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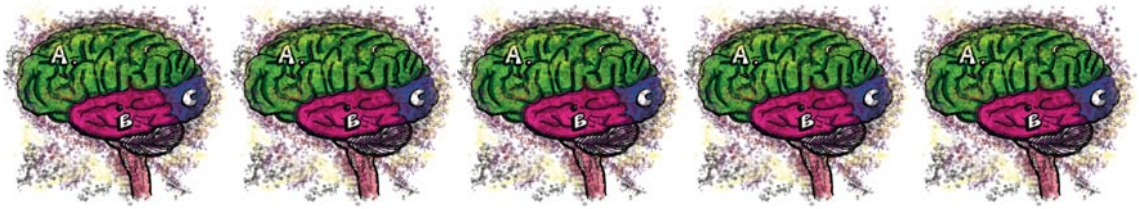
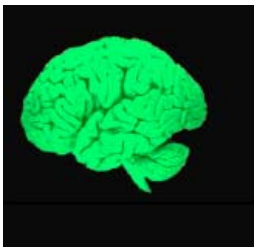
Designing with the Young Mind in Mind

A Brain-Based Case for Designing Performance Arts into the Core of All Future Preschool Education

By Rich Melheim





Your brain craves patterns and searches for them endlessly. In the absence of adequate sensory input, it will even make its own.

– Thomas B. Czerner, MD

I. Preface

A. Patterns, Firings & Wirings

If you have ever seen a person doodling patterns and shapes on a note pad during a lecture, you know the statement above is true. If listeners aren't finding any relevance in what the teacher is teaching – if they see no patterns or connections to their own lives – they will create their own patterns.

Literally.

The brain loves patterns. It organizes itself around patterns. It is constantly searching for patterns to store, patterns to retrieve, and new patterns to connect with existing patterns in its memory array. The brain hungers to make sense of the world. To do that, it needs to recognize patterns. Once the brain is efficient in recognizing a set of patterns, it begins to do amazing things. Read this if you can:

I cdnuolt blveiee that I cluod aulaclty uesdnatnrd what I was rdanieg!

The phaonmneal pweor of the hmuan mind! Aoccdrnig to a rscheearch at Cmabrigde Uinervtisy, it deosn't mttaer inwaht oredr the ltteers in a wrod are, the olny iprmoatnt tihng is taht the frist and lsat ltteer be in the rghit pclae. The rset can be a taotl mses and you can sitll raed.

it wsan't a porbelm. Tihs is bcuseae the huamn mnid deos not raed ervey lteter by istlef, but the wrod as a wlohe. Amzanig huh? yaeh and I awlyas thought slpeling was ipmorantt!

Because you are familiar with the patterns of words and letters, you don't even need to see the letters in the right order for your brain to take over and fill in the gaps of the lines above. It does the work for you… all because of patterns.

Keep this in mind. It will come in handy when it comes to designing learning experiences, platforms and environments that feed the young mind.

B. What is a memory?

Before we answer that question, it is important to know what a memory is not. Contrary to popular belief, a memory is not a bit of information. It is not stored like you store words on a page, letters in a book, or data on a computer disk. Perceptions, thoughts and memories are sets of *electronic signals* firing through the wiring of the brain and body in a synchronized fashion – a simultaneous array of electrochemical waves. Like a movie coming over cable television, a memory is a firing of energy in integrated meaning-making patterns.

How do you set up these complicated patterns to fire and to be retrieved when you want them or need them? That's the most important question a designer of exceptionally effective educational experiences can ask.

Let's begin to explore the answer by starting with the arts – music, dance, the visual arts, and theater. We'll move from there into a crash course in the anatomy of the brain and on to the art of creating long-term memory and meaning using the arts.

Every kind of music is good,
except the boring kind.

– Gioacchino Rossini

II. The Patterning Powers of Performance Arts

A. The Patterning Powers of Music

Finish these phrases:

Flintstones. Meet the Flintstones. They're a…

Come and listen to a story 'bout a man named…

One, two, three o'clock, four o'clock…

Why were you able to fill in the blanks above with "modern Stone Age family" and "Jed" and "Rock" when you may not have given the slightest thought to the "Flintstones" or "Beverly Hillbillies" or "Happy Days" in over 40 years?

Why? Because music feeds the brain what it craves.

