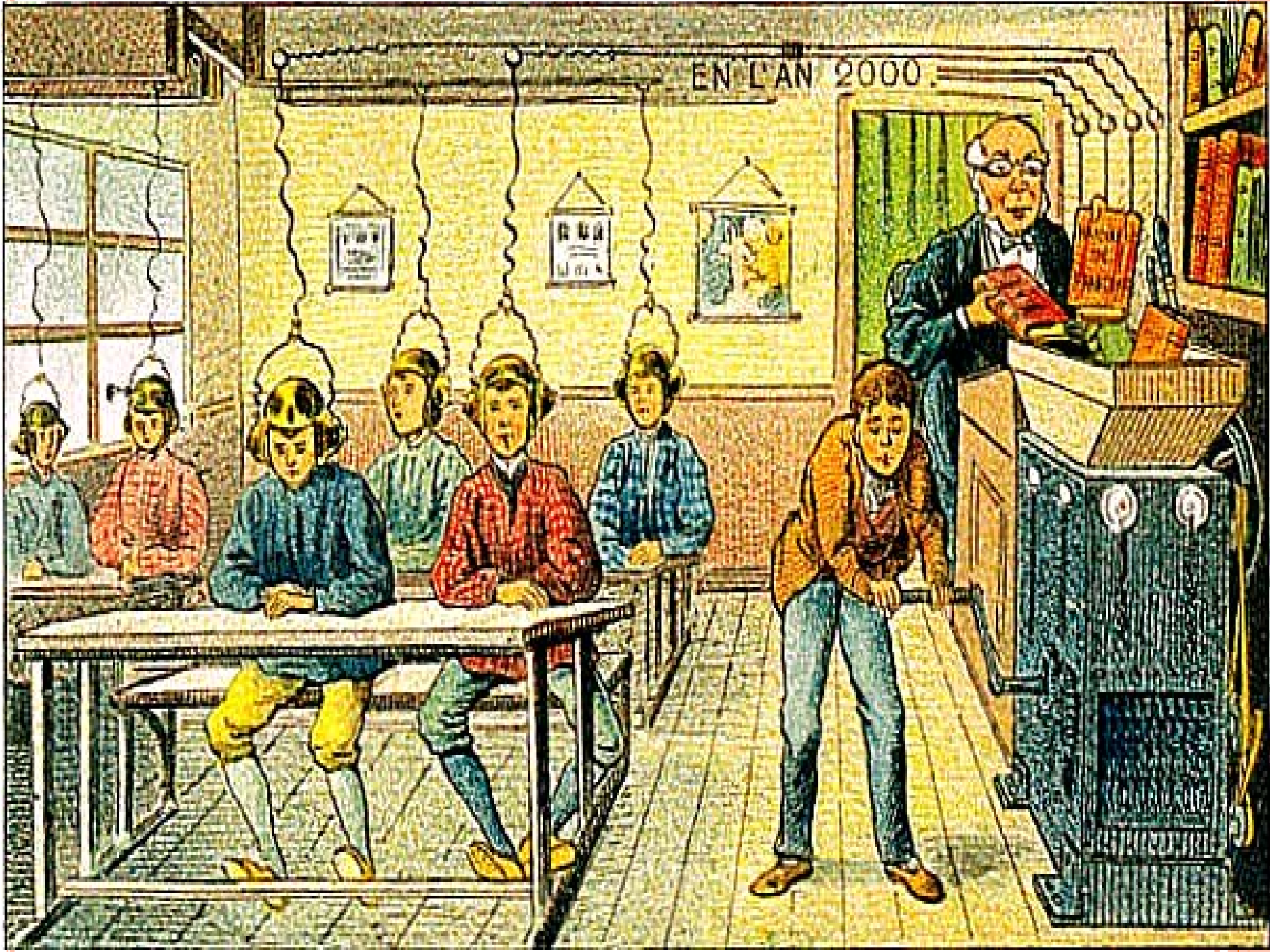
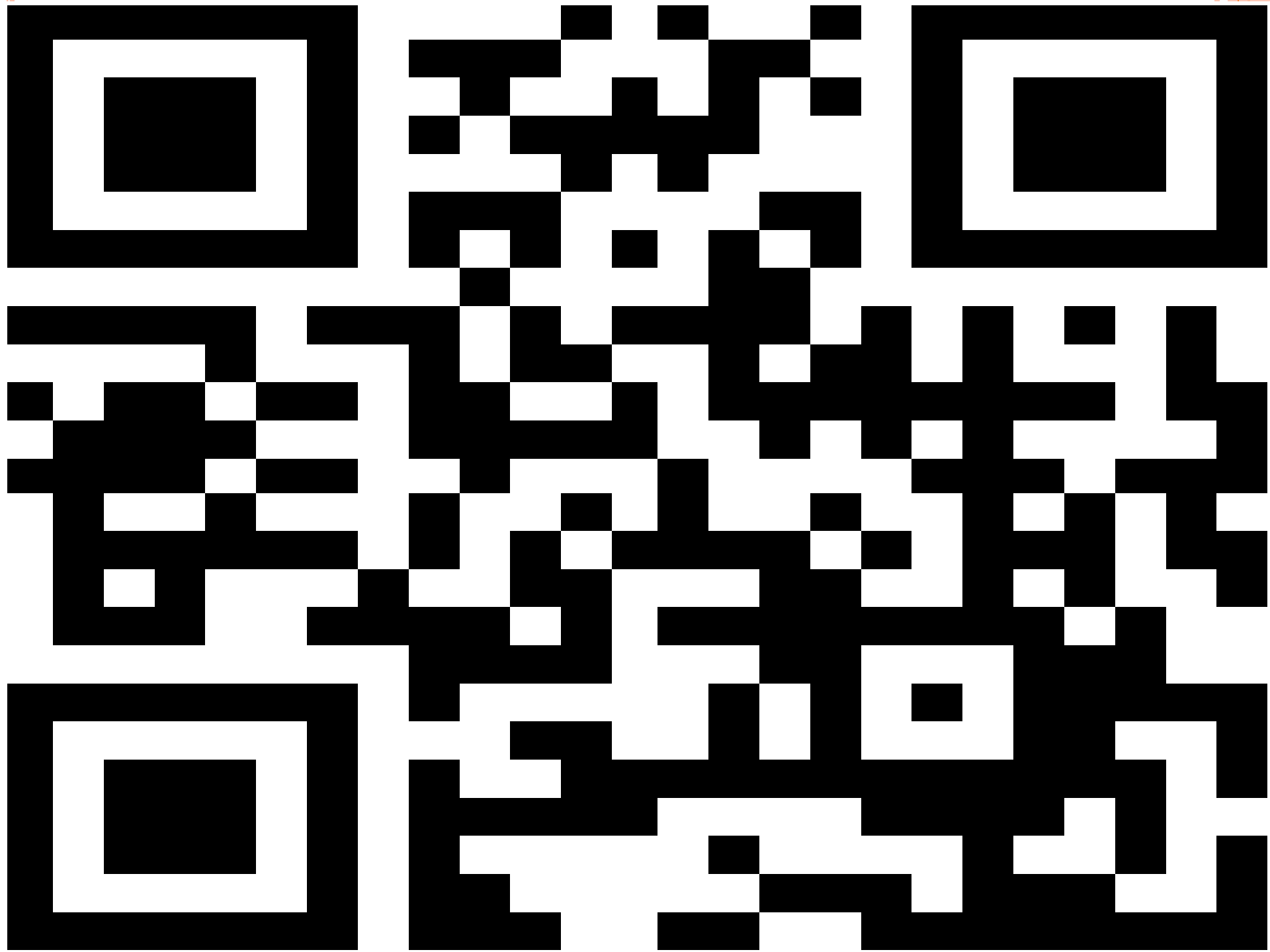


