

Unit 2 Content
Setting the Scene: Learning Systems & Environment

Setting the Scene: Environment is Everything!

The Brain's Natural Learning Systems

Learning involves a whole lot more than just content (what we teach) and strategies (tools for learning). The advances of cognitive science and brain research are exposing more concrete pictures of realms of learning that were once unidentified –or vague at best. The results have major implications for the way we go about our business of teaching and learning. Before we discuss learning environments within our schools and classrooms, it is important to understand how learners process information in the first place.

Human beings are magnificent creatures whose complex functions work together in ways that continue to elude contemporary understanding and modern science. Advances in technology, however, are providing increasingly clearer views of the once mysterious connection between the mind and the body. Researcher, professor, and co-director of George Mason University's *Adolescent and Adult Learning Resource Center*, argues that the brain-body neurobiological operating systems process information and experiences as (1) emotions, (2) social interactions, (3) cognitive functioning, (4) physiological learning, and (5) reflective insight. These are referred to as the brain's natural learning systems. They work simultaneously and in conjunction with each other –not in isolation. If, however, they do not work in harmony, the result can present as students' lack of focus and ultimately, hindered learning.

Let's take a closer look at each of the learning systems. Click the link below to read **Chapter 7 of "Theaters of the Mind"** from *Teaching to the Brain's Natural Learning Systems*. As you read, think about your students, and consider how their individual learning systems may be working in harmony or in conflict with each other.

Now that we have a clearer understanding of the human learning systems, look at the implications of each of the five learning systems as they relate to your classrooms.

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The Emotional Learning System

Learning depends on our emotional states. Teachers who understand the links between emotions and learning can help students use these feelings productively. Teaching students to express individual strengths; resolve conflicts; set personal goals; manage anger; and express emotions in socially appropriate ways can empower success in the classroom and in students' everyday lives. Students at any grade level have a fundamental need to be accepted and validated. This includes validation of their uniqueness, individual hopes, dreams, and aspirations. When the psychological "need to be me" is met, the emotional system generates passion necessary for learning. Students' emotions actually stimulate their brains to function at their highest capacity. This includes matters of intelligence, morality, and a sense of self. If students shut down their emotional learning systems, they find little joy in learning and developing new skills. This makes it difficult to engage in class activities. Students must feel safe emotionally before their minds can engage in cognitive learning activities. This is not a vague touchy-feely idea that proposes that teachers should be "nice to kids". It is critical that educators understand the direct effect that emotions have on students' ability to learn. The limbic system (the emotion center of the brain) houses the amygdala that manages fear. This part of the brain is often referred to as the *primitive* or *reptilian* brain because it was necessary for survival thousands of years ago when humans needed to defend themselves against environmental threats such as wild animals, intruders, etc. When triggered, the amygdala activates the human fight-or-flight response. Adrenaline, cortisol, and other chemicals are released into the brain, and the body prepares to defend itself or run. When in this state of fear, the brain's attention and energy is focused on survival and is operating from the reptilian brain. However, this is not the part of the brain where cognitive, creative, and metacognitive functioning occurs. Problemsolving, complex processing, and creative thinking happen in the neocortex. This conflict of attention causes disharmony among the learning systems and results in a students' inability to fully focus. The implications on the classroom are huge. If students feel that they might be embarrassed or ridiculed, the reptilian brain is activated, and the functioning of the neocortex (where cognition and metacognition happen) is stunted. A safe and supportive learning environment is not

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simply a nicety. It is a learning necessity. When teachers foster safe classroom environments that nurture students' "need to be me," and promote creativity, diversity, and personal interests, we are contributing to the healthy functioning of their students' emotional systems.

The Social Learning System

The need to belong is an innate feeling in all humans. Social learning is the development of skills and awareness of self, others, and the environment. These develop as a result of interactions. The brain is a socially wired and driven organ (Conyers & Wilson, 2006). In fact, friendships have direct physiological effects on our brains including the increase of the neurotransmitter oxytocin and other hormones that induce feelings of satisfaction and increase students' ability to learn. In some ways (due to language and cultural differences), ELLs are at a disadvantage when it comes to establishing friendships and interacting socially in their new environments. Students who feel isolated and out of place have lower levels of serotonin (hormone that contributes to the feelings of well being) that is necessary for engaged, authentic learning. School, therefore, needs to be a place where ELLs interact with their peers in an environment that is socially stimulating and supportive. Teachers should regularly implement learning activities that promote interaction and develop a sense of community and belonging. Teachers can also help ELLs overcome social anxieties by encouraging involvement in school associations and extracurricular activities.

