The Highly Effective Teaching Educational Model
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The Highly Effective Teaching model is a brain-compatible model grounded in the biology of learning, effective instructional strategies, and the development of conceptual curriculum. Formerly known as ITI (Integrated Thematic Instruction) and developed thirty years ago, the HET Model has been successfully replicated nationally in educational institutions serving rural, urban, and suburban communities. It includes proven strategies and methods for student learning, teaching and administrative management. Independent research has provided evidence of significant gains in student achievement using the Highly Effective Teaching Model.

Three independent areas of best knowledge and best practice form the structure of the HET model.

Growing Responsible Citizens

1. Research on the biology of learning has given us a window on learning never before realized in the history of civilization.
   - Translate the biology of learning into practical application
   - Implement the nine bodybrain-compatible elements
2. Teaching strategies that align with the way the human brain learns have the greatest impact.
   - Design the physical classroom to support long-term learning
   - Create workable teams of students
   - Develop classroom management that uses agreements, procedures, Lifelong Guidelines and LIFESKILLS
3. Curriculum development by classroom teachers makes learning meaningful.
   - Anchor curriculum to a yearlong theme and rationale
   - Align district and state learning goals within the theme
   - Orchestrate being there experiences tied to meaningful content being there.
   - Reach out to the community

In addition to the Five Learning Principles, the Highly Effective Teaching (HET) Model provides Bodybrain-Compatible Elements and Conceptual Curriculum embedded with state standards, as well as an effective means for creating a classroom culture with character education.

- Ten Bodybrain-Compatible Elements
- Five Components of HET Curriculum
- Lifelong Guidelines and LIFESKILLS

The HET model begins with an understanding of Five Learning Principles derived from the neuroscience of bodybrain research and is implemented through instructional strategies:

- Intelligence is a function of experience
- Learning is an inseparable partnership between brain and body
  - Emotion is the gatekeeper to learning and performance
  - Movement enhances learning
- There are multiple intelligences (ways of solving problems and/or producing products)
- Learning is a two-step process:
  - Step one: Making meaning through Pattern-Seeking (input)
  - Step two: Developing a mental Program for using what we understand and wiring it into long-term memory (output)
- Personality impacts learning and performance

For more information on concepts and functions from current brain research, check out the Explanation of HET Brain Functions provided by retired Associate Ann Ross.

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Ten Bodybrain-Compatible Elements of the HET Model

The Highly Effective Teaching (HET) Model provides a way of conceptualizing the orchestration of a Bodybrain-Compatible learning environment by implementing the science of learning (how the brain learns) and its implications within the classroom for schoolwide improvement. Originally developed by Susan J. Kovalik as the ITI (Integrated Thematic Instruction) Model and continually updated, the Highly Effective Teaching Model is currently used in hundreds of school districts across the United States and locations throughout the world. Regardless of the language, culture, ethnicity, or socioeconomic status of the student community, its outcomes are the same: quantum leaps in student achievement and a lifelong love of learning.

The Ten Bodybrain-Compatible Elements of the HET Model are the primary ways of translating the research of neuroscience into action within the classroom. These ten elements are:

**Absence of Threat / Nurturing Reflective Thinking**
Threat, either real or perceived, significantly restricts (or eliminates) the students’ abilities to engage fully in the learning process. Instructors must orchestrate a safe learning environment free of anxiety, where no threat is present (either real or perceived) and all participants feel safe to share, learn, explore, and exist in a culture of respect. Create an environment filled with meaning to invite thoughtfulness, introspection, and the mental habit of thinking things through.

**Sensory-Rich "Being There" Experiences**
"Being There" experiences are rich in sensory interaction in real-world locations where all 20 senses and mirror neurons can be activated. "Being There" locations anchor curriculum for students by illustrating how the concepts and skills appear in real life and how those who work at or visit the location interact with the environment and perform tasks with resources that are available to them.

**Meaningful Content**
Meaningful Content is determined by each learner. It digs deeply into the learner’s pool of intrinsic motivation and provides focus for the ever active brain, harnessing attention and channeling effort. When the content of the material being taught is meaningful to learners, it builds conceptual understanding, and can be experienced – thus providing real-life context and engaging students in the learning process.

