Organic Outcomes:

Using Our Brains to Maximize the Benefits of Outcomes-based Education

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Please write….

1. All of the meanings of “organic” you know of
2. Share your definitions with one neighbor and briefly compare and contrast your definitions with hers
3. With your neighbor select (and write), the definition/s most applicable to this session
4. Write down all the images/thoughts (related and unrelated memories) that came up as you remembered different definitions

Organic

- The chemistry of carbon compounds (carbon, hydrogen, nitrogen, oxygen)
- A fertilizer of plant or animal origin
- Raised or conducted without the use of drugs, hormones, or synthetic chemicals
- Instrumental-serving as a crucial means, agent, or tool
- a pesticide whose active component is an organic compound or a mixture of organic compounds
- Organic form: the structure of a work that has grown naturally from the author's subject and materials as opposed to that of a work shaped by and conforming to artificial rules. The concept was developed by Samuel Taylor Coleridge to counter the arguments of those who claimed that the works of William Shakespeare were formless.
- Syn: Unadulterated: Produced by nature; not artificial or manmade: natural, **organic**. pure as the driven snow. See CULTURE. 2. Free from extraneous elements: absolute, perfect, plain...
- Homegrown, locally produced, produced by the little guy…lots of control

Questions for Your Campus

- Learning outcomes at course and programmatic levels?
- Criteria and standards used in evaluation of student achievement of outcomes?
- Collaborative assessment of student work using criteria..?
- Used what you've learned from assessment to improve curricula, programs?
- How many of your faculty are excited about outcomes and assessment-use it to improve their teaching?

Outcomes For the Hour

- Describe at least three ways you can apply how brains learn to your teaching and implementation of outcomes-based education
- Discuss strategies for engaging colleagues in outcomes-based assessment

Assumptions

- The value in what we do is in our students' learning-not in our teaching
- We're after something more than students as consumers of information
- Transformative learning = students as producers of information
- Caveats: Parts of the brain I'm talking about
  - The cortex
  - A few parts of the limbic system
  - Just the broad brush strokes

Outline

- Brains and learning
- CSUMB's experience implementing outcomes-based education
- What are the synergies?
- How to grow these ideas on your campus

Brains and Learning

- Consciousness
- Evolution
- Control
- Abstract thinking
- Learning cycles
- Functions of the cortex
- Experience and neurons
- Neural networks
- Knowledge is
- Emotion and learning
- Teaching for transformative learning

Consciousness

- The vast majority of all thinking (work of the brain) is not conscious
- Small groups of neurons that function mainly in inhibition
- Fantastic amounts of information coming from the senses each moment- we're barely *aware* of any of it


HEY, COOL! A WISHING WELL!
CAN I DO THE WISH, SIR?
SURE, KID... GO CRAZY.
OKAY, LET'S SEE.. WORLD PEACE..
AN END TO HUNGER... AND DISEASE... AND TO ALL BAD STUFF..
JUST LOVE, AND BROTHERHOOD, AND...
WHOA, WHOA, WHOA, KID!
IS SOMETHING WRONG, SIR?
HAVE YOU THOUGHT WHAT WOULD HAPPEN IF ALL THAT CAME TRUE?
THE JOB LOSS, THE ECONOMIC DISLOCATION, THE SOCIAL UPHEAVAL...
IT WOULD BE CHAOS!
WOW.
I DIDN'T REALIZE.
OKAY, THEN... A MILLION IN CASH!
IT'S FOR THE GREATER GOOD.
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Evolution and Brains (What do Brains Want?)

- Natural selection
  - Brains want to survive
- Reward system (biochemical)
  - Pleasure for things that are contribute to survival (sweet, fat, sex)
  - Fear of (reject/avoid) detract from survival
- Why learn (what are the intrinsic rewards)?
  - Future access to resources
  - Ability to recognize and avoid danger
- What is in this for us?
  - When we don't understand why a given thing (theory, class, etc) is important for us, we leave

Continued…Control

- Intrinsically valuable
- We gravitate towards it-always
- Access to future resources and being able to avoid danger (learning) contributes to control-contributes to survival
- Psychological literature
- Giving students more control decreases their anxiety…which allows for higher cortical function

