

Teaching To Transform The Brain

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“The purpose of an educational institution is to lead the students, who initially believe the educational institution is there to educate them, to the realization that they must educate themselves.”

“They must ...learn how to learn
[integratively]...”

From Willis Hurst, MD, Medscape
[and Pelley]

Main Points Today

1. Students need to transform their brains from receiver role to producer role.
 - Receiving knowledge vs producing knowledge
2. The brain produces knowledge through thinking/learning “styles.”
 - Learning style can be developed like a skill
3. Developing learning style “skill” produces whole brain thinking.
 - Responsibility for learning lies with student

Getting In Touch With Your Thalamus

- Thalamus
 - base of brain
 - distributes all input to higher centers
- Talk with a neighbor (1 min) about how you do your best thinking:

Talk it out first or,
Think it through first

Low Gain vs. High Gain

- Talk it out – “low gain” thalamic activity; seeking more input
 - Extraversion
 - Lower cerebral blood flow, augmentation of “evoked response,” lower doses of sedatives
- Think it through – “high gain” thalamic activity; reducing input
 - Introversion
 - Higher cerebral blood flow, reduction of “evoked response,” higher doses of sedatives

What Is Personality?

- Consistent behavior
- The way we think (psychology)
- The way we are wired (anatomy/physiology)

What Is Personality - *Not*?

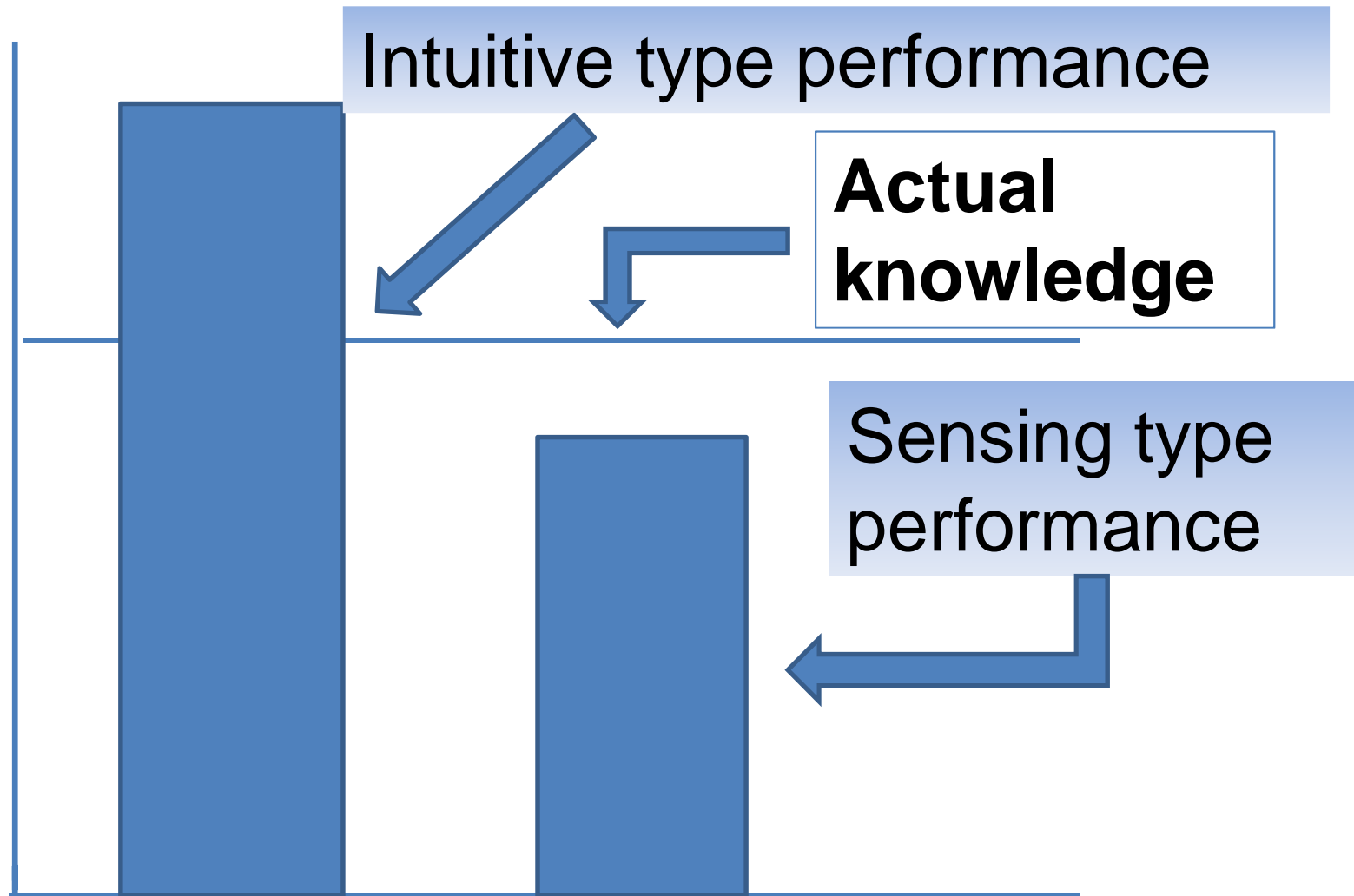
- Limitation – only a preference
- Stereotype – all types have positive description
- Intelligence – Insight into thinking only