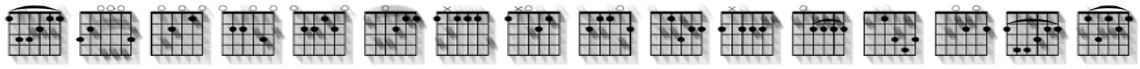
Patterns.

If you have ever caught yourself unconsciously tapping rhythms with a pencil on a desk or tapping your foot on the floor when you were nervous, anxious or bored, you know how a pattern-starved brain controls the body. Your brain was simply not getting enough patterns, so it created its own.

Music is all about patterns. Cords are full of patterns. Rhyming words contain patterns. The melody is a pattern that activates the right hemisphere of the brain.

Rhythm and harmony are patterns that activate the left hemisphere of the brain. The beat of the music travels deep into the sub-brain (cerebellum) and actually starts to synchronize your heart beat and breathing in a pattern. All of these different areas of the brain chatter and link up with one another while the music plays, increasing nerve connections between multiple parts of the brain and codifying them into retrievable memory patterns.

If the human brain and body crave these musical patterns to such a powerful extent that they will create them when they are absent, and if songs that are buried for 40 years can come effortlessly to the surface at the mere mention of the lines that precede them, why wouldn't the educational systems architect build musical patterns into the very DNA of every curriculum, lesson and experience?



B. The Patterning Powers of Movement

You can learn to ride a bicycle at age 5, get off at 10, hop right back on at 85 and immediately ride again after a 75 year break. How is this possible?

Patterns. Firings. Hard-Wirings.

Your entire body became a learning tool when you learned to ride the biks. From the ciliated epithelial cells in your inner ear coordinating balance to the major and minor muscle groups in your arms and legs to the depth perception of your eyes to the emotional connections in your brain ("You can do it! Come to mama!") to the flood of hormones and endorphins released when you finally took the training wheels off, your entire body became the tool that fired, wired, patterned, then hard-wired the "skill memory" across a vast array of neurons, muscles, organs and bones. You mastered this difficult and unnatural skill (we aren't born with this skill) and the whole-body learning experience lasted a lifetime.

Muscle skill memory is a powerful and enriching tool. (Ask Tiger Wood's accountant.) It is among the most easily retrieved of all long-term memories. Not only that, the best of science today suggests that skill memory has an unlimited storage capability in the brain. It is both the most ATTENTIVE and RETENTIVE type of learning an educational systems architect can build into the learning process. Adding dance, motion, movement and sign language at the core of a learning experience connects multiple areas of the brain and body all at once and wires them together in powerful meaning-making patterns.

Why is this so? One of the reasons has to do with all of he connections that movement fosters across the body. (We'll get to that in a minute.) One of the reasons has to do with two molecules that movement brings to the brain.

Oxygen and Glucose

There is a barrier between the blood and the brain. It's called the "blood-brain barrier." (Creative, huh?) There are only two natural molecules small enough to make it through this barrier: oxygen and glucose. Moving your body floods the brain with both. The higher the oxygen level in the brain, the more it can focus and stay alert.

What happens to learning when you connect music AND movement at the core?

First off, it is important to recognize that music IS movement. When you sing, you move your diaphragm up and down, breathe harder, and connect a whole array of muscles together, stimulating the brain. A myriad of new connections (synapses) appear. Neurons throughout the body link with neurons in the brain to memorize the song.

Add dance, movement and sign language to the song and you connect exponentially more neurons throughout the body with the meaning of the song while pumping glucose into the brain. Glucose creates the "glue" (Glial cells) that holds neurons in place and insulates them to make them fire more efficiently. Every time the song and movement are repeated, synapses get more and more efficient in recognizing a whole array of sensory input. The song, sign and dance together become a powerful pattern that the brain can easily recall, retrieve and relive. This imprint is so potent that even by closing your eyes and visualizing a song and movement, your brain will retrieve the pattern from its memory banks and allow you to reinforce it.

Picture a child lying on a mat in the middle of the floor with eyes closed, visualizing a song and dance about the order of the planets. "What are you doing?" asks the parent. "My homework!" answers the child.

