

Other Learning Considerations and Examples

Nine Brain-Compatible Elements that Influence Learning

Readings and Articles

Nine Brain-Compatible Elements That Influence Learning



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ABSENCE OF THREAT / NURTURING REFLECTIVE THINKING

What constitutes threat—real and perceived—is in the eye of the beholder. Thus, creating an environment free of threat includes a wide range of issues much like those described by Abraham Maslow. First physical safety, then psychological safety—necessary conditions for effective collaboration between teacher and students, and among students themselves, in the classroom and schoolwide. It is important to note that the environment of the school at large also spills over into the classroom. Creating a threat-free environment requires that teachers work together to alter the entire school environment.

COLLABORATION

The choice of the word "collaboration" rather than "cooperation" or "cooperative learning", is deliberate here. In *Webster's Dictionary* it means "to work in association with, to work with another." Frank Smith, in *Insult to Intelligence*, 1986 (p. 62) lists opportunity for manipulation of information as one of his key ingredients for learning,. Full understanding of what is being learned and the ability to apply it in real-life settings—creative problem solving and flexible use of what is learned—depends upon ample opportunity to manipulate information in our heads, to test it, expand it, connect it with prior learnings. Collaborating with others allows us to examine our own thinking while expanding our knowledge base.

ADEQUATE TIME

In terms of the pattern seeking and program building nature of the brain, adequate time is not a luxury, it is a prerequisite. It takes time to extract meaningful patterns (make meaning) and it takes time to know how to use what we learn in meaningful ways (acquire useful programs). Adequate time is needed to get the job of learning done well, to accomplish mastery (the ability to use the concept/skill in real life settings), to fully understand the connections among prior learnings and learnings yet to come. Using fragments of time—20 minutes for this, 40 minutes for that—is the ideal way to guarantee a low degree of meaningfulness and high failure rates. Using uninterrupted time to allow students full concentration is the ultimate gift, e.g., a two-hour block, all morning or even an entire day devoted to a major concept and its application to real life. Learning should be more than covering the material and building mental programs for use.

The implications for the classroom of the 21st century are obvious—we need to do less and do it better and more in-depth, giving students time to use the information again and again in varying settings until the information is recallable in a usable form, i.e., as a behavior, a mental program.

ENRICHED ENVIRONMENT

When creating an enriched environment, it is important to keep in mind the extent and kind of experiences with the natural and manmade world that your students bring with them to school. The key here is to balance that experience, not replicate it. For example, if students come to you long on TV, videos, video games, and secondhand resources (books and pictures), then the classroom must provide the REAL stuff—not books about, videos about, pictures about, replicas of, models of, but the real thing! If the environment is inner city with typical harshness, chaos, and dirtiness, then you must take the time and effort to create an environment in the classroom and school that is brain-compatible, e.g., aesthetically pleasing, clean, orderly, calming, etc.

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Some other things to keep in mind: Make the environment body compatible. Eliminate clutter; avoid distraction and over stimulation. Provide each class with a broad-based reference library; trade books, current encyclopedias, CD-ROM and video discs. Change bulletin boards, displays and materials frequently; always stay current with what is being studied at the moment. Put away the old except for a few items which will job recall.

MEANINGFUL CONTENT

How would one describe meaningful content? That's a tricky question for an educator because, in fact, it is not the educator's question to answer. Just as beauty is in the eye of the beholder, so is meaningfulness determined by the learner. And yet, it is worth answering because meaningful content is the most powerful brain-compatible element. It digs deeply into the learner's pool of intrinsic motivation and provides focus for the ever active brain, thus harnessing the brain's attention and channeling its power. Fortunately, thanks to brain research, we can do a better job than ever before of surmising what the learner beholds and how he/she processes learning.

CHOICES

Webster defines choice as "the act or power of choosing, the thing chosen, alternative, preference, the best." We especially like the phrase "power of choosing" because it pinpoints the essential characteristic of the lifelong learner. "Preference" acknowledges what brain research tells us over and over again: every brain is different and, therefore, each individual learner has preferred ways of learning that the individual knows to be more effective and reliable for him/her.

Frank Smith, in *to think*, 1990 (p. 27), notes that thinking is made easy and effective when two fundamental requirements are met: 1) we understand what we are thinking about; and 2) the brain itself is in charge, in control of its own affairs, going about its own business. Smith goes on to say that "Thinking becomes difficult and inefficient when the brain loses control, when what we try to think about is contrived rather than an integral part of whatever we would otherwise be engaged in at the moment. ...the most difficult kind of thinking is that which is imposed on us by someone else..."

