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LEARNING

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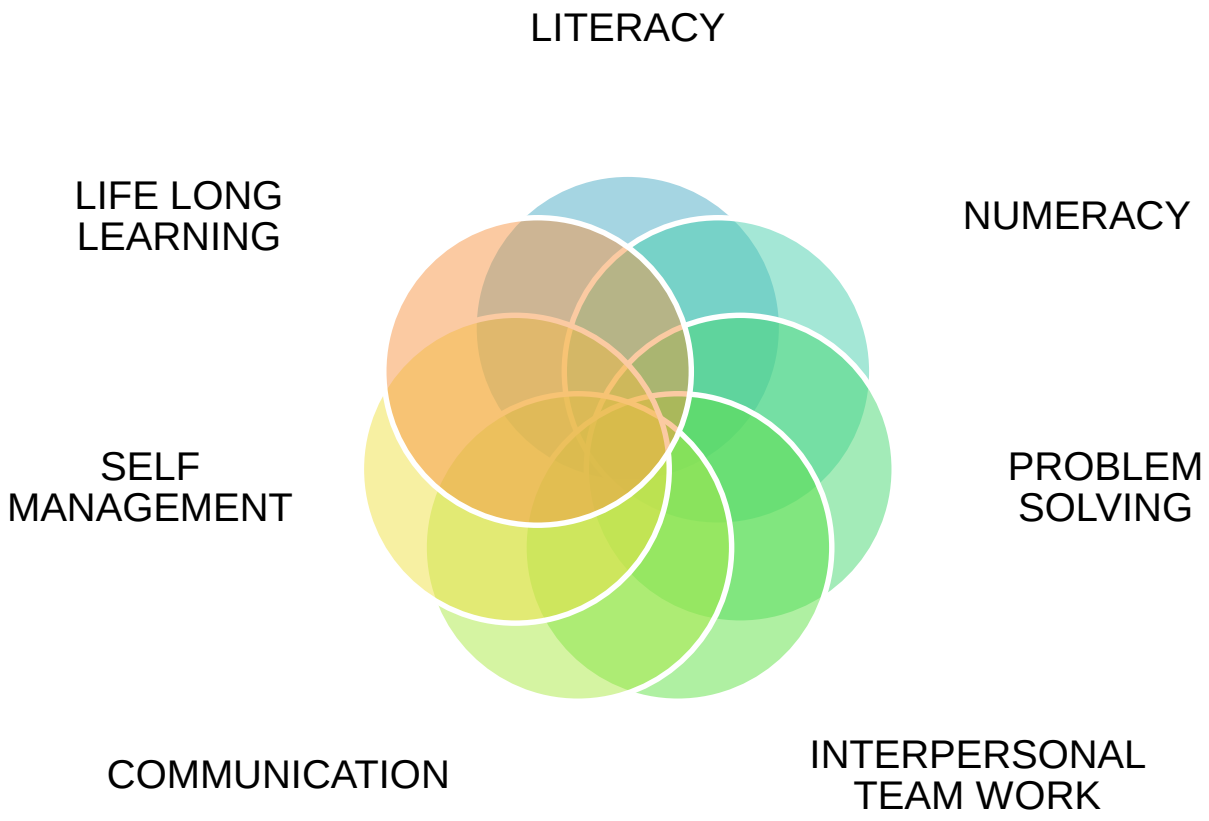
Duke-NUS Graduate Medical School Singapore

Learning Objective

- 1. Learning about science of Learning
- 2. Learn the rules of learning
- 3. Learn application to training

SEVEN CORE SKILLS FOR THE NEW WORLD



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LITERACY

- *"understanding, evaluating, using and engaging with written texts to participate in society, to achieve one's goals, and to develop one's knowledge and potential"* (OECD, 2012b).
- "literacy" is a broader construct than "reading," narrowly understood as a set of strategies for decoding written text

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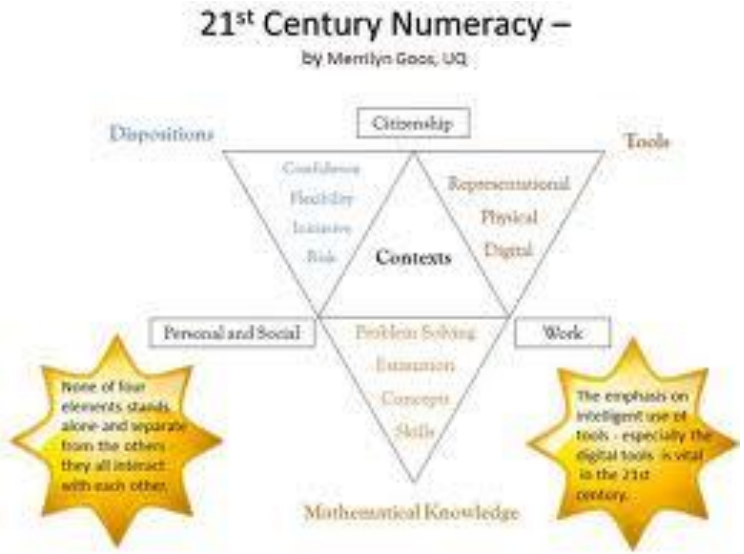
NUMERACY

- *"the ability to access, use, interpret and communicate mathematical information and ideas, in order to engage in and manage the mathematical demands of a range of situations in adult life"* (OECD, 2012b).
- "numerate behavior," which involves managing a situation or solving a problem in a real context by responding to mathematical information and content represented in multiple ways



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NUMERACY

- numeracy comprises both cognitive elements (i.e., various knowledge bases and skills) as well as noncognitive or semicognitive elements (i.e., attitudes, beliefs, habits of mind, and other dispositions) which together shape a person's numerate behavior

Science of counting numbers

- Intraparietal sulcus
- Animals to humans
- Dyscalculia
- Can you retrain ?

PROBLEM SOLVING

- problem solving in technology-rich environments is defined as "*using digital technology, communication tools and networks to acquire and evaluate information, communicate with others and perform practical tasks.*"

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Insight

- Insight versus deliberate
- strong activation in a brain area called the anterior cingulate cortex. widen or narrow their attention — say, when they filter out distractions to concentrate on a difficult task, like listening for a voice in a noisy room. ? insight puzzle-solving, the brain seems to widen its attention, in effect making itself more open to distraction, to weaker connections..

