Engage the Brain: Energize the Learner

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Using Novelty in Lessons  
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Part of our success as a species can be attributed to the brain’s persistent interest in novelty, that is, changes occurring in the environment. The brain is constantly scanning its environment for stimuli. When an unexpected stimulus arises—such as a loud noise from an empty room—a rush of adrenaline closes down all unnecessary activity and focuses the brain’s attention so it can spring into action.

Conversely, an environment that contains mainly predictable or repeated stimuli (like some classrooms?) lowers the brain’s interest in the outside world and tempts it to turn within for novel sensations.

Using novelty does not mean that the teacher needs to be a stand-up comic or the classroom a three-ring circus. It simply means using a varied teaching approach that involves more student activity. Here are a few suggestions for incorporating novelty in your lessons.

**Humor.** There are many positive benefits that come from using humor in the classroom at all grade levels.

**Movement.** When we sit for more than twenty minutes, our blood pools in our seat and in our feet. By getting up and moving, we re-circulate that blood. Within a minute, there is about 15 percent more blood in our brain. We do think better on our feet than on our seat! Students sit too much in classrooms, especially in secondary schools. Look for ways to get students up and moving, especially when they are verbally rehearsing what they have learned.

**Multi-Sensory Instruction.** Today’s students are acclimated to a multi-sensory environment. They are more likely to give attention if there are interesting, colorful visuals, if they can interact with appropriate technology, and if they can walk around and talk about their learning.

**Quiz Games.** Have students develop a quiz game or other similar activity to test each other on their knowledge of the concepts taught. This is a common strategy in elementary classrooms, but underutilized in secondary schools. Besides being fun, it has the added value of making students rehearse and understand the concepts in order to create the quiz questions and answers.

**Music.** Although the research is inconclusive, there are some benefits of playing music in the classroom at certain times during the
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Providing Choice for Students
*The Highly Engaged Classroom*-2011
Marzano, Robert and Pickering, Debra

Choice has the potential of helping students perceive classroom activities as important. Teachers can build choice into many of their activities. There are 3 good ways to provide choice:

- Choice of tasks
- Choice of reporting formats
- Choice of learning goals

**Choice of tasks**
When assigning a task, provide students with options from which they can choose or guide students in designing their own tasks. Examples include allowing students to choose which numbered questions they would like to answer, choice boards, tic-tac-toe boards.

**Choice of reporting formats**
Providing choice or reporting formats is a relatively simple way of providing student choice to students. Options include a written report, an oral report, a dramatic presentation, a debate, a video-taped report, or a classroom demonstration or simulation.

**Choice of learning goals**
One powerful way to provide choice is for teachers to allow students to generate their own personal learning goals with a unit of instruction. Quite obviously, when students are generating their own goals, there is a great chance they will focus on subjects that interest them.

Mini Challenges, Games, and Inconsequential Competition
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Games and inconsequential competition help stimulate interest, and teachers can embed them in their lessons in a variety of ways. Games should always have an academy focus. The inconsequential competition means the games are just for fun. Continually regroup students throughout the year so all students can experience winning and losing. Points are tallied to identify winning teams, but points are not used to increase or decrease students scores or grades.
Environments for Learning
(Jensen, Eric. Environments for Learning, 2003)

The first thing we do when we walk into any new space, whether consciously or unconsciously, is look around, listen, breathe, and form judgments about the environment. We decide whether it’s familiar, safe, friendly, or not. This automatic filtering of environmental cues is an ongoing process that occurs every minute of every hour we are awake. It is so much a part of being human that most of us don’t give it a second thought. However, when it comes to creating the optimal educational environment, we can learn a lot by giving a second thought to what students see, hear, feel, smell, breathe, and taste in the places dedicated to their learning.

The physical environment of the classroom is important to student success. The physical environment, to every extent possible, is aesthetically pleasant, attractive, colorful, comfortable, and engaging to the senses. Since the environment is a variable that can be easily enhanced, it makes sense for teachers to take full advantage of it. Students should be provided with an almost constant opportunity for sensory stimulation – things to see, touch, hear, and smell.

Seating/Ergonomics (Jensen, Eric. Environments for Learning, 2003)

Ergonomics: The study of workplace equipment design or how to arrange and design devices, machines, or workspace so that people and things interact safely and most efficiently.

The traditional desk chair pushes the sitter’s lower weight straight down, increasing pressure on the lower back and forcing students to sit on the chair rather than in it. Cranz suggests that a good classroom desk keeps the shoulders back and the chin up...as well as provides arm rests to minimize strain on the upper body.

In addition, a good chair should have as much adjustability as possible and be easy to modify. Think about those 7th graders who range in height from 4’10” to 6’2!” The seat should not be so long that it digs into the back of the legs, nor should it be so high that feet don’t touch the floor.

Class Size Does Count! (Erlauer, Laura. The Brain-Compatible Classroom, 2003)

Although the issue is still debatable (and probably will be for some time!), research does suggest that smaller class sizes can have a significant and positive impact on learning and teacher interaction. Studies reveal that smaller classes can increase individual instruction time in grades K-12, increase early learning and cognitive skills in preschoolers, and enhance reading and math performance in elementary students, especially among educationally disadvantaged children (Bets & Shkolnik, 1999; Bosker, 1997; Finn, 1990; Mosteller, 1995).
Studies show that the brain responds positively to learning environments with high levels of individualized instruction, constructive feedback, small-group interaction, and high expectations—elements that are shown to occur more readily in smaller classrooms (Sommers, 1990).