The Fun Factor

Aside from the oxygen and glucose you get while singing, dancing and signing a lesson, watching your friends sing and sign can be fun, too. This positive emotional boost pumps a dozen or more memory-enhancing neurotransmitters (adrenalin, serotonin, and dopamine) into the blood stream. By adding dance, song and sign to a lesson, the motor cortex in your frontal lobe connects to the internal gyroscope in the bones behind your ear, which connects to your somatic sensory cortex in the parietal lobe, which registers the location of your arms and hands in space. (Okay, that is more than you want to know.) Suffice it to say, teach with song, sign language and dance, and you'll be feeding the brain the patterns it craves, the firings and wirings it needs, and the chemicals it feeds on to solidify the learning in place. Forever.

If adding movement and muscles to music at the core of a learning experience can tap into the unlimited storage capacity of skill memory and create experiences at 5 that can be retrieved effortlessly at 85, why wouldn't the educational systems architect build muscle movement into the very DNA of every curriculum, lesson and experience she designs?

C. The Patterning Powers of Art

We've learned about the patterning powers of music and movement at the core of a brain-based approach to designing educational curriculum, methods, and environments with the young mind in mind. Now let's look at art.

Why Teach With Art?

Because the chatter of a hundred billion neurons is hard to silence. If one is to get the attention of the child's brain (or any brain, for that matter), one must make a compelling, chatter-silencing case for the brain to focus upon. Art does that. It triggers the attention of huge groups of neurons in your cerebral cortex. When a portion of a group of neurons is stimulated, the whole neural set will fire and you will see and remember. Art has a way of involving the whole brain in interpretation. The right side of the brain processes colors, symbols, pictures and

relationship. The left side of the brain processes words, sequences, and logical detail. The right likes to see the whole picture. The left focuses on the parts. Striking, novel art also has a way of getting the attention of the brain's curiosity centers. Chemically, this creates an anticipation event that activates multiple centers of the brain and floods them with alertness, attention and arousal neurotransmitters.

What does art have to do with patterns, firings and wirings?

The human ear can process up to 10,000 bits of information per second (bps). At maximum bandwidth, the human eyes can process up to 7 billion bps. With this in mind, a picture is not worth a thousand words. It's worth 700,000 words. Leonardo Da Vinci said, "I hear it and it's gone. I see it and it's there again! It's there again! It's there again."

Art connects to the visual cortex, but it does a lot more. Color, contrast, and the emotional content of the art – all theses add recognizable patterns. Karaoke letters flashing on a screen, animated Edutoonz that "prepete, pete, and repeat" the words, numbers and learning of the week, beautiful paintings inspiring the mind, along with art that the children create themselves - all these add a rich tapestry of depth to the learning experience. Bombarded with a sensual array of sight, sound, motion, emotion, fun, and meaning – the gatekeepers of the brain have no choice but to send the information through from short-term to long-term memory centers.

Sing it. Sign it. Dance it. Draw it. Splash it across a large canvas with finger paints. Draw it on the sidewalk with colored chalk. Cut it out of magazines. Glue it together with junk drawer treasures. Make it out of jello, feathers, walnuts, ice, SPAM sculptures. Touch the art. Smell the art. Taste the art. Watch an animation or film, then create an animation or film. See a part of the lesson, then BE a part of the lesson. Create a work of art on the theme, name it, then frame it and hang it on the wall in a weekly gallery. Applaud it. Toast it. Celebrate it in a weekly exhibition and photograph it before you let it out of your sight. Tell your teachers, friends, parents and strangers about it. Bring it to a nursing home, a veteran's hospital, a flea market, a sidewalk sale. Teach others about your art and ask them about theirs. Build the numbers, letters, colors, shapes and animals of this week's lesson into a collage and post the art online for the world to see! Podcast the young artists' voices telling about their work. Call a famous artist, photographer or film maker on the speaker phone and ask them questions about their art, then show them what you have done. Take the works home and recreate them with parents seven nights a week.

Picasso said, "Art is the lie that helps you see the truth." Go deep, deep, deep into the "why" behind the "what" and draw out the pathos, the humor, the emotion, the truth behind the canvas.

Every way you interact with the art becomes another learning experience, another myriad of neural connections, another road to take towards deeper meaning. Create the student as the teacher, and the teacher as the student of the young artist.

Make every lesson a work of art and every work of art a lesson. You will create life-long lovers of learning and students who find it natural and necessary to teach.

If the word “education” in Latin “education, educo, educare” literally means “to lead/draw out” and a picture is literally worth 700,000 words in terms of the impact on the brain, why wouldn’t the educational systems architect build art patterns into the very DNA of every curriculum, lesson and experience?

