu January 7, 2016



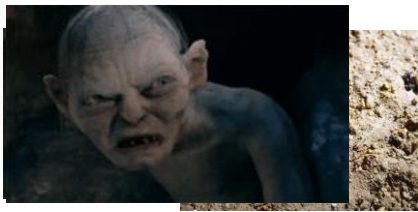
26

November 19, 2015

3. Curiosity, Intrigue, Unknowns: F. New Discoveries in Science...

New daddy longlegs named after 'Lord of the Rings' character Smeagol, Mary Bowerman, USA Today

<http://www.usatoday.com/story/tech/science/2015/11/19/new-daddy-longlegs-named-after-lord-of-the-rings-character-smeagol/7483278/>



27

4. Variety, Novelty, Fun, Fantasy: A. Random Lists

(Random.org—clocks, coins, playing cards, dice, integers, passwords, jazz scales, lists, sequences, etc.)



28

June 12, 2019

4. Variety, Novelty, Fun, Fantasy: B. Your doctor may be playing medical video games at work. That could be good for your health

Edward Baig, USA Today

<https://www.usatoday.com/story/tech/gadgets/2019/06/12/your-doctor-may-be-playing-medical-video-games-at-work/471273002/>
1:59 (video medical training): <http://cutrbank.com/medical-video-games.html>



29

January 24, 2019

4. Variety, Novelty, Fun, Fantasy: C. Coronavirus Outbreak Causes Surge In Plague Inc Downloads

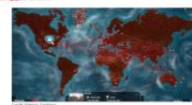
Lara Jackson, Gamebyte

<https://www.gamebyte.com/coronavirus-outbreak-causes-surge-in-plague-inc-downloads/>

CORONAVIRUS OUTBREAK CAUSES SURGE IN PLAGUE INC DOWNLOADS

Many fans have been told:

"It's just a game. It's not real."



30

4. Variety, Novelty, Fun, Fantasy:
D. Online Test/Quiz Review Games
 (e.g., Jeopardy Rocks)
<https://www.jeopardy.rocks/r511merv/>



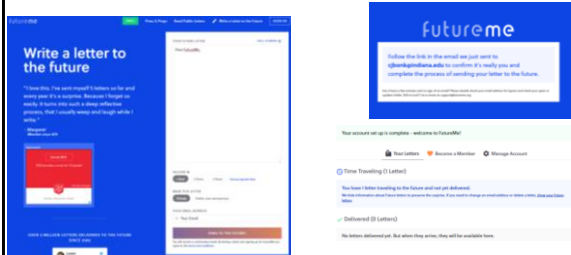
31

4. Variety, Novelty, Fun, Fantasy:
E. Kahoot!
<https://getkahoot.com/>



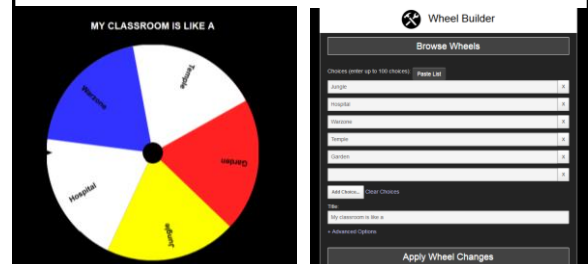
32

October 10, 2018
4. Variety, Novelty, Fun, Fantasy:
F. FutureMe.org
 Write a letter to the future
<https://www.futureme.org/>



33

February 21, 2017
4. Variety, Novelty, Fun, Fantasy:
G. My classroom is like a,
<http://wheeldecide.com/>



34

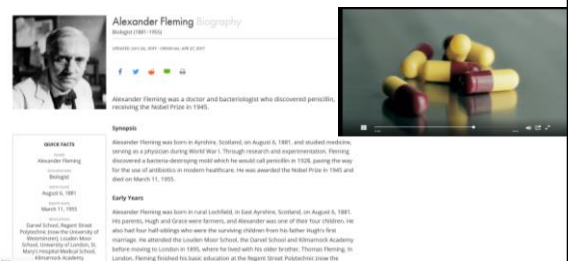
January 14, 2019
5. Autonomy, Choice:
A. Enroll in a MOOC and Reflect
 (e.g., see Class Central)

Beer Matters: Karl Brown, Assistant Professor of History
 Video: <http://edx.org/course/nutrition-exercise-and-sports>
https://www.youtube.com/watch?v=8K6PoYNIA&feature=emb_logo
<https://www.edx.org/course/nutrition-exercise-and-sports>



35

5. Autonomy, Choice:
B. Tracking the Life of a Medical Professional
 (e.g., biography.com)
<https://www.biography.com/scientist/alexander-fleming>



36

5. Autonomy, Choice: C. Design Multimedia Glossaries

P540 Final Assignment: Nate Wynne, Supersized Personal Course Glossary
<http://natewynne1982.wiks.com/p540courseglossary>
 Ozgur Ozdemir, December 2012
<http://r685glossary.shutterfly.com/>
 Umida Khikmatillaeva, Dec. 2011, P540
<http://learningplanet.shutterfly.com/>



37

Poll:

Any light bulbs going off in
your head so far...?