TEAM WORK

- the capacity to relate to others and work cooperatively.
- Core skill in the labor market

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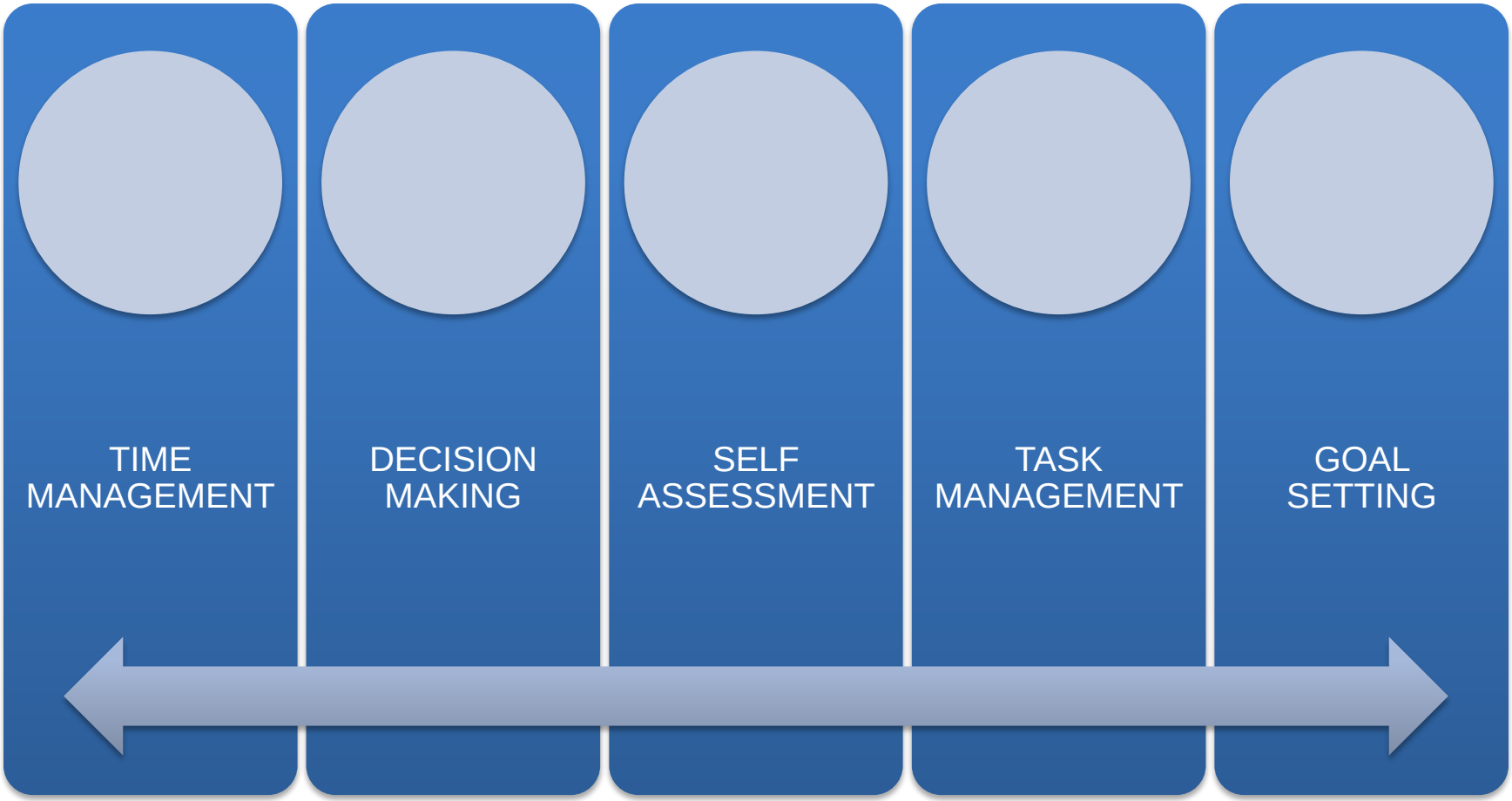
COMMUNICATION

- Effective communication is much more than being able to talk; it is also the ability to listen and understand others, to “read” and interpret body language and to know the best ways to get points across.

SELF MANAGEMENT



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LIFELONG LEARNING

- Heutagogy on *learning how to learn*,
- HABIT INQUISITIVE CREATIVE SELF DIRECTED LEARNING
- KEY FOR WORK PLACE GROWTH

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Lectures do not work

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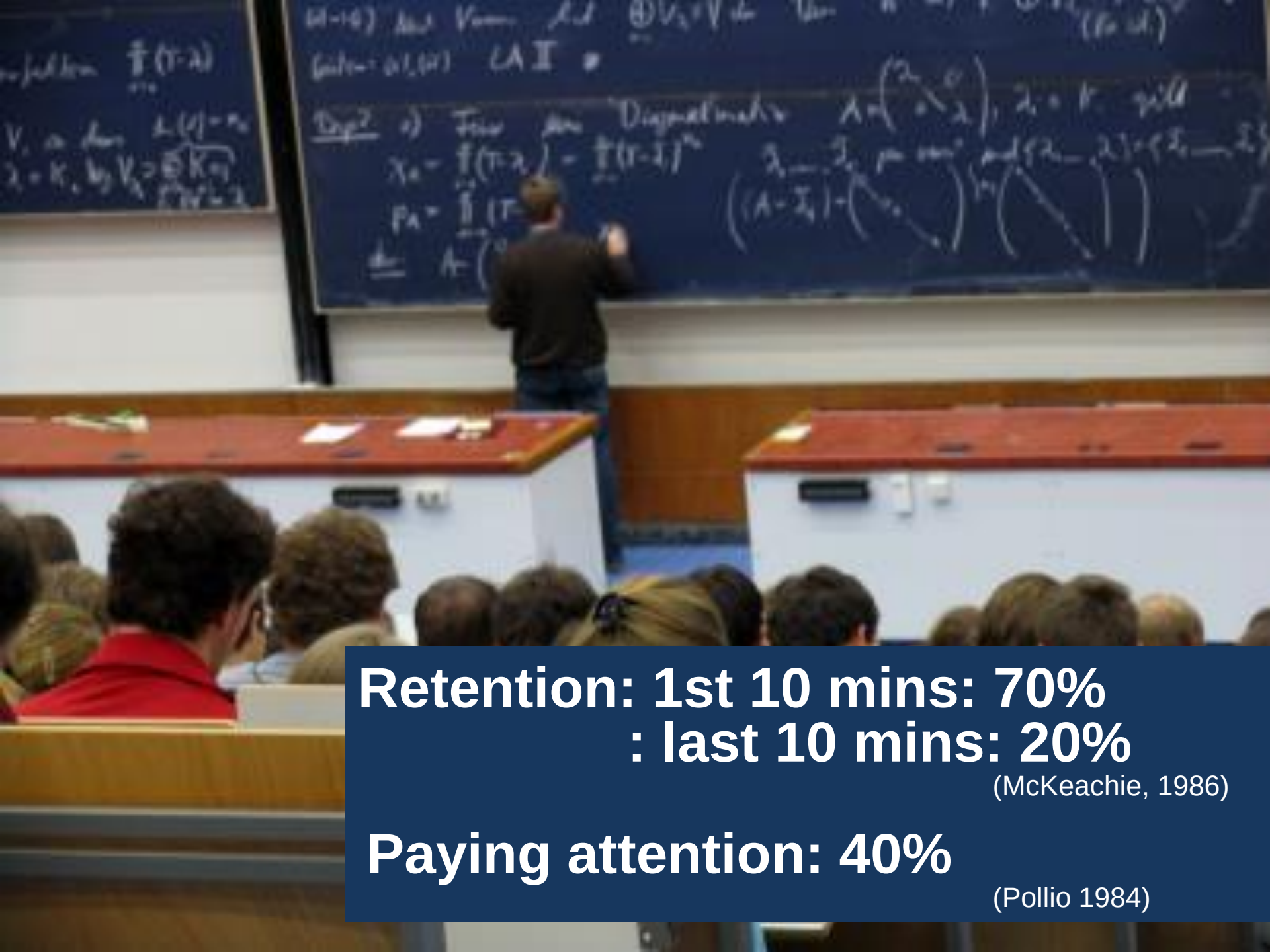
Twenty terrible reasons for lecturing



Retention: 1st 10 mins: 70%
: last 10 mins: 20%

(McKeachie, 1986)

Paying attention: 40%

(Pollio 1984)


HOUSE
FOX.COM / HOUSE


HISTORY

15,000-17,000 medical journals!!!

