



Integrating Educational Technology into Medical Education

Process versus Product

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Objectives

1. Discuss the process of integrating technology into medical education
2. List common barriers to integrating technology and ways to overcome them
3. List at least one method to integrate technology into teaching



Why Tech Matters



2005





2013



“Digital native”



THE EVOLUTION OF MAN

Gen C is a state of
mind



80% of
Millennials

Creation
Curation
Connection
Community

understanding the data deluge: comparison of scale with physical objects

1 megabyte

(A large novel)



A tiny ant

x 1000

1 gigabyte

(Information in the human genome)

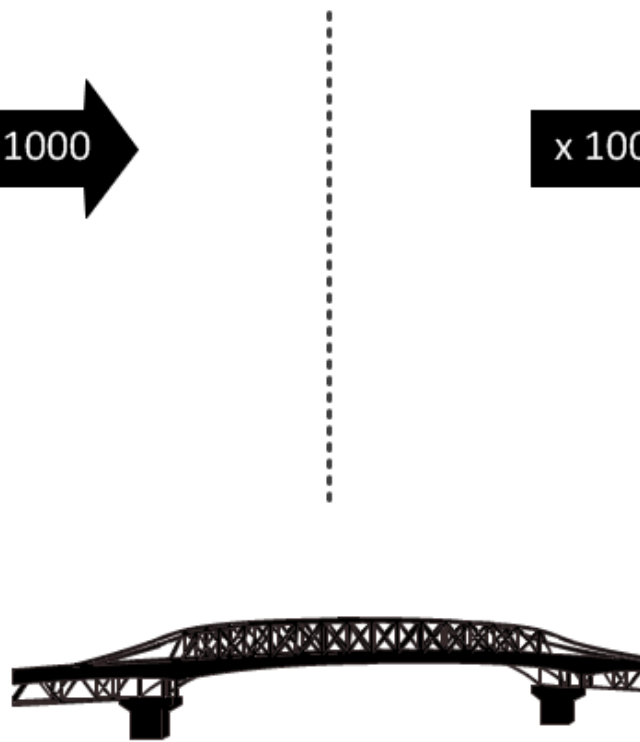


Height of a short person

x 1000

1 terabyte

(Annual world literature production)



Length of the Auckland Harbour Bridge

x 1000

1 petabyte

(All US academic research libraries)



Length of New Zealand

x 1000

1 exabyte

(Two thirds of annual production of information)



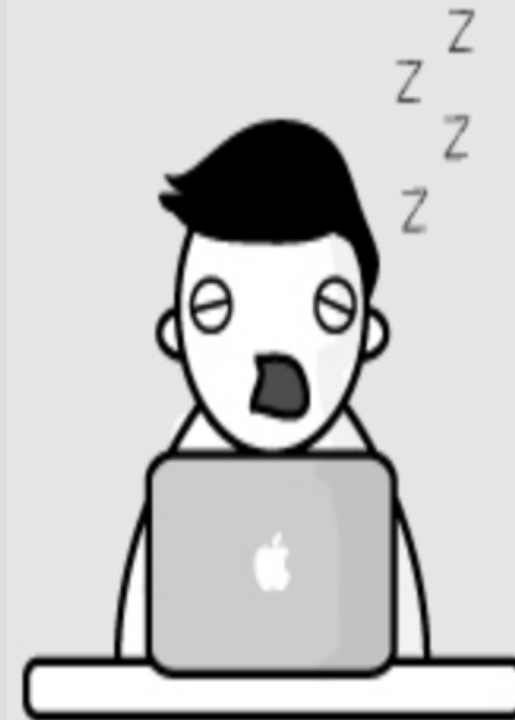
Diameter of the Sun

The Effect of Technology on Modern Education

Medical Student
1960



Medical Student
2018



THEGENTLEMANSARMCHAIR.COM

“Today’s students are no longer
the people our educational system
was designed to teach.”

-Marc Prensky,
Digital Natives, Digital Immigrants



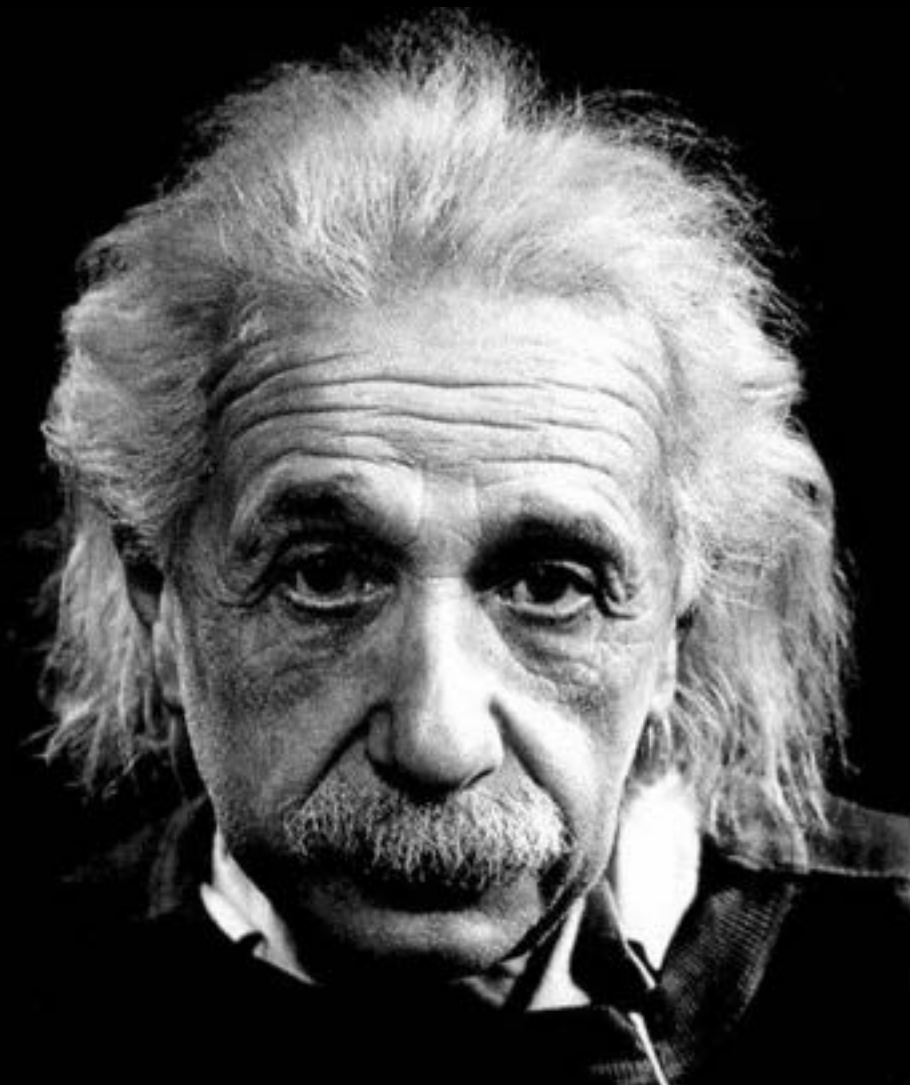
#IMPAC
T



Education in the Digital Age



“ I never teach my
pupils; I only attempt
to provide the
conditions in which
they can *learn*. ”



“[Metacognition is]...essential to foster deep and durable learning.”