- A. Yes definitely***
- B. Yes maybe!
- C. Not yet (but hopefully soon...)



38

(Zoom Meetings) 6. Relevance, Meaningfulness: A. Weekly Guest Expert Chats R511 Chat with Mike Molenda, IU



39

6. Relevance, Meaningfulness: B. Case-Based Learning: Instructor Cases (e.g., Mark Braun, IU)

40

March 20, 2018 6. Relevance, Meaningfulness: C. Editing Wikipedia Pages Women's-Studies Students Across the Nation Are Editing Wikipedia Emma Kerr, The Chronicle of Higher Education <https://www.chronicle.com/article/Women-s-Studies-Students/242866>



Samantha Erickson, left, of the Wiki Education Foundation; Tina Brock, a dean of the School of Pharmacy at UC San Francisco; and professor Amin Azzam discuss implementing the integration of Wikipedia pages on medical topics with students' work

41

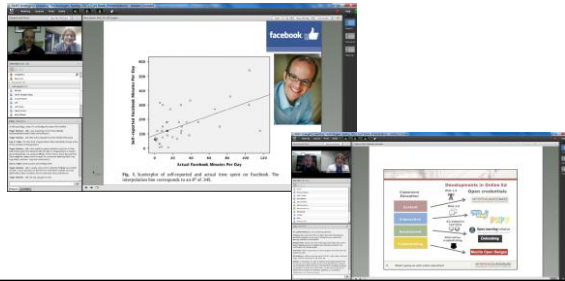
7. Interactive, Collaborative: D. Negotiate Meanings Online (e.g., PiratePad: <http://meetingwords.com/>) <http://blogs.elon.edu/technology/6-collaborative-writing-applications-for-group-projects-or-pages/> MeetingWords, Google Docs, NowComment, MixedInk



42

7. Interactive, Collaborative:

A. Guest Speaker Quotes (Rey Junco, February 25, 2013)

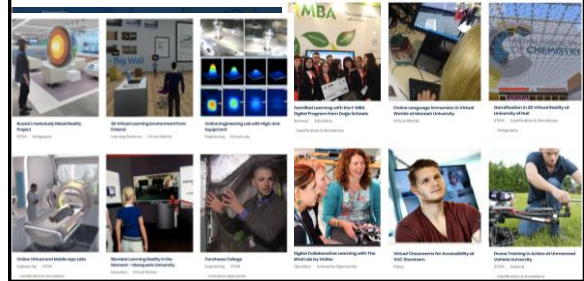


43

7. Interactive, Collaborative:

B. Explore Simulations in Virtually Inspired

<https://virtuallyinspired.org/portfolio/online-engineering-lab-with-high-end-equipment/>



44

7. Interactive, Collaborative:

C. Virtual Mobile (at Virtually Inspired)

virtual laboratory brings the opportunity for remote collaboration enables students to conduct experiments, access, interpret, evaluate, and exchange relevant technical information.

<https://virtuallyinspired.org/portfolio/online-virtual-labs/>



45

7. Interactive, Collaborative:

D. Serious Gaming

A Serious Game for Massive Training and Assessment of French Soldiers Involved in Forward Combat Casualty Care. Percy Military Teaching Hospital, Department of anesthesiology and intensive care, French Military Health Service, Clamart.



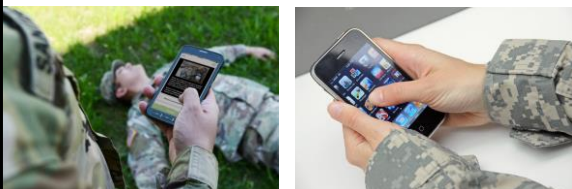
46

May 21, 2018, David Vergun, Army News Service

8. Engagement, Involvement:

A. Mobile App First Responder Casualty Care

Simulation, Training and Instrumentation recently prototyped a user-friendly medical app called the Tactical Combat Casualty Care All Combatant Cognitive Trainer, or TC3 ACCT. The new app provides a consistent, but personalized presentation of TC3 material to each learner on any mobile device



47

2019

8. Engagement, Involvement:

B. Healthcare Scenarios and Simulations

High Fidelity Simulations

<https://www.healthysimulation.com/high-fidelity-simulation/>
<https://www.healthysimulation.com/birth-simulator/>

High Fidelity Simulation



High-fidelity simulation is a healthcare education methodology that involves the use of equipment, the use of simulation scenarios, and the use of simulation scenarios to create a realistic learning environment. It is a methodology that involves the use of simulation scenarios to create a realistic learning environment. It is a methodology that involves the use of simulation scenarios to create a realistic learning environment.