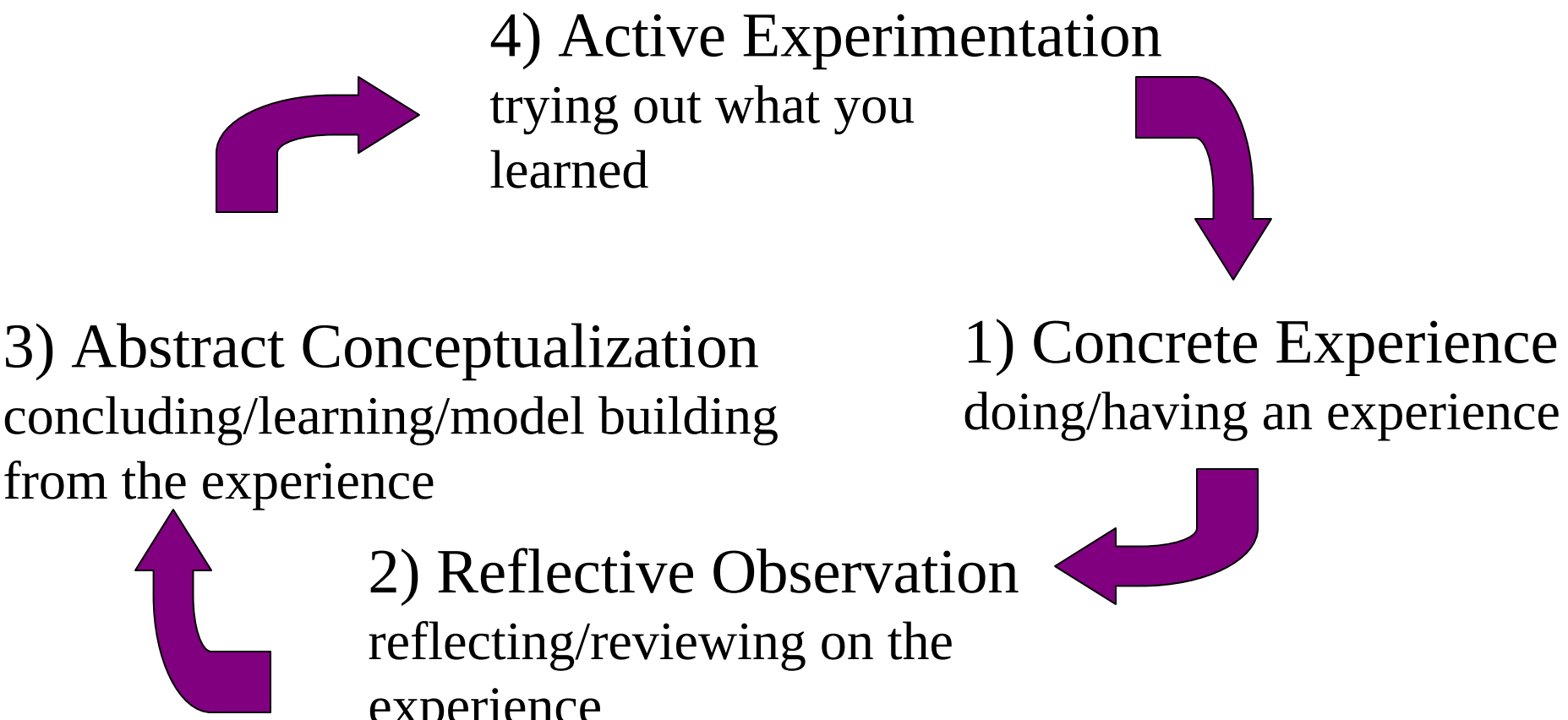
Abstract Thought

- Linked to concrete experience through metaphor
- Justice, compassion, freedom-all connected to concrete experience
- Brains are great at forming images (understanding is “seeing”)
- Helping students create their own images is an important part of effective teaching

Experience and Neurons

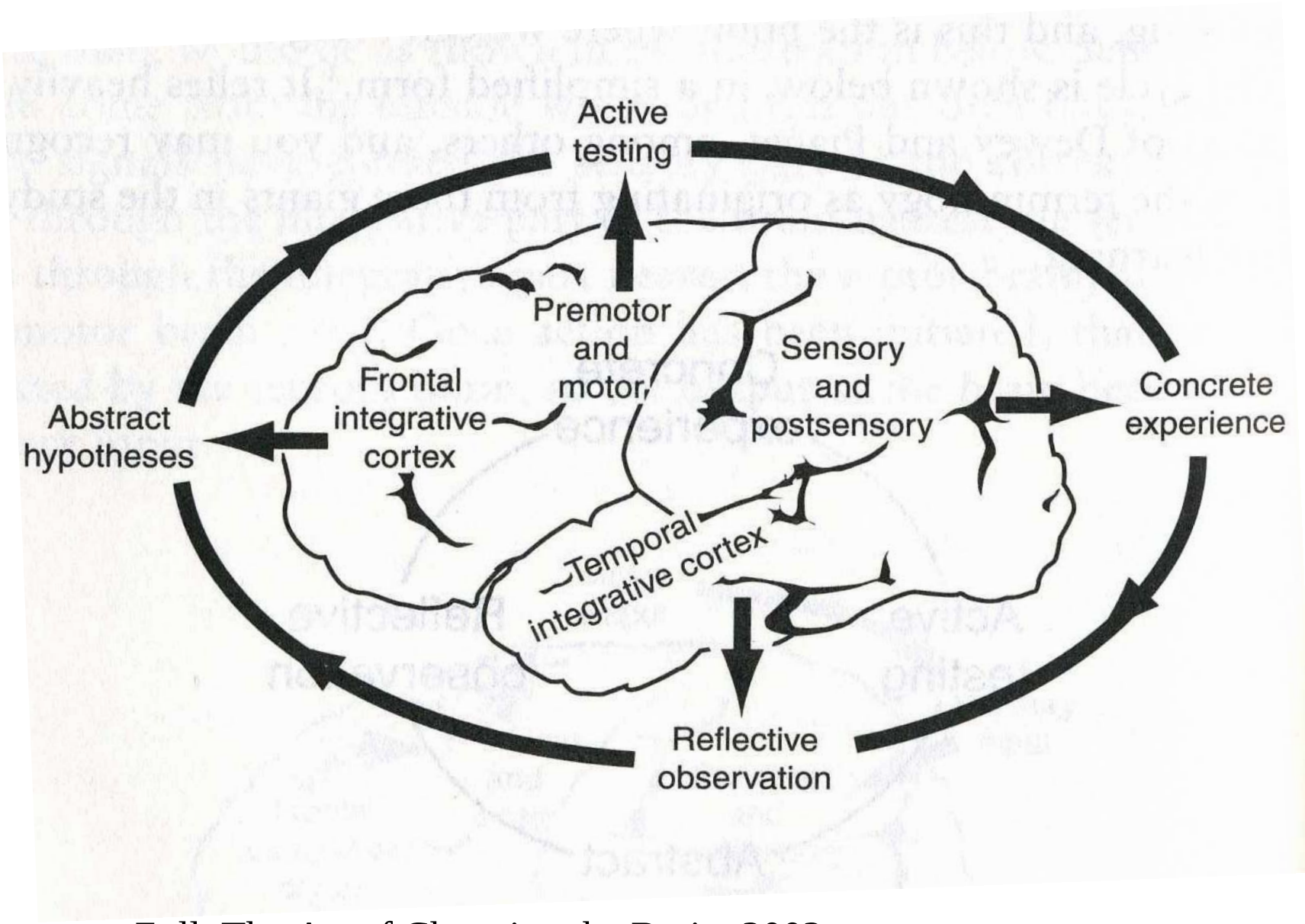
- Brain is a river, not a rock. It is constantly changing.
- All that we've learned manifests physically as neurons and neuronal connections or networks
- More connections between neurons (brain cells) than there are cells in the rest of your body
- Learning is a function of experience-our job is to contrive the most productive learning experiences
  - Make sense to our students, rather than make sense to us
- Use strengthens the networks and connections