At-Risk Syndrome Contained Clues

- Up until 2 am, reading and re-reading
- Harder study = harder reading
- Study effort \neq test performance
- Knew more than others who did better
- Test questions are tricky

Myers-Briggs Personality Types As A “Learning Style”

- Mental model for thinking process
- “Type” influences how you learn
- Affects academic performance
- Self awareness; important first step
- Also affects:
 - Communication skills
 - Choice of specialty



Knowledge vs. Performance

Myers-Briggs Personality Type

- Mental Model: Extraversion (E) vs. Introversion (I)*
Sensing (S) vs. Intuition (N)*
Thinking (T)* vs. Feeling (F)
Judging (J) vs. Perceiving (P)*

*Pelley's type

- Normal differences between people
- Persistent tendencies (choices)
 - Do not change once established
 - e.g. Folding your arms, throwing a ball, writing your name
- Comfort zone for thinking; requires less effort than the opposite
 - Use of opposite is a conscious effort

Sensing (S) vs. Intuition (N)

- What information do you give the *most* attention to?
- Sensing types give their attention to specifics
- Intuitive types give their attention to the big picture
- Everyone does both, but only *one* is preferred.

Test Taking Style

- N style
 - Rule out answer choices
 - Don't fit pattern
 - Big picture learning establishes patterns
- S style
 - Seek answer that matches memorized knowledge
 - Re-read question to stimulate recall
 - Memorization learning requires recognition

How Do Preferences Relate To Learning?

- Extraversion: Good at initiating
 - think out loud and then work alone
- Introversion: Good at reacting
 - work alone and then think out loud
- Sensing: Enjoy using what already learned
 - annoyed when part of learning left to imagination
- Intuition: Enjoy learning new things
 - bored when learning too explicit

How Do Preferences Relate To Learning?