Birth Simulator



48

Commitments:

Stop and Share:

Which principle(s) of TEC-VARIETY will you use?

Tone/Climate

Encouragement, Feedback

Curiosity



Variety

Autonomy

Relevance

Interactive

Engagement

Tension

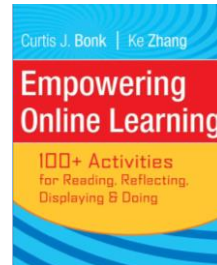
Yields Products

What motivates?

1. Tone/Climate: Psychological Safety, Comfort, Sense of Belonging
2. Encouragement: Feedback, Responsiveness, Praise, Supports
3. Curiosity: Surprise, Intrigue, Unknowns
4. Variety: Novelty, Fun, Fantasy
5. Autonomy: Choice, Control, Flexibility, Opportunities
6. Relevance: Meaningful, Authentic, Interesting
7. Interactivity: Collaborative, Team-Based, Community
8. Engagement: Effort, Involvement, Investment
9. Tension: Challenge, Dissonance, Controversy
10. Yielding Products: Goal Driven, Purposeful Vision, Ownership

61

Part II: The R2D2 Model: Read, Reflect, Display, Do...



62

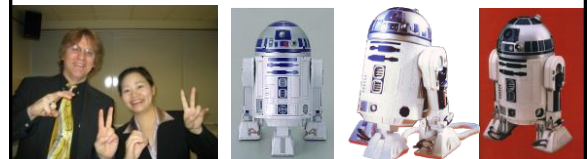
Question: How can technology address diverse learner needs?



63

The R2D2 Model

1. Read (Auditory and Verbal Learners)
2. Reflect (Reflective Learners)
3. Display (Visual Learners)
4. Do (Tactile, Kinesthetic, Exploratory Learners)



64

1. Auditory or Verbal Learners

- Auditory and verbal learners prefer words, spoken or written explanations.



65

Read 1a. Choose from Online Tidbits Holistic Health and Fitness

https://www.army.mil/article/151402/army_launches_holistic_health_and_fitness_initiative

Army launches holistic health and fitness initiative

November 14, 2019

By: [Name]

Photo: [Name]

Challenge: [Name]

Related: [Name]

Related: [Name]

Related: [Name]

Related: [Name]

Related: [Name]

Related: [Name]

Related: [Name]

Related: [Name]

Related: [Name]

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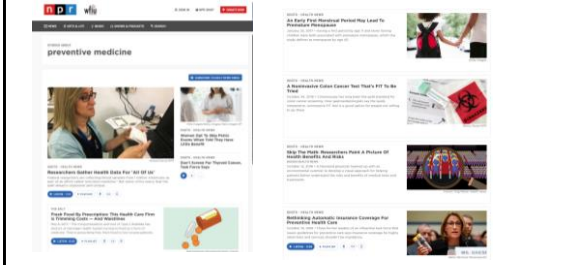
Related: [Name]

Related: [Name]

66

January 20, 2016 Read 1b. Listen to Podcasts

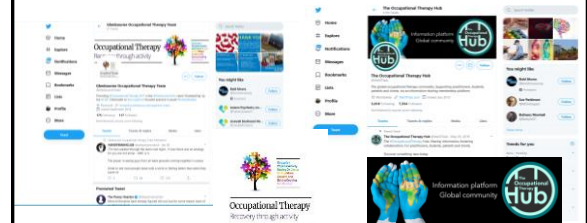
(e.g., preventive medicine podcast, NPR:
<https://www.npr.org/tags/206695374/preventive-medicine>)



67

Read 1c. Twitter Fed Class Discussions

(e.g., OT: <https://twitter.com/glenbourneteam>)



68

2. Reflective and Observational Learners

- Reflective and observational learners prefer to reflect, observe, view, and watch learning; they make careful judgments and view things from different perspectives



69

February 11, 2020 Reflect 2a. Live Event Decision Making and Reflection

Implementation: Live Events to Promote Dialogue

- Facilitate Discussion: Engage participants during live events to apply their clinical decision making skills to an authentic patient journey.
- Share Data: Present aggregated data from the participant clinical decisions, enabling the facilitator to lead discussions regarding the targeted insights.
- Guide Self Reflection: Personalized coaching reports enable participants to review their decisions and compare their performance against their peers.