Kolb Learning Cycle

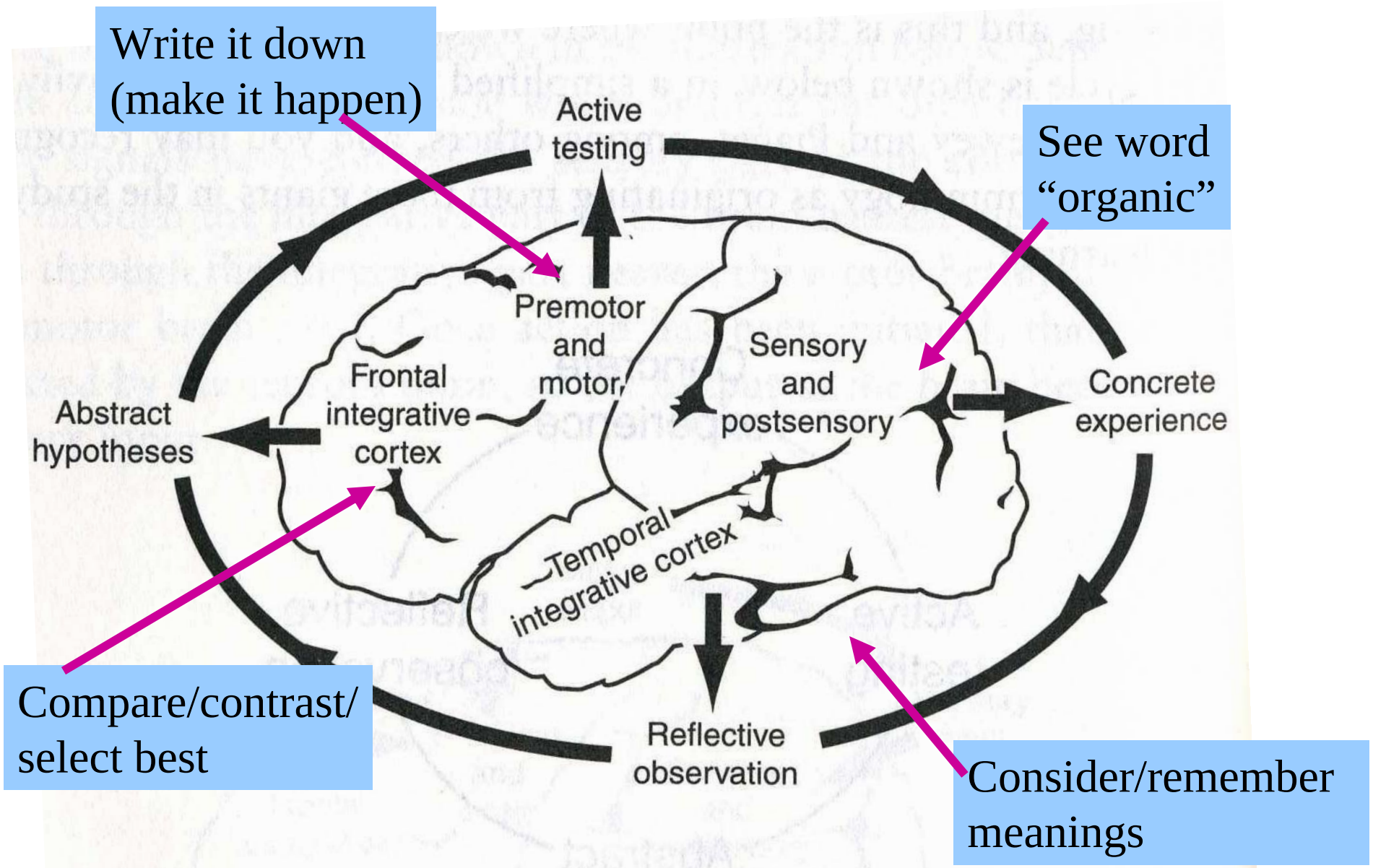


Given That Learning is Biological…

- And Kohl's learning cycle has general application
  - What does that mean about the brain?



