

Plenary Session

The Biology of Learning and Change

Enriching the Practice of Teaching by Exploring the Biology of Learning¹

WHO: participants, leaders

Participants: Dialogue educators from around the world; men and women who have been using Dialogue Education in their specific context for some time. I have read the registration forms of all participants as well as our Learning Needs and Resource Assessment results from NING and have sent each participant a welcoming e-mail inviting them to read Zull's *The Art of Changing the Brain*.

Facilitator: Jane Vella, founder of Global Learning Partners, Inc., assisted by Michael Culliton & Valerie Uccellani of GLP's Core Consulting team.

WHY: the situation

This is the first and plenary session of the Third International Dialogue Education Institute whose theme is Learning & Change. This event sets the tone of the Institute: a tone of

- inclusive engagement,
- the use of cutting edge theory,
- challenge in terms of behavioral indicators of learning and transfer,
- fidelity to both the principles and practices of Dialogue Education and to a context where these must be challenged and developed.

SO THAT: evaluation indicators

Participants all go into the Institute events re-charged to use Dialogue Education and develop both the theory and practice for their context in the light of the biology of learning. They are also re-freshed after having worked together in a well-designed, effective session.

Behaviors indicating re-charged and re-freshed:

- They re-do their present designs in the light of new learning.
- They name and contact new Dialogue Education colleagues from the Institute.
- They identify potential allies in their work context, and introduce them to the GLP website and other resources.
- They actively research the latest in neuroscience and learning.

WHERE: site

Ballroom of the Marriot Hotel: large round tables with 6-8 chairs each. A table with three seats in front – for Leaders.

Materials: Your Smartphone or other 3G tablet used as resources when doing these learning tasks as you wish. Each person has a copy of this design and Jane's summary, which includes three illustrations.

¹ This is also the subtitle of James E. Zull's book, *The Art of Changing the Brain*, which we will use throughout this session.

WHERE: site, *continued*

At each table:

- Copy of Jane’s design (one for each participant)
- Copy of Jane’s summary of Zull’s work including an outline showing parts of the brain (one for each participant)
- Felt pens: black/navy/purple
- Large colored cards for listing corroborates
- Masking tape for posting corroborates

In the meeting room:

- Six flip chart stands with a flip chart poster with the title “Corroborates”

WHEN: time frame

Ninety minutes at the opening of the Institute

Exact time: 9:00 – 10:30 a.m. Friday, October 25, 2013

Timing of Learning Tasks #1: 10m, #2: 20m, #3: 25m, #4: 20m, #5: 15m, total: 90m

WHAT: content: cognitive, affective, psychomotor

- The power of Dialogue Education: present and latent
- The potential of an Institute
- The biology of learning as shared by Dr. James E Zull highlighting:
 - The cerebral cortex: skin of the brain
 - Opening the door: through the sensing cortex:
 - Using five senses: auditory/visual/taste/smell/ touch +
 - Putting learning in place: Temporal Integrative cortex
 - Putting it all together: Frontal integrative cortex
 - Indicators of learning: Actions: Motor cortex
 - Knowledge is physical: neurons : Neuronal networks
 - Only connect: Synapses: continuous
 - Emotions and learning
 - Motivating: Intrinsic/extrinsic rewards
- “Corroborates” - Where Dialogue Education and Zull’s research meet

WHAT FOR: achievement based objectives

By the end of this Plenary Session all will have:

1. **Named and shown** the power of Dialogue Education: present and latent.
2. **Experienced** the potential of national & international connections.
3. **Reviewed** recent research on the biology of learning.
4. **Named** “corroborates” between Zull’s research and Dialogue Education.
5. **Created** a visual showing the action of learning in the brain.
6. **Identified** ways this knowledge will enhance our work in the near future.

Learning Task #1 AN INDUCTIVE REFLECTION: THE POWER OF DIALOGUE (sharing your neuronal networks) 10 min

Working with a global learning partner – whom you do not yet know, **describe** to one another how dialogue has been useful in your life and work. We'll hear a sample.

Learning Task # 2 THE BIOLOGY OF LEARNING 20 min

On each table, **find** personal copies of the summary of Zull's book by Jane, including a copy of selected illustrations.

2 A In small groups, personally **read and mark** the summary paper. From the items you marked, **identify** one thing that you can use from Zull's research in your work. We'll hear a sample.

2 B **Name** in your table group *one thing* you read either in Zull's book *The Art of Changing the Brain* or in Jane's short summary of his research that would change the way you work. We'll hear a sample.

Learning Task # 3 "CORROBORATES" 25 min

On each table find large colored cards, felt pens, and tape.

Zull's book shares research which I see corroborates the theory and practice of Dialogue Education.