**Enriched Environment**
The learning environment should reflect a healthful, inviting, and comfortable setting providing an immersion area with many resources from which students can learn. Special emphasis should be placed on real places, people, and objects to provide real-life context for that learning. The enriched learning environment is bodybrain-compatible in that it has designated areas for further exploration of material, group work, team projects, reflection, and movement.

**Movement to Enhance Learning**
Current brain research has revealed that the body and mind are a partnership – one cannot be developed without the other. This has confirmed the importance of movement in a learning environment. Movement is critical to every brain function, including memory, emotion, language, and learning. Therefore, movement activates and focuses the bodybrain systems for optimal learning.
Choices
It is clear that all students do not learn in the same manner, nor do they have the same interests. Parents know this and so do teachers. In HET classrooms, students are given options (Choices) to demonstrate understanding through multiple intelligences, higher level thinking, and personality preferences so that students can master required curriculum, explore potential career interests, and acquire the skills to be lifelong learners.

Adequate Time
It takes time to extract meaningful patterns and it takes time to acquire useful programs. Enough time must be given so each learner can thoroughly explore, understand, and use ideas, information, and skills. One of the greatest gifts a teacher can give the student is adequate time to sort through the information, establish the meaning of it all, develop a mental program for using and remembering what is learned, and apply what is learned to his/her own personal life.

Collaboration
The use of the word "collaboration" (rather than cooperation) is deliberate. *Merriam-Webster's Dictionary* states: "the act of working jointly with others or together especially on an intellectual endeavor." This means working together toward a common goal – mastery. This leads toward career skills in communication and interaction for solving problems, exploring, and creating when learning or performing.

Immediate Feedback
Immediate feedback is a necessary element in the successful learning environment – both for pattern-seeking and for program-building (the two steps of the learning process). Receiving feedback that is immediate and ongoing ensures effective first learning by assembling sensory input into understandable components and allowing the correct use of what is understood as well as orchestrating the situation for students to explain to others what is learned.

Mastery (Application)
The focus must be shifted to what is learned – what the student understands and can do with it – rather than on what was taught or covered by the instructor. A focus on Mastery ensures that students acquire mental programs (step two of the learning process) to use what is learned in the real-life situations and that such programs get stored in long-term memory.

Five Curriculum Components of the HET Model

The *Highly Effective Teaching* (HET) Curriculum is Bodybrain-Compatible and designed to enhance the Two-Step Learning Process: pattern-seeking, and program-building while embedding state/educational standards. Effective curriculum is founded in sensory-rich experience, uses a concept to integrate content, knowledge, and skills from multiple subject areas, offers student activity choices, and extends relevant learning beyond the classroom into real-life situations.

All decisions about curriculum should be made in response to the findings of current brain research. The curriculum content must be meaningful, mentally and physically engaging, and include a vastly increased amount of sensory input to stretch the learner beyond the worksheets, textbooks, videos, and/or internet searches.
Five Components of HET Curriculum

- Sensory-rich *(being there)* or simulation) Experiences
- Organizing Concept
- Key Points:
  - conceptual key points
  - significant knowledge key points
  - skills key points
- Inquiries
- Social / Political Action

Sensory-Rich Experiences

The trademark of bodybrain-compatible curriculum in the HET Model is based in sensory-rich *being there* study locations or simulations while using an organizing concept to integrate content and skills from multiple subject areas. The two most convincing findings from brain research which support this are:

1. The need – the absolute requirement – for full sensory input to the brain through all 20 senses
2. the importance of emotion and movement in the bodybrain learning partnership

Anchoring curriculum and instruction in sensory-rich *being there* study locations or simulations meets both requirements. Content should expand and connect relevance to the real world – a backyard, a mall, a park in the neighborhood, or a grocery store. Effective teachers provide connections to real places where real people go to meet their needs. Even selecting locations within the boundaries of the school property provides more opportunity to experience than is provided by remaining in the classroom. Resources are expanded when choosing locations near the school where the student can frequently revisit by walking or when taking a short ride on public transportation. Curriculum should be intriguing and enjoyable to both the teacher and the student. Remember, sensory-rich experience is an effective entry into integrated curriculum.

Organizing Concept

The organizing concept is the big idea; it is the gestalt that guides the overriding lesson content and ties all successive learning into a common purpose.