Zull, The Art of Changing the Brain, 2002



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Neural Networks

- Organic: you wrote all the images/apparently related and unrelated memories that came up as you remembered different definitions of “organic”

“Organic” How Many of You Wrote Down…

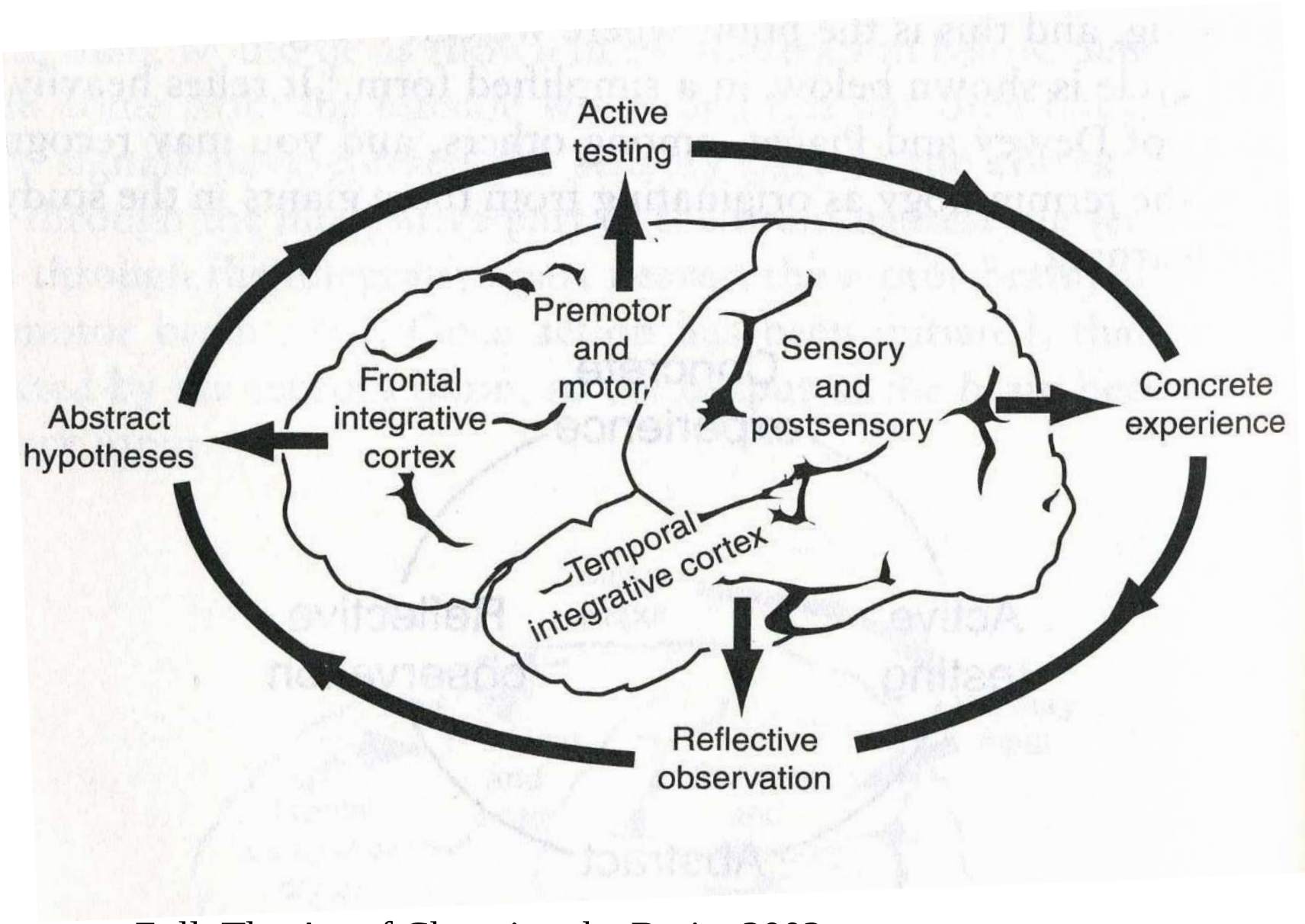
- Someone who grows, eats, lauds, or pooh poohs organic food?
- A hippie (whatever that is)?
- Some negative stereotype of the challenge of organic chemistry?
- That organic chemistry was scary?
- The terrible smells of organic chemistry lab?
- These are examples of neuronal networks connected the concept of “organic” in our brains?