Interactive teaching styles that facilitate reflection, self-assessment, and perspective-taking



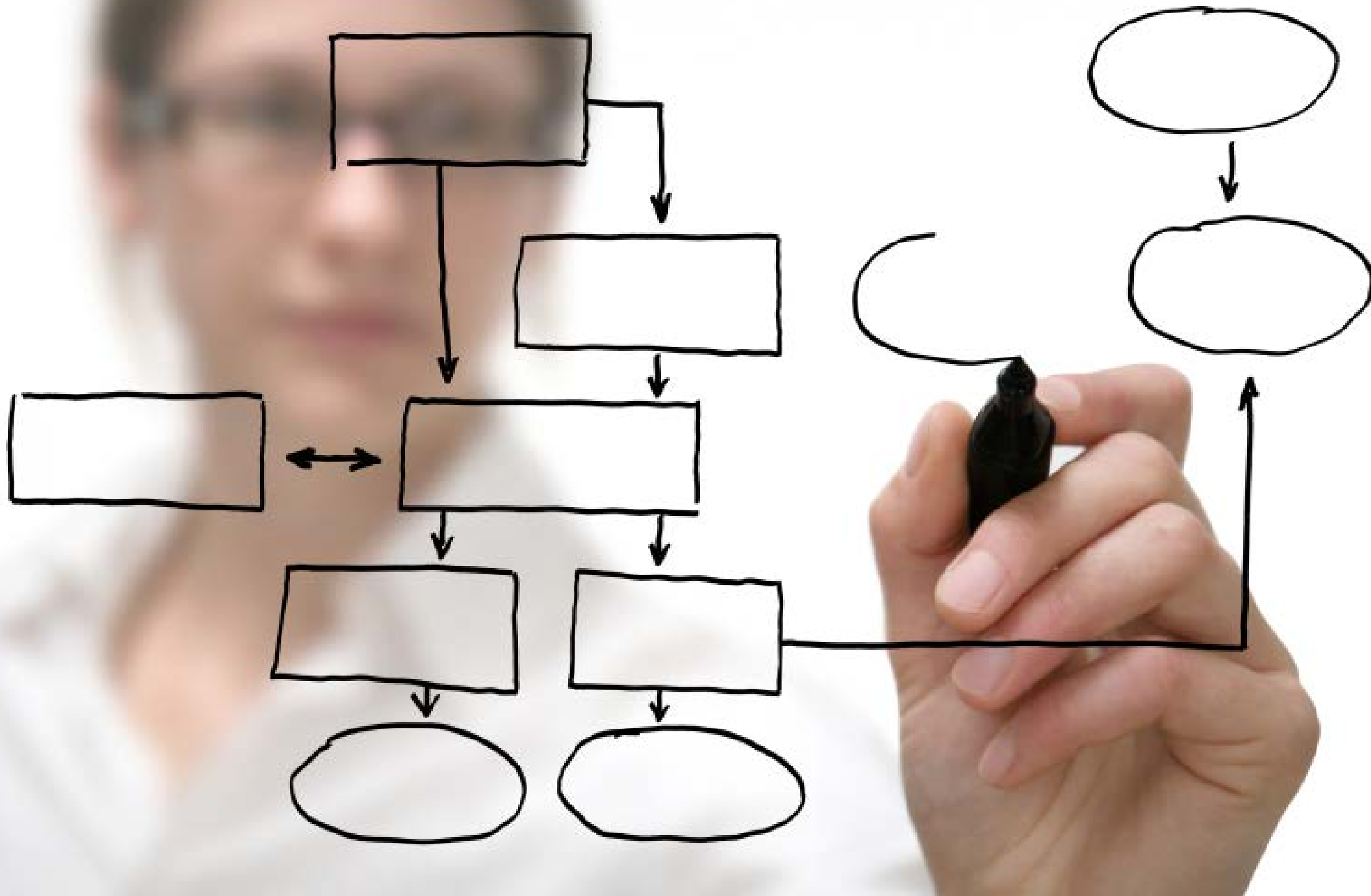
-Gonullu, Artar. Educ Health 2014;27:225-6

Educational design is the creation of curriculum and instruction which optimizes an immersive learning environment

-Me



Process



Educational technology

“...a process-oriented and systems-based pedagogical approach for facilitating learning and improving performance in patient care by the integrated mode of creating, using, and managing technological process and resources.”

Han, et. al. Teach and Learn in Med. 2013;25(S1):S39-

Discussion Time:

So we live in a digital world?

How do our trainees learn
and how do they want to
learn?

Why Don't My Students Think I am Groovy? The 5 R's For Engaging Millennial Learners

Christie Price-Dalton State U



Connected Faculty

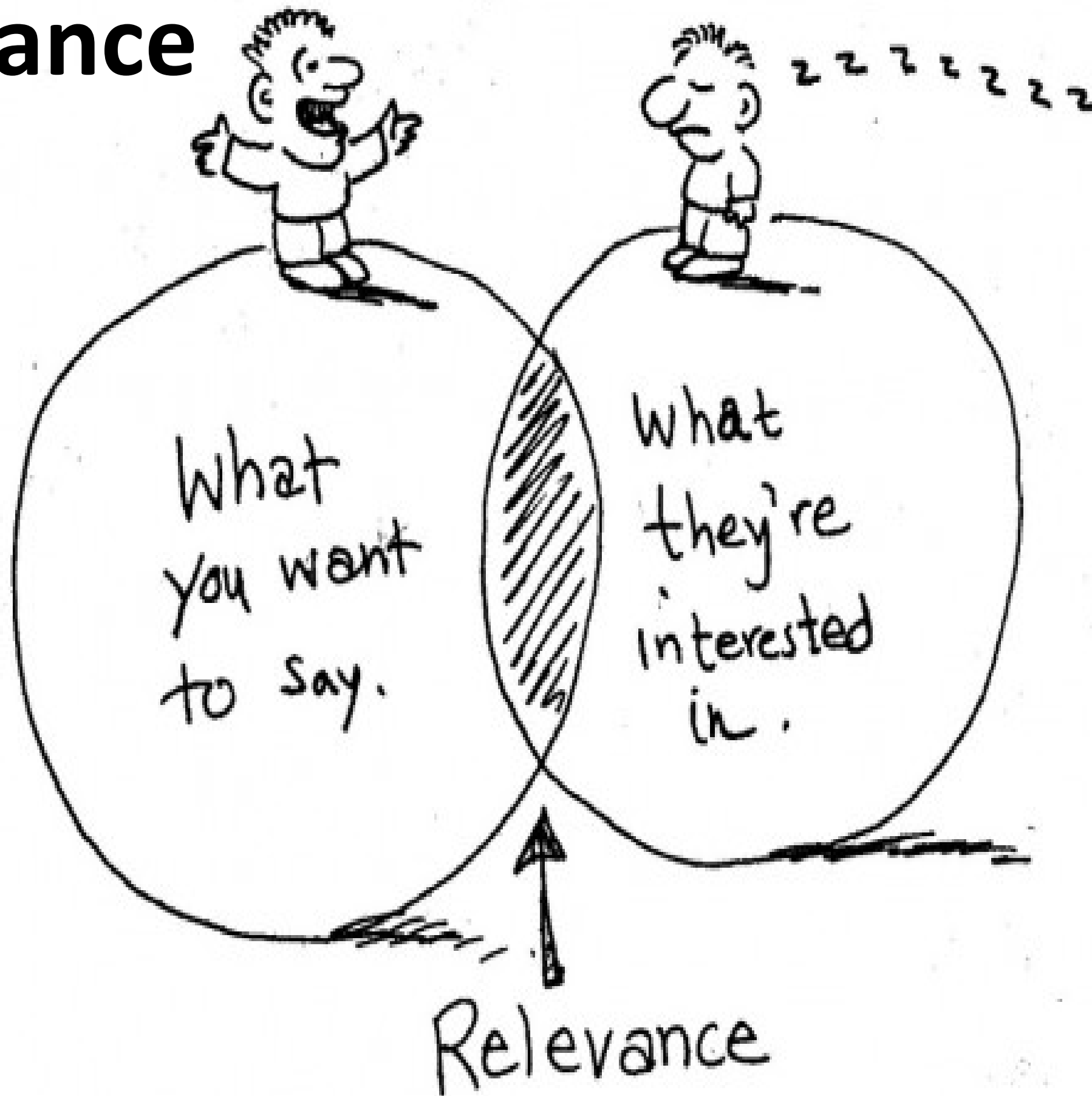
A man with a beard and glasses, wearing a blue shirt, is sitting at a desk and looking at a laptop. A woman with dark hair, wearing a striped shirt, is sitting next to him, looking at the laptop. The man is holding a small white card with a geometric pattern on it. The background is blurred, showing other people in a meeting room.