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Motivation is the beginning

- A=ABILITY
- B=BENEFIT
- C-CONFIDENCE
- D=DESIRE
- WITHOUT THESE THERE IS NO MOTIVATION

INTRINSIC MOTIVATION

- RATS WILL CROSS ELECTRICAL GRID TO EXPLORE
- MONKEY WILL PLAY WITH NEW OBJECT THAN EAT
- SO NOVELTY IS KEY BUT IT IS INTRINISIC

The science

- Rats Nissen cross electrical grid to explore
- Monkeys Harlow play with objects and explore without reward
- Berlyne epistemic curiosity
- curiosity obeys an inverted U-shaped curve, so that we’re most curious when we know a little about a subject (our curiosity has been piqued) but not too much

Curiosity

- The participants were presented with a selected trivia question and while they waited for the answer to pop up on the screen, they were shown a picture of a neutral, unrelated face.
- Afterwards, they performed a surprise recognition memory test for the presented faces.
- As expected, when people were highly curious to find out the answer to a question, they were better at learning that information.

Dopamine reward curiosity

- question was first asked, subjects showed a substantial increase in brain activity in three separate areas: the left caudate, the prefrontal cortex and the parahippocampal gyri.
- Caudate reward
- Dopamine mechanism
- intrinsic motivation – curiosity – affects memory," Gruber neuron

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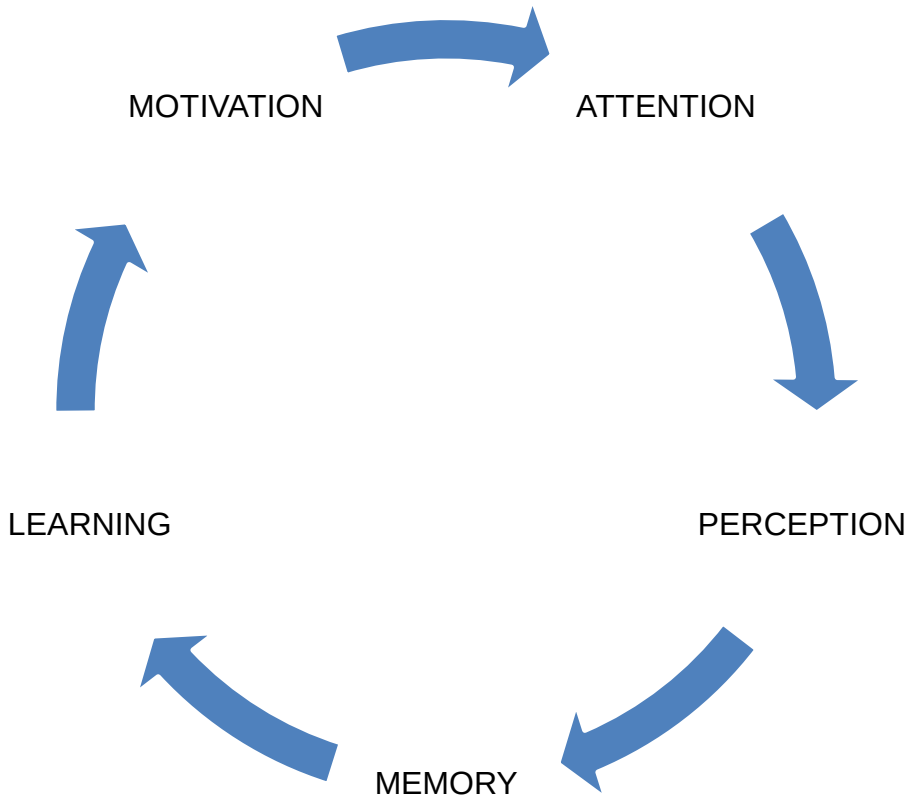
ATTENTION



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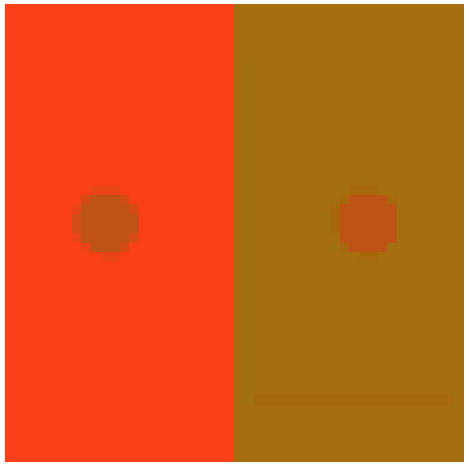
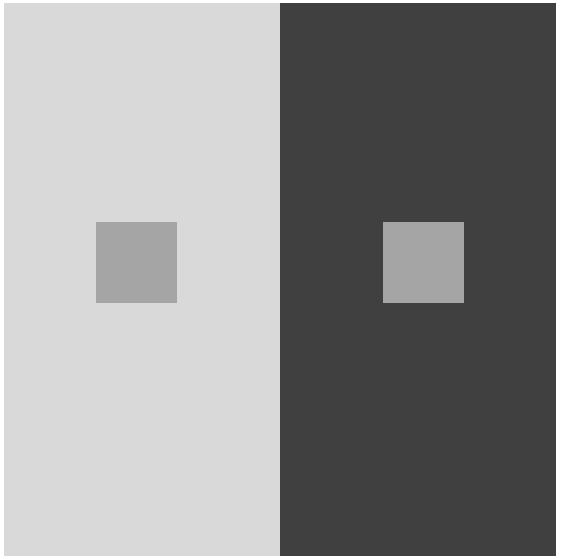
PERCEPTION