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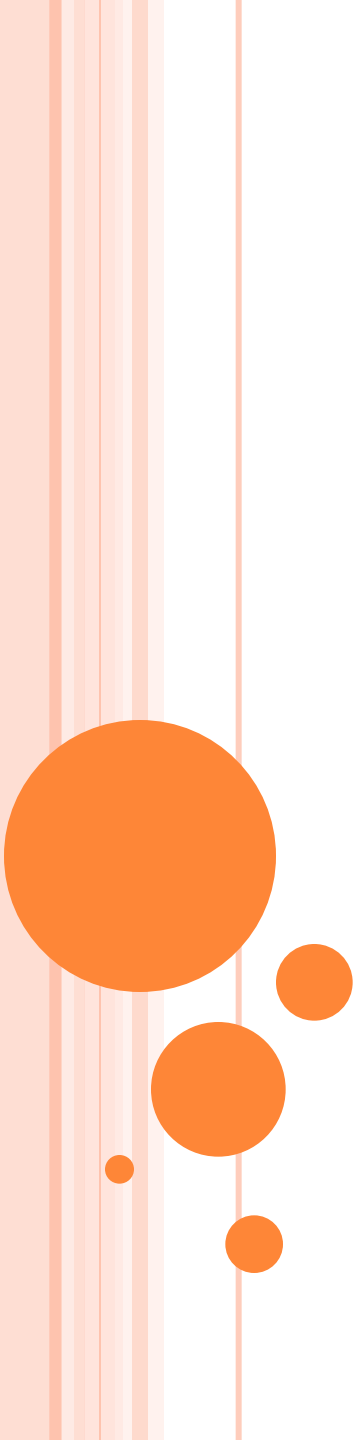




Rob Reilly

- Retired in June 2011
- Doctor of Education
- Visiting Scientist, MIT Media Lab
- President, IEEE Education Society (2011-12)
- Candidate for IEEE Board of Directors





**WHAT IS: PEDAGOGY,
EDUCATION, INTELLIGENCE,
KNOWLEDGE, LEARNING,
TEACHING, INFORMATION: WHY
DO WE CARE?**

Reilly's Rule

Teacher's can no longer just throw information, and facts at students and expect '*education*' to occur!