D. The Patterning Powers of Theater

Drama involves pretending in a variety of situations. It helps children develop imagination, language skills, cooperation and other social skills, confidence, and creative expression. – Illinois Early Learning Project

“Good teaching is ¼ preparation and ¾ theater.” – Gail Godwin

“The play’s the thing wherein I’ll catch the conscience of the king.” – Hamlet, Act 2, Scene 2

“If you’re going to tell the truth, you’d better make them laugh or they’ll kill you.” – George Bernard Shaw

“In the quality school, everyone is the teacher.” – Bill Glasser

“If you don’t plan the drama, the comedy, and the tragedy in your classroom, the kids will plan it for you.” – Rich Melheim

Okay. Okay. Drama is good. But why put it at the core of a learning environment?

Chemically, having fun with drama, enjoying the acting with your friends and hearing the applause from the audience pumps the reward neurotransmitter dopamine and the “upper” epinephrine into the brain. Dopamine gives you energy, stimulates further neural growth, and increases positive attraction toward people and where the affirmation occurs. Affirmation in this context builds a love of learning, increases bonding, and increases greater flexibility in the brain’s executive attention system. Epinephrine helps the brain focus. Whenever epinephrine is released, its sister chemical, norepinephrine rises throughout the body, stimulating the expansion of your capillaries and fostering even more blood flow to the brain. The result? Alert students ready to learn! Even more, norepinephrine helps fix long-term learning by stimulating the amygdala. (See below) Dress-ups, role plays, participation stories, creative movement, acting like animals, acting like adults – all of these methods feed the brain healthy chemicals and give the young child room o blossom, grow, experiment, experience, and enjoy the learning process. They flood the brain with stimulating chemicals, build billions of healthy neural connections, and add joy to the learning process. A little fun, a little applause, a little recognition, and a little attention go a long way!

If activities that cause dopamine, epinephrine and norepinephrine to be released will be associated with pleasure (leading children to want more and more of the activity associated with it - in this case, learning), alert attention and long-term retention, why wouldn’t the educational systems architect build performance arts into the very DNA of every curriculum, lesson and experience?

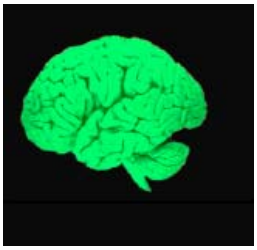
En-Ter-Taining Patterns

Does all this sound too much like entertainment to you to be education? Before dismissing it, look for a pattern in the word en-ter-tain.

En means in or into. *Ter* (territory, terra, terrain, terrarium) means the land. *Tain* (contain, retain, obtain, fountain) means to hold. The word en-ter-tain literally means to “enter their land and hold them.” That sounds like an excellent teacher’s daily mission.

You can’t expect the child to enter your world. You must enter their land if you are to hold them. And the only way to enter their brain - the only way to hold their attention is through relevant and recognizable… Patterns! What makes something irrelevant and unrecognizable? The lack of meaningful patterns. What makes it meaningful and relevant? You recognize some familiar patterns and the brain calls out for more. What does this have to do with education, memory and designing systems with the young mind in mind?

That’s what the rest of this white paper is all about. But first, a crash-course on memory in the macro and micro.



I never teach my pupils; I only attempt to provide the conditions in which they can learn. *– Albert Einstein*

III. Memory in the Micro and Macro

In order to truly understand the basis of memory and design teaching tools to maximize long-term retention, let's take a look at memory on the molecular, cellular, then structural levels.

A. Molecular Memory

Picture a wall with a gate. The gate is locked with a magnesium lock. Unless you have at least two keys, the locks aren't going to open. That's how memory works on a molecular level. A spaghetti-like protein responsible for long-term memory called the *calmoldulin* is the gatekeeper. This structure can't and won't open the lock unless there are at least two simultaneous stimuli knocking on its door. (It actually looks like a little gate in your nerve cell!) Technically speaking, if you don't provide at least two stimuli, the *calmoldulin* won't unlock the magnesium lock and release the calcium ions that create the long-term potentiation that forms a memory. (Okay, that's more than you wanted to know.) Suffice it to say, you've got to open the molecular gates with at least two keys for long-term memory to occur on a molecular level. Knocking lightly on the cell door with only one stimulus won't do the trick. Keep that thought in mind as we move from the molecular to the cellular basis of memory.

