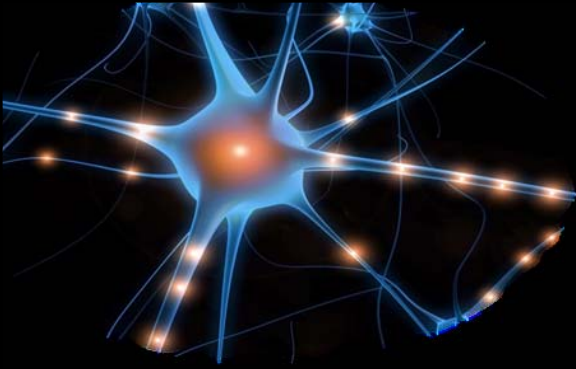




Considering the Student Mind in Instructional Design

2011 Higher Education Conference: Online and Up Close

*Lisa Besnoy, Sarah Schroeder, and Karina McGill of Northern Kentucky
University*



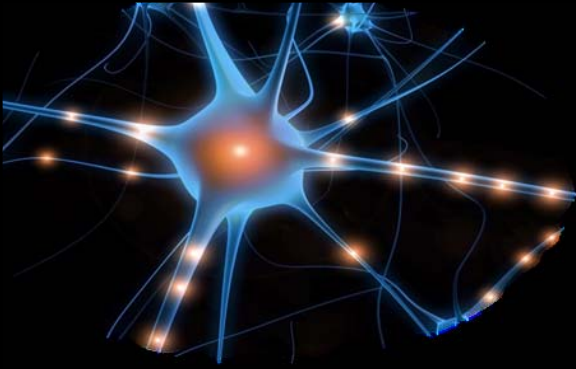
What is brain-based learning?

“Learning changes the brain...Like silly putty, the brain is molded and reshaped by the forces of life acting on it.”

Zull, James E. (2004) *The Art of Changing the Brain. Educational Leadership*

“Any ideas from neuroscience should be integrated with consistent models from psychology and behavioral sciences.”

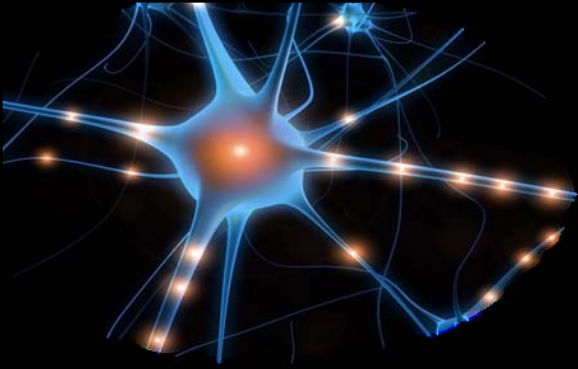
Jensen, Eric. (2005). *Teaching with the brain in mind.*



What have we learned...

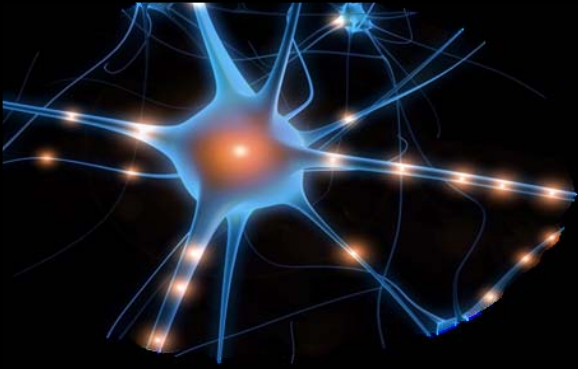
- Neurogenesis: new neurons are generated
- Neural plasticity: new paths are created
- Left brain/right brain paradigm outdated





Critical Factors of the Learning Process

- **Engagement** (goal-oriented attention)
- **Repetition** (priming, reviewing, revising)
- **Input quantity** (capacity, flow, chunk size)
- **Coherence** (models, relevance, prior knowledge)
- **Timing** (time of day, interval learning)
- **Error corrections** (mistakes, feedback, support)
- **Emotional state** (safety, trust)

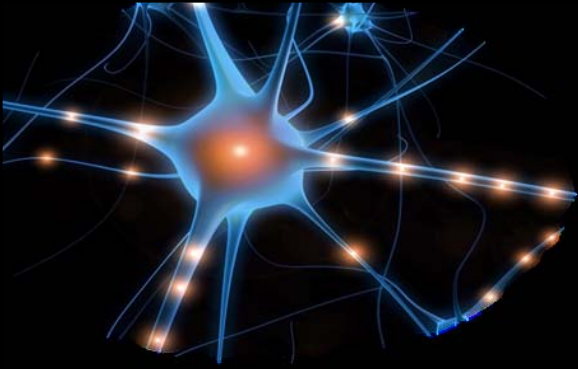


What is Universal Design?

“The design of products and environments to be useable by all people, without the need for adaptation or specialized design.”