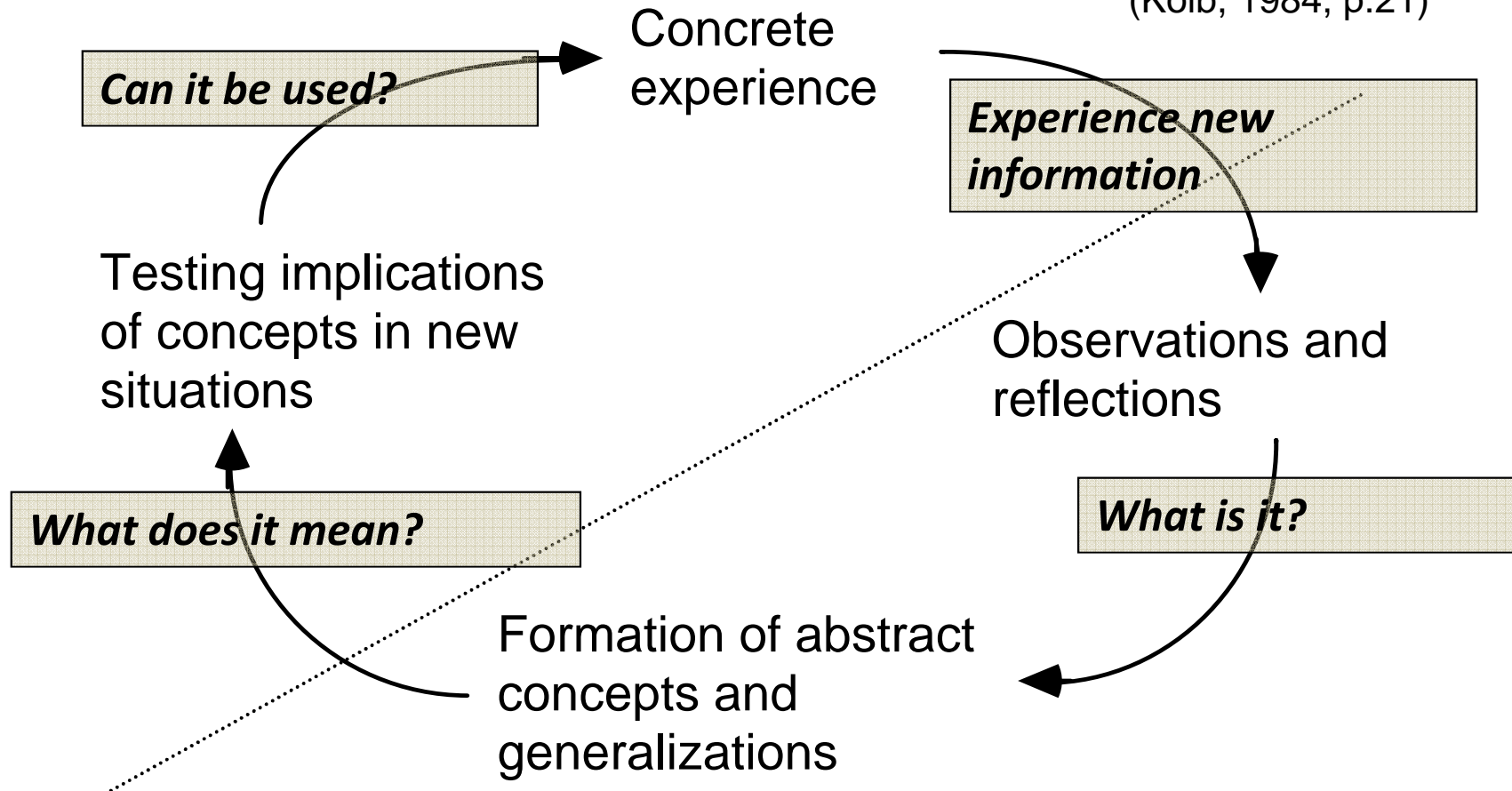
- Thinking: Learn best when given a clear and objective rationale
 - like receiving a critical analysis
- Feeling: Learn best when given personal encouragement
 - criticisms are often taken personally
- Judging: Value orderly use of information
 - complete tasks at expense of new information
- Perceiving: Value inquiry
 - postpone tasks to acquire more information

Transforming The Brain

- What does brain anatomy tell us about how we learn?
- How do we change our brains?