B. Cellular Memory

Your brain contains 100 billion nerve cells – as many as all the stars in the Milky Way galaxy. There are quadrillion connections between these neurons – as many as all the phone calls made in the world in the last twenty years. There is a physical pathway connecting nearly every part of your brain with every other part. Not only that, but these neural connections extend far beyond the brain, itself, to every part of your body.

1. Neurons (Nerve Cells) An average nerve cell, the color of raw liver and the consistency of an avocado connects electrochemically with an average of 10,000 other nerve cells. Neural signals are not confined to your head, but travel through an amazing maze – an information super-highway of unfathomable complexity and overlapping wiring. These tentacle spies reach out to sensory outposts in every part of your body. In a very real sense, your mind extends to your fingertips.

Here's another strange truth: you don't just have memories in your brain. Memories are stored in every nerve cell in your body. You actually have memories in your arm, your liver, your eyeballs, and your feet. If, as neuroscientists believe today, nearly every part of your brain is involved in nearly everything you do, then nearly every part of your body is also connected to nearly everything you think, feel, learn and experience. Memorization on a neural level is all about building, maintaining, and strengthening connections and patterns of connections between the neurons of the brain and body. The more connections - and the more repetition to solidify those connections - the better your chances of creating long-term retention of what you are trying to learn.

2. Glial Cells (Memory Glue) Aside from neurons, an increasing bit of attention has been paid recently to another type of brain cell – a glue cell made from glucose that provides several maintenance functions for the brain. These mysterious, yet abundant, glue cells (glial cells) provide structural support in the brain, lay down markers to tell nerve cells where to grow, facilitate waste removal, and maintain nutrition in the brain. They provide one additional function that will relate to our singing and signing Scriptures: they insulate the wiring of the neurons with a little fatty sheath – myelin – to help the nerves fire more efficiently. As with electrical wires, the more insulation, the better the connection.

C. Structural Memory

The human brain is made up of three major mainframes, a number of smaller processing centers, dozens of sensory input devices (to process what you see, smell, taste and touch), and an unusual collection of chemical messengers that affect who we are, what we perceive, what we believe, how we react, and how we remember.

1. Mainframe I: The "Autopilot" Brain (Medulla) The brain stem, or medulla, is the non-thinking part of your brain. It automatically (autonomically) maintains and regulates your pulse, blood pressure, temperature, and other vital signs. You can get to this autopilot through meditation, and other focusing techniques, but it takes great concentration and practice to tell it what to do and how to behave. The easiest way to adjust it is through the cadence and beat of music.

2. Mainframe II: The "Emotional" Brain (Cerebellum) The cerebellum sits above the automatic portion of your brain and takes care of your instincts,

emotions, and feelings. Your genuine smile or frown comes to you sponsored by this brain. So do ritualized movements like serving a tennis ball, driving a car, or signing a song. Over the last decade, scientists have learned that emotions fire along the same brain circuits that govern social relationships and the processes of making meaning. Emotions are integrated with cognition, perception, and physical action. They affect not only the state of your body and mind, but they also enhance or impede your memory. Music has a profound power to set moods in place in this center of the brain.

3. Mainframe III: The "Thinking" Brain (Neo Cortex) Crowning the top of your head is a wrinkled 1/2 inch maze of overlapping wiring called the cognitive or cerebral neo cortex. This mainframe takes in most of your sensory information and controls the majority of higher thoughts. It decides whether or not it is appropriate to feel as bad as you do; whether or not you should act or refrain from acting based on your best interest; and whether or not you give a rip about what the teacher is saying if doesn't appear to have relevance or meaning. This brain serves as the long-term memory hard drive and retrieval system for all that you think you know, and much of what you actually do.

The neo cortex is made up of two halves (hemispheres). The left brain works faster than any computer in the world and loves to process details. It controls complex voluntary movement and calculations, while the more artistic and intuitive functions are performed better by the right half. The right carries with it a sense of the whole as seen separately from its parts. It is spontaneous, creative, and able to modify mid-course. The right half of your brain sees the forest. The left half sees the trees. (And in some people, the bugs on the trees.) Sitting between the two halves and connecting them into a whole is a big body of wiring called the corpus callosum ("big body" in Greek). The more these two sides of the brain talk, the more firing in the wiring between the two, the thicker the connections there will be and the deeper you will understand a subject.

