Overview

• Introduction
• “Singularity” emergent (defined)
• Knowledge Acceleration Implications
• “(some) New tools & technologies” (blend)
• Strategies & Mental Models
Technology Adoption Curve(s)
Everett Rogers’s Diffusion of Innovation Model
Accelerating Speed of Technology Driven Change

Linear / Incremental

Logarithmic / Disruptive

https://www.techiexpert.com/driving-innovation-in-disruptive-technology/
Half Life of Knowledge: Dealing with 2 questions:

What is foundational?
- Deeper
- Broader

What skills are most important? (Are “soft skills” moving to the center?)
- Communication
- Critical Thinking
Personal Case Study:
3D Modeling, Photogrammetry & LiDAR
Integrating 3D Modeling, Photogrammetry and Design

Authors: Foster, Shaun, Halbstein, David
iPad Pro (6/2020) / iPhone 12 (10/2020)
Game: The Vanishing of Ethan Carter
Disruptive Technology: Education

- Adaptive Learning
- Massive open online courses (MOOCs)
- Minimally Invasive Education
  - TED: New experiments in self-teaching | Sugata Mitra

Herron & Co 1/2019:

https://herron-co.com/blog/2019/03/disruptive-technology-education
Adaptive Learning

AI driven Learning: “Adaptive Learning Algorithms”
Adaptive 3.0

New Interfaces: AR/VR

- Virtual Reality (VR)
- Augmented Reality (AR) Ai.R-Cord
Virtual Production / Mixed Reality
Travis Scott and Fortnite Present: Astronomical
Emergent Interfaces

Virtual Reality (VR)
- Eye Tracking

Augmented Reality (AR)
- Face
- GIS
- Glasses

Mixed Reality (XR)
- Sensors and Feedback

Virtual Production
The world's most detailed globe
Project “Anywhere”
AI Infused Tools: Generative Design, Optimization

Nvidia Gau GAN

Benefits of generative design

Explore a wider range of design options
In the time you can create one idea, a computer can generate thousands, along with the data to prove which designs perform best.

Make impossible designs possible
Generative design lets you create optimized complex shapes and internal lattices. Some of these forms are impossible to make with traditional manufacturing methods. Instead, they're built using new additive manufacturing methods.

Optimize for materials and manufacturing methods
Set goals and parameters, and the software will create high-performing design options based on those constraints. The software resolves conflicting design constraints so you can focus on innovating.
Engagement to Autonomy: Four Strategies for Face-to-Face or Online Learning in First-Year Experience Courses

8 Shortcuts to Stay Relevant in Learning and Development
ACCELERATION PROBLEM:  MENTAL MODELS & METAPHORS

Interfaces
Deep vs Broad
Prosthetic Knowledge
Branching systems & control
Surroundings & Flow Control
Knowledge Delivery Methods

VIDEO BASED LEARNING
HEAVILY HYPERLINKED
SYNCHRONOUS & ASYNCHRONOUS
SIMUL-CRITIQUES
LEARNING “TEAMS” (RESEARCH GROUPS)
How do you change from being a sage-on-stage to a guide-on-the-side?

Changing Nature of “Teacher”

Knowledge Holder

- Hyperlink
- Inspirational
- Expectations
- Judge / Coach

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
Abacus, Slide Rulers & Calculators

The abacus is a calculating tool that may be as old as 2700–2300 BC. It has been used for centuries and is still widely used by merchants, traders, and clerks in Asia, Africa, and elsewhere.

https://wehavekids.com/education/How-to-teach-Abacus-to-kids
Interfaces: **Fitt’s Law** & Achieving Acceleration

\[ MT = a + b \times ID \]

- \( MT \): Movement Time (typically in milliseconds)
- \( a \): intercept (\( MT \) where \( ID = 0 \))
- \( b \): slope
- \( ID \): Index of Difficulty

There is a linear relationship between \( MT \) (Movement Time) and the \( ID \) (Index of Difficulty).

- Where the pointer is located
- Near and Big
- Far and Small

Faster  Slower
Going
Beyond
Above
Self referential

META
\m\text{me-\text{tə}}\ - \text{Definition:}
When and how do you switch your teaching?
Understanding technology drives both...
Convergence & Divergence

Example:
Compass over Maps
Strategies: Optimize Flow Control

Protections, Warm-up, Exercise, Cool-down

Turn off distractions

Interact with
test knowledge

Chunk Knowledge

Repetition
23 Sites for Free Online Education, 2/2/2021

1. Coursera
2. Khan Academy
3. Open Culture Online Courses
4. Udemy
5. Lifehack Fast Track Class
6. Academic Earth
7. edX
8. Alison
9. iTunesU Free Courses
10. Stanford Online
11. Open Yale Courses
12. UC Berkeley Class Central
13. MIT OpenCourseWare
15. Codecademy
16. Code
17. University of Oxford Podcasts
18. BBC Podcasts
19. TED-Ed
20. LessonPaths
21. Memrise
22. National Geographic Kids
23. Fun Brain
Highway vs Local roads (vectors & branching)

Hierarchy of Roads

- Freeway
- Arterial
- Collector and Distributor
- Local

Through Traffic Movement and Speed

Access to Property
Grass vs Sassafras

Rhizome vs Tree
Prosthetic knowledge

n. Information that a person does not know, but can access as needed using technology.

Aimee Mullins talks about her prosthetic legs

Advantage: JIT information
Disadvantage: Not Integrated
ST vs LT Knowledge
Biology is the new digital

The Age of Living Machines: How the Convergence of Biology and Engineering Will Build the Next Technology Revolution
By: Susan Hockfield
Professor Nan B. Adams argues that based on Gardner's definition of multiple intelligences, digital intelligence – a meta-intelligence composed of many other identified intelligences and stemmed from human interactions with digital computers – now exists.
Organizational: Advantages / Disadvantages

Transform when possible

Upstream manage

Flow around
My Rule of 3

Teaching & Learning should benefit

- Open Community
- My Students
- Myself
Summary & Questions

Covered:

- “Singularity”
- Knowledge Acceleration Implications
- New and blending technologies
- Strategies, resources & mental models
- Questions