- 1. Tech-Savvy:**
- 2. Relevant:**
- 3. Seriously Humorous.....**
- 4. Relaxed and Relatable:**





Relevance





Rationale





Relaxed



Rapport





Research Based Active Learning

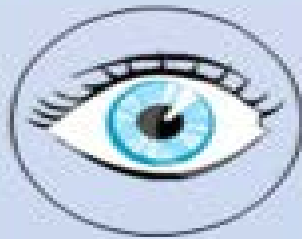
What Methods Do You Use to Teach?

<http://vark-learn.com/the-vark-questionnaire/teaching-questionnaire/>





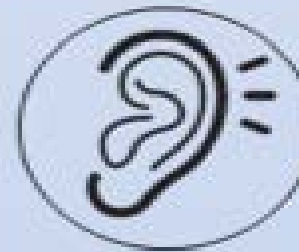
VISUAL



I prefer to see information graphically through maps, charts, graphs, flow charts, labeled diagrams. I like to see meaningful symbols for relationships between different concepts. Please note, it does NOT include movies, videos, or PowerPoint.



AUDITORY



I prefer to learn by hearing or speaking such as from lectures, books on tape, group discussion, talking to others. I want to sort out ideas by speaking them first. I may need to say something in my own way to learn it.



READ/WRITE



I prefer to see information displayed as words. I like to learn by reading books and essays, watching PowerPoint, and completing written assignments. I often have to write something down to help learn it. Anything that involves reading or writing words (not diagrams).



KINESTHETIC



I prefer to learn by experience and practice. In other words, I learn by doing (or seeing something be done). I like learning through demonstrations, simulations, case studies, and practical applications.



iPad

10:45 am



COMPONENTS OF A 21st Century Classroom

Technology is undeniably changing the face of education, and it's easy to see the impact already. Imagine what classrooms will be in 20 years with the speed of technological innovation. Let's look at some of the key advancements in the 21st century classroom.



of teachers have computers in their classrooms.



but just 1 in 5 feel their classrooms have the right level of technology.

INCREASING THE PRESENCE OF THE FOLLOWING TECHNOLOGIES COULD CHANGE THAT RATIO DRAMATICALLY

TECHNOLOGY

Project-based learning (PBL) teaches concepts, but also organization, articulation, project management and collaboration.



Integrating life skills into education can improve student engagement and retention and prepare them for 21st century careers.



Online Courses



Almost a third of all college students take at least one online course.

Online enrollments saw 21% growth while overall higher education student population only saw 2% growth.

Over 60% of education institutions credit better learning as critical for long-term educational success.



of teachers have used online games in the classroom.

average test scores

90.5%

with the use of digital games

75.5%

without the use of digital games

TEACHERS' PERCEPTIONS

Help teachers gauge top concerns and achievements related to their students.



Legislation for the Learning Analytics and Knowledge conference studied between 2011 and 2012.



One system claims to predict whether a student's likelihood of sufficient course completion with about 70% accuracy, highlighting risk factors for individual students.



Top 3 Reasons for Teachers to Use Technology in the Classroom



Adapt to diverse learning styles



Boost student motivation



Enhance the material being taught



TECHNOLOGY

Mobile, open source is expected to grow to 1/3 of the textbook market.

By 2015...

a textbook may comprise...

10% of textbook market

6 in 10

to have used a digital textbook by the end of 2014.



...of teachers will consider mobile for classroom, compared to now ... of college professors.



59%

of students would like to use their own mobile devices in school's learning.