The definition of "power of choosing" is wonderfully descriptive because it pinpoints the essential characteristic of the lifelong learner. Making wise choices comes from practice; the desire to choose comes from confidence that choices will be good ones. "Preference" acknowledges what brain research tells us over and over again: that every brain is different and, therefore, each individual learner has preferred ways of learning which that individual knows to be more effective and reliable for him/her.

IMMEDIATE FEEDBACK

Each of us has personal experiences with learning when the feedback was confusing, delayed, or not forthcoming at all. Such feedback is dangerous because it too often results in development of incorrect patterns (misinformation) and programs (wrong responses). Examples abound. Many among us experience the frustration of fumbling over the spelling of a particular word; our two choices are always the same, the same incorrect version vs. the correct. Years later, we continue to fumble between the same competing set of possibilities.

Contrary to popular belief, the hardest thing the brain does is forget something it has learned, as distinguished from forgetting something it never learned in the first place or that was never meaningful....which occurs for 80 percent of the students on the bell curve who stopped just short of mastery, just short of building a program. Feedback (and time) must be sufficient for the student to develop a correct mental program.

The importance of immediate feedback to the student, then is obvious. Feedback, accurate and immediate, is needed at the time the learner is building his/her mental program to ensure that the program is accurate and to help speed up the building of a program.

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MASTERY / COMPETENCE

Leslie A. Hart has a dual definition for learning:

- 1) Learning is the extraction, from confusion, of meaningful patterns.
- 2) Learning is the acquisition of useful programs.

Simply translated, the issues are **what** do students understand and **how** they can use it.

Part 1 of the learning process involves processing of incoming data, making meaning of the input. While every learner's perspective differs somewhat, care should be taken to uncover the accuracy of those patterns.

Part 2 of the learning process involves using what we understand, the mental patterns we have detected to get translated into specific actions.

Assessment procedures should be established in the classroom to permit the teacher to determine the accuracy of patterns and the depth of understanding they represent and to determine if mental programs have been developed and stored in long-term memory.

MOVEMENT TO ENHANCE LEARNING

Motor skills are fundamental to learning. (Eric Jensen) "Physical activity is good not only for the heart, but also for the brain, feeding it glucose and oxygen and increasing nerve connections, all of which makes it easier for children of all ages to learn. Numerous studies show that children who exercise do better in school."
(Newsweek, 2/19/96)

Excerpted from *Synergy: Transforming America's High Schools Through Integrated Thematic Instruction* by Karen D. Olsen (1995) pp. 3-4 to 3-38.

SEAL Vignettes

Vignette One:

Using Designated English Language Development to support academic engagement in a second-grade classroom

Walking into this 2nd grade English-taught classroom, there is no question that students are studying ocean habitats and that the teacher is implementing many of the strategies she learned from SEAL trainings. The classroom door proclaims: “Welcome Oceanographers,” a kelp forest cascade adorns one wall as part of a class-made mural of the ocean, and the desks are filled with books and photographs of the ocean. The classroom is comprised of 30 students, more than half of whom are English Learners. They represent seven different language groups. Five are Spanish speakers, four are Vietnamese, 3 speak Tagalog, 2 speak Mandarin, one speaks Russian and another speaks Arabic. Among the 10 English proficient students in the class, four have heritage languages other than English (Korean, Pilipino Portuguese and Farsi). The diversity is evident in more than the roster of names and the colorful human variation of the children. A display of beautiful self-portraits is labeled with each student’s name, a list of things they love to do, and the languages they speak. Another prominent feature of a SEAL classroom environment is the focus wall, where the central language function for the unit of study is prominently displayed. For this unit, the teacher selected “compare and contrast” as the central language function, which serves as the focus of both integrated and designated English language development (ELD) lessons.