- concept: a general notion; an idea of something formed by mentally combining all its characteristics or particulars; a construct.

An organizing concept connects both the state educational standards and the sensory-rich study locations. It is, by itself, a concept powerful enough to jump-start the learning process and help the student learn more quickly and comprehensively so the knowledge is generalized and transferred. Concepts are rich, powerful patterns for the brain – useful in unlocking meaning around us and much easier to store in long-term memory than curriculum fragments and factoids. To learn fragments of information and factoids, students mostly resort to rote memorization; in contrast, concepts allow students to leap from today's lesson to yesterday's personal experience to tomorrow's situations in real life and future learning. Concepts are powerful curriculum builders.
**Key Points**

The **Key Points** answer this guiding question: **What do I want my students to understand?**

Answering this question helps to focus on what should be taught – the concepts and skills. It also requires specific, clearly written statements of what the students should understand. State the Key Points so students can comprehend what is expected of them and feel it’s worth their time and effort (as well as yours). There are three kinds of Key Points:

- **A Conceptual Key Point** is global; it has the power to be transferable and generalizable to other times and places.

- **Significant Knowledge Key Points** provide knowledge to understand the concept locally where it can be directly experienced throughout the sensory-rich *being there* location or simulation.

- **Skill Key Points** are those skills (math, language arts, social studies, geography, science, the arts, and others mandated by the state or district) that are needed to complete the inquiry.

Key Points are clear, succinct statements of learning goals describing what students are expected to learn. They are stated exactly the way we want students to remember them. State educational standards are embedded in the content. To make sure these goals are met, each key point has inquiries (activities) for providing various experiences to practice using the information provided. Inquiries provide the opportunities for enabling students to develop mental programs (Step-Two of the Learning Process) to apply each key point to real-world situations. Inquiries make learning active and more memorable.

**Inquiries**

The **Inquiries** (activities) are based on this guiding question: **What do I want my students to do with what they understand?**

In the **Highly Effective Teaching** (HET) classroom, bodybrain-compatible action is planned and carried out through inquiries. They frame how students will go about deepening their understanding of the concepts and skills identified in the key point. Inquiries are where words become realities, the things talked about become experience, discussions become actions, where reading about historical figures becomes experiencing their problems and dilemmas with the intent of attaining a deeper understanding or attaining mastery. Inquiries provide the necessary practice until a mental program is developed (Step-Two of the Learning Process) and wired into long-term memory. Good inquiries ask for action that:

- supports the bodybrain partnership by adding action and evoking emotion
- engages as many of the 20 senses as possible to optimize learning for the brain to grow and wire into long-term memory
- provides interaction with working people at the sensory-rich *being there* location which activates mimicry neurons
- incorporates educational standards and benchmarks
- addresses all the multiple intelligences

Inquiries are the “doing” part of the lessons where high level learning occurs! They allow students to discover, understand, apply, and extend knowledge.

**Social / Political Action**

Social/Political Action Projects and celebrations of learning are two culminating features of the **Highly Effective Teaching** model. They both provide the means to translate brain research into action, while providing guided practice in how to participate in society as an informed, responsible citizen.

Social/Political Action Projects are invitations for students to make a difference in their world – typically through their own community. In doing so, students master personal, social, and academic skills allowing them
to succeed as individuals, family members, productive contributors to the economy and to their own financial well being as citizens. These are the relevant, real-life doing elements of curriculum and instruction that launch brain research concepts into action. Social/Political Action Projects:

- emerge as a natural extension of the curriculum concept, key points, and inquiries
- are the relevant application if what students want to change or improve
- validate the student's learning and passion
- are chosen, planned, and carried out by the students
- provide a rich source of topics for yearlong research projects

The overarching goal of HET education is to increase human capacity and create responsible citizens. The learner's brain function is optimized through opportunities presented in these Five Curriculum Components, making the learning effective, relevant, and memorable while providing the opportunity to make a difference through Highly Effective Teaching and bodybrain-compatible education.