4. Processor I: The Short-term Scratch Pad (Hippocampus) There is a seahorse-shaped apparatus called the hippocampus tucked between the two hemispheres of your brain. (hippo = horse in Greek) This device converts current daily events into storable memories. When you first see, sing, sign or experience something, that data is sorted, classified, and stored for a while in this short-term memory center. The moment you repeat it, it moves from the scratch pad into the long-term memory centers of the neo-cortex. Learning something new and then repeating it a short time later is a powerful way to move it from short-term to permanent storage. In fact, it is the only way to move it and mark it for later retrieval.

5. Processor II: The Gate Keeper (Thalamus) There is a guard at the door of your brain's long-term memory center. This guard, called the thalamus, controls what goes in and what goes out of the neo cortex. It is not a relay station but a check point to the deeper brain. The thalamus is a discriminating gatekeeper. It has to be. Billions of competing messages bombard it every second. Most are

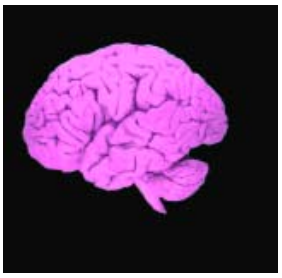
blocked out. Only the few chosen ones get through. Your ears are processing 10,000 bits of information per second. Your eyes are processing 7 billion bps. Estimates are that you are only consciously aware of 1/10,000 of the information that assails your brain every second. Without a good guard at the gate, you likely would go mad with sensory overload.

How do you get a message beyond this gatekeeper to the deeper brain? How do you convince it to allow information through to long-term memory? With all of the competing chatter going on in the wiring, you've got to bombard the guard. Your only hope of getting through with whatever it is you are trying to teach, is by creating a multi-sensory attack on the guard post. The more senses you employ, the more convincing, compelling, challenging, novel, coherent, pattern-driven sensory bombardment you can create, the better the chances that your message will get through. It is the synchronous bombardment and stimuli from a variety of sense organs that pounds on the doors of the thalamus – the sensory gateway – and tell it "Listen to this!" and "Let us in!"

You've got to hit it with your best shots again, and again, and again. Or, as Winston Churchill liked to say: "If you've got a point to make, you must hit it once! Hit it twice! Then grab a tremendous hammer and give it a tremendous whack!"

6. Processor III: The Emotional Filter (amygdala) Emotion and memory are more connected than most people think. The reason for this is an almond-shaped structure called the amygdala. Connected to most areas of your brain – especially the advanced sensory processors – this fingernail-sized dynamo actually selects those experiences that your brain will choose to remember. Only those events that connect strongly with the emotions, create meaningful patterns, and unlock the magnesium locks will be marked for future recall. (i.e., long term memory) The amygdala's earliest fears, impressions, and pleasures are nearly impossible to dislodge. Some think that the amygdala is the one part of the brain that never forgets. For this reason, you want to design all emotional exchanges within your small groups to be positive, affirming, direct, fun, and creative. You don't get a second chance to make a good (or bad) first impression when it comes to the amygdala. You'd better make the first shot count.

7. Sensory Input Devices: The body may have five major input devices (eyes, ears, nose, mouth, skin), but it has billions of listening posts sending information to central command at every given moment. You understand complex topics better when you experience them with rich sensory input. You want depth in learning? Increase the number of neurons involved in your learning process. You want long-term retention of the materials you are teaching? Increase the number of synaptic connections between those neurons. If you sing a verse, sign the verse, dance the verse, act the verse, draw the verse, add form and color to the verse, you add depth and meaning to it. You give your brain more reasons to notice it first, store it second, and retrieve it later on.



To sentence a person of true genius to the drudgery of a school is to put a racehorse on a treadmill.
– Samuel Taylor Coleridge

VI. Why Performance Arts (Brain-based Learning) at the Core of Education for Small Children

A decade ago the University of California at Irvine did a study on the effects of music on small children. One group of 3 year olds were exposed to piano lessons and singing daily, the other was not. After eight months, the musical preschoolers scored 80% higher in puzzle making than the non-musicians. 80%! They found that music trains the brain for higher forms of learning. Music is math. It expands the potential for understanding special intelligence – and nearly everything else!

One can learn a new song, new vocabulary words, new math concepts at any time in life, but before age 12 the brain is set up to learn it a whole lot easier. Henry Kissinger came to America at 12. His brother was 10. Kissinger speaks with a strong German accent. His brother has no accent!