Knowledge is Neurons and Networks of Neurons

- Prior knowledge is a fact (all students have it and it is housed physically as neurons and neuronal networks)
- It is persistent (we can't get rid of what students already know)
- Learning requires the formation of new neurons and linking of existing neuronal networks
- Prior knowledge is where acquisition of new knowledge begins
- Knowledge from the past creates the learning environment of the future

Traditional Modes of Teaching and Learning

- Rely heavily on memory
- Fail to take advantage of and integrate other parts of the cortex
- Bloom's Taxonomy: knowledge, comprehension, application, analysis, synthesis, evaluation…as we move through we see a more and more sophisticated integration of the cortex



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Emotion and Learning

- Fear center (amygdala)
  - Scanning for danger
  - When it fires strongly, prefrontal cortex (abstract thinking) comes off line
  - In general less active in social interactions
  - Less active when engaged in abstract (prefrontal cortex) thinking
- Pleasure centers
  - Location
  - When pleasure centers are active, amygdala is less active

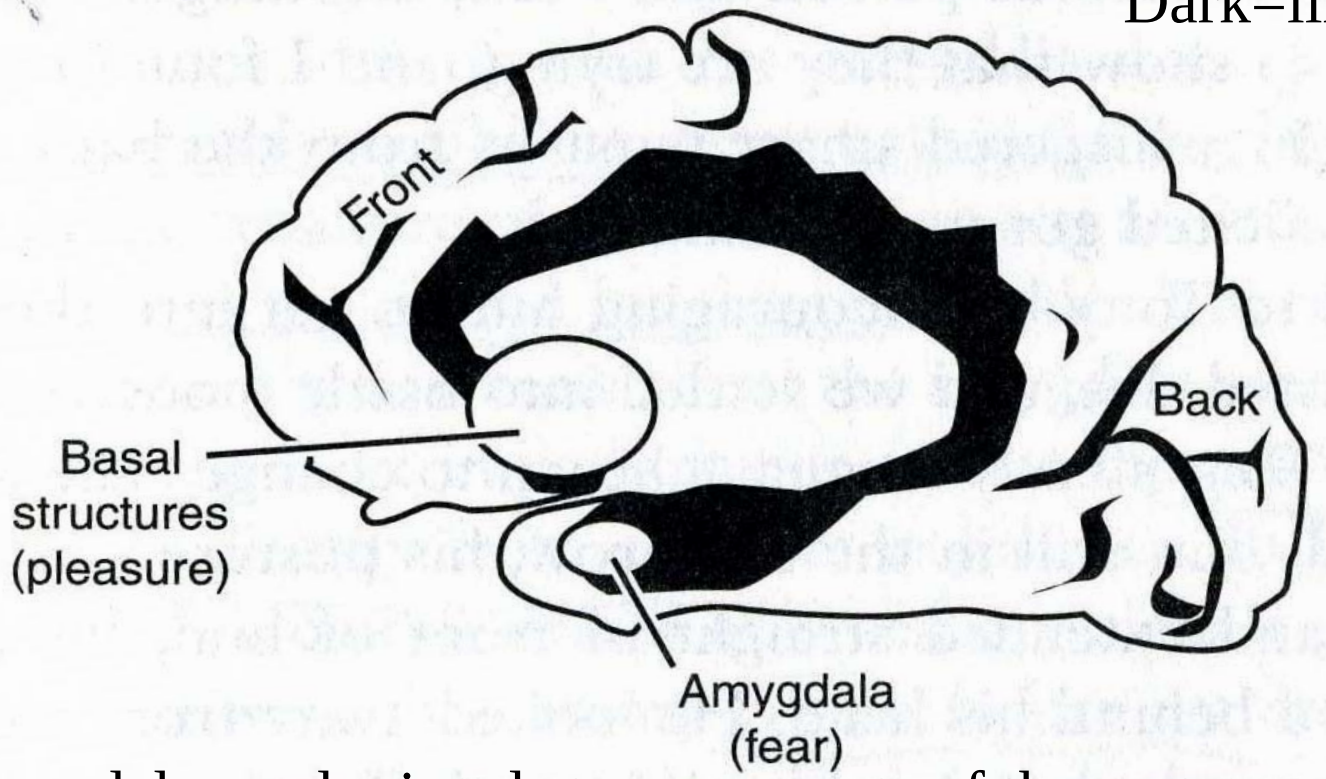
Emotion and Learning Cont.

- Attention is based on emotion-positive emotion feeds attention
- Ultimately make decisions on emotion, how things feel, not through the intellect

Zull, 2002

Note pleasure area's proximity to prefrontal cortex.

Dark=limbic cortex



Amygdala sends signals to many parts of the cortex

Teaching for Transformative Learning

- Uses the whole cortex
- Takes advantage of what the brain was designed (through evolution) to do
- Builds on what students know (existing neurons and neuronal networks)
- Connects with students in ways that are meaningful/important to them (motivation)

Continued

- Gives control (makes outcomes and assessment criteria and standards public) to students
- Actively works to calm amygdalar (fear center) activity

Organic Outcomes: A Home-grown, Faculty-centered Approach

1 Brains (carbon, hydrogen, oxygen, nitrogen….)

- What do they want?
- How do they work?
- How can we take advantage of what they want and how they work to improve student success?