- What we see is not what it is
- https://youtu.be/AEgfMmmIjPY





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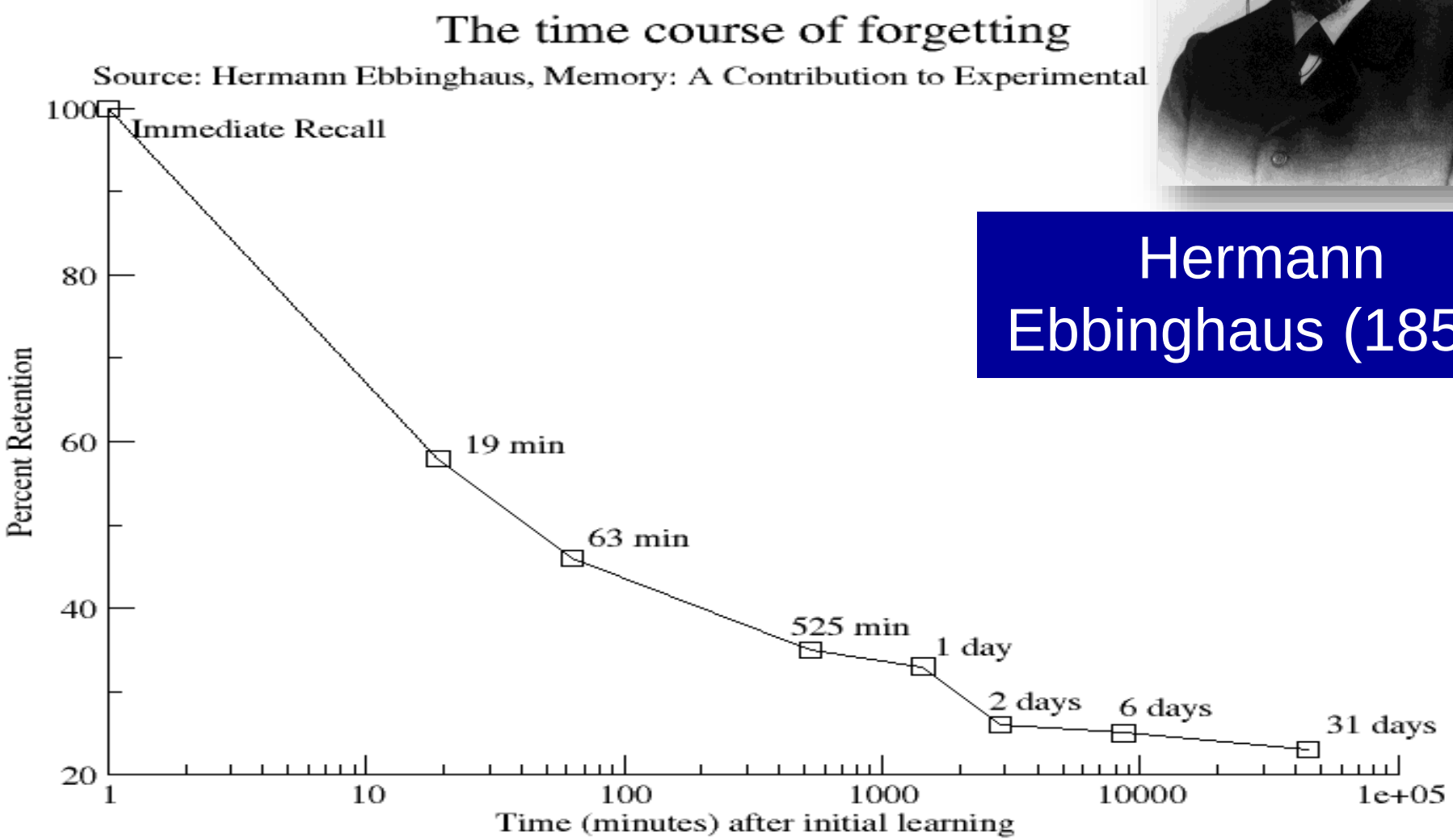
Forgetting – What we have known since the 1860's

Hermann Ebbinghaus (1850-



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Rules for learning

What works

RULE #1 Goals

- **Set the right goals in the right way for the right time period**
- **Set your own goals that are specific, concrete and measurable**
- **Set specific goals that is near term not in the distant future**
- **Start with goals that are realistic and achievable at the beginning**
- **Stretch goals and make them more difficult as skills develop**

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Rules #2

- **SMART GOALS:**
- A very popular approach to goal setting is SMART.
- The acronym is
- **S=Specific**
- **M=Measurable**
- **A=Achievable**
- **R=Relevant**
- **T= Time limited.**

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Just right

- Goldilocks rule, not too hard, not too easy but just right".

Science

- If- then sequence and goal setting prefrontal top down control to bottom up cue based activation
- EEG and FMRI studies Golwitzer

All training

- Setting explicit goals are key
- Goals give direction
- Measure achievement towards goal.
- SMART goals can be built

Rule #2: Organize yourself

- To meet goals and develop a sustainable learning cycle requires self-discipline and organization self-regulation.
- The first is being aware of one's thoughts and behaviour (Self-observation or self-monitoring)
- Self-judgement is to use the self-monitoring to ask how they are performing, whether they are falling behind, whether the effort that they are using is sufficient etc

Organize

- Self-reaction is when they adjust their actions based on self-judgement. So for example, if the goal is not realistic then revising their goal.

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RULE #3: Repetition rules and Practice makes perfect

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In contrast to restudy, initial testing that contributed to future memory success was associated with engagement of several regions including the anterior hippocampus, lateral temporal cortices, and medial prefrontalcortex (PFC). Additionally, testing enhanced hippocampal connectivity with ventro-lateral PFC and midline regions. These findings indicate that the testing effect may be contingent on processes that are typically thought to support memory success at encoding

Cabeza 2013 Neuropsycholgia

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RULE #4: It is not just simple repetition but planned thoughtful and deliberate practice.

- Practice more of what you know less well or have trouble with
- If the learning can be simulated use that approach as much as possible

Counterintuitive training

- This is maybe obvious but there is usually a tendency to go towards what you are comfortable with rather than deal with what you are not so good at.
- Working on weakness is more important than reinforcing strength

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Rule #5 Recall is better than rereading

RULE # 6: SPACE YOUR LEARNING

- **If you want to remember for just a short while cram. If you want to remember for a long time space the interval between learning sessions.**
- **Longer intervals are better for long term retention**

Spaced learning science

- fMRI study, participants were scanned while intentionally memorizing 120 novel faces, half under the massed learning condition and the other half under the spaced learning. Successful face memory encoding associated with stronger activation in the bilateral fusiform gyrus, which showed a significant repetition suppression effect modulated by subsequent memory status and spaced learning. spaced learning significantly reduced repetition suppression. Gui Xue, Leilei Mei and Qi Dong 2011

Counterintuitive Training

- This is counterintuitive but cramming leads to short retention
- 10 to 30% rule of spacing for retention

RULE #7 INTERLEAVING

- Switch topics when learning
- Switch problems when learning
- Switch all the time

Holistic training

- This means the whole rather than parts
- The focus is on the whole rather than a component

Rule #8 Tips to remember

- **Mnemonics tools to remember facts. Words, rhymes, or a phrase**
- **Remember by linking (associate what you need to remember with what you know especially if it is memorable, ridiculous or funny**
- **Using a hook or peg to connect numbers to memory**

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RULE#9 Test Yourself:

- Testing yourself keeps you engaged that in turn means more repetition. But the best test are those that make you sue the information nd extend yourself. Think about where else what you learnt could apply.

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Rule # 10. Use more than one way of learning visual , sound multimedia

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Rule #11 Learning with concepts:

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Rule # 12: Learn with friends: **Peer learning**

The big Rule

- **The major rule of learning:**
- Curiosity based exploration drives experience dependent learning. Learn by remaining curious, discover, experience explore the world.