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**Lifelong Guidelines of the HET Model**

The Lifelong Guidelines became the foundation for character education by establishing a classroom culture through the Highly Effective Teaching (HET) Model. Our theory is that it's not what we do to make students behave, it's what we model day-in and day-out that provides an example of what acceptable behavior looks, sounds, and feels like. The emotional climate must be safe and predictable if high achievement is to be attained. Experience has shown that once a school embraces Lifelong Guidelines and the LIFESKILLS (which further define Personal Best), there are two immediate changes:

1. The number of discipline referrals falls by at least 50 percent (and in some cases at much as 90 percent)
2. Average daily attendance increases to above 96 percent (both the students and the teachers want to come to school)

In addition, the number of reference books being checked out of the library increases from 30-50%, and previous behavior issues resulting in lost classroom time is minimized, resulting in higher focus towards learning. The Lifelong Guidelines are guideposts for success in life; not just rules for the classroom. They apply to all aspects of life – personal relationships, the workplace, religious gatherings, community meetings, and all interactions for life in general.

**Lifelong Guidelines**

- **TRUSTWORTHINESS** – To act in a manner that makes one worthy of trust and confidence
- **TRUTHFULNESS** – To be honest about things and feelings with oneself and others
- **ACTIVE LISTENING** – To listen with the intention of understanding what the speaker intends to communicate
- **NO PUT-DOWNS** – To never use words, actions and/or body language that degrade, humiliate, or dishonor others
- **PERSONAL BEST** – To do one’s best given the circumstances and available resources
All decisions about education should be made in response to the findings of current brain research. The learning environment must be free of threat while promoting mutual respect and fostering a sense of belonging. This relationship connection between teachers and students, student-to-student, and teacher-to-teacher, is necessary to effectively set the tone in an optimal learning environment before the mentally, physically, and academically engaging components can be attained. **This is the foundation of character education and responsible self-management.** The overarching goals of HET education are to increase human capacity and create responsible citizens. The learner’s brain function is optimized through the implementation of our bodybrain-compatible education model, making the learning effective, relevant, and memorable while providing the opportunity to make a difference through **Highly Effective Teaching.**

**LIFESKILLS** of the HET Model

The Lifelong Guidelines became the foundation for character education by establishing a classroom culture through the **Highly Effective Teaching** (HET) Model. The Lifelong Guidelines are guideposts for success in life; not just rules for the classroom. They apply to all aspects of life – personal relationships, the workplace, religious gatherings, community meetings, and all interactions for life in general. After analyzing the **Lifelong Guideline** of **Personal Best**, the realization came that further definition was needed. Thus emerged the list of **LIFESKILLS.**

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**LIFESKILLS**

- **CARING** – To feel and show concern for others
- **COMMON SENSE** – To use good judgment
- **COOPERATION** – To work together toward a common goal or purpose
- **COURAGE** – To act according to one’s beliefs despite fear of adverse consequences
- **CREATIVITY** – To generate ideas; To create something original or redesign through imaginative skill
- **CURIOSITY** – A desire to investigate and seek understanding of one’s world
- **EFFORT** – To do your best
- **FLEXIBILITY** – To be willing to alter plans when necessary
- **FRIENDSHIP** – To make and keep a friend through mutual trust and caring
- **INITIATIVE** – To do something, of one’s own free will, because it needs to be done
- **INTEGRITY** – To act according to a sense of what’s right and wrong
- **ORGANIZATION** – To plan, arrange, and implement in an orderly way; to keep things orderly and ready to use
- **PATIENCE** – To wait calmly for someone or something
- **PERSEVERANCE** – To keep at it
- **PRIDE** – Satisfaction from doing one’s personal best
- **PROBLEM SOLVING** – To create solutions to difficult situations and everyday problems
- **RESOURCEFULNESS** – To respond to challenges and opportunities in innovative and creative ways
- **RESPONSIBILITY** – To respond when appropriate; to be accountable for one’s actions
- **SENSE OF HUMOR** – To laugh and be playful without harming others
All decisions about education should be made in response to the findings of current brain research. The learning environment must be free of threat while promoting mutual respect and fostering a sense of belonging. This relationship connection between teachers and students, student-to-student, and teacher-to-teacher, is necessary to effectively set the tone in an optimal learning environment before the mentally, physically, and academically engaging components can be attained. This is the foundation of character education and responsible self-management. The overarching goals of HET education are to increase human capacity and create responsible citizens. The learner’s brain function is optimized through the implementation of our bodybrain-compatible education model, making the learning effective, relevant, and memorable while providing the opportunity to make a difference through Highly Effective Teaching.