2 How CSUMB developed outcomes-based education

- What we did
- How we did it
- What we learned
- How this might be relevant to your campus
- How to work with others on outcomes and assessment

3 What are The Connections?

During the Stories, Please Consider

- Why faculty resist assessment
- Why CSUMB succeeded in developing outcomes-based assessment
- How academics can integrate our understanding of the brain with our implementation of OBE (for students *and* faculty)

Early CSUMB Discussions on OBE-Key strengths

- Encourages and facilitates university-wide exploration of the knowledge, skills, understanding, and abilities needed for…
- Enhances accountability by identifying and publishing learning goals and related assessment criteria
- Helps avoid needless redundancy and reduces estimated time to degree by allowing students to take advantage of prior learning

- May link education and graduation with preparedness for personal, professional, and social life
- Facilitates interdisciplinary curricular design and delivery
- Potential to foster continuous improvement
- Facilitates the institutionalization of improved interrelations among disciplines, instructional practices and learning styles, and higher-order academic development goals

Key Concerns

- OBE can be cost-prohibitive (requiring rigorous and costly assessment)
- Encourages a mechanistic view of teaching and learning
- Tends to be highly prescriptive, both for learners and educators
- Tends to oversimplify complex and nuanced learning processes
- Tends to privilege measurable skills and knowledge acquisition over creative expression, critical capacities…

Cost/Benefit Analysis of Three OBE Rationales

- **Option 1:** To enhance university quality control and accountability
- **Option 2**: To reduce time and cost to degree by maximizing student opportunities to gain credit for prior life learning.
- **Option 3:** *To focus academic time, effort, and resources on commonly agreed up knowledge and skill priorities.*

Adoption but no Implementation

- Late ’90’s we developed learning outcomes using faculty learning communities…are we done yet?
- No connection to courses
- No university-wide support for OBE
- No faculty development
- General distrust
  - Perceptions at home and abroad
- Lots of sand-bagging
- Recognized need for leadership

1999 Comes a Director of Teaching, Learning, and Assessment

- Food
- Coffee
- Money
- Accreditation
- A year of disappointment
- Disconnect between outcomes and assessment
- Resistance
  - Fear of how assessment will be used
  - Fear of standardized tests-teaching to a test
  - Fear of the unknown
  - How is this connected to something I value?
- She approached the GE faculty learning communities

How Would a Student Know if She had Mastered a Learning Outcome?

- Developing criteria and standards for assessment
- Process
  - Subsets of GE faculty learning communities
  - Probed with questions
  - Two days with small groups of faculty
    - Back to the GE faculty learning communities

- Outcomes
  - What students have to know and be able to do
- Examples of evidence
  - The kinds of student work that might be used to demonstrate competence on a given outcome
- Criteria
  - Concepts that describe, or qualities of the evidence
- Standards
  - Illustrate levels of achievement

What We Learned From an Interview Study

- Value of developing examples of evidence, criteria, and standards for GE learning outcomes
- Influence of faculty status on participation
- Agenda of OBE
- Process helped dismantle assumptions
- Student perspective

Developing Criteria and Standards for Our Learning Outcomes Resulted in:

- Intensely rich faculty development
- Discovery of big problems with learning outcomes
  - Vacuous
  - Poorly written
  - Graduate rather than sophomore level
  - Many changes
- Faculty resistance dropped like a rock
- Degree programs took up the charge

Agenda of Outcomes Based Education

"I was afraid I was being asked to run humanities courses (an understanding of the human experience) through a business model."

"We had been worried that outcomes would be used to endorse a particular style of measurement that we were very much against."

“The process of developing standards and criteria alleviated our concerns. We saw outcomes still upheld the values of the ULR.”

“We were able to develop the outcomes to meet our agenda rather than having the outcomes based model develop us.”

“Our big epiphany - or at least mine - was through recognizing that outcomes could be structured and measured as process rather than as a single point measurement tool.”

Two Years Later…How do We Know Students Actually Attain the Outcomes?

- Collected student evidence from courses
- Groups read a piece three times
- 1st-did work meet outcome and did group agree with original assessment?
- 2nd-looked for examples of criteria and standards in the evidence
- 3rd-what could be learned about instructor/pedagogy from evidence?

What We Learned From a Second Interview Study

- Value of process
- What *do* the outcomes mean?
- Aligning teaching activities with assessment activities
- Active review of learning outcomes
- Changes in teaching and assessment
- Fear
- Bias
- Value of OBE
- Reflection on pedagogy

- “The benefit of assessment is that you get to see where you went wrong. You see the mistakes, and if you don’t take time to reflect on those, then you’ll never improve in those areas. I really can’t overstate how valuable I found it”.

- “I’ve been teaching 20 years and this is probably as deep as I’ve gone into my own thinking, evaluation, and rethinking of my teaching. It is has been the most meaningful time too.”

Aligning Teaching and Assessment with Learning Outcomes, Criteria, and Standards

- 82% subjects discussed one or more of the following:
- Disconnects between outcomes and teaching activities (not addressing outcome in teaching)
- Disconnects between learning outcomes and assignments (asked for x but wanted y)
- Disconnects between assignments and rubrics (asked for x but graded for y)
- Importance of carefully crafting questions

Changes to Outcomes, Criteria, or Standards

- 88% subjects said their GE learning communities modified their outcomes, criteria, or standards as a result of the review

Changes in Teaching and Assessment

88% of subjects said that they made changes in their teaching or assessment as a result of process

- Clarified language
- Connected teaching better with outcomes
- Scaffolding
- Iterative assessment
- Assessment as valuable teaching tool

Fear and Vulnerability

- Peer review in academia

"I was actually fearful to have people from other departments listening in on my teaching process."