What do you do when a student is:

- being bored
- getting frustrated
- doing cognitive assessment

How do you recognize a student that is:

- being bored
- getting frustrated
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- Not an engineering project
- Not calculating the coefficient of sliding friction!

These are models for human-use
...to motivate humans!



The illiterate of the 21st century will not be those who cannot read and write, but those who cannot learn, unlearn, and relearn.

—*Alvin Toffler*



“ACQUIRE KNOWLEDGE...”

Over the past 10 years and over the previous century, we have seen mega change in, for example, transportation, medicine, and, communications!

What changes have there been in Education, in teaching pedagogy in the past 10 years, in previous centuries?





Function of education is independent from its delivery technology



‘CALL CENTER’ MODEL

“Any activity where we can digitize and decompose the value chain, [the decomposed activity] will get moved around the world.”

Thomas Friedman, *The World is Flat*



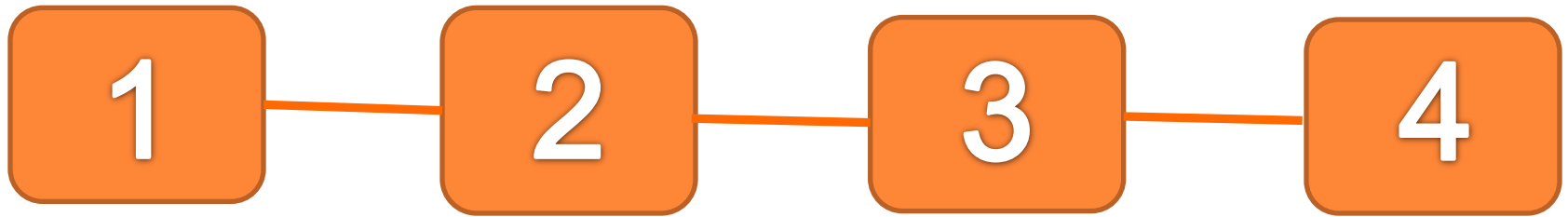
'CALL CENTER' MODEL

You can't digitize (or outsource) a **haircut** or a **meal** at a restaurant.

You can digitize (and outsource) reservations, appointments, financial records, tax preparation