Five Principles of Learning in the HET Model

Intelligence is a Function of Experience

In the development of the human brain there are “windows of opportunity” when the hard, permanent wiring must take place. To miss these windows handicaps the child’s ability to learn, attach emotionally and socially with adults, and will cause difficulty in the integration of the 19 senses. The first three years of a child’s life should be filled with enriching experiences provided by the parents or caretakers. These experiences create connections in the brain that form the foundation for spoken language, reading, comprehension of written language, writing, and problem-solving. These experiences allow the child to recall past experiences as if they were happening at the moment. Dr. Harry Chugani, a neurologist working with parents who have adopted Romanian children, using PET scans and MRI’s has discovered how the brain can be altered permanently due to lack of parental nurturing and enriching experiences.

The brain prefers to input information in a hierarchy depending on the number of senses engaged. The most preferred way is the sensory-rich being there experience that engages all 19 senses. These are experiences as they happen in the real world. The second way input is taken in is the “immersion” experience. It is an experience that attempts to replicate a being there experience by creating an immersion wall, pond, or mural, reconnects in a students to the being there experience. The third way input is taken in is by using “hands-on, real” experiences. These are the “real” spider, the “real” frog and the “real” earthworm living in a habitat on each student’s desk. The fourth way input is taken in is by using “hands-on representational” experiences. These are the rubber or plastic models of frogs, spiders, and earthworms. They represent the real animal, but are not real. The fifth way input is taken in as “secondhand.” This information is found in models, pictures and videotapes of real experiences. This form of input has power and impact if there has been a sensory-rich being there experience prior to secondhand input. The most challenging way the brain takes in information is "symbolic." This information is found in the form of letters that create words, numbers that create math problems, notes in music, and equations and formulas found in science or math. This information is the most difficult for the brain because it engages only one or two of the 19 senses.

Leslie A. Hart, Human Brain and Human Learning

Learning is an Inseparable Partnership Between Body and Brain

The body and brain form an inseparable learning partnership. Each sends messages out to the other which alters the messages that are sent back. Most sensory input (if not all) is filtered through/modulated by our emotions which direct our attention… Emotions are the Gatekeeper to performance. Therefore, the
environment of the body is critical – the physical surroundings and the quality of interrelationships of those in it (student-student and student-adult). Consequently, implementation of the HET model begins with ensuring that the classroom and schoolwide environment enhance rather than impede students’ abilities to focus on the learning at hand and creating a sense of community characterized by absence of threat (real or perceived).

Movement enhances learning. Thanks to the advances in current brain research, it is documented that most of the brain is activated during physical activity (much more so than when doing seatwork). Movement increases circulation in the blood vessels that allow for the delivery of oxygen, water, and glucose (brain food) to the brain. Sitting for extended periods of time, even as little as ten minutes, reduces awareness of physical and emotional sensations and may even trigger behavior problems. Movement cannot help but optimize the brain's performance.

---Robert Sylwester, Celebrating Neurons, ASCD, 1996
Dr. Paul Maclean, National Mental Health Institute

There are Multiple Intelligences to Solve Problems and to Produce Products.

Howard Gardner, Frames of Mind: A Theory of Multiple Intelligences, has identified at least eight different ways of intelligences for solving problems or producing products. He has established criteria for these eight intelligences including where they are located in the brain. Gardner firmly believes the human brain has all eight, but many are not developed or are underdeveloped due to lack of experiences. His eight intelligences and clues for identifying them include:

**Linguistic Intelligence** - the most observable clue is that people who are highly linguistic have a book with them at all times just in case things get boring. Individuals can be linguistic in four different ways: reading, speaking, listening, and writing. It is possible to have a highly developed linguistic intelligence and not necessarily be good in all four ways.

**Logical-Mathematical Intelligence** - the most observable clue is that people who are highly logical-mathematical are listers and appreciate things done in a sequential manner. They like order and insist that all drawers and doors be closed, encyclopedias need to be in order and they use post-it notes to tab reading materials.

**Spatial Intelligence** - the most observable clue for spatial intelligence people is they look up toward the ceiling when asked a question. They are looking for the answer to the question by forming a picture, from their experiences, in the prefrontal lobes of their brain. The most important thing teachers can do is allow “wait time”, time for the answer to form so they can respond.