–Center for Universal Design at North Carolina State University

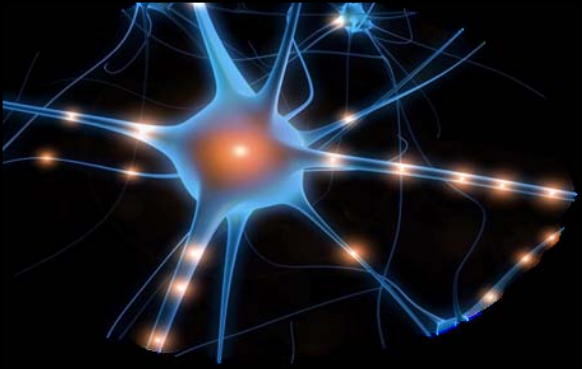
- UD entails
 - awareness of human diversity
 - anticipation of variety of needs
 - an intentional approach to designing an inclusive environment.



Flexibility

1. Design accommodates a wide range of individual preferences and abilities.

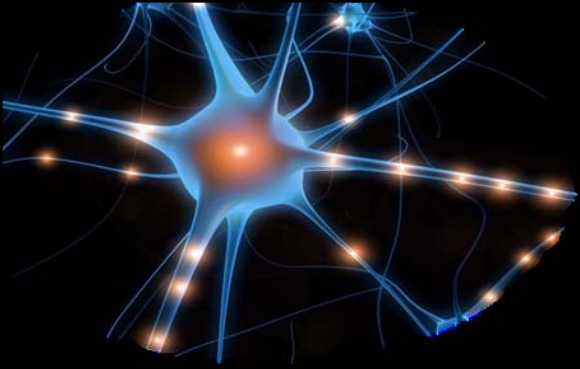
Example: Multiple Learning Styles



Learning Style Inventory

What is your learning style?

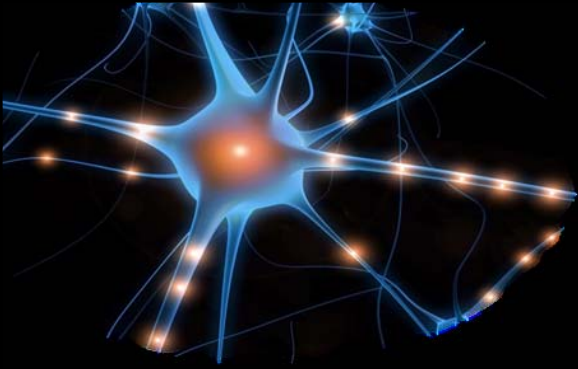
- Visual
- Auditory
- Kinesthetic



If I have to learn how to do something, I learn best when I:

- 1) Have someone show me how
- 2) Hear someone tell me how
- 3) Try to do it myself

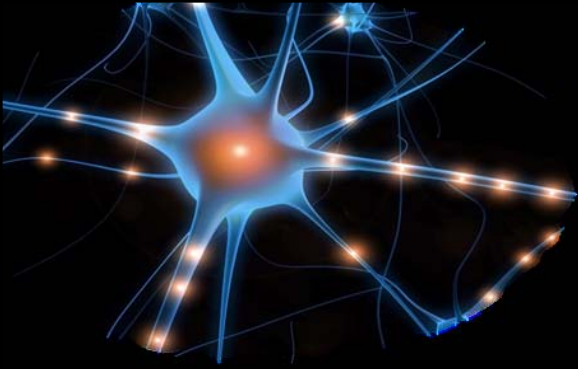
Adapted from, *Learning to Study Through Critical Thinking*, J. A. Beatrice



When I read, I often find that I:

- 1) Visualize what I am reading in my mind's eye
- 2) Read out loud or hear the words inside my head.
- 3) Fidget and try to “feel”: the content

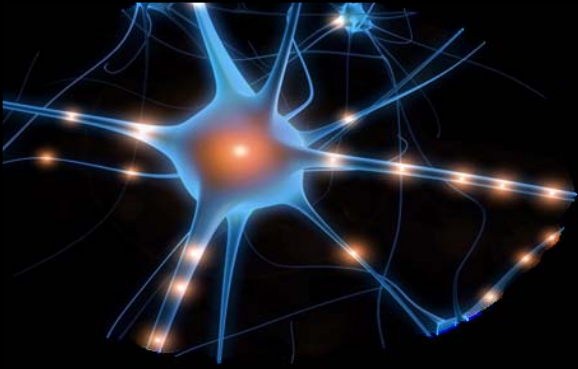
Adapted from, *Learning to Study Through Critical Thinking*, J. A. Beatrice



When asked to give directions, I:

- 1) See the actual places in my mind as I say them or prefer to draw them
- 2) Have no difficulty in giving them verbally
- 3) Have to point or move my body as I give them

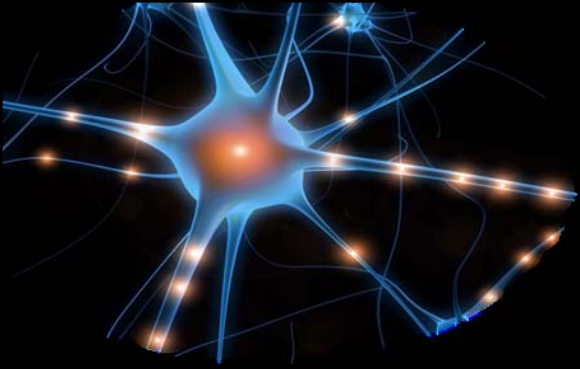
Adapted from, *Learning to Study Through Critical Thinking*, J. A. Beatrice