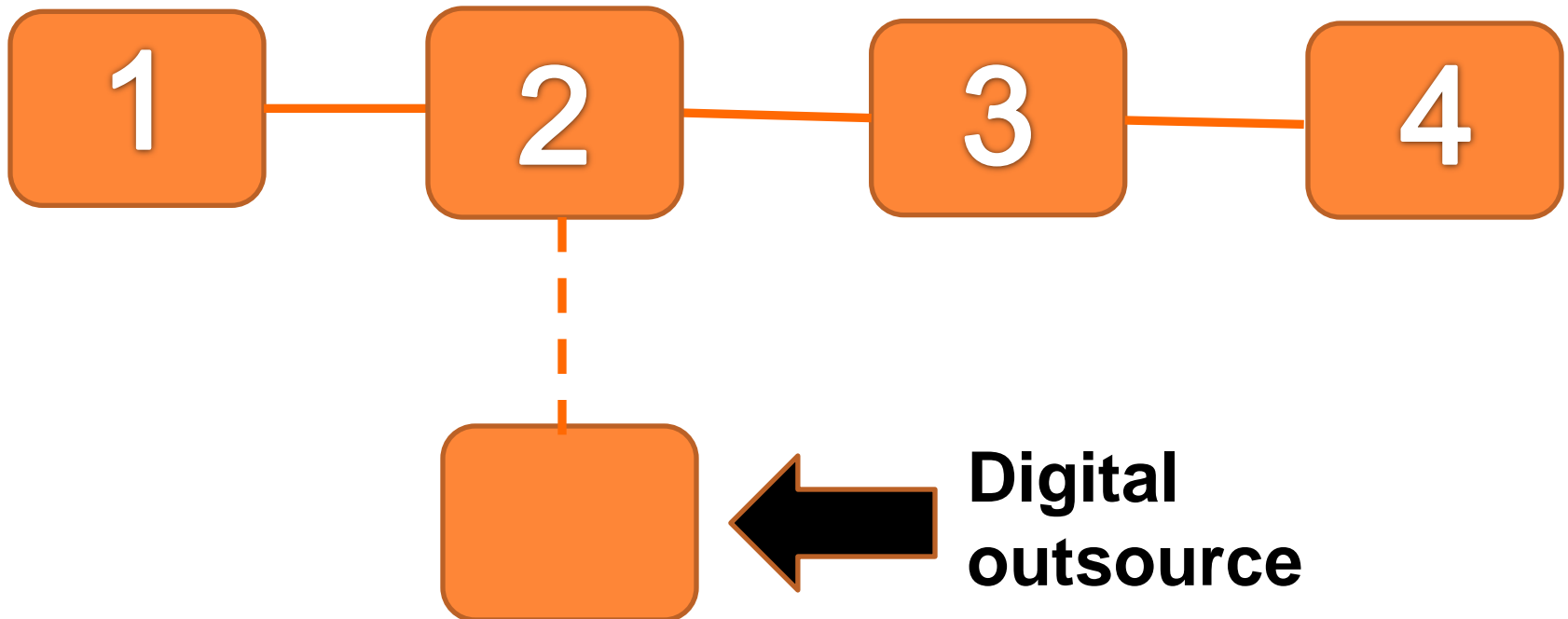


a Process



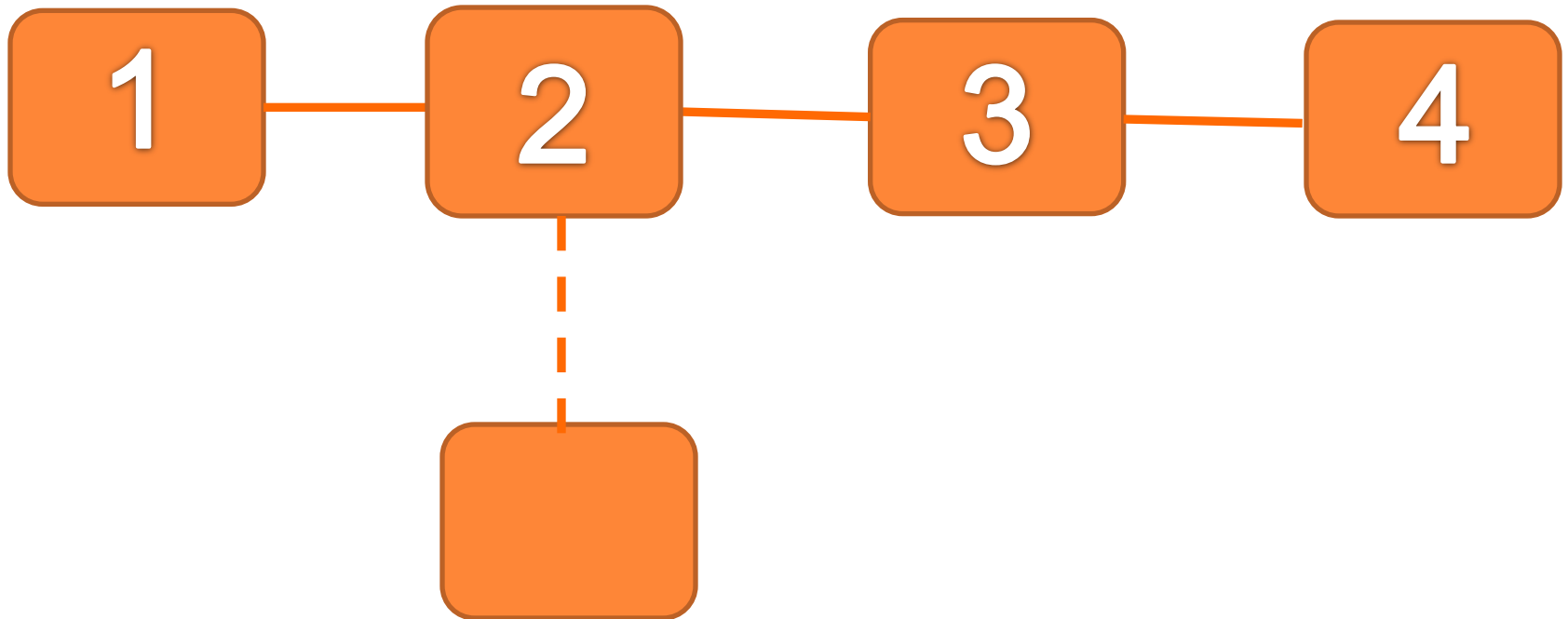
a Process – w/Call Centers

Much wider thinking



a Process –

w/Digital Outsourcing



‘DIGIT

Don’t
Educ

Char
be di



McDonald's drive-up configuration

- 2 order rows – 1 pickup row



MY HYPOTHESIS

The impact of technology involves understanding how we deliver the fruits of knowledge to a student.

- **Goal of Educational System:
Deliver a functional adult to
society.**
 - How to construct one



Language of Rules vs. Language of Functions

- People not equipped to meaningfully understand STEM (theory & function)
 - Brain areas not developed, not exercised,
 - build automobiles w/out building an automobile factory



Language of Rules vs. Language of Functions

- **K-3 develop brain pathways & areas**
- Not trying to build geniuses – everyone!
- **Need to accommodate increased ability of technology**



Language of Rules vs. Language of Functions

What is the cost of doing this?