**Musical Intelligence** - the musical intelligence person is the “most distracted person in the room.” Their brain is trying to make sense from every sound it hears. The most observable clue is that the person looks toward the source of the sound, a speaker in a classroom, a door opening, or a book dropped on the floor. Any source of sound is a distraction. They can be called the “hummers and drummers” since they often are trying to tap out the rhythm of the voice of the teacher. Stopping the tapping or humming will cut off the input to the brain so alternative ways must be sought as the person needs to feel the rhythm.

**Naturalist Intelligence** - this is the newest of the intelligences identified by Howard Gardner and involves the ability to distinguish, compare, or make sense, of man-made things and things found in nature. The most observable clue is their need to be outside doing “real” things. They gain the most from being there experiences. Naturalists among us include farmers, conservationists and people who know how to navigate “the city” or community in which they live.
Bodily-Kinesthetic Intelligence - people with this intelligence need to experience input via the long muscles of their arms and legs. They need to have the freedom to move, stand, or walk around. The most observable clue to identify them is the "work dance." After an assignment is given by a teacher the bodily-kinesthetic individual will get up to sharpen a pencil, go back and sit down, get a book and sit down, get a drink of water and sit down, get another book and sit down. What they are doing is processing the directions to do the assignment or task. These students need to be allowed to stand and work or need to be assigned tasks such as collecting papers and passing out materials.

Interpersonal Intelligence - people with this intelligence are firm believers in the "power of many." They believe collaboration is the way to solve problems and produce products. They want and need to be part of a group. The observable clue is often heard in the form of a verbal "Yes!" when told they will be working in groups today.

Intrapersonal Intelligence - people with this intelligence consistently ask, "Can I do this alone?" They firmly believe they can do a job better by themselves. This intelligence is one that will suffer the more classrooms move toward collaboration. Time needs to be set aside for the intrapersonal person. Silent sustained reading and silent sustained writing must be silent to honor this intelligence.

Howard Gardner, Frames of Mind: A Theory of Multiple Intelligences

Learning is a Two-Step Process

Step One: Pattern Seeking
The human brain is constantly seeking patterns in its environment. Leslie A. Hart, author of Human Brain and Human Learning, has identified six major patterns the brain identifies. These are objects, actions, procedures, situations, relationships, and systems. The brain does not take in patterns in a logical, sequential manner. In order to determine the patterns in one's environment the brain needs many, real experiences. Pattern recognition is the ability to identify and understand the things in the environment. The brain needs quantum amounts of experiences to understand the patterns. Application of patterns is how mental programs are built.

Step Two: Program Building
Leslie A. Hart, author of Human Brain and Human Learning, defines learning as "the acquisition of mental programs." To build a mental program takes lots of pattern repetition. For example, if teachers taught multiplication facts using the pattern-seeking ability of the brain and repeated the patterns until the brain was able to identify and understand them, all students would master multiplication facts. The reality is teachers do not do enough pattern-seeking and move on too quickly, thus multiplication is taught at every grade level 3-12 and every college and university in the United States offers multiplication in its remedial math classes. Mental programs allow humans to use the patterns they have identified and understand. More curriculum connections and mastery of skills could result from building mental programs.

Leslie A. Hart, Human Brain and Human Learning

Personality/Temperament Impacts Learning and Performance

Beginning at first and continuing throughout life the personality and temperament of a person has a direct relationship to how the person learns, takes in information, how he/she organizes during learning and when applying learnings, decision-making, and orientation to other learners in group settings or in the classroom. David Keirsey and Marilyn Bates's, Please Understand Me: Character and Temperament Type is an
excellent tool to use to gain information about oneself or colleagues. Some characteristics of each of the personality and temperaments include:

- orientation to life: introversion (lose energy from interaction with people) or extroversion (gain energy from interaction with people)
- take in information: sensing (details, concrete) or intuitive (wholes, hunches)
- decision-making: feeling (subjective, empathetic) or thinking (objective, logical)
- lifestyle: judging (organized, closure) or perceiving (spontaneous, open)

In developing grade level or interdisciplinary teams, teachers need to be aware of the differences in the personality and temperament of their teammates. Middle and high school teachers need to be aware of the personality and temperament styles of their students.