As early as 1951, studies were being conducted on the impact of environmental factors on learning. One study (Harmon) of over 160,000 school children reported that 50% of children developed academic or health deficiencies as a result of insufficient lighting at school. This study also reported that when lighting was improved, visual difficulties were reduced.

Students in brightly lit classrooms perform better in school compared to students in dimly lit classrooms (London, 1988). Sustained exposure to bright light also reduces eye fatigue during close work activities, making it easier to read and to solve complex problems.

Bright natural sunlight is best for learning. Therefore, keep blinds open to take advantage of the ambient sunlight. Fluorescent lighting has been shown to increase cortisol levels. The flickering quality and barely audible hum emitted by fluorescent lights have a very powerful impact on our central nervous system.


Which one are you in a typical learning environment? Freezing or sweating?

One of the first things you notice when entering a room is the temperature. One of the first things that happen is that you become distracted from learning if you’re too hot or too cold.

The cooler your brain is, the more relaxed, receptive, and cognitively sharp you are (up to a point). Generally, cooler (not colder) is better than warmer (or hot). Our bodies can better adjust to a room that is 5 degrees too cold than one that is 5 degrees too hot. Classrooms kept between 68 - 72 degrees are most comfortable for the majority of students, with 70 degrees ideal for most learning situations, particularly those involving reading and math, in which optimal focus and concentration are required.


Our visual system takes in approximately 100 million bits of information per second…more than any other of the five senses. Much of our brain is devoted to processing what we see. Based on this, how much might the colors around us impact our brain and learning?
Researchers are finding that color can and does enhance mood, emotion, and behavior…and possibly cognition. Why the brain responds more positively to one color over another is still not understood. It’s probably a process started in infancy when exposure to color, especially bright colors, played an important role in stimulating and strengthening immature neural connections in the brain’s occipital lobe/primary visual cortex.

Shaie and Heiss (1964) found that, regardless of age or cultural background, the “warm colors” (red, orange, and yellow) are highly arousing, although not necessarily pleasing. The “cool colors” (blues and greens) have a calming, relaxed effect. The researchers noted that most people identified the “cool colors” as most pleasant.

TIPS:  
- **Classroom or office spaces:** Sky-blue tinged with red…conducive to thoughtful study, but also alertness.  
- **Cafeteria:** Purple…known in the restaurant industry as tranquilizing and good for the appetite.  
- **Gym:** Yellow, orange, and coral…represent the energizing hues.  
- **Add colors** to reports, presentations and visual displays for better recall.  
- **Experiment** with printing exams on blue paper (deep concentration and thinking).


The sweet smell of success! What does smell have to do with it? Like the rest of our senses, smell is a key component in learning and can, in some cases, improve cognition. The connection between our olfactory glands and the autonomic nervous system is quite strong. What we smell triggers responses such as anxiety, fear, hunger, calmness, depression, and sexuality. Think about the Christmas holiday and the smells associated with it…hospital smells…locker smells…the beach…warm chocolate…freshly baked bread.

According to a study done by Alan Hirsch in 1993, people can increase their abilities to think creatively as much as 30% when exposed to certain floral odors…and it’s no wonder! The olfactory regions are receptors for endorphins which signal the body’s response to feelings of pleasure and well-being. As for the classroom…a little peppermint, basil, lemon, rosemary, or cinnamon scent may increase alertness. Chamomile odor seems to be able to put people in a better mood. Lavender, orange, and rose may induce calmness and relaxation (Lavabre, 1990).

In another study by Carla Kallon in 1991, the odor heliotropine, a vanilla-almond fragrance, seemed to be the only odor that did not disrupt sleep and quicken the heart rate during slumber.

While there is no direct evidence that aromas can help cognitive performance, there is evidence that specific odors can better enable one to recall information learned in the presence of that odor (Smith 1992). This effect may only be a case of context-dependent learning, so we should be careful not to take the findings too far at this time.

What to do? Experiment with various aromas in your classroom…but have an awareness of those students who might have allergies to certain odors. Ask learners what they think. Do they feel
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energized and more alert after a whiff of peppermint? Do they feel relaxed and calm after a whiff of vanilla? How do they feel when surrounded with the aroma of chocolate chip cookies, a pumpkin-scented candle, or fresh-baked bread? If nothing else, you can have fun watching your students’ eyes light up and their nostrils twitch when they walk into your classroom!

“Wait-Time”
(www.av.k12.mo.us/main/files/Differentiated%20Instruction)

Wait-time allows students sufficient time to process and develop a response to a question before the teacher asks a specific student to respond.

1. Every 20 minutes provide a 60 second talk break for students to process information
2. Give students 3-5 seconds of “wait-time”.
3. Some students need more than 5 seconds when the question is above their recall level.
4. Some boys may need up to 60 seconds to bring information up on their “screen”.
5. Many students from poverty need additional “wait-time.”
6. Students whose primary language is not English will need additional processing time.
7. Students with expressive language difficulty need more time for the retrieval of words and thoughts.
8. Some students with learning disabilities have difficulty locating and retrieving “stored” information will benefit from increased wait-time.

Note: Wait-time and think-time are often used interchangeably.