USHealthConnect Inc.
K Y N E C T I V E



70

February 24, 2019 Reflect 2b. Big Issue Reflections Can Students Handle the Big Questions?

Beth McMurtrie, The Chronicle of Higher Education
<https://www.chronicle.com/article/Can-Students-Handle-the-Big/245753>
<https://godandgoodlife.nd.edu/syllabus/>
https://www.youtube.com/watch?time_continue=1048&v=EMKbtSC3-2I



71

April 13, 2016 Reflect 2c. Interpreting Interactive Graphs and Infographics

Tech billionaire announces \$250 million in cancer immunotherapy funding, Jayne O'Donnell, USA Today
<http://www.usatoday.com/story/news/2016/04/13/billionaire-announces-250-million-cancer-immunotherapy-funding/82821138/>



72

June 3, 2016

**Display 3e. Explosion of Virtual Reality
VR Lets Med Students Experience What
It's Like To Be 74**

Elyse Wanshel, Huffington Post
<http://ht.ly/bSpe300XEPJ>

Virtual Reality Lets Med Students Experience What It's
Like To Be 74



79

January 20, 2017

**Display 3f. You VR Takes You on a Tour of
The Human Body**

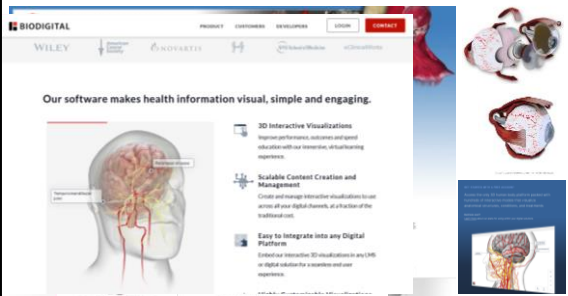
https://www.youtube.com/watch?v=L8Waj1f_UjM



80

**Display 3g. Multimedia Supplements
Online Anatomy and Biology**

<http://www.cyber-anatomy.com/>
<https://www.biodigital.com/>



81

4. Tactile/Kinesthetic Learners

- Tactile/kinesthetic senses can be engaged in the learning process are role play, dramatization, cooperative games, simulations, creative movement and dance, multi-sensory activities, manipulatives and hands-on projects.



82

Do 4a. Sample Student Work
e.g., Interactive Archive/Gallery of best work
(e.g., physical therapy, SDSU)



83

Do 4b. Case Decision Making
e.g., snake bite



84

January 29, 2020

Do 4c. Emergency Worker VR Training
No smoke, no water, no waste. VR could train the next generation of firefighters
Nell Lewis, CNN Business

<https://www.cnn.com/2020/01/29/tech/virtual-reality-firefighter-training/index.html>



A grassfire scenario in virtual reality, created by FLAIM Systems.

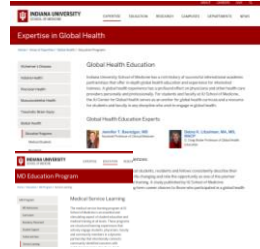
Firefighter trainees from the Cosumnes Fire Department are taught how to handle specific scenarios while wearing VR headsets.

85

January 26, 2020

Do 4d. Medical Service Learning and Community Outreach
Global Health Education, Indiana University

<https://medicine.iu.edu/expertise/global-health/education/>



86

Poll: How many ideas did you get from this talk?

1. 0 if I am lucky.
2. Just 1.
3. 2, yes, 2...just 2!
4. Do I hear 3? 3!!!!
5. 4-5.
6. 5-10.
7. More than 10.



BRAINY IDEAS

87

**Poll: Which do you prefer...
 (A) TEC-VARIETY or (B) R2D2?**



What motivates?

1. Tone/Climate: Psychological Safety, Comfort, Sense of Belonging
2. Encouragement: Feedback, Responsiveness, Praise, Supports
3. Curiosity: Surprise, Intrigue, Unknown
4. Variety: Novelty, Fun, Fantasy
5. Autonomy: Choice, Control, Flexibility, Opportunities
6. Relevance: Meaningful, Authentic, Interesting
7. Interactivity: Collaborative, Team-Based, Community
8. Engagement: Effort, Involvement, Investment
9. Tension: Challenge, Dissonance, Controversy
10. Yielding Products: Goal Driven, Purposeful Vision, Ownership



88

Any Questions or Comments?

Slides at: TrainingShare.com

Papers: PublicationShare.com

Free book: <http://tec-variety.com/>

Dr. Curt Bonk – CJBonk@Indiana.edu

<http://curtbonk.com/>



89