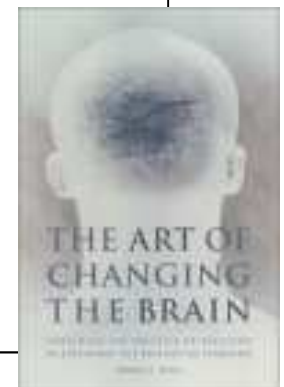
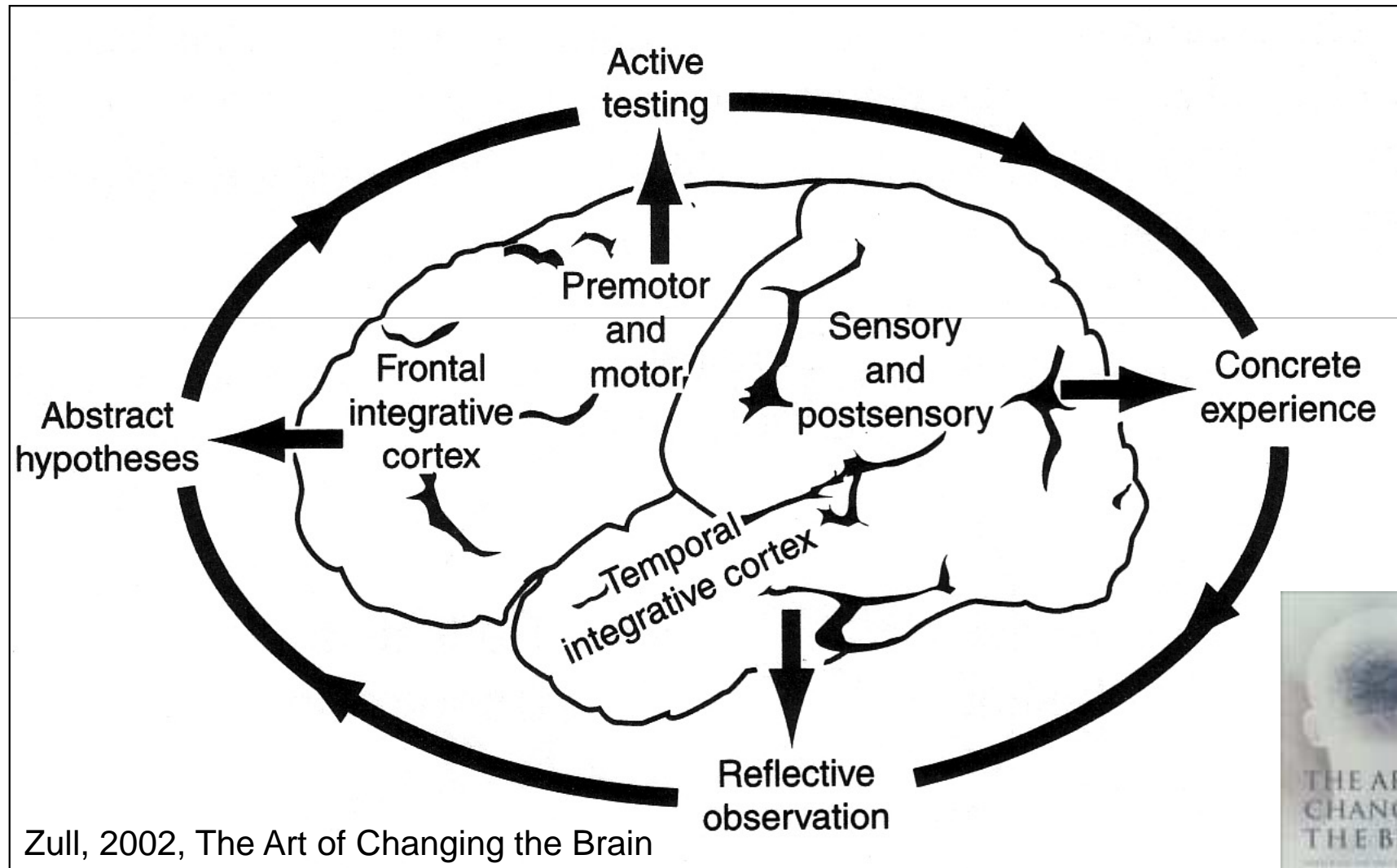
Experiential Learning Model

(Kolb, 1984, p.21)



The Learning Cycle

David Kolb adapted by Zull



Compilation of Kolb and Zull

- Kolb (1984) – Experiential Learning Model
 1. Concrete experience; sensory areas (what?)
 2. Reflective observation; temporal (so what?)
 3. Abstract Conceptualization; pre-frontal (now what?)
 4. Active Testing; motor areas (concept mapping, group discussion/problem solving)
- New knowledge is “produced” at step 4.

Learning Taxonomy (Quellmalz) And Types

Rote Thinking

1. Recall: Remember or recognize facts and concepts.
 - Preferred by sensing types; challenge to intuitive types
2. Analysis: Group by relationship, cause and effect, organize a hierarchy
 - Preferred by both sensing and intuitive types
3. Comparison: Explain differences and similarities.
 - Preferred by intuitive types; challenge to sensing types

Learning Taxonomy (Quellmalz) And Types

Higher Order Thinking

4. Inference: Draw logical conclusions inductively or deductively by choosing between possibilities.
 - Preferred by intuitive types; challenge to sensing types
5. Evaluation: Express and defend a decision or opinion; prioritize and predict
 - Preferred by intuitive types; challenge to sensing types

Which Areas Of The Brain Process Each Of The Following?

- Recall – Define hyperglycemia, ketoacidosis, glycosylation.
- Analysis – Give the characteristics of type 1 diabetes.
- Comparison – Explain how type 1 and type 2 diabetes are both similar and different.
- Inference – Justify your diagnosis of type 2 diabetes.
- Evaluation – Develop a treatment plan for a type 2 diabetic.

Back To The Future

- Temporal (back) processing looks at
 - Facts, grouping, learned patterns
 - Recall, Analysis
- Frontal (future) processing looks at
 - “Discovered” grouping, new patterns, inferences, evaluation of options
 - Analysis, Comparison, Inference, Evaluation

If You Build Pre-frontal Skills, Temporal Memory Will Come.