iPad

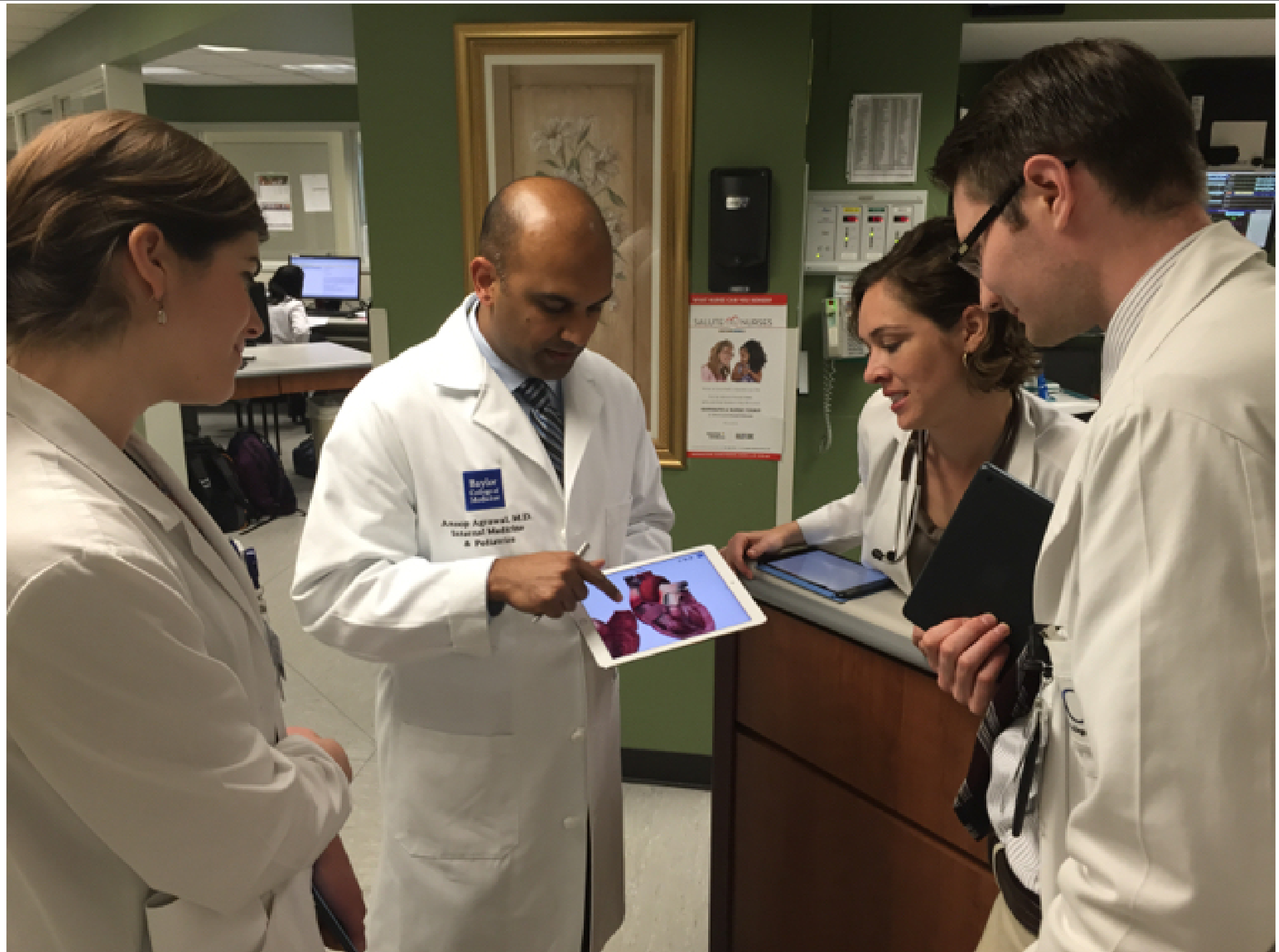
2:00pm





iPad

10:45 am



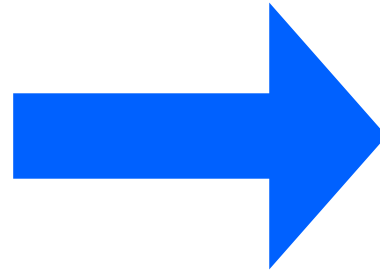
What are Our Current Teaching Methods (aka How to Do It Better)

Evolution of ET

Use

Delivery

Exposure



Mastery

Facts

Concepts



Integrating Educational Technology

1. Understand and embrace the technology
2. Add to an existing educational framework
3. Start slow and build slowly
4. Don't be afraid to experiment and innovate



A person wearing a white lab coat is holding a blue, cloud-shaped object with both hands. The object has a gradient from light blue to dark blue. The text "Embrace Technology" is written in white, sans-serif font across the center of the cloud. The background is a blurred white lab coat.

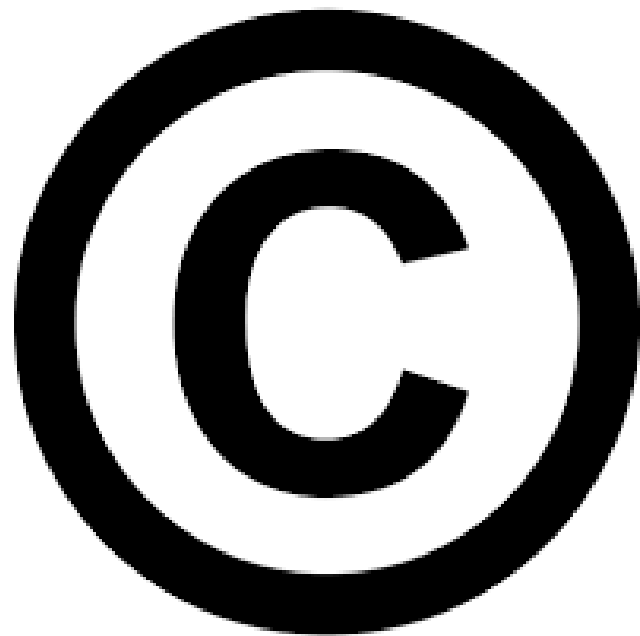
Embrace
Technology

Cloud Storage



Become a hoarder

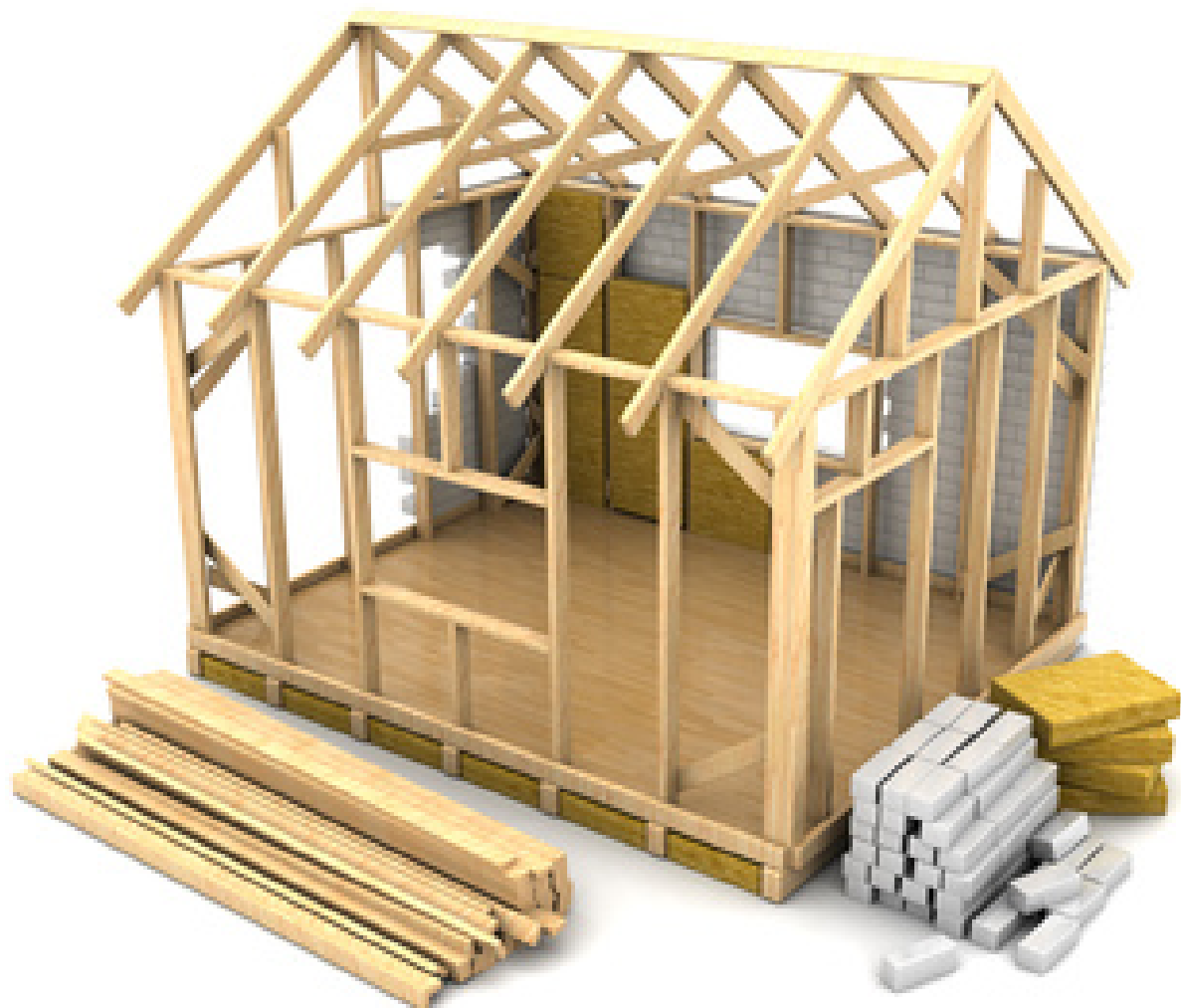




**Confidentiality
of Personal Health
Information**

Establish a framework

Add the technology
into an existing
framework to
enhance delivery
or retention of
information