David Keirsey and Margaret Bates, Please Understand Me: Temperament and Personality

The Brain

**Five Principles of Learning** (of the Highly Effective Teaching model)
1. Intelligence is a Function of Experience
2. Learning is an Inseparable Partnership Between Body and Brain (Emotions & Movement)
3. There are Multiple Intelligences to Solve Problems and to Produce Products
4. Learning is a Two-Step Process – Step One: Pattern Seeking; Step Two: Program Building
5. Personality/Temperament has an Impact on Learning and Performance

The Human Brain and Learning
An external picture of the brain is shown below.

The above picture identifies the centers found in the brain. The hard, permanent wiring for each of the centers develops at a different time before and after birth. Neuroscientists and brain biologists label these periods as “windows of opportunity.” The windows of opportunity for the hard wiring to occur open and close at different
times. The window of opportunity for motor development begins before birth and closes around the age of two. The window of opportunity for emotional and social attachment open at birth and close around age two. The window of opportunity for acquiring a second language opens around birth and closes between the ages of 8 and 10. The window of opportunity for vocabulary opens around the age of 2 and closes around age 6. The window of opportunity for math and logic opens around the age of three and closes around age 6. These opportunities can happen earlier or later depending upon the individual child. The key point is the importance of recognizing that there are these opportunities and both parents and teachers need to do all they can to ensure every child has the chance to develop these centers. This will create easier and more productive experiences once children enter school. We can acquire some of these skills with great effort after the window of opportunity has closed.

--ABC News, PrimeTime, January 25, 1995
Time Magazine, February 26, 1996, "Your Child's Mind"

A cross-section of the brain is shown below

The **hippocampus** is the part of the limbic system associated with conscious factual/rational (declarative) memories. The hippocampus can store information for either short periods of time or long periods of time depending on the type of information being stored.

The **amygdala** is the part of the limbic system associated with unconscious behavioral/emotional (procedural) memories. Robert Sylwester, Celebrating Neurons, has labeled the amygdala the brain's "911 Response System" because it rapidly processes information related to fear.

The **thalamus** is part of the limbic system associated with transmission of sensory information to the cerebral cortex.

The **hypothalamus** is part of the limbic system associated with regulation of body temperature, metabolism and influences certain emotions.

The **pituitary gland** is located in the cerebral cortex and secretes hormones that have a wide range of effects on the growth metabolism and other functions of the body.

The **adrenal glands** are located on the kidneys and secrete adrenaline, a form of epinephrine, that speeds up heart rate and increases blood pressure and respiration during times of stress.

The pathway followed for slow processing necessary for situations in our environment that don’t have a sense of urgency includes: the **senses-thalamus-hippocampus-cerebral cortex circuitry** to reflectively analyze the situation we are experiencing. For example, while walking along the ocean, we continually and rationally select and translate various input from the 19 senses into ignored or remembered objects and events.
The pathway followed for fast processing necessary for situations in our environment that engage our brain's fear system includes: the senses-thalamus-amygdala-hypothalamus-pituitary gland-adrenal gland (located on each kidney) circuitry causing a stress response that is designed to provide a high energy response to a physically threatening situation. For example, driving along and suddenly being hit by a wall of water as you cross a dried river bed. Slamming on the brakes, getting out of the car, wading through the water to safety all happen because the adrenal cortex releases stress hormones that rapidly move throughout our body and brain, activating the fight/flight response.

--- Robert Sylwester, Celebrating Neurons, ASCD, 1996

10 Characteristics of A Highly Effective Learning Environment

by Terry Heick

Ed note: This is an updated version of a related post published last year.

Wherever we are, we’d all like to think our classrooms are “intellectually active” places. Progressive learning (like our 21st Century Model, for example) environments. Highly effective and conducive to student-centered learning. But what does that mean?

The reality is, there is no single answer because teaching and learning are awkward to consider as single events or individual “things.” This is all a bunch of rhetoric until we put on our white coats and study it under a microscope, at which point abstractions like curiosity, authenticity, self-knowledge, and affection will be hard to pin down.

So we put together one take on the characteristics of a highly effective classroom. They can act as a kind of criteria to measure your own against—see if you notice a pattern.