Prior to puberty, the brain is operating at 1/250,000 of a second. At the onset of puberty, it slows down to 1/150,000 of a second. The child's brain is almost twice as efficient at grasping and holding the language, math skills, science and social skills, as it will be when their hormones kick in. Neglecting to employ the BEST learning techniques as early as possible is simply lousy stewardship. Suffice it to say, you've got to start young.

You get the hockey protégé on ice skates young or they won't stand a chance. You get a young child on stage, into music, and onto the canvas young, and you'll create a life-long learner who is also a life-long teacher. The earlier you learn to love learning and feel successful at it, the greater the chance you will crave it, seek it, revel in it, share it with your friends, and love it the rest of your life. Like no other tools, Performance Arts lead children to love learning. Like no other tools, they feed the developing brains exactly what they need to grow, thrive, and crave more. Like no other tools, they should be at the core of everything we try to teach if we claim to teach with the young mind in mind.

In Conclusion

“Neurons are greatly influenced by the company they keep,” says Dr. Thomas Czerner. What company are most of our neurons keeping in the under-challenged, mindlessly doodled, pattern-starved, teach-to-the-test school?

On the molecular level, we have discovered that without at least two types of simultaneous stimuli, an individual molecular gate won’t open. Without the gate opening, an individual nerve cell won’t fire. Without multiple nerve cells firing a massive sensory bombardment of information, the brain won’t recognize patterns and register what we are trying to teach or recall. If we take this brain science seriously, it will force us to rethink how we teach everything. How we design and create our lessons, testing, learning tools and learning spaces.

The word “education” comes from the Latin *(educatio)* - meaning to lead out or draw out. Adding music, movement and art draws out and engages the young mind like nothing else. If we want to teach something the young learners will be able to draw out for the rest of their lives, why wouldn’t we have them literally draw it out on paper now? If we are serious about putting patterns into their brains that they will be able to retrieve years later, why wouldn’t we teach with more than the spoken word? Why wouldn’t we employ the eyes, ears, mouths, muscles, emotions, and the one sense that is often forgotten in the classroom - the sense of humor? If we want to optimize memory, why wouldn’t we use every asset in our brain-based arsenals, and put those patterns in place at the optimal moments in a child’s life?

If we take the young developing minds seriously, we must re-engineer our classrooms into theaters of the mind, hearts, and arts. Performing Arts – music, movement, visual arts and theater - must be quickly and intentionally designed into the DNA of every learning experience. Our classrooms need to look more like performance centers, art galleries, and dance halls than straight-rowed, droning, sterile centers of one-directional teaching. Why?

Because the Performance Arts work. Because they teach the way the brain learns. Because they create patterns that cross all portions of the brain and reach beyond the brain to neurons throughout the body. Because they will turn the next generation of children into active participants in their own education. Because they are filled with joy, surprise, and fun, and these gifts change the child. The parent. The teacher. The society. The world.

Rich Melheim
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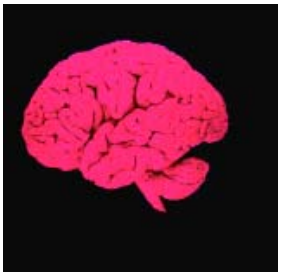

You gotta open the kid before you open the book.
– Rich Melheim

V. Ten Brain Books Worth a Second Read

1. What Makes You Tick (The Brain in Plain English), Thomas Czerner, MD
2. Brain-Based Learning (The New Science of Teaching & Learning), Eric Jensen, MD
3. The Scientist in the Crib, Alison Gopnik, Andrew Meltzoff, Patricia Kuhl,
4. On Intelligence, Jeff Hawkins
5. Joyful Fluency, Lynn Freeman Dhority
6. Becoming a "Whiz" at Brain-Based Teaching (Make Every Year Your Best), Marilee Sprenger
7. Primal Teen (What New Discoveries About the Teenage Brain Tell Us), Barbara Strauch
8. Tools for Engagement (Managing Emotional States for Learner Success), Eric Jensen, MD
9. Drawing on the Right Side of the Brain (Enhancing Creativity/Artistic Confidence) B. Edwards
10. A Celebration of Neurons (An Educator's Guide to the Human Brain) Robert Sylwester
11. Great Preschools, Tamara Will, Karen King & Michelle Mergler
12. Okay. This article is pretty good, too. Rich Melheim

Our favorite source for brain-based learning materials and seminars:
www.thebrainstore.com