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HIGHLIGHTING ‘HIGHLIGHTING’:

Highlight selectively and as little as possible after understanding the material

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SUM IT UP:

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New Instructional Strategy:

TeamLEAD

(Learn, Engage, Apply, Develop)

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Voice Annotated Presentations

- Editable, “Update-able”
- Different Versions possible
- Review of lectures for Quality
  - Open Community (Wikipedia)
- User:
  - ability to search for specific topic
  - “Just in time” education

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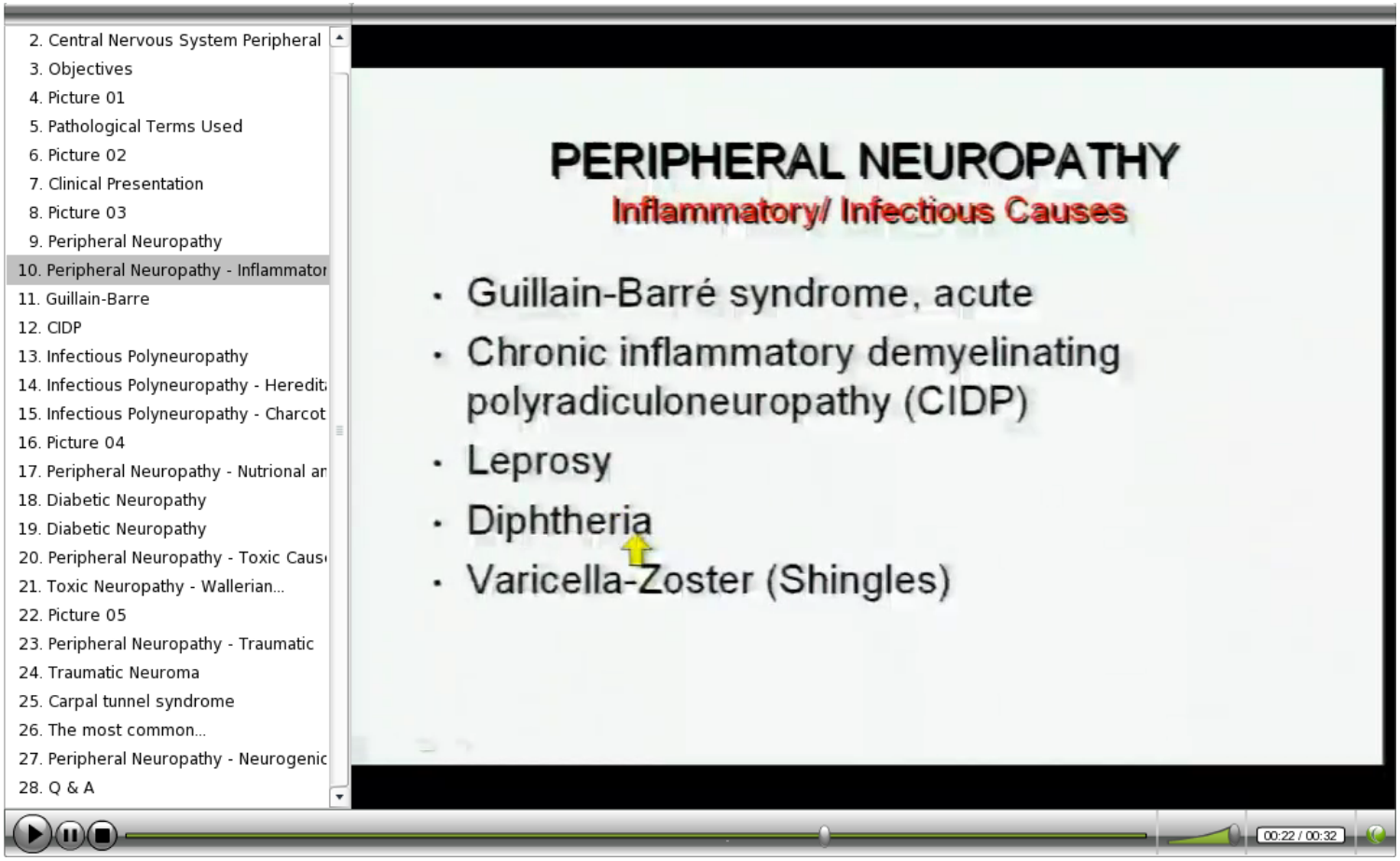
Scenario #2

Random access to slides of interest



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Prototype Annotated PPT Database

GATEWAY to learning

For those with a mismatch in delivery-learning rates, we offer Voice Annotated Presentations (VAPs), a Browse and Learn resource player list of voice annotated slides of a presentation.

Sharing medical knowledge with the world: Curiosity @ Work

Username

Password

Log in

Register | Forgot Password

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HOME

"This website is best view with Google Chrome browser. To download Google Chrome browser, please click on this link"

Browse and Learn

- Modules
  - Learning in Ten
  - MCI
  - About TeamLEAD
  - About Duke-NUS
  - Principles of Clinical Research
  - About VAP Technology
  - Great Learning Resources
  - Partners
  - MD
  - Clinical Concepts
  - Residency Training
  - Assessment
  - Mood and Behavior
  - Quantitative Medicine Forum
  - Biostatistics Forum
  - Residency Research Program

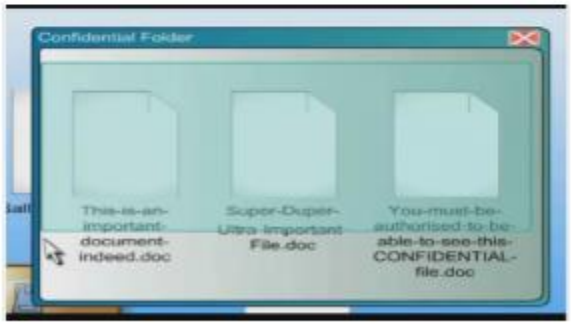
Search

Search results

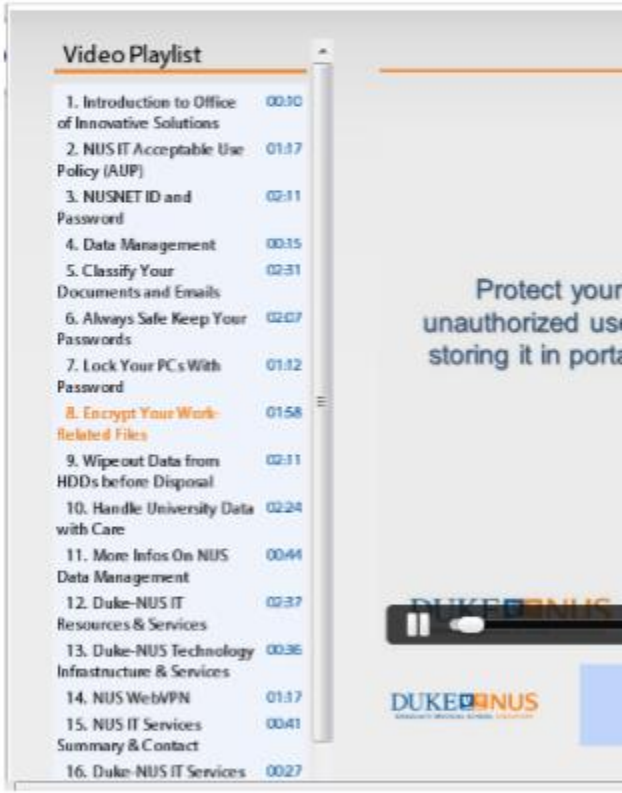
VAP HTML5

PowerPoint slides

Lecture



Video processing



MATH

Algebra

Conceptual videos and worked examples from basic algebra through algebra 2. Includes videos from the former algebra worked examples playlists.