If I am unsure how to spell a word, I:

- 1) Write it in order to determine if it looks right
- 2) Spell it out loud to determine if it sounds right
- 3) Write it in order to see if it feels right

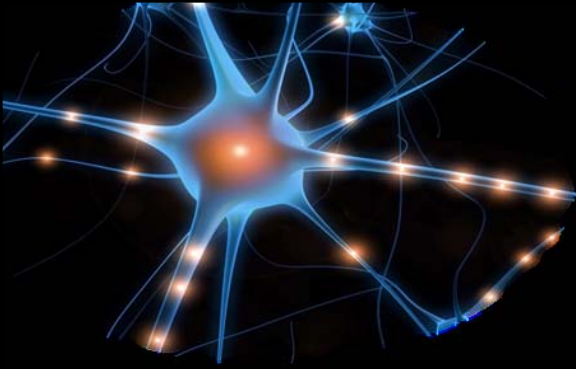
Adapted from, *Learning to Study Through Critical Thinking*, J. A. Beatrice



When I write, I:

- 1) Am concerned with how neat and well spaced my letters and words appear
- 2) Often say the letters and words to myself
- 3) Push hard on my pen or pencil and can feel the flow of the words

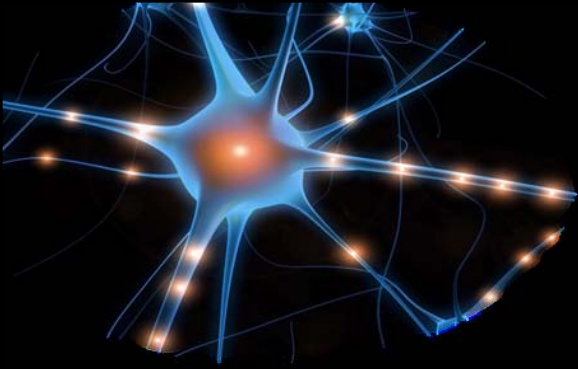
Adapted from, *Learning to Study Through Critical Thinking*, J. A. Beatrice



If I had to remember of list of items, I would remember it best if I:

- 1) Wrote them down
- 2) Said them over and over to myself
- 3) Moved around and used my fingers to name each item

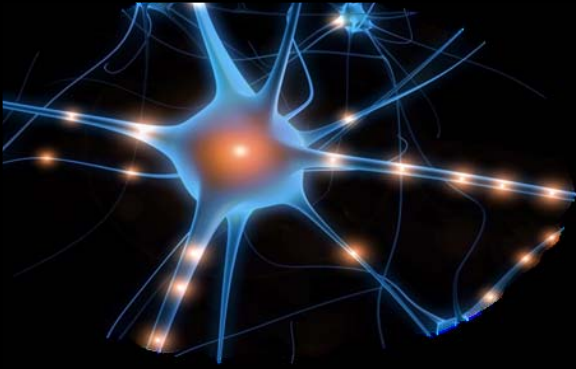
Adapted from, *Learning to Study Through Critical Thinking*, J. A. Beatrice



I prefer teachers who:

- 1) Use a board or overhead projector while they lecture
- 2) Talk with lots of expression
- 3) Use hands-on activities

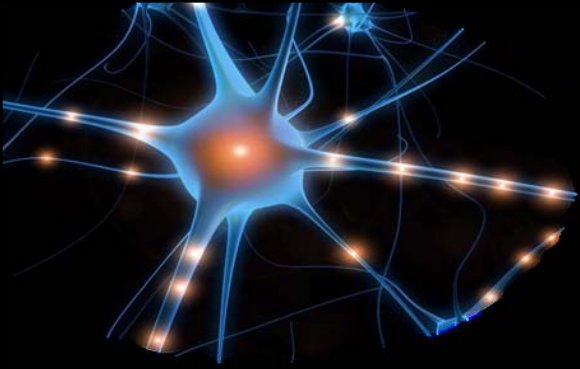
Adapted from, *Learning to Study Through Critical Thinking*, J. A. Beatrice



When trying to concentrate,
I have a difficult time when:

- (1.) There is a lot of clutter or movement in the room
- (2.) There is a lot of noise in the room
- (3.) I have to sit still for any length of time

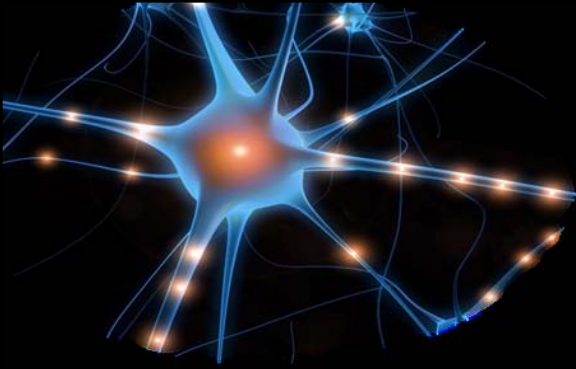
Adapted from, *Learning to Study
Through Critical Thinking*, J. A. Beatrice



When solving a problem I:

- (1.) Write or draw a diagram to see it
- (2.) Talk myself through it
- (3.) Use my entire body of move objects around to help me think