The importance of educational theories for facilitating learning when using technology in medical education

JOHN SANDARS¹, RAKESH S. PATEL², POH SUN GOH³, PATRICIA K. KOKATAILO⁴ & NATALIE LAFFERTY⁵

1. Problem identification
and general needs
assessment

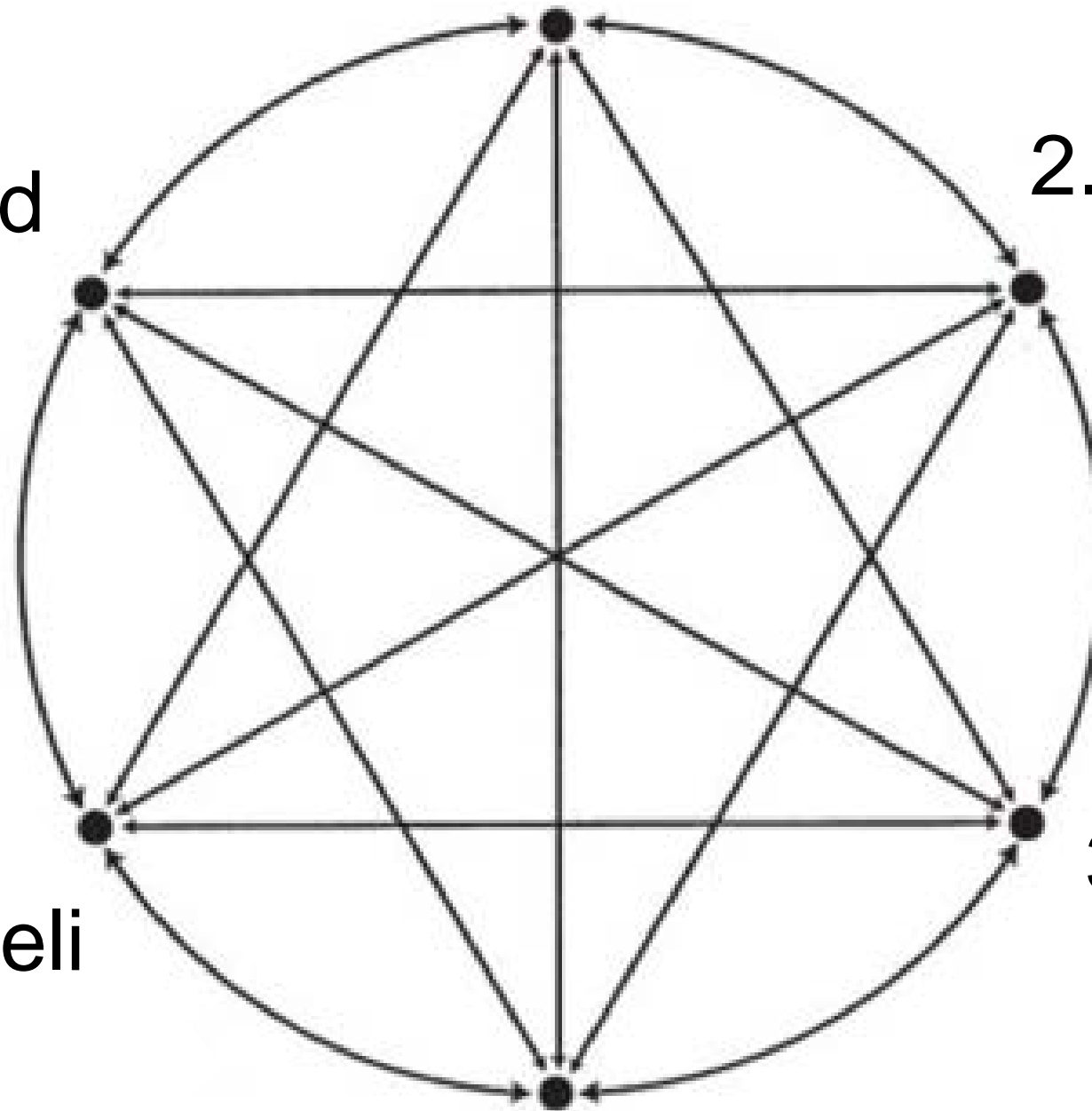
2. Targeted needs
assessment

3. Goals and
objectives

4. Educational
strategies

5.
Implementation/deli
very

6. Evaluation and
Feedback



Take your time...