Community Questions

Introduction to algebra

54 ★ 15

Videos exploring why algebra was developed and how it helps us explain our world.

Linear equations

89 ★ 19

Linear inequalities

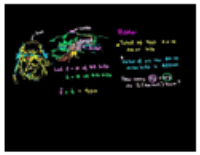
27 ★ 5

Exploring a world where both sides aren't equal anymore!

Graphing and analyzing linear functions

94 ★ 35

Use the power of algebra to understand and interpret points and lines (something we typically do in geometry). This will include slope and the equation of a line.



Systems of equations and inequalities

75 ★ 24

Solving a system of equations or inequalities in two variables by elimination, substitution, and graphing.

Multiplying and factoring expressions

73 ★ 12

This topic will add a ton of tools to your algebraic toolbox. You'll be able to multiply any expression and learn to factor a bunch a well. This will allow you to solve a broad array of problems in algebra.

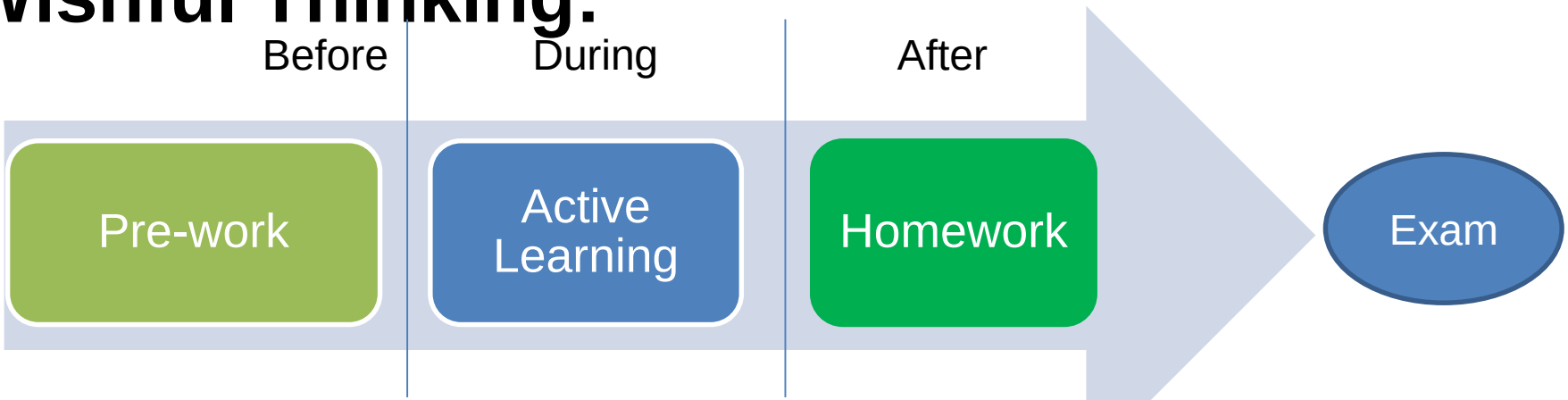
Quadratics functions and equations

47 ★ 13

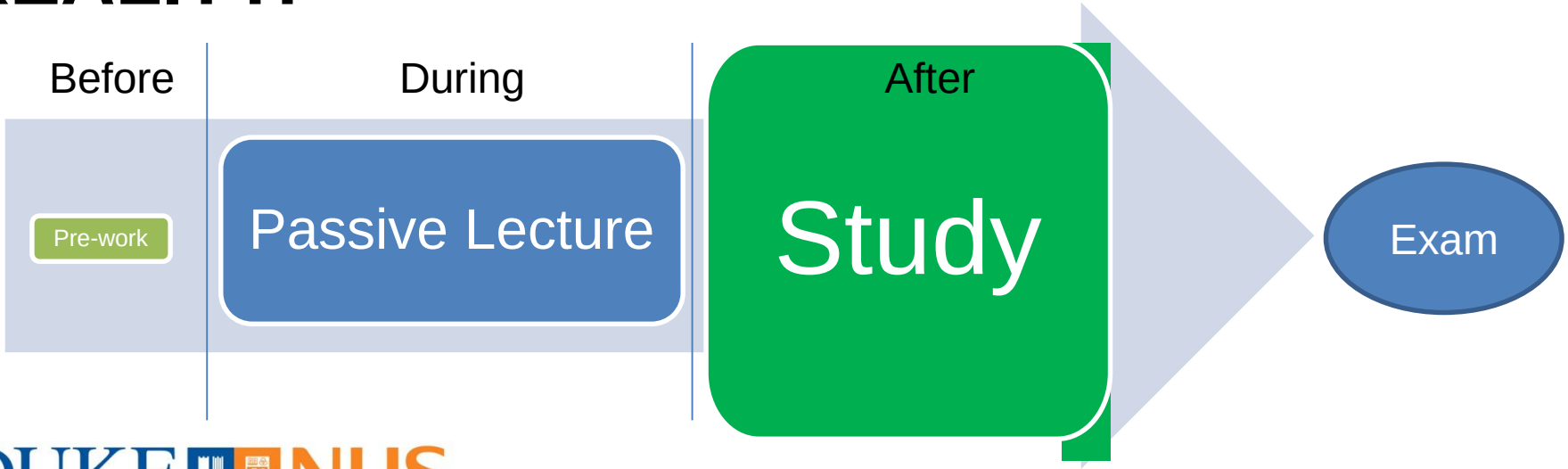
In this topic, we'll analyze, graph and solve quadratic equations.