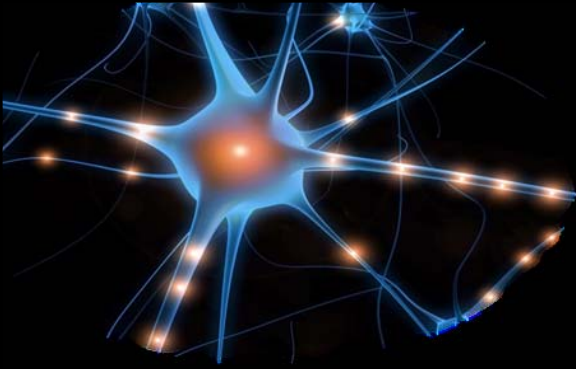
Adapted from, *Learning to Study Through Critical Thinking*, J. A. Beatrice



When given written instruction on how to build something, I:

- (1.) Read them silently and try to visualize how the parts will fit together
- (2.) Read them out loud and talk to myself as I put the part together
- (3.) Try to put the parts together first and read later

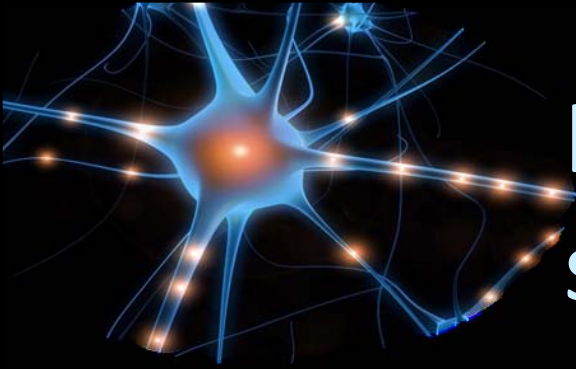
Adapted from, *Learning to Study Through Critical Thinking*, J. A. Beatrice



To keep occupied while waiting, I:

- (1.) Look around, stare, or read
- (2.) Talk or listen to others
- (3.) Walk around, manipulate things with my hands, or move/shake my feet as I sit

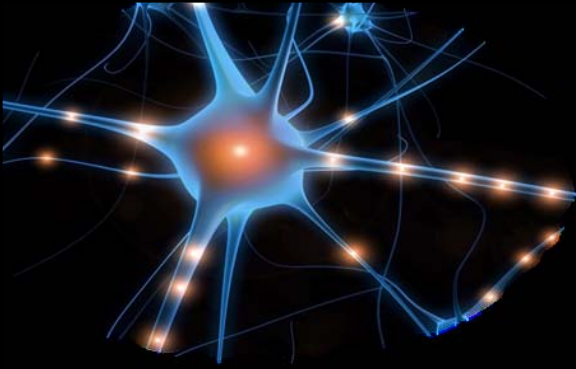
Adapted from, *Learning to Study Through Critical Thinking*, J. A. Beatrice



If I had to verbally describe something to another person, I:

- (1.) Be brief because I do not like to talk at length
- (2.) Go into great detail because I like to talk
- (3.) Gesture and move around while talking

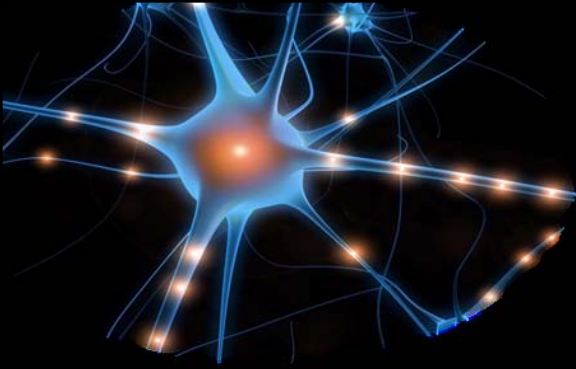
Adapted from, *Learning to Study Through Critical Thinking*, J. A. Beatrice



If someone were verbally describing something to me, I would:

- (1.) Try to visualize what he/she was saying
- (2.) Enjoy listening, but want to interrupt and talk myself
- (3.) Become bored if her/his description got too long and detailed

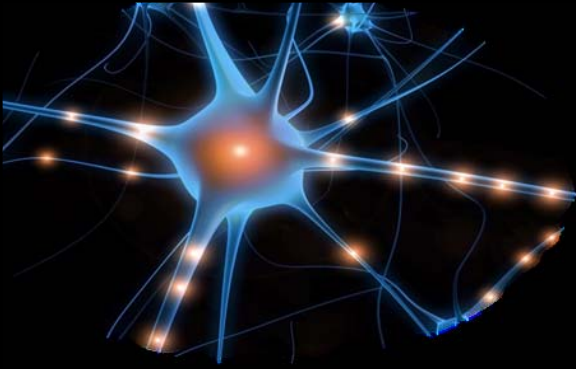
Adapted from, *Learning to Study Through Critical Thinking*, J. A. Beatrice



When trying to recall names, I remember:

- (1.) Faces, but forget names
- (2.) Names, but forget faces
- (3.) The situation where I met the person rather than the person's name or face