- cost – not primary issue
- care about knowing what the brain capability actually is!
 - linear vs. non-linear
 - *walk and chew gum* – multi taskers

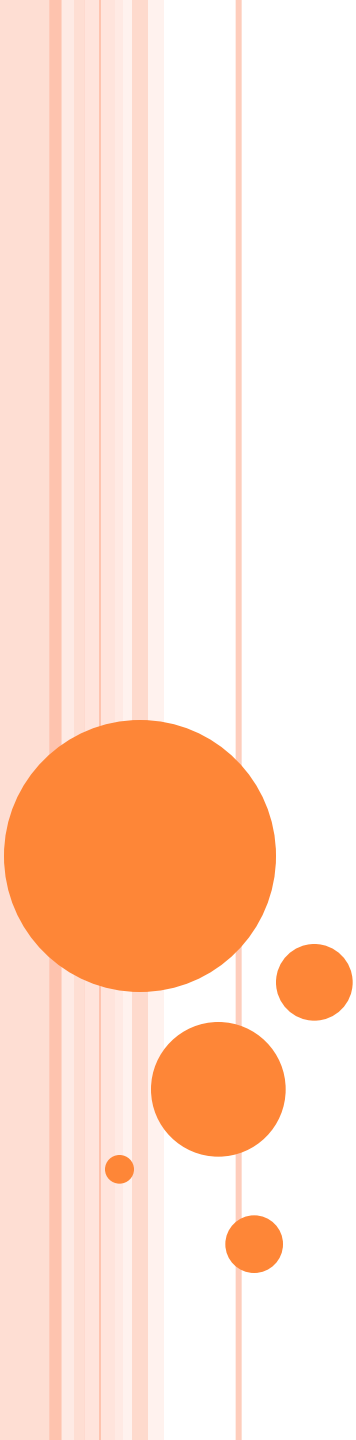


Language of Rules vs. Language of Functions

- Stuck with Language of Rules
- Need the Language of Function
- Evolve the Language of Education
 - Apply it to a model



BACK TO
BUSINESS



**WHAT IS: PEDAGOGY,
EDUCATION, INTELLIGENCE,
KNOWLEDGE, LEARNING,
TEACHING, INFORMATION: WHY
DO WE CARE?**

What is the **Language of Education**



WE MUST UNDERSTAND THE FUNCTION-OF AND RELATIONSHIP-OF:

- Intelligence
- Knowledge
- Wisdom
- Information
- Data
- Education
- Teaching/Learning
- Pedagogy

Disambiguate terms



WE MUST UNDERSTAND THE FUNCTION-OF AND RELATIONSHIP-OF:

- **Intelligence** → capability solve think



WE MUST UNDERSTAND THE FUNCTION-OF AND RELATIONSHIP-OF:

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- **Knowledge** → collection of beliefs, methods, ideas, models, facts, culturally neutral, assemble jigsaw



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KNOWLEDGE DOMAINS

○ **Rule-based** – INFORMATION

- learn the rule, you have the knowledge
 - reading, learn to speak a language, driving test

○ **Model-based** – UNDERLYING PROCESS

- recursion, deep learning, understand the model and be able to apply it
 - sciences, engineering



RULES!

1. YOU SHALL!
 2. YOU WILL!
 3. YOU MUST!
-
-

RULE BASED DOMAIN – JUKE BOXERS



Jukeboxers:

- park every song separate slot
- compartmentalizers
- most people store information like a Juke Box stores records -- separate compartments.
- adjacent records have little or nothing to do with each other.