On this particular day, the students were working in small groups on a literature study to compare and contrast biographies about environmentalists. For the Passionate Humans and the Environment literature study, the class read two books: “Rachel Carson and Her book that Changed the World” and “Olivia’s Birds – Saving the Gulf” about the ornithologist, Olivia Bouler. They drew connections from these books to their study of the impact of humans on the ocean environment. Students could choose from three different Literacy Centers. In the first one, students wrote reflections; in the second one they collectively created a “Found Poem” from vocabulary and expressive phrases they found in the books; and, in the final center students read aloud to each other from a third biography. The teacher used this time to pull a small group of English Learners for a designated ELD lesson focusing on constructing compare and contrast sentences that compared the two biographies. For this designated ELD lesson, the focus would be on providing explicit instruction on how to use comparing and contrasting language to the academic and cognitive task of a literature study. Because the teacher had already scaffolded the central language function by asking students to compare and contrast familiar content and had scaffolded the content during previous read alouds of the books in question, she could now work with the students to populate a Venn Diagram drawing upon what they remembered from the two books. As they did so, the teacher modeled compare and contrast language. “Whereas “Rachel Carson” focused on ..., in contrast “Olivia’s Birds”” After filling in the Venn diagram with the details the students remembered from their reading, they took turns constructing multiple ways to contrast the two books – eventually working together to write what they considered to be their most elegant way to compare them. Thus, the English Learners were gaining skills in how English works and is structured, and were engaged in the same general task as the rest of the class (comparing and contrasting two pieces of literature).

*Vignette Two:**Coaching teachers to leverage a student's home language in a linguistically diverse classroom*

In addition to professional development that helps teachers understand the role of home language and learn some strategies for using students' languages in the classroom, an essential component of the SEAL model is the assignment of a Coach Facilitator to each school. The role of the Coach Facilitator is to support the development of language-intentional integrated thematic curriculum units, and to coach teachers in applying the learnings and implementing the strategies from the SEAL professional development. This includes responding to teacher requests for assistance when teachers are unclear how to apply this new learning within their particular classroom context. One challenge some teachers encounter is how to leverage a child's home language in his/her learning when the teacher has a classroom of children from multiple language backgrounds.

At one elementary school, the Coach Facilitator set out to support a teacher who said she was overwhelmed with all of the different languages in her class. This teacher had previously taught bilingually, was credentialed as a bilingual teacher but was (as is the case of many bilingual teachers since Proposition 227 in California) now teaching in an all English program. Her expertise and training as a bilingual teacher gave her a strong conviction about the importance of home language, but her linguistically diverse classroom left her feeling inadequate and uncomfortable; she didn't have the language skills to teach children in their home language. She told the coach, "I don't feel effective. I speak Spanish and English, but I have seven different languages in my class that I don't speak. The coach asked if she could spend some time in the classroom working with one of the students the teacher was concerned about – a student struggling with reading skills that the teacher couldn't diagnose. In preparation, the coach researched the student's home language. From previous training on inter-language read-alouds, she knew it was important to find out the similarities and differences between the phonological system of the child's language and English. As she sat down to work with the child, the teacher watched. As the student read aloud, the coach listened carefully to the child's oral language. She realized that the student was having particular difficulty with specific letter sounds associated with the vowel o. Turning to her well-worn resource book on metalinguistic transfer, she noted that there were no comparable sounds in the child's language. The child needed specific practice in forming the phonemes of English related to the letter o. Learning to hear and distinguish those sounds was a necessary precursor to being able to decode or use the letter o in emergent writing. As the coach worked with the student, lightbulbs went on for the teacher about issues of cross-linguistic transfer. She asked for a copy of the book, and has used it repeatedly since that time – researching positive, negative and zero transfer between the various languages in her classroom and English, and setting herself up to be able to listen for and diagnose reading and writing struggles of her students through that lens. She reflected "it turns out I don't really need to be able to speak all of their languages, but I definitely need to know something about their language and the relationship to English."

ELD Resources

ELD Standards Implementation Guiding Questions Rubric

	Substantially Developed	Moderately Developed	Minimally Developed	Undeveloped	Notes
We have processes in place to ensure that ELs have access and support to both content and language development.					
We have processes in place to ensure that ELs experience culturally responsive educational practices simultaneous with Designated and Integrated ELD.					
We provide site-level and local district-level personnel with resources to promote EL success.					
We have re-envisioned our professional development approaches/structures to provide differentiation for developing and deepening teacher knowledge of ELD standards.					
Tools and resources currently exist in order to enter into full implementation of the ELD standards.					
Our student assessments inform ELD instructional practices and provide evidence of impact on EL's language proficiency.					

<p>We provide parents with vital information in an accessible and comprehensible manner.</p>					
<p>We enhance systemic efforts to keep current ELs from becoming Long-Term ELs within and beyond the transition plan timeframe.</p>					
<p>ELD is meaningfully included in all CA standards professional development.</p>					
<p>We monitor EL progress and Designated and Integrated ELD instruction.</p>					