Adapted from, *Learning to Study Through Critical Thinking*, J. A. Beatrice

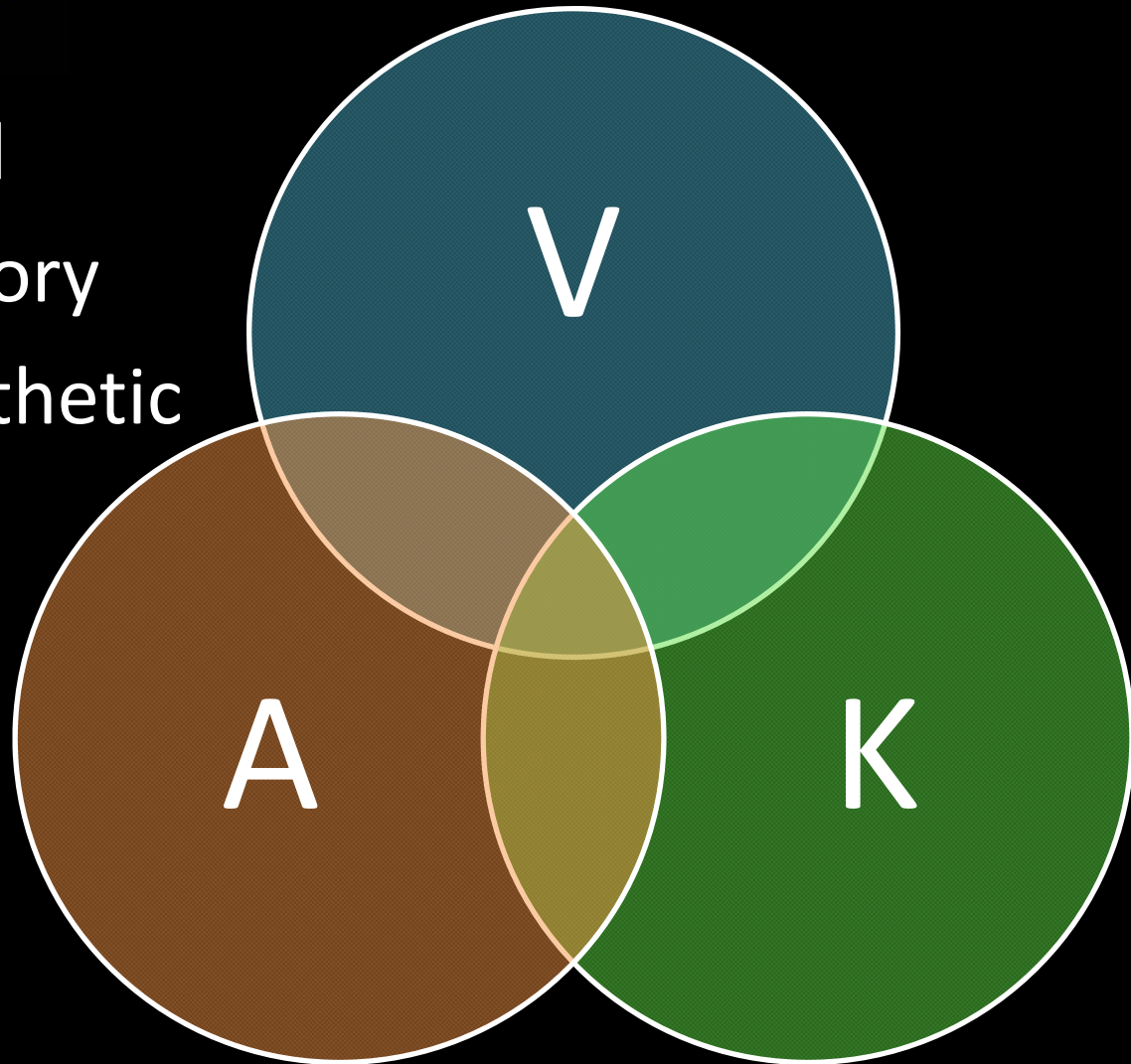


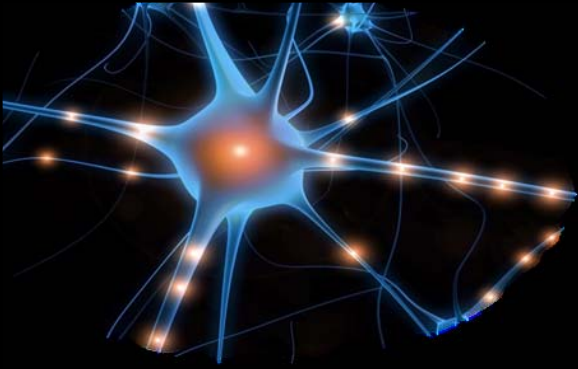
Evaluate your learning style

1 = Visual

2 = Auditory

3 = Kinesthetic

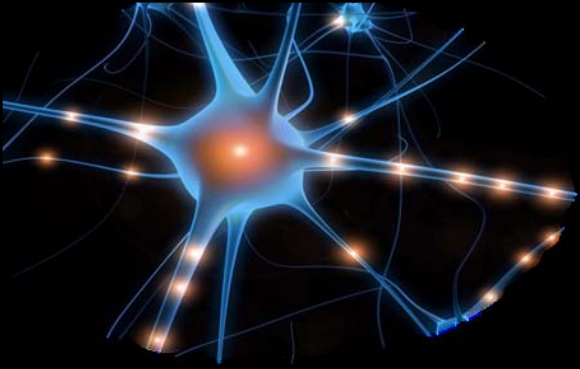




Flexibility

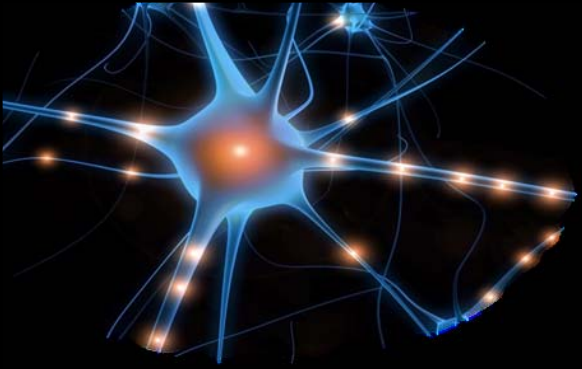
Experiences and assignments that engage all aspects of the cerebral cortex:

- sensory cortex (getting information)
- integrative cortex (making meaning of information)
- integrative cortex near the front (creating new ideas from these meanings)
- motor cortex (acting on those ideas)



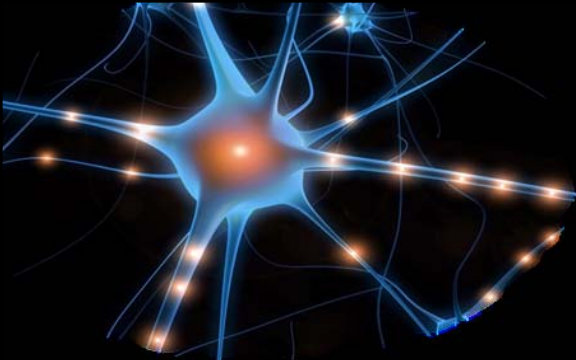