A corroborate is what I call the obvious connection between what Zull teaches and what we learn as we study and develop the theory and practice of Dialogue Education.

3 A At your table – with your same global learning partner – **name** one or two obvious "corroborates." Write each corroborate on a card.

EXAMPLE: SAFETY ZULL: Fear is never helpful to learning.

3 B Share these at your table. Then post your cards on a "Corroborates" chart near your table. As you post, notice and group any similar responses.

3 C Alone or with others, **walk around and see** the corroborates named. As you do, **consider**: What do these corroborates say to you about our work in Dialogue Education?

We'll hear a sample.

Learning Task #4 PARTS OF THE BRAIN AND FUNCTIONS OF EACH PART/ THE ROUTE OF OUR LEARNING 20 min

On each table, find your personal copy of a labeled illustration of the parts of the brain.

- # 4 A Individually, **use** the outline to depict a recent learning experience for you. **Draw** and **show** the route of the learning that you see took place in your brain.
- # 4 B With a new global learning partner, **share** your sketch of the learning with each other. We'll hear a sample of what we all noticed.

Learning Task # 5 CLOSURE: WHAT'S NEXT? 15 min

- # 5 A In your same new pairs, **name** one way you see this session affecting your participation in this Institute *and* your work in the future. We'll hear a sample.
- # 5 B At your table, **tell** what happened to/for/with you in this past 80 minutes. Each **look** at the Institute Program and each **respond** to this question:

What's next for you?

We'll hear a sample.

Thank you! For Learning & Change! Together!

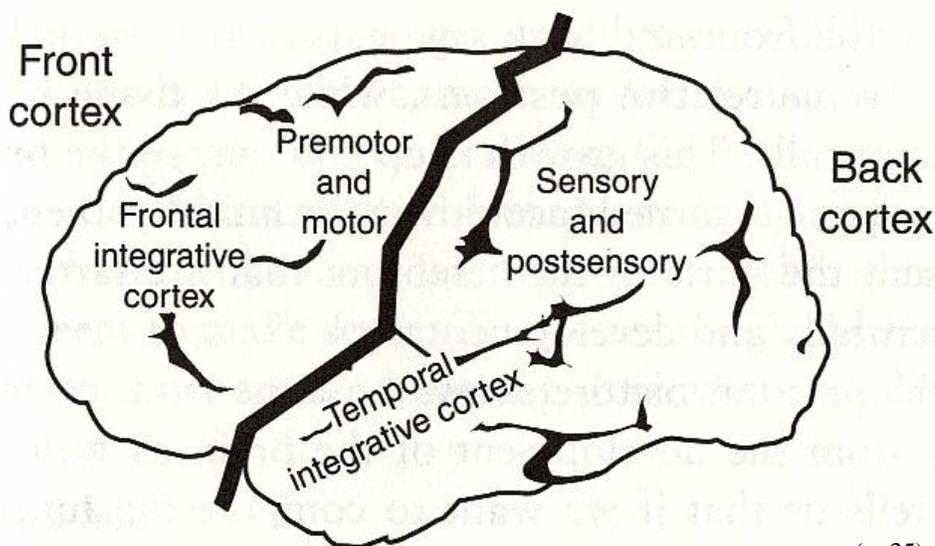
Plenary Session

Selected Elements from the work of James E. Zull¹

Structure of the Brain

There is a biology of learning. The brain is the physical structure designed for human learning, for understanding and comprehension.

The cerebral cortex is a set of folds that serve as the “skin” of the cerebrum, like the bark of a tree. “Generally, the receiving and remembering part of the brain is located toward the back of the cerebrum, and that which generates ideas and actions in the front. ...The division between back and front of the cerebrum is illustrated below.” (pp. 34-35)



(p. 35)

Sensory Cortex: Receives signals from the outside world

Temporal Integrative Cortex: Compiles those signals: makes “sense”

Frontal Integrative Cortex: Compiles signals further into ideas, thoughts, plans

Motor Cortex: Executes those plans: takes action.

Once the action has begun, that action is detected as new input by the sensory cortex, and the cycle continues.