"I really felt like part of the group after that happened. These were probably some of the best moments I've had with faculty across the campus."

"The level of vulnerability was stunning."

"But the funny thing about it was that if I hadn't been so embarrassed, I probably wouldn't have learned as much."

"It was very validating to hear my colleagues say 'oh, what a good idea. Now I know how to talk about what I do in my class' I suddenly realized I was serving as a good role model. I hadn't expected that."

Side Note: In working with faculty on assessment…you'll want to work on calming their amygdalas too

Reflection on Pedagogy

65% subjects said that the process was a valuable tool for reflecting on their pedagogy.

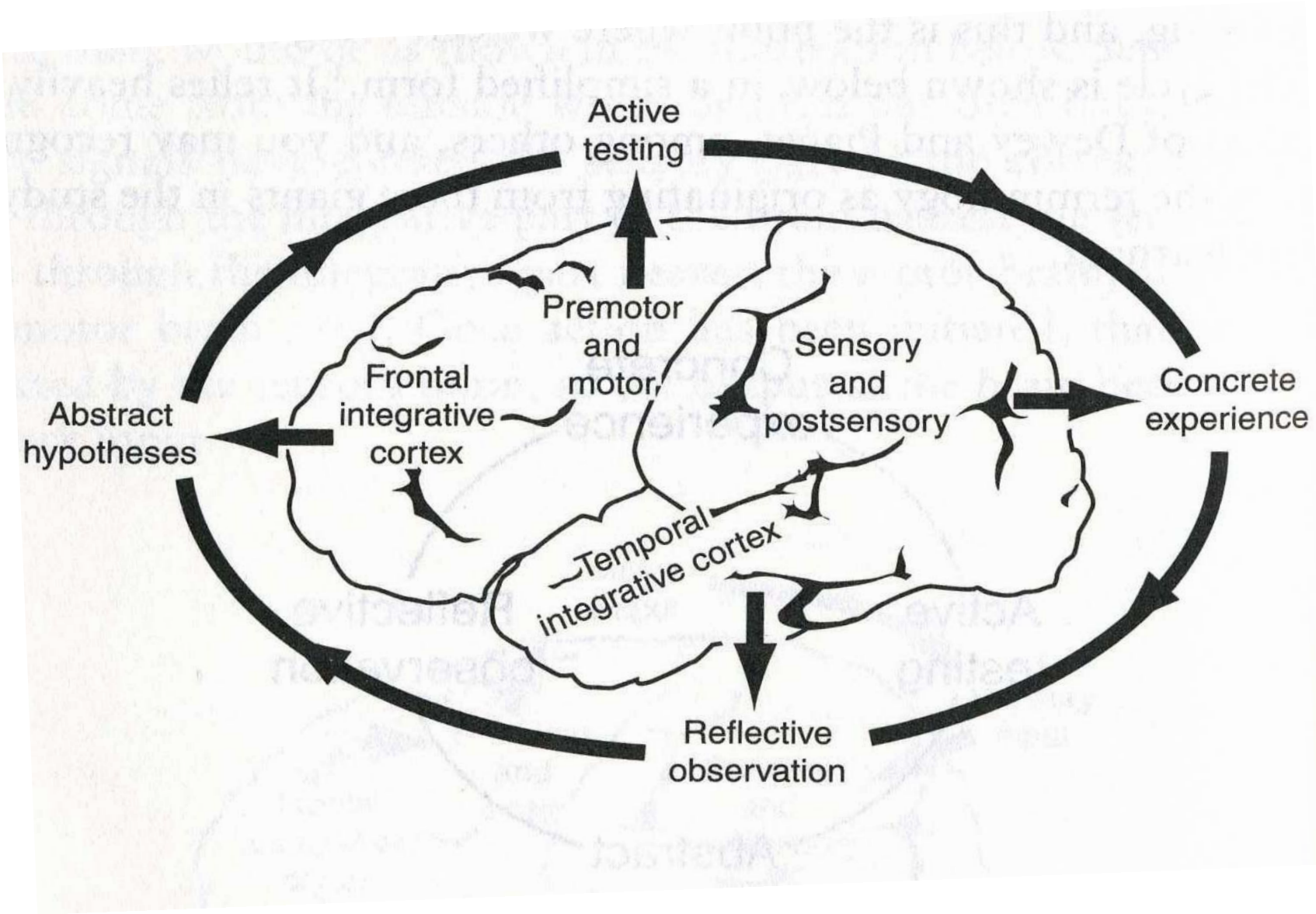
“You know, it is like if we were all monks, and had nothing to do but this, wouldn’t this be the practice? You’d prepare for the your teaching, and you’d teach and then retreat, and you’d swim in the evidence of student learning. Then you’d rework your curriculum, and that is the cycle you’d live in-preparation, teaching, evidence reflection, preparation.”

Why Were These Processes So Successful?

