The following paper addresses the responses that the learner has to changes in the learning environment that enhance instruction. While theorists have supported the notion that instruction embedded in sensory-filled, brain-based and hands-on activities, classrooms remain unchanged in many, if not most interactions. What can we do to wake up teachers and administrators to make these modifications? We believe as educators we must “come to our senses” to bring about best quality learning environments. The following section of this paper supports why we have come to the conclusion that sensory and brain based teaching strategies can no longer be left behind. For many years scientists viewed the brain as somewhat inflexible, subject to genetic control. Recent research, however, indicates that the brain is quite adaptable over the individual’s lifespan. Many researchers now consider environmental influences to be more significant than hereditary factors. These findings have considerable implications for educators as they directly affect pedagogical strategies used in the classroom.

Teachers can no longer ignore the findings and implications of brain-based research in the educational environment. The cognitive development of children is affected by a multitude of diverse factors, but educators have been slow to recognize the impact that brain-based research provides in our awareness of the role of the brain in learning. Since the 1960’s, research in this area is more convincingly supporting notions of the increased role of brain activity in learning. Findings suggest that heredity provides 30-60 percent of our brain’s wiring, while 40-70 percent is due to environmental factors (Jensen, 1998). Educators have a significant moral and ethical responsibility for enhancing the lifetime potential of an individual, especially since schools are places that learners reside for an average of six hours, 180 days for 13 years of their lives (Jensen, 1998).

Before teachers begin to incorporate positive changes in the learning environment, negative influences in the learning environment must be altered or removed. If undue stress, for example, is present, brain-based practices will be less successful. Teachers often resort to scolding and threats to motivate students. “Finish your work or else!” or other similar exhortations are often ineffective. Other similar strategies such as finger pointing, humiliation, sarcasm, the use of unrealistic deadlines, and other demeaning methods, also have dubious impact.

The teacher-student relationship which best facilitates learning is characterized by “trust, safety, and mutual respect” (Jensen, 1998). According to Jensen (1998), there is no evidence to suggest that the use of threats effectively meets long-term academic goals. To the contrary, there is substantial evidence to suggest that negative types of stress can prohibit learning. It is believed that such stress causes the “fight or flight” syndrome for many students. Conant (2001) stated that glucose, the fuel of the brain, travels from the center of the brain where reasoning and thought occur and goes to the muscles during stressful situations. For instance, if an instructor reprimands a student in front of the class, this action may trigger the “fight or flight” syndrome. Once stress or fright develops, it may take some time for the body to recover, making it difficult to breathe normally, much less to learn. While humans use this defense mechanism in life-threatening situations, it can be counterproductive when used in the classroom. Stress hormones can reside in the body at high levels for several days, depending on the severity of the situation. Similar findings suggest that chronic stress in the environment may produce excess glucocorticoids, which are toxic to neurons (Conant, 1988). Once the environment is balanced, educators can begin to manipulate the environment. The following section of the paper will address manipulating the environment to include sensory-filled, brain-based instructional strategies into the classroom to produce more effective learning.

Enhancing the Visual Environment

Brain research demonstrates that human eyes are capable of registering 36,000 visual messages per hour and that over 80 percent of all information that is absorbed by the brain is visual in nature (Optimal Environments, n.d.). Therefore, it is critical that educators consider the significant role visual factors play in learning. There are several brain-based principles that are useful in creating an enriched visual environment involving movement, contrast and color. There are several ways to access the brain’s inherently fast access to these properties. An excerpt from Brain-based learning,
Let students use earplugs to conceal extraneous sound.

Place a rubber strip around the door to block hallway noise.

Keep windows and doors shut.

Place tennis balls on the legs of chairs preventing them from banging against tables and other chairs.

Possible ways teachers can reduce classroom noise include the following:

Place area rugs in discussion areas to soften sound level and movement in classrooms.

Place tennis balls on the legs of chairs preventing them from banging against tables and other chairs.

Keep windows and doors shut.

Place a rubber strip around the door to block hallway noise.

Let students use earplugs to conceal extraneous sound.
Use earphones with tapes for individual learning.

Using Music in Classrooms

Music is an element that may also be heard throughout the day. The role of music in learning is well known. Music "enriches the human intellect and spirit. It can provide solace or joy; it can entertain or educate. And music is a universal language, which helps bind together the human community (Campbell and Brewer, 1998). Music certainly has a unique way of integrating many elements of the brain. It appeals to emotional, cognitive and psychomotor elements of the brain, and several studies show a link between music and increased learning (Brain-based learning, n. d.).

Unfortunately, despite the evidence for its value, often music and other art programs around the country have been reduced or cut from the curriculum.

Listening to music engages the entire brain (Jensen, 1998). Furthermore, medical research has shown that the nerves in the ear have more extensive brain connections than any other nerves of the body. Research also indicates that music directly effects pulse rate, blood pressure, the nervous system, and glands of the body (Neuman, n. d.). Music can be used for arousal, as a carrier of words, and as a primer for the brain (Jensen, 1998).

Arousal refers to the increases and decreases of attentional neurotransmitters. The theme from "Rocky" would be an example of "perk-up" music and a soft piano melody would be more relaxing. Soft background music, some studies show, results in substantial improvement in reading comprehension (Jensen, 1998).

Music is used as a carrier when the melody acts as a vehicle for the words. Words of songs are very easily remembered because of this strong musical connection, and, therefore, are often used as educational tools. Toddlers, for example, learn the letters of the alphabet through the familiar "Alphabet Song. Another example of song-based learning is the tune of "Twinkle, Twinkle, Little Star." All musical songs do not necessarily produce the results educators desire, such as Winston cigarettes and the slogan, "Winston Tastes Good Like a Cigarette Should." This ad is remembered today even by those who were not smokers, and even though cigarette ads have been missing from media for a number of years (Teacher’s Helper, n. d.). Academic content put with music is powerfully connected to the brain. One of the most powerful ways music enriches the environment is its ability to prime neural pathways.