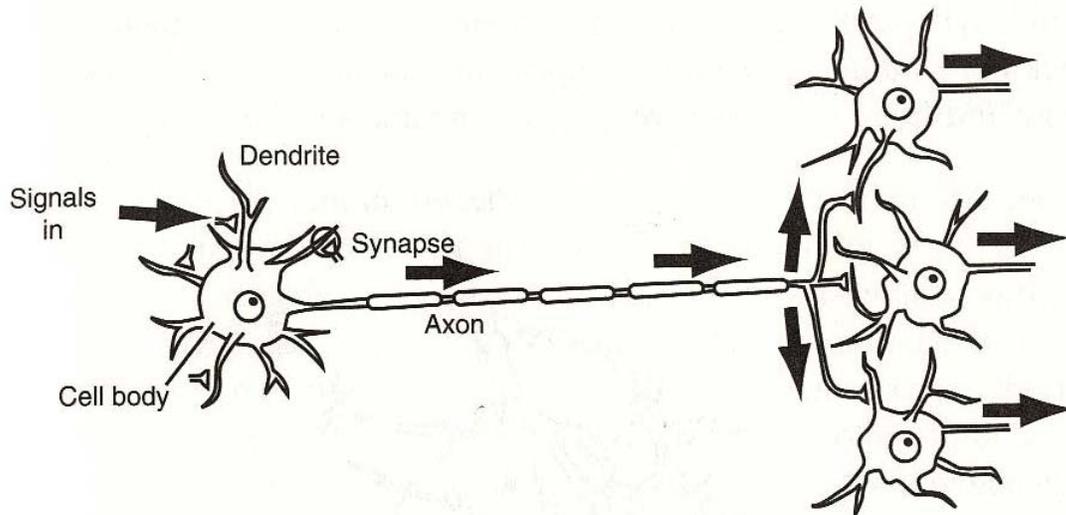
¹ From the work of Dr. James E Zull as presented in *The Art of Changing the Brain: Enriching the Practice of Teaching by Exploring the Biology of Learning*, Stylus Publishing: Sterling VA 2002

Plenary Session

Selected Elements from the work of James E. Zull¹

Neuronal Networks

Neurons are nerves, shaped like the branch of a tree: axon (central), dendrites (shoots). Neurons communicate as they are stimulated (synapse: point of communication).



(p. 97)

Neurons: axon / dendrites Learning is manifested in growing dendrites. Knowledge is visible. The human brain has 100 billion neurons: learning makes these grow! No matter how many synapses (electrical charges) a neuron has, it seems it has the potential to have more.

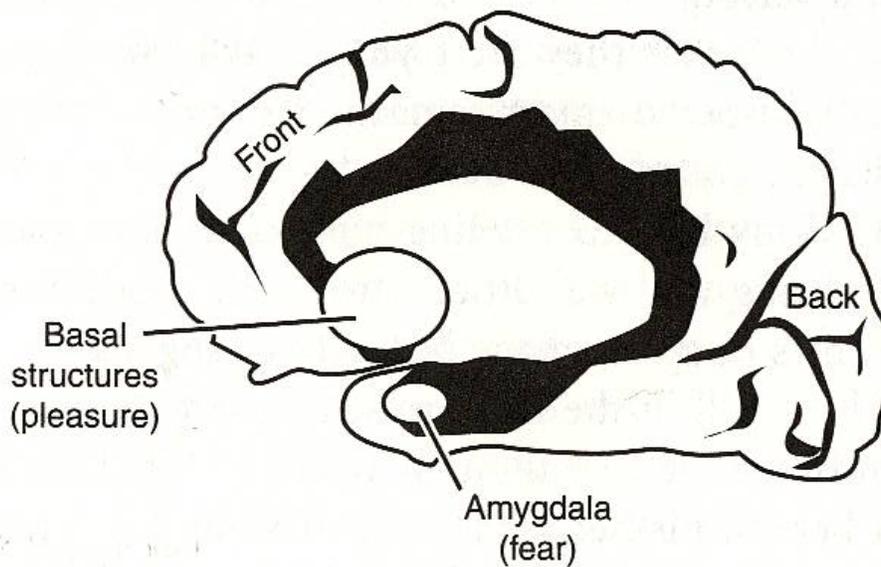
Teaching is the applied science of the brain. Teaching is the art of changing the brain, not directly, but by creating conditions that lead to natural changes in the learner's brain: Neurons grow: dendrites emerge! fMRI and PET technologies can see and record this process.

Plenary Session

Selected Elements from the work of James E. Zull¹

Emotions and Learning

The amygdala is the brain's "danger center," scanning for perceived threats. "Our amygdala is constantly monitoring our experience to see how things are. It begins to make meaning of our experience before we begin to understand it cognitively and consciously. (p. 59)



(p. 57)

Fear is never helpful to learning.

The basal structures are the brain's "pleasure center." The basal structures regulate the actions needed for us to satisfy our drives and are also the central structures for both movement and action. (p. 62)

The brain is designed for survival: for this, the individual must feel he is in control. Motivation to learn is therefore internal, never external. The first thing the brain sees in external rewards or punishments is loss of control. So such external rewards or punishments can impede learning.

Knowing is a feeling! Our emotions influence our thinking more than our thinking influences our emotions. (p. 74)