Equitable Use

2. Design of a product, assessment tool, or meeting area is useful and marketable to people with diverse abilities
- Connection to Brain-Based Learning: Preferred and Secondary modality for learning (learning styles)
 - Example: Electronic text of class notes



Simple and Intuitive Use

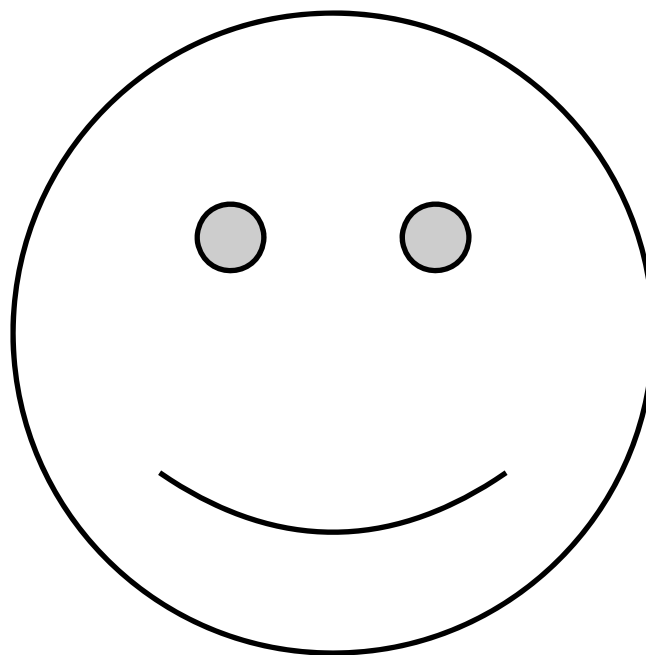
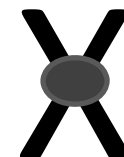
3. Use of the product is easy to understand, regardless of the users of experience, knowledge, language skills or current concentration level.
- Connection to Brain-Based Learning: Cognitive Load
 - Examples: Rubrics, expectations, clear links