The Cognitive Learning System

This system is the information processing system of the brain. It takes input from the outside world and all other systems, interprets that information, and guides problem solving and decision-making. This is the system that typically gains the most attention and focus in our schools. With the increased importance of high stakes standardized tests, and the decrease of spending in education, the cognitive learning system has seemingly usurped most of the resources of our school districts. Remember, though, that these systems do not work in isolation. They are dependent upon each other in order to function to their full capacity. The cognitive system, therefore, cannot function effectively when the other systems are competing for attention. Whenever the emotional and the social systems

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are in turmoil, the cognitive system must spend its energy on them before it can focus on higher order thinking required for knowledge and skill acquisition. So, establishing and maintaining that supportive learning environment comes first. Once we know students feel safe to share, err, and even mispronounce in our classes without fear of embarrassment or ridicule, we can focus on cognition. To get students' cognitive system fully engaged, it is important to provide constant connections between the content and our students' lives. This is because the brain processes new information in relation to information it already has stored (also known as schema). By connecting new ideas and concepts to students' prior knowledge (especially ideas they find important), we help students to make sense of new ideas and see the relevance within their own lives. In order to do this, it's necessary to take the time to learn about our students' personal lives. What are their likes and dislikes; their wishes, dreams, and desires? These are all important questions that give us a starting place for building student connections to the new content we will share.

The Physical Learning System

The brain's physical learning system transforms all other learning systems' content into action. While the other systems contemplate internally, this system executes –often externally. Information is gathered through the senses, processed, and turned into action through the body. This learning system is a great benefit to ELLs because it allows for concrete contextualization of text and other input through the senses. For example, self-correcting with manipulatives; constructing their own learning materials; developing visual arts or multimedia products; and acting out historical or social events or literature are all ways that ELLs can access the curriculum through their physical learning systems.

The Reflective Learning System

This is the most sophisticated learning system and the last to develop. Reflective learning encompasses recalling prior knowledge and past experiences while contemplating the future in the here and now. Simply put, reflective learning is the monitoring of one's own thinking in order to solve problems; make decisions; and adjusting what one already knows. This is also called metacognition. All teachers, regardless of the subject, are teaching students how to solve problems, make decisions, understand difficult concepts, and perform intellectual tasks that they are going to confront in life. These skills all require

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reflective thinking. Fortunately, there are concrete ways that we can teach reflective thinking skills to our students. We can promote reflective or metacognitive thinking skills through think-alouds and by explicitly showing students how to evaluate their own work; reflect on their own thinking; and plan and employ skills and behaviors that are appropriate for specific learning goals. When we intentionally promote high order thinking in our classes we naturally teach students how to use reflective thinking skills. We will talk much more about the focus on high order thinking skills later in the course. In many ways, as teachers, we act as the reflective system of our classrooms. We plan out our goals. We monitor students' progress. We evaluate the effectiveness of our instruction. And we correct when we know the goals have not been met.

Summary

In summary, just as we have interconnected biological systems such as circulatory, digestive, endocrine, and immune systems that depend on each other to maintain a healthy body; we also have five interconnected learning systems associated with emotions, relationships, cognition, the senses, and assessment of self. Each system processes information simultaneously, and each are connected and reliant upon the others. Imbalance among the learning systems (overreliance upon one system or an underdevelopment of another) can have adverse effects on individuals. For example, students who over-rely on their emotional system tend to be self-absorbed and have a hard time seeing the other person's point of view. Students who rely exclusively on family or peers may not be able to act independently. Others who lack skills in the cognitive system fail to develop self-enhancement plans and drift from one thing to another.

Okay, let's pause for a moment. Take a deep breath. Good. How are you feeling? Does the information about learning systems validate what you already know and have in place for your ELLs and all of your students? Or are you eager to compare this new information to each of your students and start reevaluating your classroom practices?

If, however, the thought of meeting the learning system needs of all of your students is causing you to experience anxiety, which would trigger your physical system to react with a racing heart, just take another deep breath. Good. Now exhale. Remember, these systems work in synergy. Not in isolation. Our instruction should as well. Learning happens

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best when these important systems are working in harmony. And by fostering safe, stimulating, multisensory, high-achieving learning environments, we are already setting the scene for harmonious learning! Here are a few ideas to keep in mind as we create learning experiences that promote healthy interplay among students' learning systems:

- Tap into students' personal goals and make the lessons personally relevant (emotional learning system)
- Offer authentic individual, small group, and teacher/student learning experiences that provide acceptance of diversity and generate a sense of belonging (social learning system)
- Facilitate intentional learning for knowledge and skill construction through authentic problem-solving challenges (cognitive learning system)
- Create active involvement through meaningful projects (physical learning system)
- Teach students to analyze their progress, consider ways to enhance it, and develop plans for continued growth (reflective learning system)

There will be more about what this looks like for our ELLs and for us!