Experiment and innovate

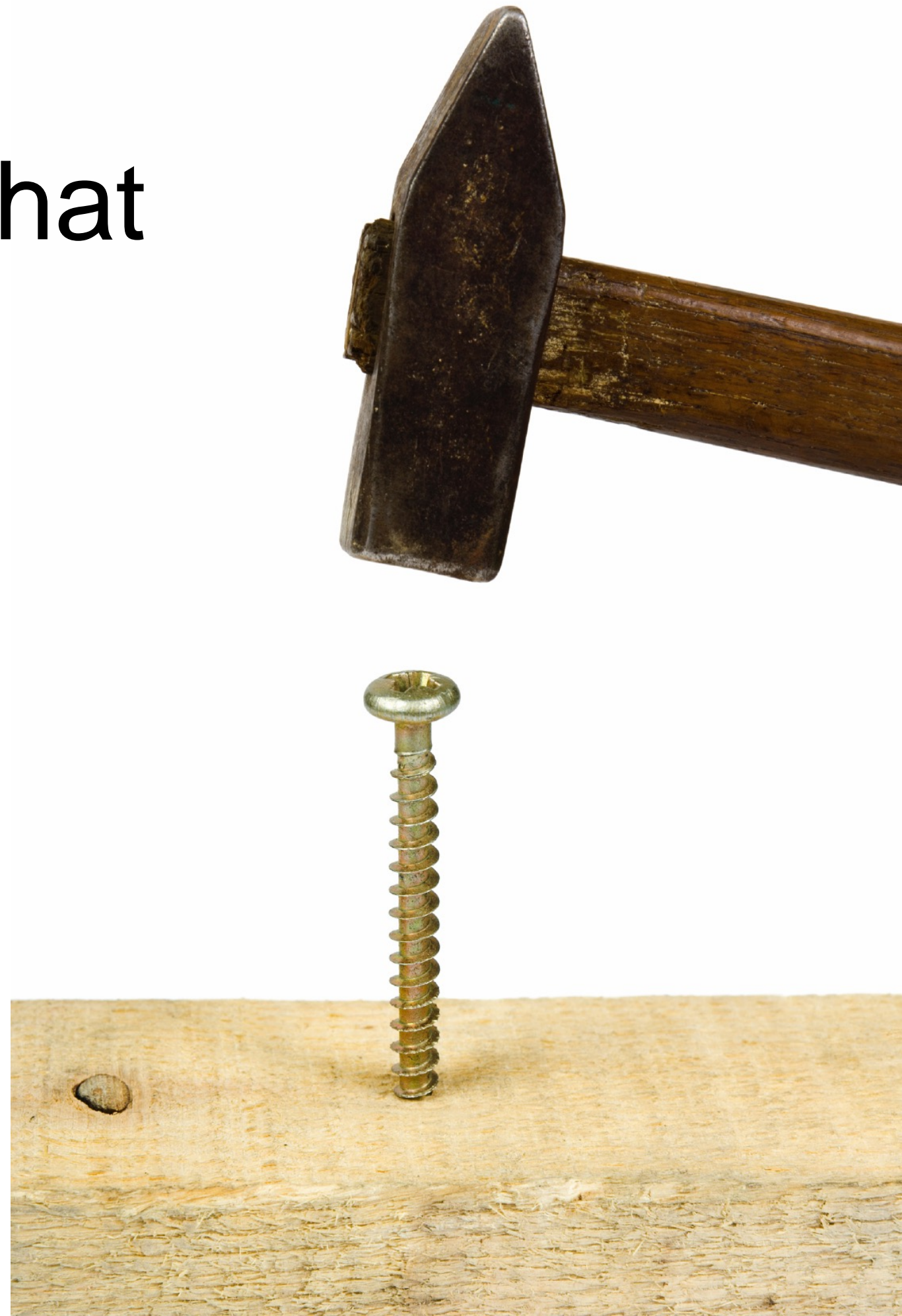
Adopt the
beginner's mind



Foster communication



...but recognize that
it is just a tool



Simplicity



Success Stories

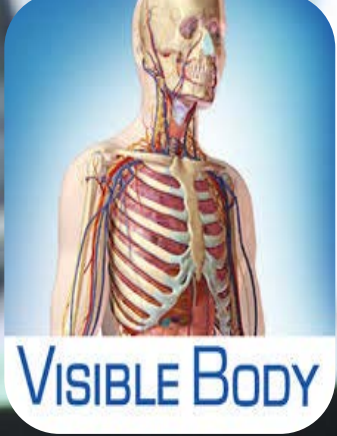
Educational Technology and Scholarship in the Digital Age





**KEEP
CALM.
THERE'S
AN APP
FOR THAT**









**KEEP
CALM
AND
GET OUT
OF THE WAY**

SAMR

TRANSFORMATION

R

REDEFINITION
Tech allows for the
creation of new tasks

M

MODIFICATION
Technology allows for
significant task redesign

ENHANCEMENT

A

AUGMENTATION
Tech acts as a direct substitute,
with functional improvement

S

SUBSTITUTION
Technology acts as a direct substitute,
with no functional change

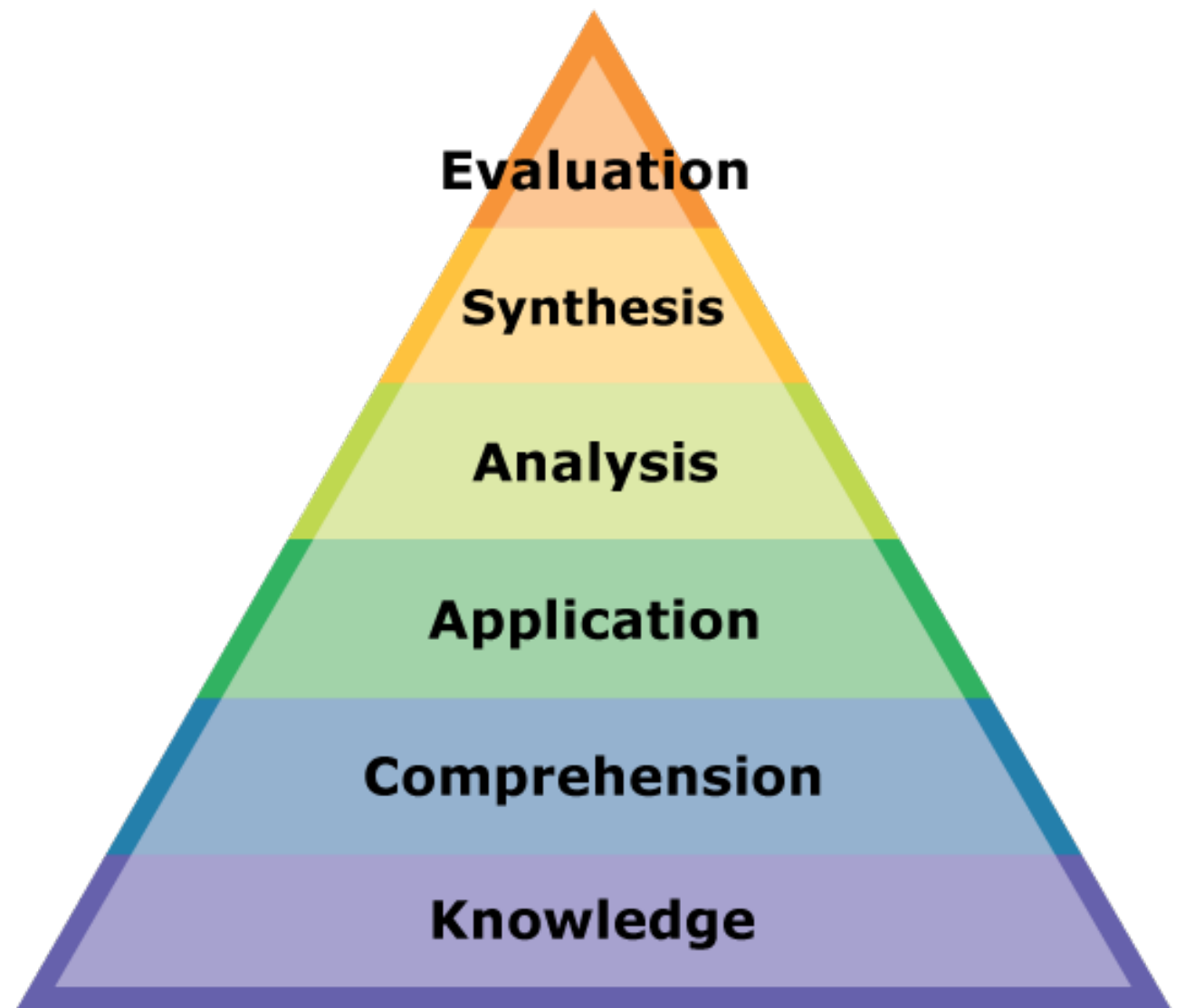
SAMR and Bloom's

Redefinition

Modification

Augmentation

Substitution



The SAMR Model for Technology Integration

SAMR

I wonder what's in the ocean?

@shvaduckworth
f@edappadvice

NO TECH

SUBSTITUTION

Tech acts as a direct tool substitute, with no functional change.

AUGMENTATION

Tech acts as a direct tool substitute, with functional improvement.