TRADITIONAL

Wishful Thinking:



REALITY:



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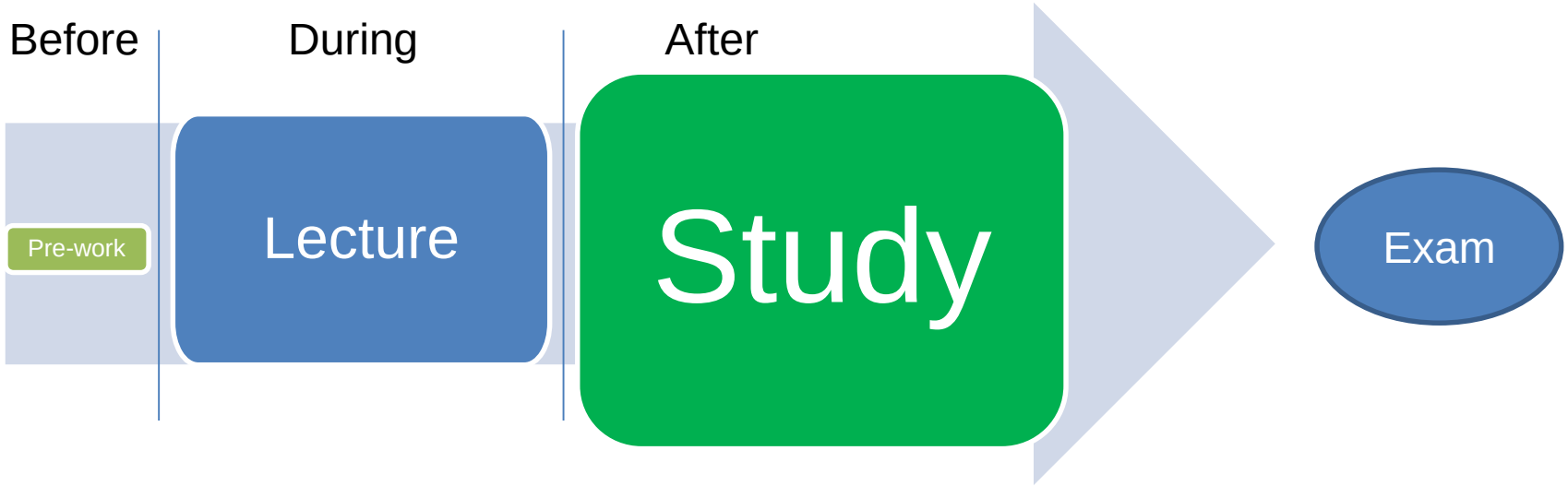
Traditional EAD: Reality:



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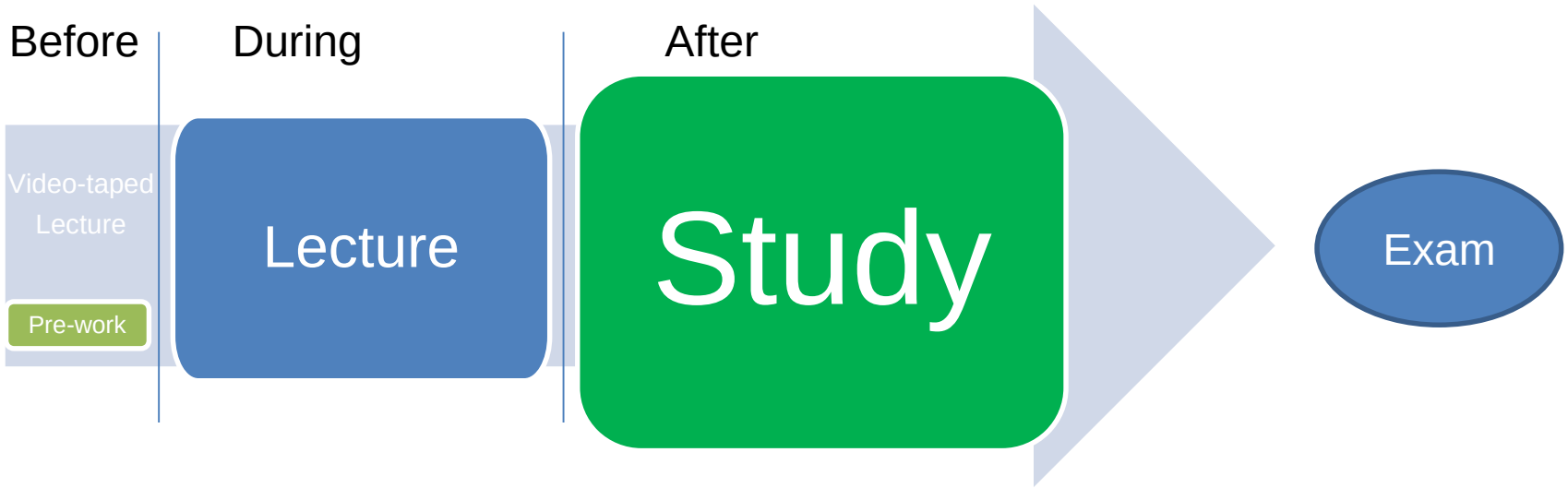
TeamLEAD:



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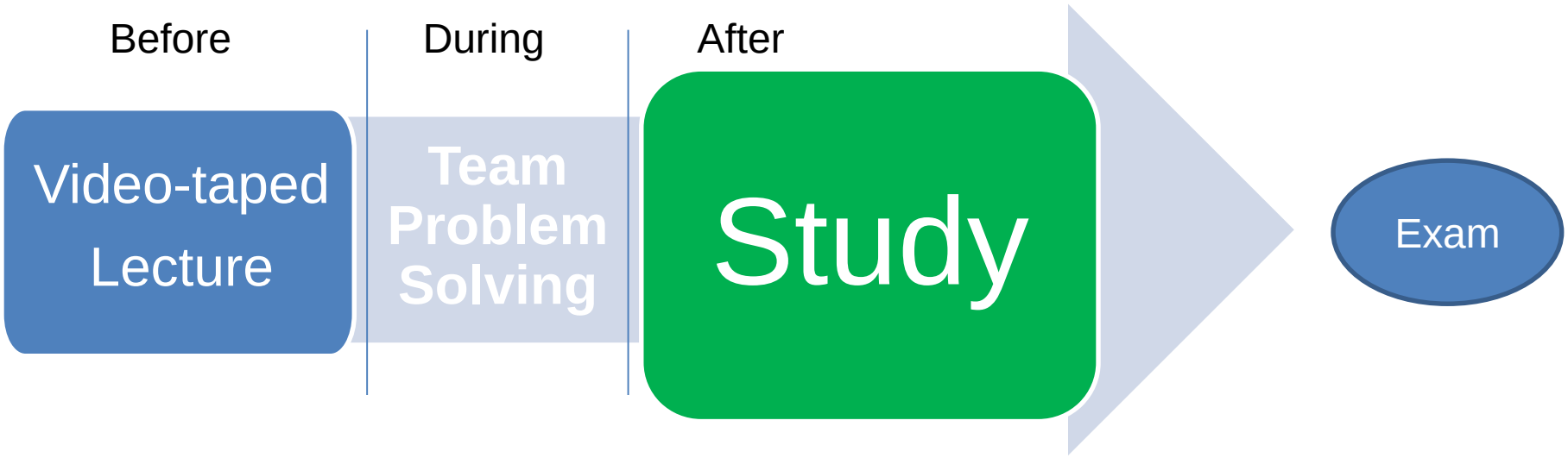