memorize facts



rigidly adhere to rules

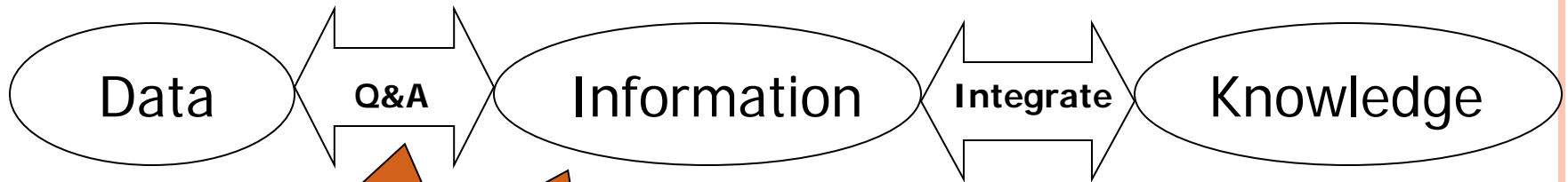


don't have unique solution



RULE-BASED LEARNING -- INFORMATION

a set of facts



Focus of modern
day education



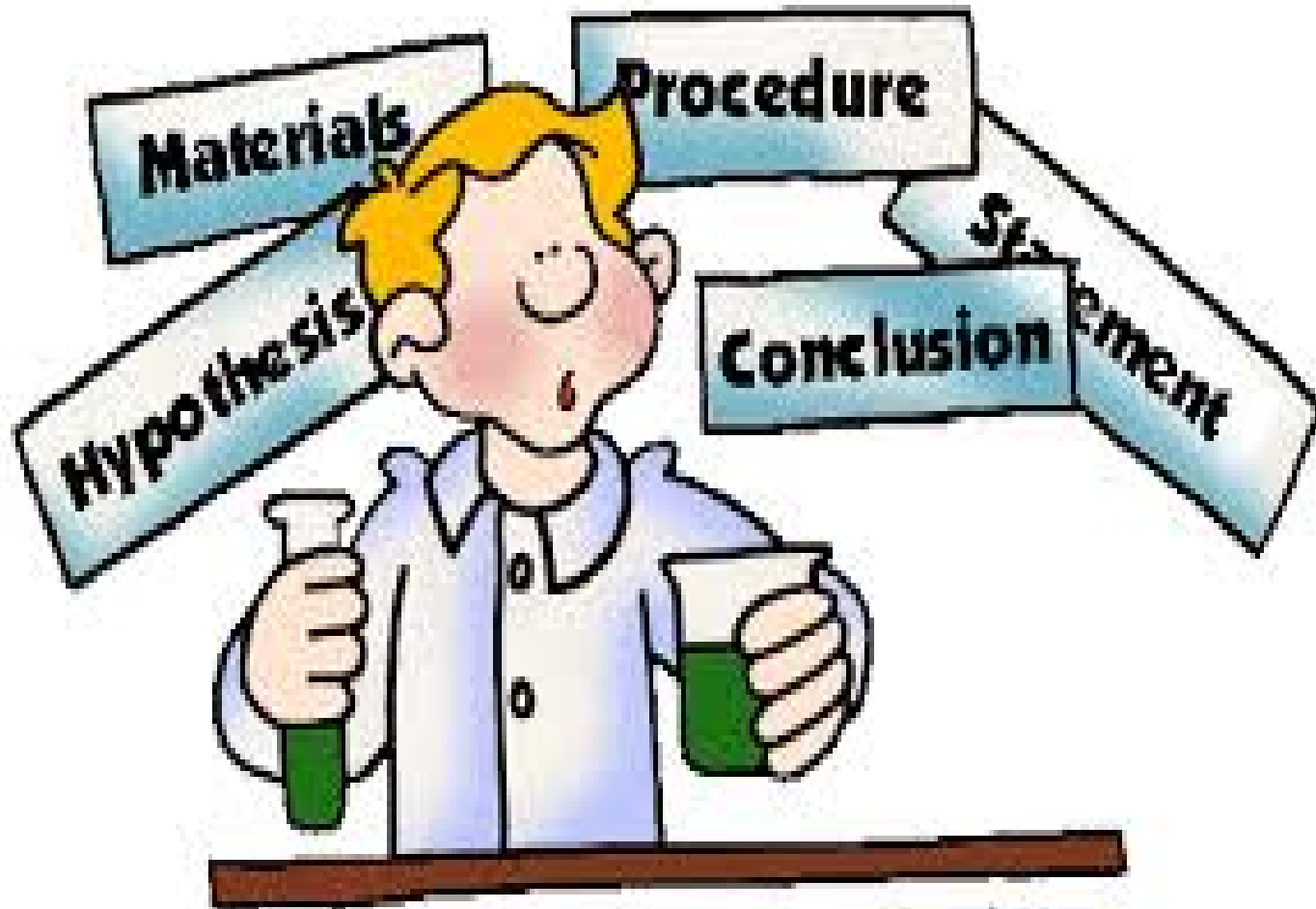
We Bring Excitement!