MODIFICATION

Tech allows for significant task redesign

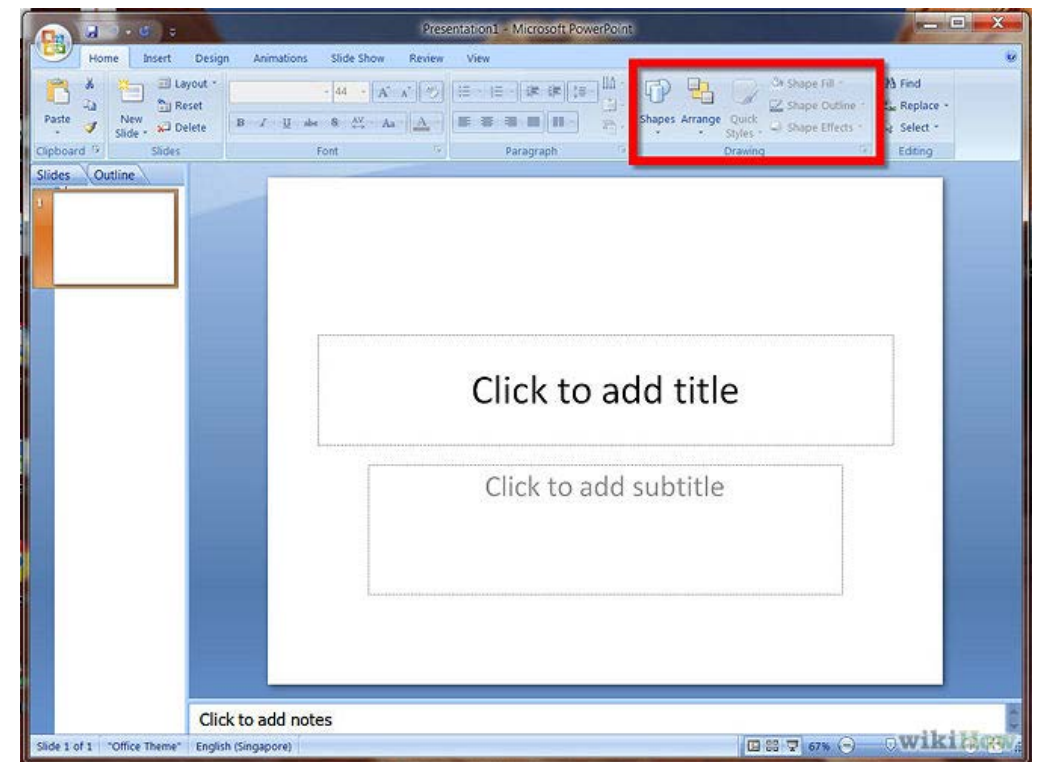
REDEFINITION

Tech allows for the creation of new tasks, previously inconceivable.

ENHANCEMENT

TRANSFORMATION

Substitution



Augmentation

ARROWS TEXTBOXES PROCESS



Modification

“THE FLIPPED CLASSROOM”

Student watches video at home.



**Team based learning exercise in
classroom instead of didactic
instruction.**

Redefinition

Tech allows for creation of new tasks previously inconceivable.



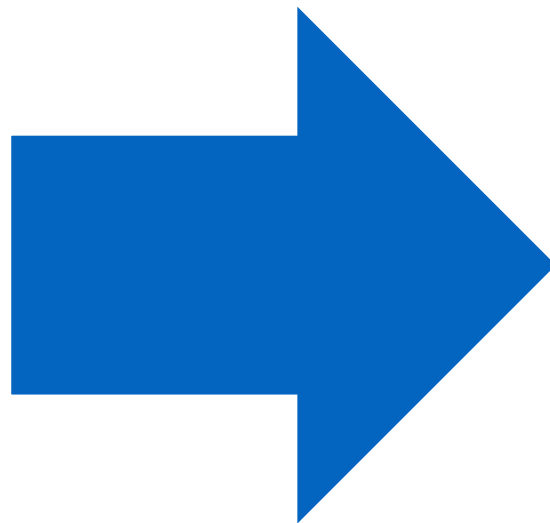
SAMR Worksheet

Transformation	Redefinition	Tech allows for the creation of new tasks, previously inconceivable		
	Modification	Tech allows for significant task redesign		
Enhancement	Augmentation	Tech acts as a direct tool substitute, with functional improvement		
	Substitution	Tech acts as a direct tool substitute, with no functional change		

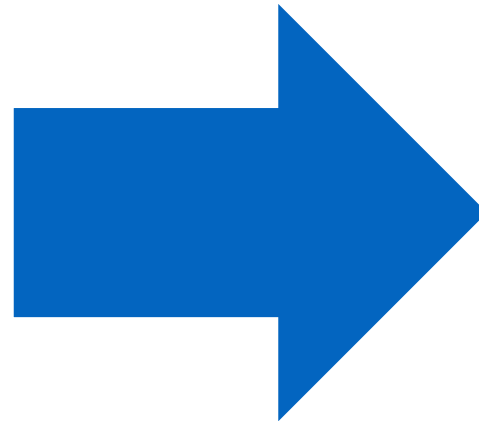
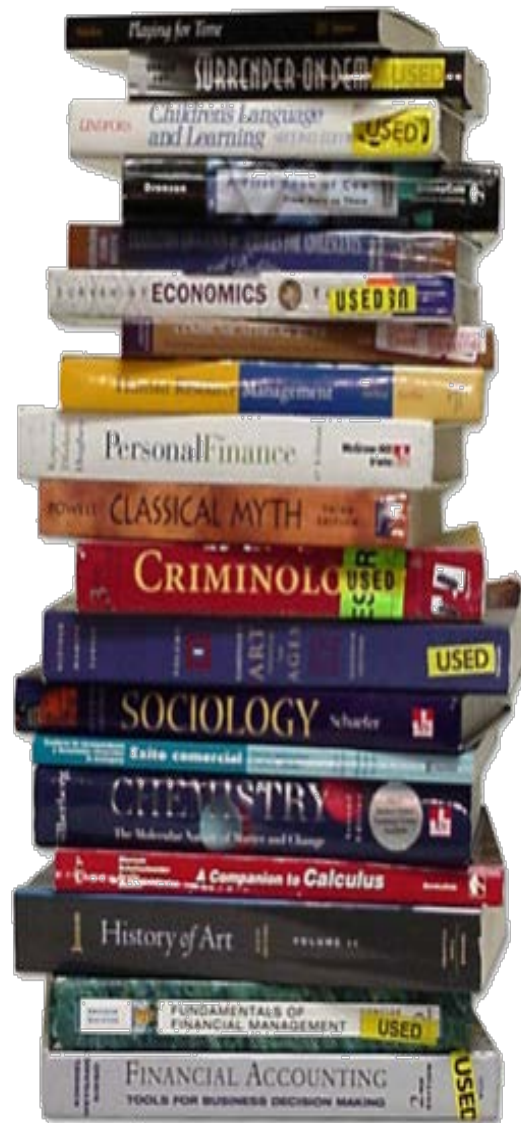
Best Practices (Q&A)