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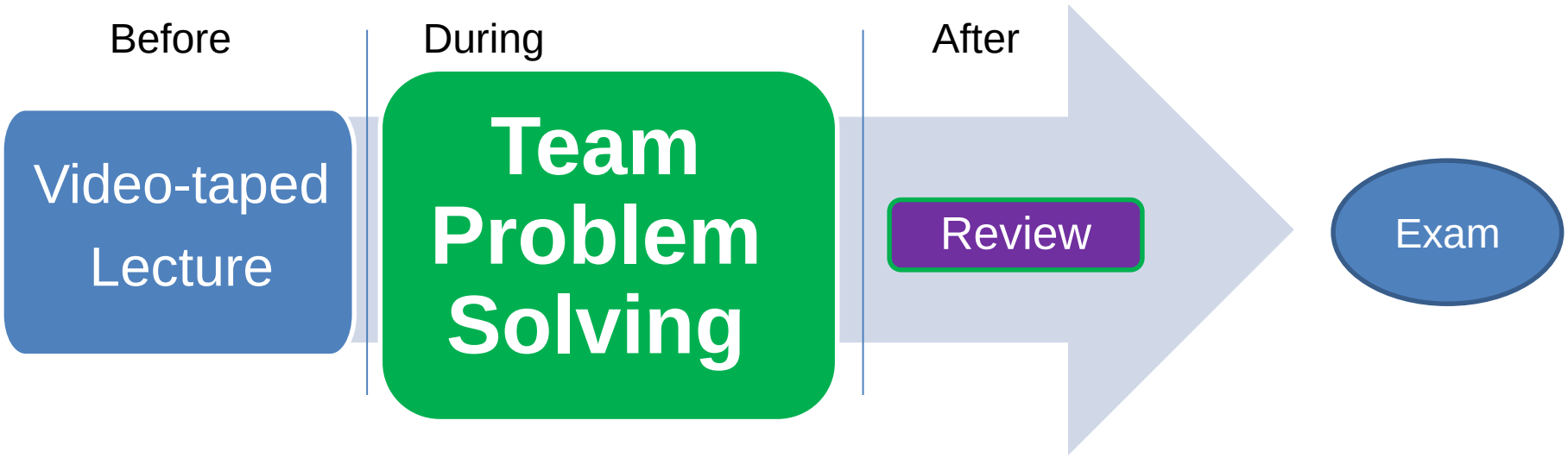
TeamLEAD:



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New Instructional Strategy:

TeamLEAD

(Learn, Engage, Apply, Develop)

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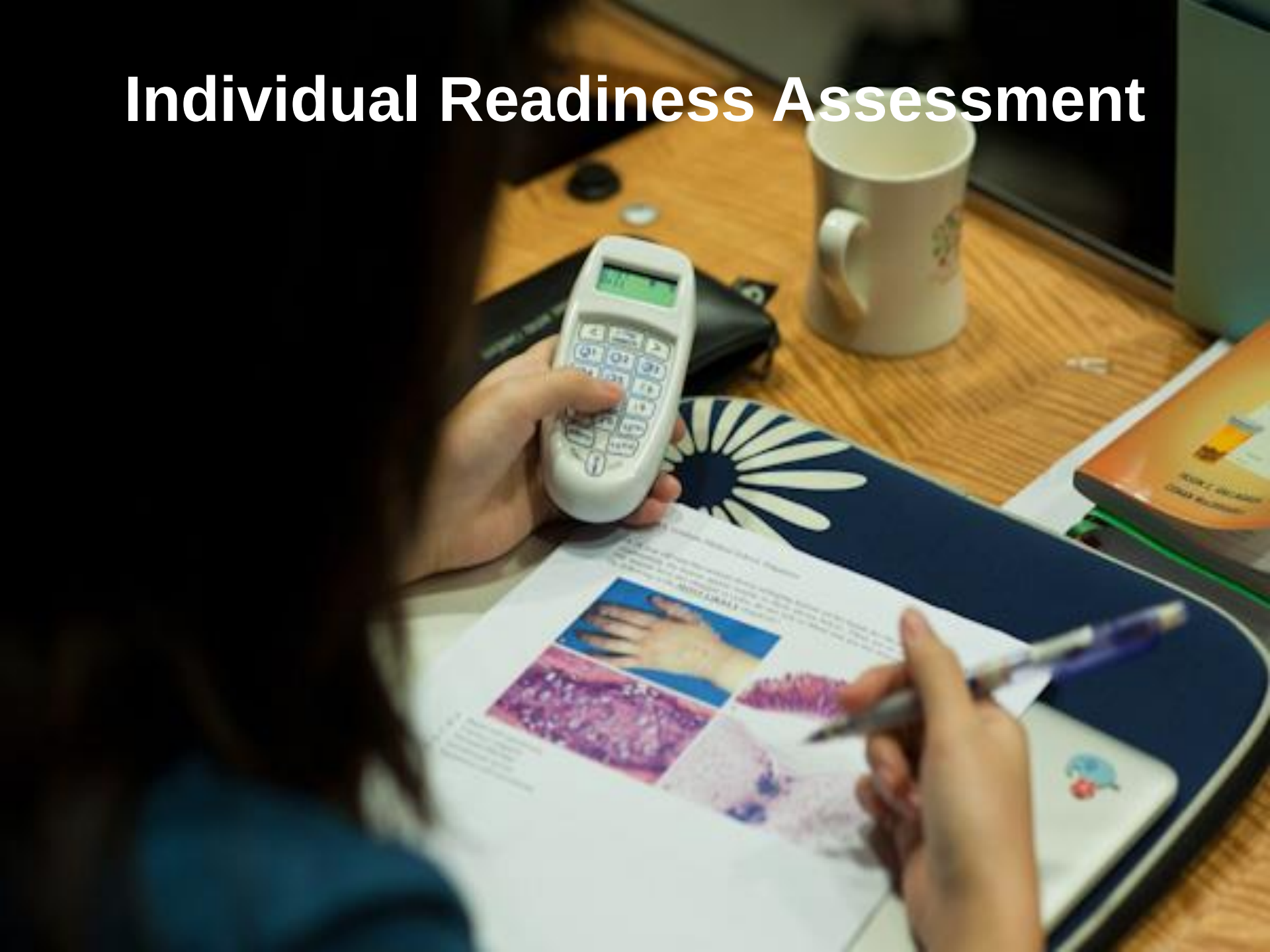
6/29/2009

Individual Readiness Assessment



Group Readiness Assessment

IF/AT forms


DUKE
LAM Shang Leen
Jason
GOH Choon Wang
Kenneth

Application Phase

The Future: Learning Organization

LITreviews
Learning In Ten

LIT reviews
Learning In Ten

Bite-sized, 10 minute audio visual vignettes / modules delivering variety of clinical topics


CHANGE
AHEAD

Ben Chams – Fotolia

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Partnership in Translating the Academic Medicine Vision

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SingHealth
Defining Tomorrow's Medicine

THANK YOU

Learning

- Learning to use data
- Learning to communicate
- Learning to “read people”
- Learning to apply what you learn
- Learning thru life
- Learning to learn

The Path to Innovation is Paved with Questions: Why, What, How, Where and What if?

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Spectra school experiment

- https://teamlead.duke-nus.edu.sg/vap_Duke-NUS/spectrasecschool/spectrass_openhouse/spectrass_openhouse-1.mp4
- https://www.youtube.com/watch?feature=player_embedded&v=oZp_TKF0RSQ