Neurons fire constantly. The difference between “neural chatter” and clear thinking lies in the speed, sequence, and strength of the connection. For this reason, some people are primed by certain types of music to help them get a task completed (Jensen, 1998). Campbell and Brewer (1998) stated that music is recognized as a "vital, easy, and simple tool for dynamic improvement in body and mental awareness." They further suggest that music can be used in the classroom to accomplish various learning goals including:

- creating a relaxing atmosphere, establishing a positive learning style, providing a multi-sensory learning experience that enhances memory, increasing attention by creating a short burst of energizing excitement, developing rapport, providing inspiration, and adding an element of fun.

The Teacher's Helper (n. d.), an online educational resource, suggests using active concerts where the instructor introduces new learning material to classical music in a theatrical manner. This strategy can deliver 60% of the content in 5% of the time! What teacher couldn't use that kind of help in enhancing academic instructional time? The power of music to bring about learning is immense (Newman, n. d.).

What benefits can be found from the use of oral or the use of sound-based methodology in the classroom? Stahl and Yaden (2004) reported strong correlations that involved memory and recall tasks pairing a TV episode and aurally presented stories. Konoid, Juel, Minden-Cupp and McKinnon (2000) found in a longitudinal study of 213 children that oral language development significantly related to growth in phonological awareness in kindergarten children.

Benefits may also be seen when attention is given to oral language skills as they relate to written word knowledge, to comprehension and to phoneme awareness. Thus, it is imperative that teachers consistently schedule adequate time for children to talk, discuss, and for them to hear good oral language models with a widely spoken language vocabulary.

Another method using sound to produce brain activity changes was reported by McCandless and Posner (2003) of a study using Fast For Word, a process of rapidly changing auditory information to draw attention to changes in speech streams. This method, using amplification of sounds, has been found to increase brain activity in the posterior areas of the brain that are related to sounding out visual words. It would seem that teachers should use auditory changes in pitch and intensity to enhance children’s reading print for any academic content that may be addressed.

Using the Sense of Smell

Smell is the least obvious of the senses in its value to enrich the learning environment; however, its impact is also powerful. Wallace (2000) cited this quote from Oliver Wendell Holmes, “Memories, imagination, old sentiments and associations are more readily reached through the sense of smell than any other channel.” Scientists now recognize that they only know a fraction about olfaction and its relationship to learning. What they have discovered so far about the nose has practical applications for learning. The use of aromas produces similar effects as music in the learning environment. Both can energize, set or change a mood, relax, reinforce memory, and make the surroundings more pleasant and welcoming (Wallace, 2000).
Obviously, not all aromas produce the same effects. Certain aromas are linked to increased performance. Peppermint and lemon scents are known to energize. One study showed that groups exposed to the aroma of peppermint were able to solve puzzles 30% faster than the unexposed control group (Brain based learning, n. d.). Popcorn and fresh coffee signify a mood change and raise anticipation. Vanilla, chamomile and pine are great for performance jitters before tests to create a relaxing atmosphere. The scent of pine is used to put travelers at ease going through customs at London’s Heathrow Airport (Wallace, 2000).

Educators can reinforce memory by using the same aroma while introducing the information that will be used during the exam. Although the exact mechanism responsible for the effects of odor on memory is not known, memory seems to be enhanced when associated with odor (Lippner, 1999).

Pleasant smells can improve cognitive functioning. When exposed to pleasant odors of powder, spiced apple, and lemon, college students performed word construction and decoding tasks under stressful and no stress environments better than those not exposed to the fragrances. In addition, one study showed that a combination of floral aromas was associated with double the speed of learning (Lippner, 1999). To boost learning in the classroom, educators should use essential oils rather than artificial ones (Wallace, 2000). There are also “scratch and sniff” labels and other scented papers available to help connect learning to aromas. Computer technology has utilized aromatherapy effectively. Scented papers available to help connect learning to aromas. Computer technology has utilized aromatherapy effectively. Digital scent technology has made it possible to send and receive “e-smell” messages. Websites now have the capability to release a customized scent (Wallace, 2000). Imagine the possibilities!! Although this technology is not widely available and is rather costly, instructors can very easily, and inexpensively enhance the learning environment using aromas. Furthermore, as an added bonus, the use of aromas can also energize or relax the instructor!

Conclusions

Scientists and educators alike have produced volumes of evidence and studies that demonstrate the significant impact that the environment has on learning. But why are we not putting into practice brain-based environmental strategies when we have evidence that they work? The key to a quality-learning-productive environment is a sensory-rich, brain-based classroom using techniques that include visual, color, music and sound, wide-spectrum lighting and even aromas. As long as the student’s physical needs are met, and the student feels safe and secure in an environment, sensory enrichment really has no limits. We can reduce stress through the use of color by incorporating blues and greens into our classroom walls and floor coverings; using yellow on a bulletin board in the area of the classroom where teachers confer with children to set future goals could produce good benefits; simple changes including changing out light bulbs and using natural lighting has demonstrated many benefits; teaching new information through song and music maximizes the use of teaching time; and incorporating aromas with new learning has been shown to increase recall.

Enriching student learning through using sensory strategies in a brain-based environment is one of the easiest and most rewarding ways for an instructor to begin to improve the learning environment and academic outcomes for all children! Teachers can no longer ignore the significance the sensory environment and to fail to implement the forementioned, wellresearched sensory and brain based teaching strategies. We educators must “come to our own senses” and implement the senses through brain-based environments and activities if we are to maximize learning opportunities for children!

References


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