Becoming paperless

Step 1: Mimic your paper system



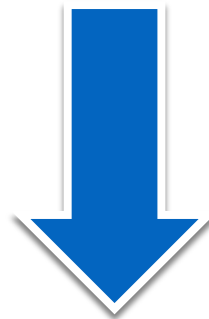
Step 1: Mimic your paper system



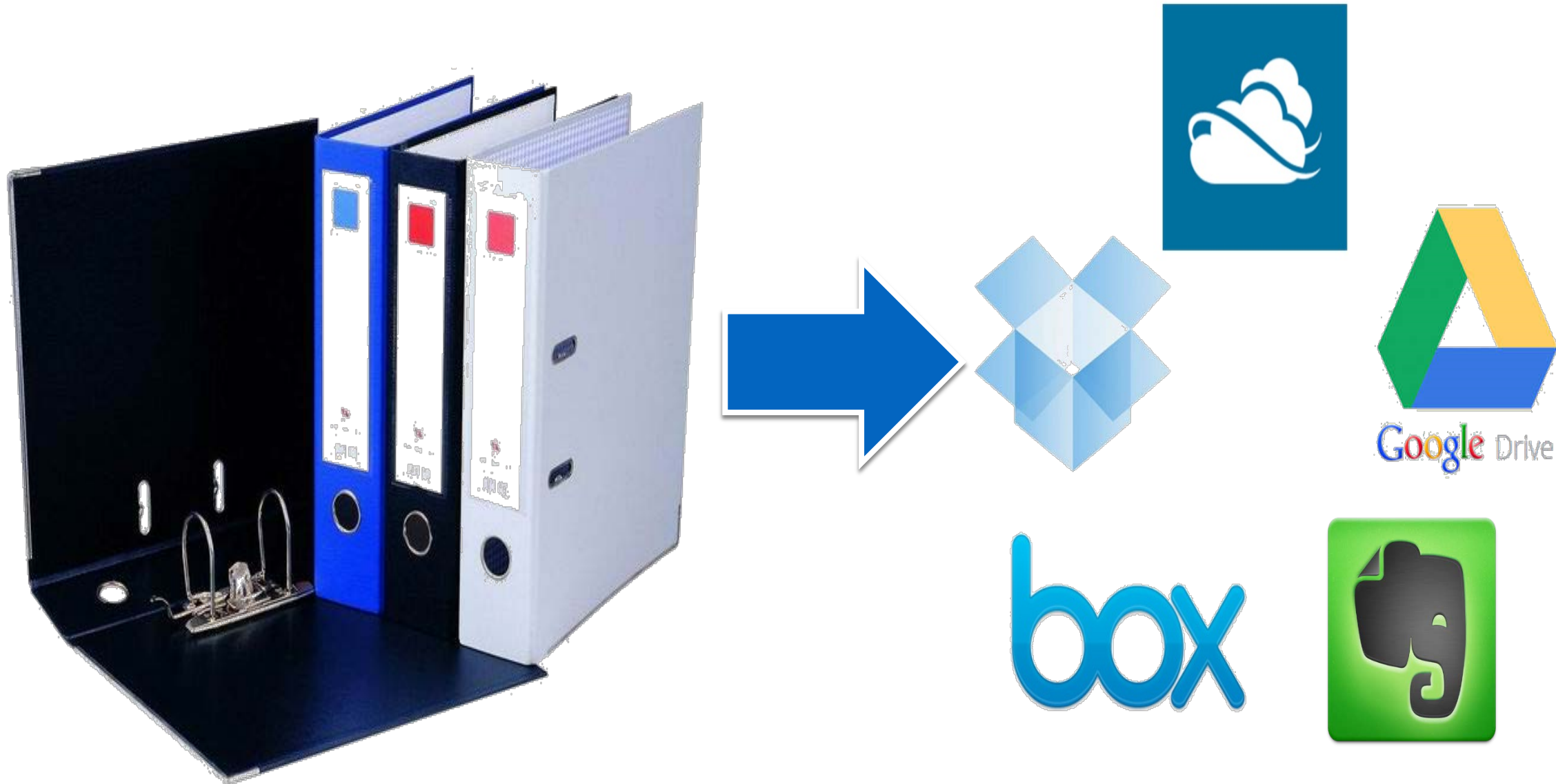
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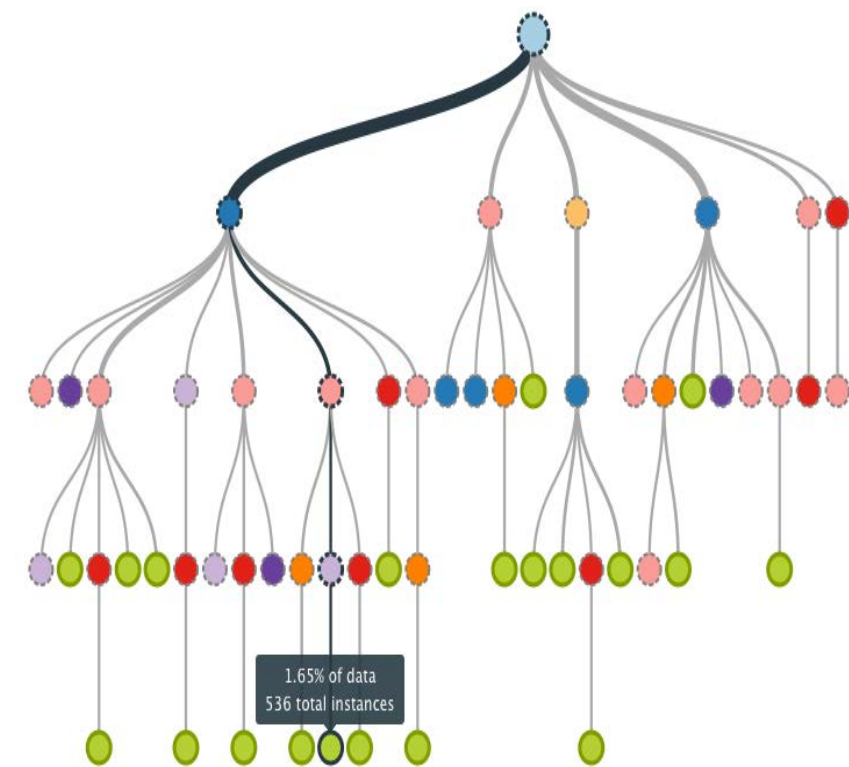
Step 1: Mimic your paper system



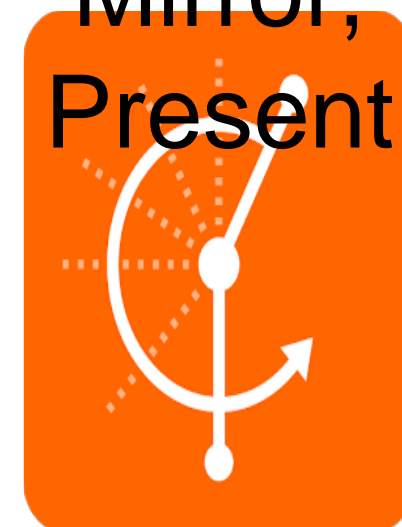
Step 1: Mimic your paper system



Written Clinical Simulation Even



Film,
Analyze,
Mirror,
Present



LEAD

Lecture Enhanced Active
Didactics

Move to the Lecture Enhanced Active Didactics

1. Make a shift in lecture content- No Lecture segment lasts more than 45 min
2. We increased our expectations and communicated that message
3. Active learning experiences every hour
4. Constructivist Classroom/Constructivist Bedside?

HOW: Constructivist

1. We engage learners using desirable difficulties
2. We allow their responses and their baseline knowledge help in tailoring the learning experiences
3. We build off of the initial learning experience or benchmark set by the initial desirable difficulty
4. Students reflect, process, and present with frequency

tysonpillowmd.com



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Process versus Product

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