DANGER

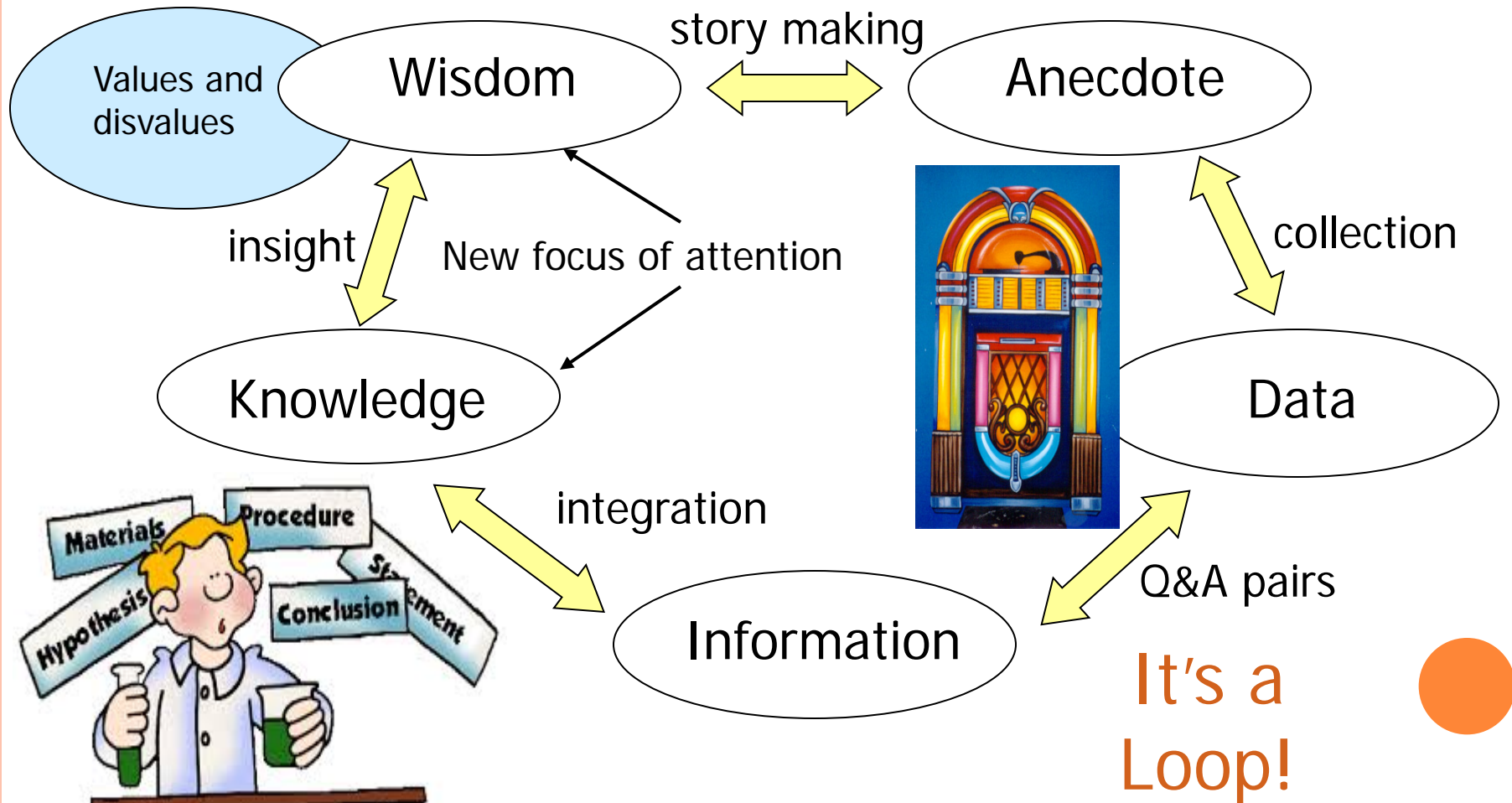
NO RULES

MODEL BASED REASONING



MODEL-BASED LEARNING – UNDERLYING PROCESS

theories with underlying models



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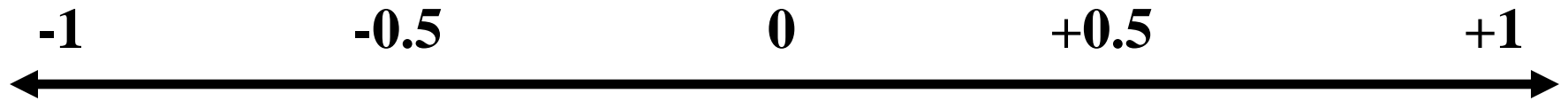
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Emotion Axes