1. The students ask the questions—good questions

This is not a feel-good implication, but really crucial for the whole learning process to work. The role of curiosity has been studied (and perhaps under-studied and under-appreciated), but suffice to say that if a learner enters any learning activity with little to no natural curiosity, prospects for meaningful interaction with texts, media, and specific tasks are bleak.

Many teachers force students (proverbial gun to head) to ask question at the outset of units or lessons, often to no avail. Cliché questions that reflect little understanding of the content can discourage teachers from
“allowing” them. But the fact remains—if students can’t ask great questions—even as young as elementary school—something, somewhere is unplugged.

2. Questions are valued over answers

Questions are more important than answers. So it makes sense that if good questions should lead the learning, there would be value placed on these questions. And that means adding currency whenever possible—grades (questions as assessment!), credit (give them points—they love points), creative curation (writing as a kind of graffiti on large post-it pages on the classroom walls), or simply praise and honest respect. See if you don’t notice a change.

3. Ideas come from a divergent sources

Ideas for lessons, reading, tests, and projects—the fiber of formal learning—should come from a variety of sources. If they all come from narrow slivers of resources, you’re at risk of being pulled way off in one direction (that may or may not be good). An alternative? Consider sources like professional and cultural mentors, the community, content experts outside of education, and even the students themselves. Huge shift in credibility.

And when these sources disagree with one another, use that as an endlessly “teachable moment,” because that’s what the real world is like.

4. A variety of learning models are used

Inquiry-based learning, project-based learning, direct instruction, peer-to-peer learning, school-to-schol, eLearning, Mobile learning, the flipped classroom, and on and on—the possibilities are endless. Chances are, none are incredible enough to suit every bit of content, curriculum, and learner diversity in your classroom. A characteristic of a highly-effective classroom, then, is diversity here, which also has the side-effect of improving your long-term capacity as an educator.

5. Classroom learning “empties” into a connected community

In a highly-effective learning environment, learning doesn’t need to be radically repackaged to make sense in the “real world,” but starts and ends there.

As great as it sounds for learners to reflect on Shakespeare to better understand their Uncle Eddie—and they might—depending on that kind of radical transfer to happen entirely in the minds of the learners by design may not be the best idea. Plan on this kind of transfer from the beginning.

It has to leave the classroom because they do.

6. Learning is personalized by a variety of criteria

Personalized learning is likely the future, but for now the onus for routing students is almost entirely on the shoulders of the classroom teacher. This makes personalization—and even consistent differentiation—a challenge. One response is to personalize learning—to whatever extent you plan for—by a variety of criteria—not just assessment results or reading level, but interest, readiness-for-content, and others as well. Then, as you adjust pace, entry points, and rigor accordingly, you’ll have a better chance of having uncovered what the learners truly “need”.
7. **Assessment is persistent, authentic, transparent, and never punitive**

Assessment is just an (often ham-fisted) attempt to get at what a learner understands. The more infrequent, clinical, murky, or threatening it is, the more you’re going to separate the “good students” from the “good thinkers.” And the “clinical” idea has less to do with the format of the test, and more to do with the tone and emotion of the classroom in general. Why are students being tested? What’s in it for them, and their future opportunities to improve?

And feedback is quick even when the “grading” may not be.

8. **Criteria for success is balanced and transparent.**

Students should not have to guess what “success” in a highly-effective classroom looks like. It should also not be entirely weighted on “participation,” assessment results, attitude, or other individual factors, but rather meaningfully melted into a cohesive framework that makes sense—not to you, your colleagues, or the expert book on your shelf, but the students themselves.

9. **Learning habits are constantly modeled**

Cognitive, meta-cognitive, and behavioral “good stuff” is constantly modeled. Curiosity, persistence, flexibility, priority, creativity, collaboration, revision, and even the classic *Habits of Mind* are all great places to start. So often what students learn from those around them is less directly didactic, and more indirect and observational.

Monkey see, monkey do.

10. **There are constant opportunities for practice**

Old thinking is revisited. Old errors are reflected on. Complex ideas are re-approached from new angles. Divergent concepts are contrasted. Bloom’s taxonomy is constantly traveled up and down, from the simple to the complex in an effort to maximize a student’s opportunities to learn—and demonstrate understanding—of content.

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