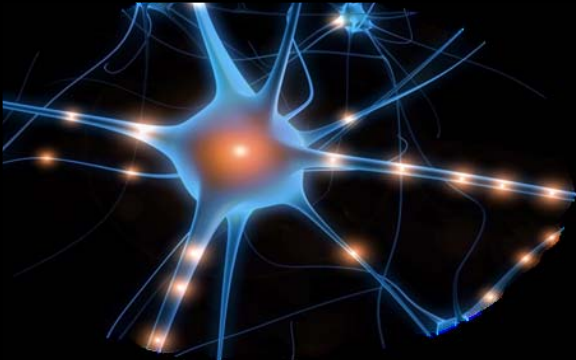


Cognitive Load

Your Name

Date Birthdate





Intuitive Course Menus

- Home Page
- Syllabus / Start Here
- About Prof. Smith

- Weekly Assignments
- Discussions
- Exams
- FAQ Discussion Board

- Tools
- Email
- My Grades

Clear place to begin with the course

Frequently used course tools

Simple menu w/ clear purpose

- Announcements
- Syllabus / Start Here
- About Prof. Smith

- Docs and Assignments

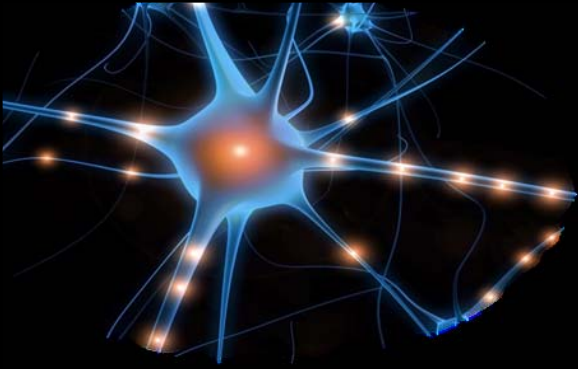
- Weekly Calendar
- Learning Units

- Helpful Resources

- FAQ Discussion Board
- Technology Help
- Library Research Help
- Tools
- My Grades

Sub headers

Offer Help



We Seek and Use Visual Structure

Unstructured:

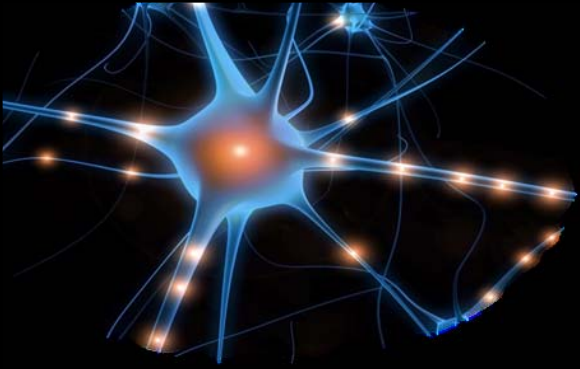
You are booked on United flight 237, which departs from Auckland at 14:30 on Tuesday 15 Oct. and arrives at San Francisco at 11:40 on Tuesday 15 Oct.

Structured:

Flight: United 237, Auckland—San Francisco

Depart: 14:30 Tue 15 Oct

Arrive: 11:40 Tue 15 Oct



Perceptible Information

4. Design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities.
- Connection to Brain-Based Learning: Our brains are trained to see information in a specific way
 - Application/Illustration: Color, structure

The Effect of Visual Priming

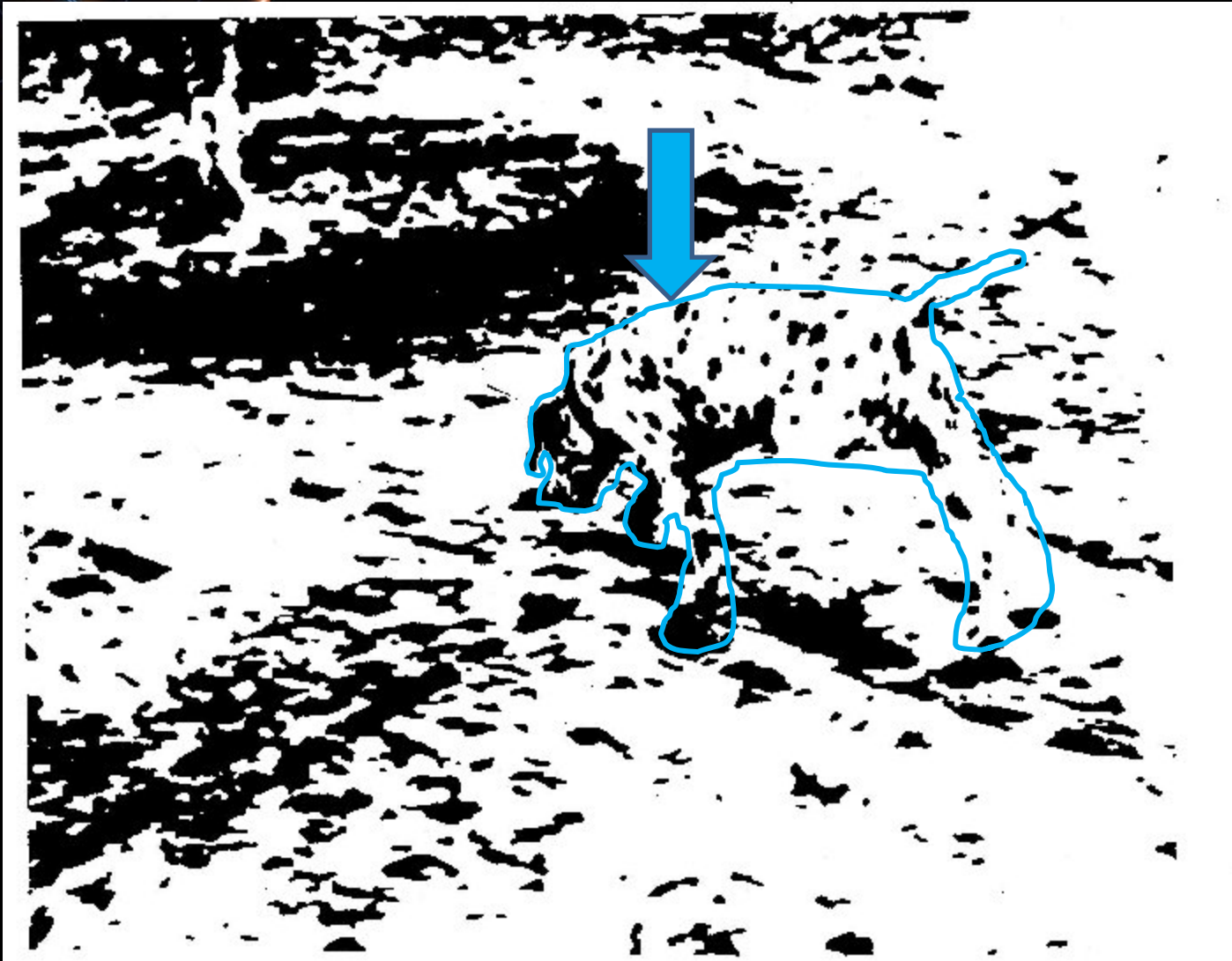
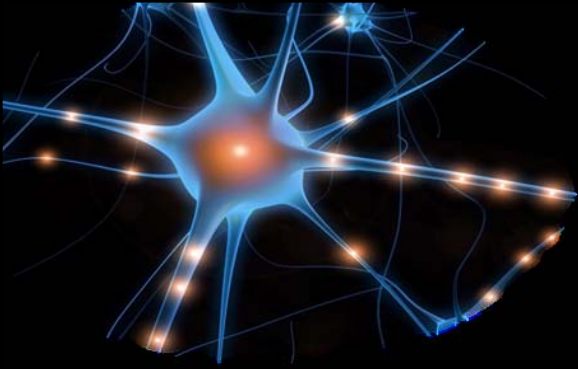