anxiety worry discomfort comfort hopeful confident

ennui boredom indifference interest curiosity fascination

frustration confusion puzzlement insightful enlightened euphoric

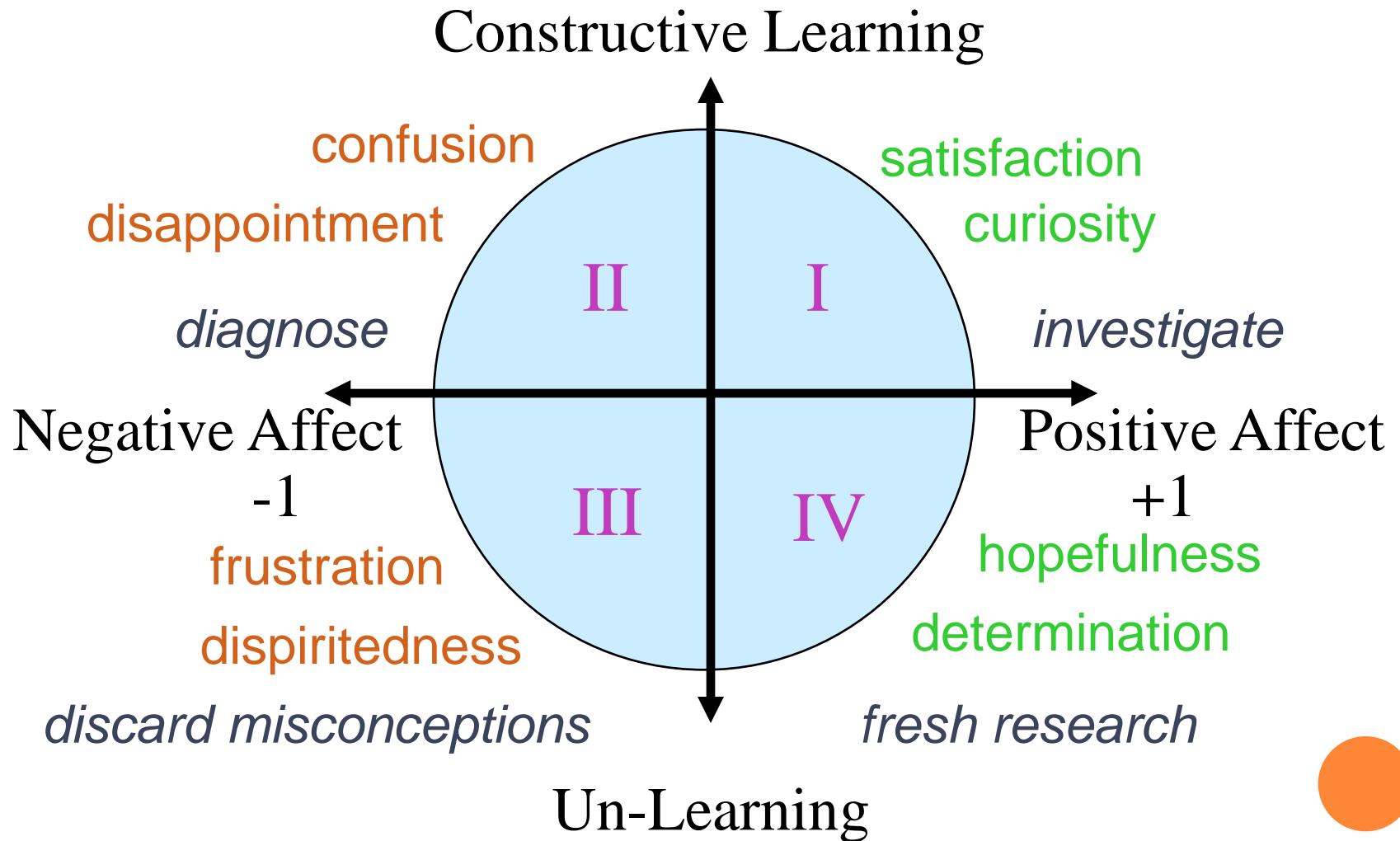
dispirited disillusioned dissatisfied wistful hopeful encouraged

terror dread apprehension calm enchanted enthralled awe

humiliation embarrassed chagrin content pleased prideful



Emotions and Learning Cycle





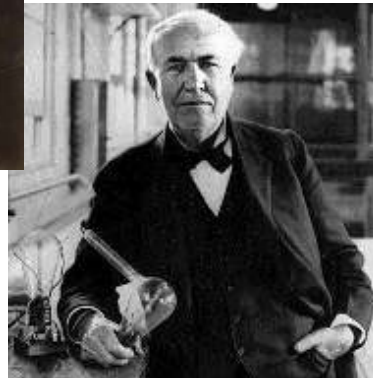
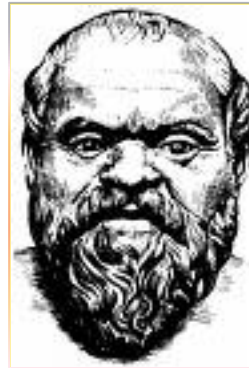
Life isn't about finding yourself.

Life is about
creating yourself.

Use what you are!



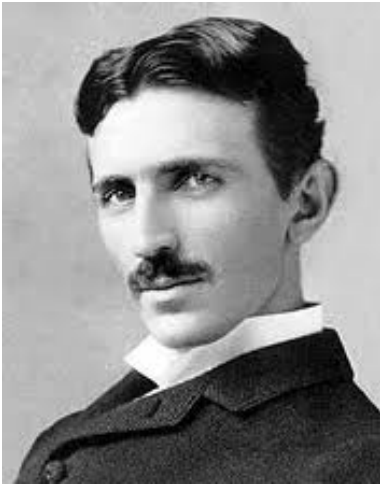
GREAT LEADERS OR GREAT VISIONARIES



**Prophet
Mohamed
(pbuh)**



Apply INFORMATION → KNOWLEDGE
→ WISDOM



What if we could broadcast high voltage electricity the same way radio is broadcast?

- Bankrupt some countries?
- Social changes?
- New businesses will develop?
- Old businesses will disappear?
- What else would occur?



Fred Charles Ikle

second revised edition, with a new preface

Every War Must End



Every War Must End

Fred Charles Ikle
(1971, 1991)



Thank you

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