- Constructivist (took advantage of, started with what faculty knew…started with existing neuronal networks)
- Inquiry based (engaged all of cortex)
- Faculty driven (ahh-we're in control, now we can be productive!)
- Open ended-no "correct" answer (more control, lots of cortical engagement)

Cont

- Faculty cared deeply about the outcomes (motivation-this was intrinsically valuable)
- Our facilitator listened carefully to faculty concerns (somebody cared!)
- Faculty took ownership of the process (control)
- Faculty learning communities (rapport increased willingness to take risk)



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Facilitating This Work Well is Knowing When To:

- Let the conversation continue in its new direction
- When to clarify the direction
- When and how to quiet the dominant voice so that others can contribute
- When and how to get the discussion on track to completion
- When and how to check in with the group to determine comfort, clarity, and presence of issues or concerns
- How and when to motivate a lagging conversation

Useful Qualities in the Person Leading This Work on Your Campus

- Background in teaching, learning, and assessment
  - Or at least in teaching and learning
- Makes connections with faculty easily
- Experience in leadership and facilitation
- Leads from the side
- Professional/personal joy derives from the success of the process and the success of the people she is working with

Recommendations…organic

- Start small fires and feed them
- Build on your faculty strengths
- Don’t dismiss your older faculty
- Anticipate and work to undermine faculty fear
  - Low stakes
  - Results won’t come back to individuals
- **Develop open ended, inquiry-based, faculty-centered processes**

Anticipate Faculty Motivations

- Food (pleasure calms the amygdala)
- Retention/Promotion (control)
- Money
- Release time
- Connect learning outcomes to what faculty value
  - Teaching
  - STUDENT SUCCESS!

How do Outcomes Serve Brains? (when students understand what we expect and how we will assess them…)

- How do we feel when someone in a position of power has an expectation…but we don't know what it is?
  - Apprehension, nervousness, and fear…Anxiety decreases our capacity for abstract thinking
- Outcomes make expectations explicit-makes for easier integration of the different cortexes
- Allow students to focus their efforts

Brains, Outcomes, and Curriculum

- Easy to develop learning outcomes
- How do we make sure that the curriculum flows from and supports the outcomes?
  - Analyze the curriculum
  - Are we using it to develop mastery of the outcomes?
  - Are there tight connections between what we are teaching and knowledge sets, skills, and abilities we require of our students?
- Are we approaching curriculum from the faculty or student perspective?

Outcome: Learners analyze ethical issues from different cultural perspectives

- Curriculum from the faculty perspective

- Curriculum from the student perspective
  - What is an analysis?
  - Why do I need to know this?
  - What parts of me will I have to expose?
  - Will I have to agree with the professor?

Outcome: Analyze the concepts of power relations, equity, and social justice using examples of each concept in the US society, and other societies.	Content Area: Equity	Content Area: Power Relations	Content Area: Social Justice	Writing Skills	Analysis	US and other societies	
Class Activities							
Role play power relations							
Discussion on NY Times article							
Guest: Rev Monica Galligan							
Model analysis-what are the component pieces of an analysis?							
Assignments							
Assessments							

Brains, Outcomes, and Pedagogy

- Is the *experience* we are providing actually leading to the learning we hope for?
- Do our students understand how the outcomes are important to them?
- Do we give our students time (require them) to practice (that is, are we strengthening the neurons and neuronal connections they've formed in response to our teaching)?
- Are we helping our students feel safe (working to calm the amygdala)?

Cont.

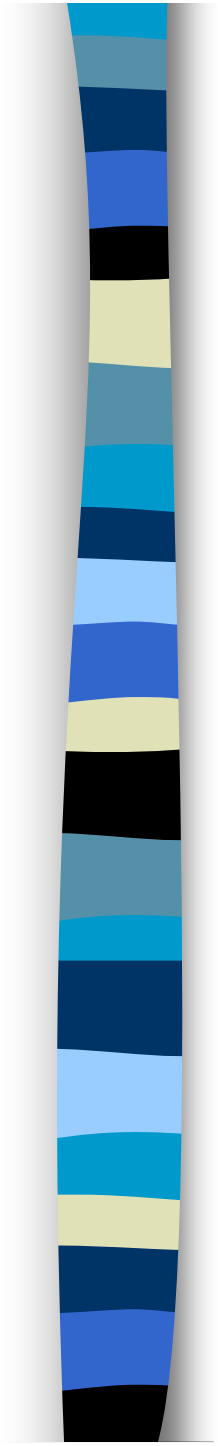
- Have we structured time blocks to use the most effective kinds of pedagogies
  - 50 minute lecture tends towards heavy input
  - Little time for reflection
- If we want transformative learning, we have to make time for integration
- Changing brain circuitry takes time

Brains, Outcomes, and Assessment

- Does our assessment actually align with the skills and abilities we want in our students?
- Are our students *learning* from our assessments, are they involved in helping create them, helping design the rubrics (are we working towards giving students control)?
- Are our assessments structured and timed to minimize stress and fear (big exam at the end of the semester???)
- Do our assessment require integrated use of the cortexes?

Outcomes Work With Our Brains Because

- They help give the learner control
- They make it easy to structure curricula that use all of the cortex
- Help guide the selection of effective pedagogies
- Promote students as producers (transformative learning) of information



Questions?