Image by R.C. James. Published in Marr D. (1982) Vision. W. H. Freeman, New York, NY, p. 101, Figure 3-1

The Effect of Visual Priming



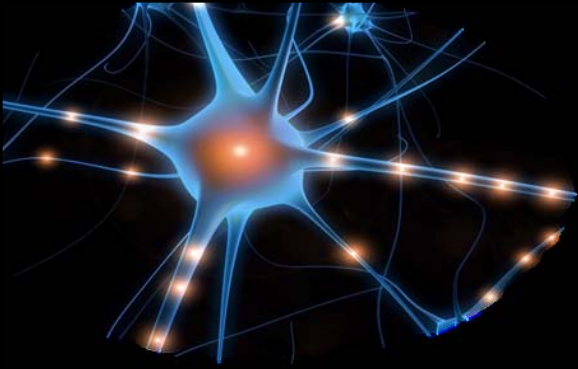
Image by R.C. James. Published in Marr D. (1982) Vision. W. H. Freeman, New York, NY, p. 101, Figure 3-1



Tolerance for Error

5. Design minimizes hazards and the adverse consequences of accidental or unintended actions.
 - Repetition—priming, reviewing, revising
 - Coherence—prior knowledge
 - Error corrections—mistakes, feedback
 - Emotional state—stress

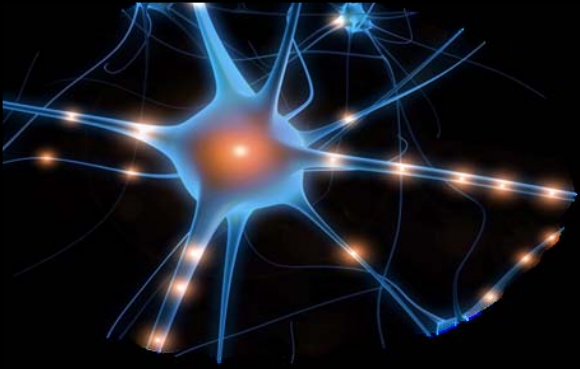




Goals and Learning Objectives

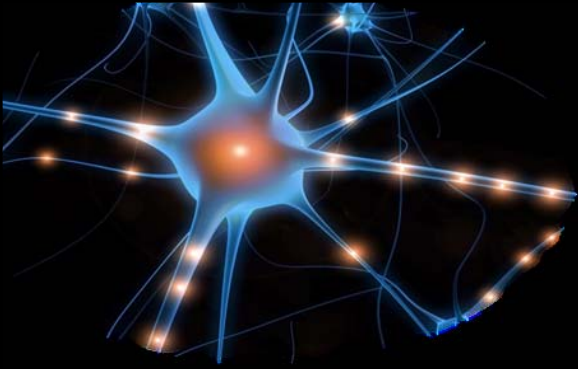
We pay attention to things we know will help us achieve our goals...so we have to understand the goal.

1. Rubrics
2. Detailed instructions
3. Clear learning objectives
4. Samples of what we want



Thank you!

- Lisa Besnoy—besnoyl1@nku.edu
- Sarah Schroeder—schroedersar@nku.edu
- Karina McGill—mcgillan@nku.edu



Resources

Books

- Zull, James E. (2004) *The Art of Changing the Brain*. Educational Leadership
- Jensen, Eric. (2005). *Teaching with the brain in mind*. Association of Supervisory and Curriculum Development.
- Beatrice, J.A., *Learning to Study Through Critical Thinking*

Websites

- The Center for Universal Design, North Carolina State, <http://www.ncsu.edu/www/ncsu/design/sod5/cud/>
- San Jose University, Accessibility. <http://www.sjsu.edu/cfd/accessibility/>