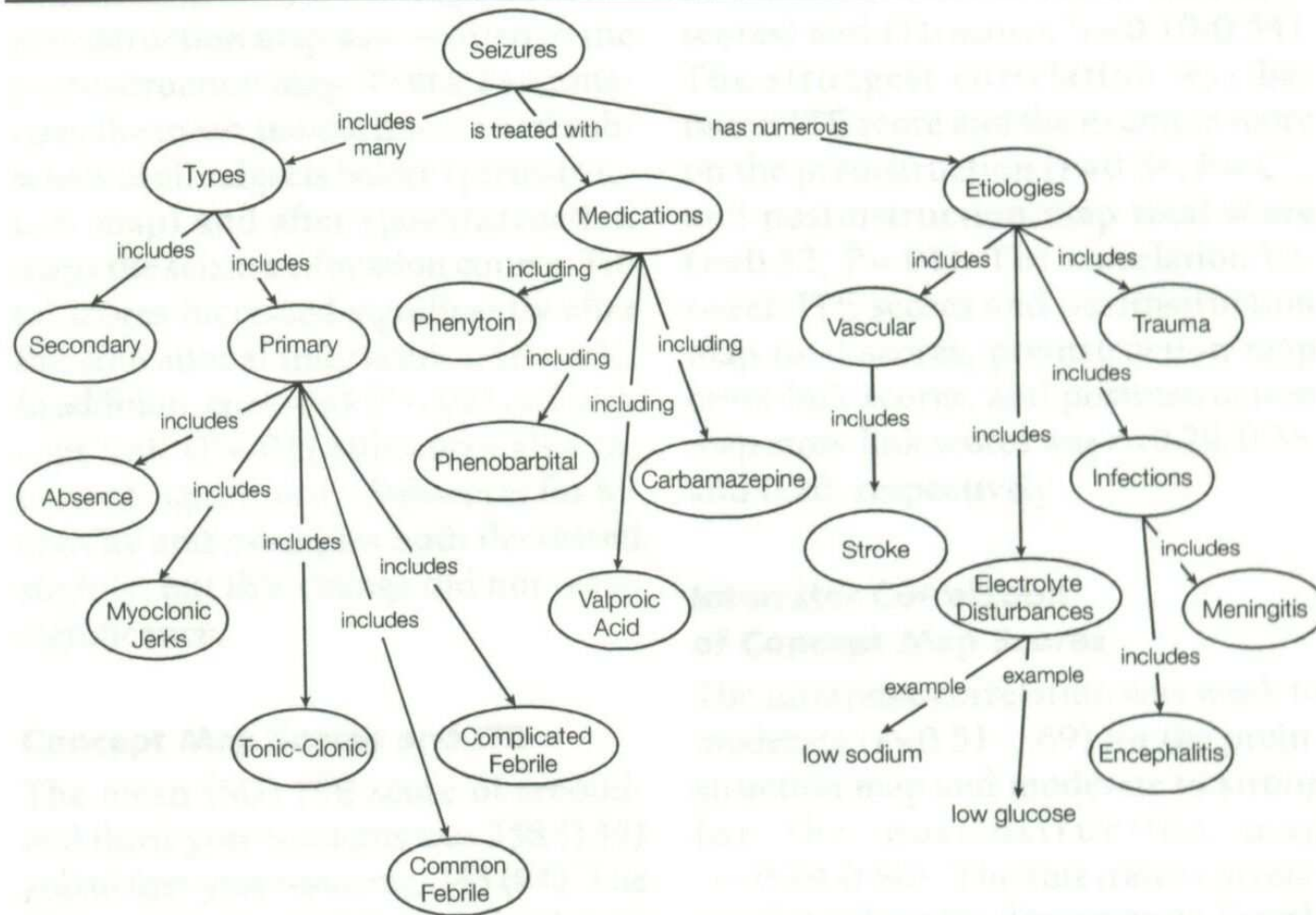
- Field of Dreams

- Back = fact memory
- Front = analytic skill memory
- Develop analytical skills, long-term memory will follow.

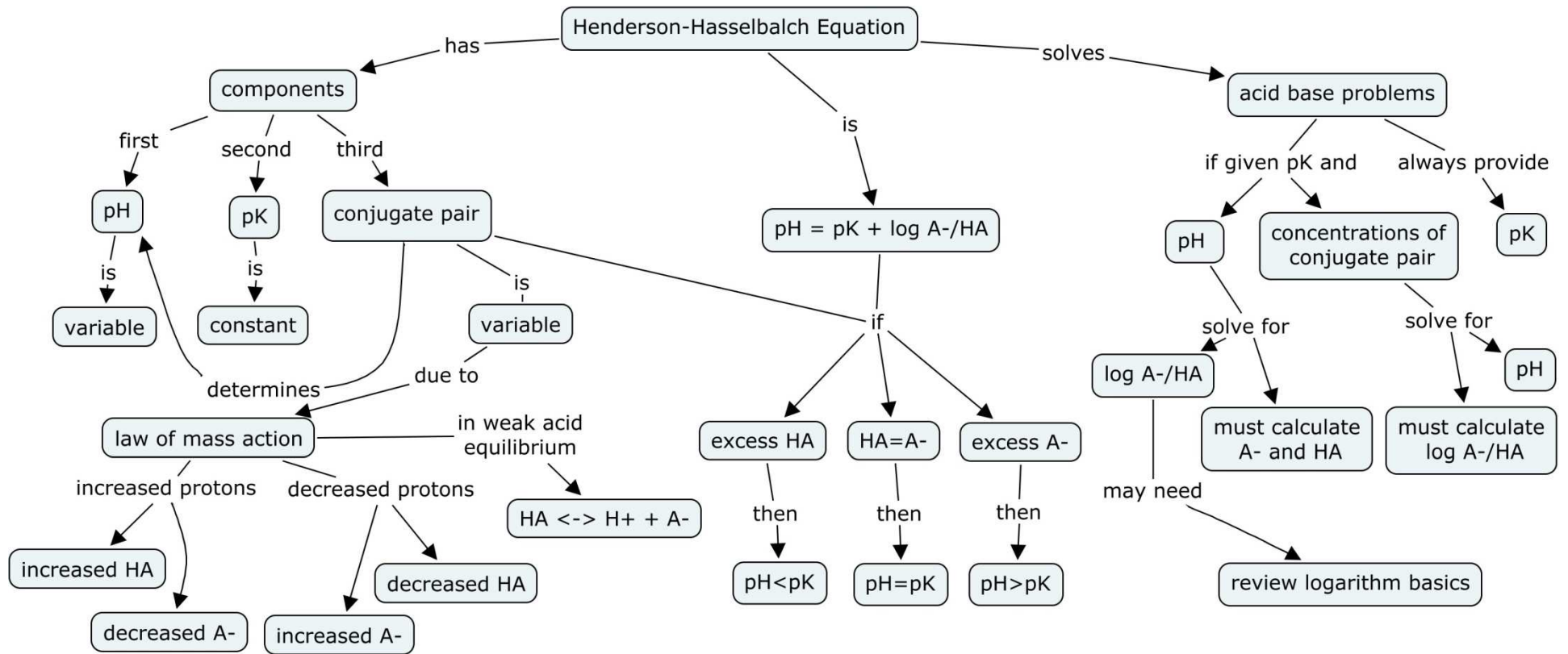
Example Of Teaching Strategy For Complete Learning Cycle

Encourage Concept Maps

Figure 2. Low-Scoring Concept Map



Reproduction of a hand-written concept map of *seizures* by a first-year resident. Note the absence of cross-links and the consistent use of 2 to 3 levels of hierarchy, resulting in a low score.



From SuccessTypes
 Prematriculation Program
www.ttuhschool.edu/SOM/success

Two-Level Concept Maps

- Usually derived from lecture outline
- Draw map and comment on it to provide summary or a look ahead.
- Students then use as study guide.
- Natural progression to inclusion of crosslinks
 - About 2 weeks
 - Changes in reading style
- Described in “*SuccessTypes*” at website
 - www.ttuhs.edu/SOM/success

Easiest Route To Change/Influence

- Communicate “through” type
 - Be specific with sensing types
 - Be visionary with intuitive types
- Expect adaptation and learning
 - Type is a starting line not a finish line
 - Balanced use of type characteristics is mark of professionalism
 - Type is not an excuse or a “cause”

Recap

- Experiential learning “flows” through the cortex – personality type reflects easiest flow.
- Experiential learning develops both:
 1. Cognitive memory
 2. Thinking skills
- Experiential learning develops learning type.