



Brain Compatible Learning Environments

Buildings affect teaching and learning. New studies of the brain show us the effect of the built environment on a student's ability to learn. This new knowledge allows us to build better places for learning. As Martha Kaufeldt notes, "Brain compatible learning environments are places where students' curiosities are piqued and potential anxiety, frustration or confusion is diminished."¹

Neuroscience and Learning Environments

New technologies such as FMRI (Functional Magnetic Resonance Imaging), the NMRI (Nuclear Magnetic Resonance Imaging) and PET (Positron Emission Tomography) allow us to view and study brains that are alive and functioning versus those only available through autopsy. We can see the sequences of thinking measured across very narrow areas of the brain. Viewing the brain in terms of the right and left hemispheres or lower, mid and higher brain areas is now outdated.

Today's research encourages a "whole brain" approach to learning. Current research is also proving a connection between brain chemicals and how they relate to one's success as a learner. For example, more or less serotonin, dopamine or other related compounds have an impact on attention, motivation and behavior.

Neuroscience has begun to prove what we as designers have felt—that learning environments are needed, not classrooms.

Robin Fogarty wrote that such spaces:²

- Set a safe emotional climate
- Create a rich learning environment through challenge, choice and space
- Teach mind skills for life (critical, creative thinking)
- Develop learner skillfulness through a variety of teaching methods
- Challenge learning through experience
- Target multiple intelligences
- Transfer learning through reflection
- Balance assessment measures

The principles of brain based learning may be incorporated into the framework of a school's mission and goals. Where is the focus for education? Is it technologically rich? What are the values of the school and community? Where are the limits and absolutes? What are the systems and organizations that will be supported? Answering these and other such questions will provide direction to develop spaces that are supportive of good teaching and learning.

Brain Space Principles

Dr. Jeff Lackney has summarized some brain space design principles. While these may seem logical and simple, they can be significant in their impact on teaching and learning.

- Create rich, stimulating environments with "teaching architecture," colorful, tactile displays that are created by students (not the teacher) so that students have connection and ownership of the product.
- Build places for group learning like breakout spaces, alcoves and table groupings to facilitate social

¹ [Begin with the Brain](#) Zephyr, 1999

² "The Intelligence Friendly Classroom" (Kappan, May 1998)

learning and stimulate the social brain. Or turn breakout spaces into living rooms for conversation.

- Link indoor and outdoor places to promote movement and to engage the motor cortex linked to the cerebral cortex for oxygenation.
- Display symbols in corridors and public places that celebrate the school community's larger purpose. These will provide coherency and meaning to increase learners' motivation. (Warning: go beyond slogans.)
- Promote safe places that reduce threat, especially in urban settings.
- Vary places to provide multiple spaces with different shapes, color, light, nooks and crannies.
- Change displays because changing the environment influences interaction with the environment and stimulates brain development. Provide display areas that allow for stage-type construction to push the envelope further with regard to environmental change.
- Have all resources available to provide educational, physical and varied settings in close proximity. This encourages rapid development of ideas generated in a learning episode. "Wet" areas like science labs and computer-rich workspaces should be integrated and not segregated. Multiple functions and cross-fertilization of ideas are a primary goal.
- Be flexible; this common principle from the past continues to be relevant. Many dimensions of flexibility of place are reflected in other principles.
- Create active and passive places so that students have places for reflection and retreat away from others for intrapersonal intelligence. And they should have places for active engagement to support interpersonal intelligence.
- Recognize personal space because the concept of "home base" needs to be emphasized more than the metal locker or the desk. This speaks to the importance of uniqueness because learners need to express their

self-identity, personalize their special places and have places to express territorial behaviors.

- Understand that the community-at-large is the optimal learning environment. Find ways to use all urban and natural environments as the primary learning setting. The school as the "fortress of learning" needs to be challenged and conceptualized more as a resource-rich learning center that supplements lifelong learning. Community and business partnerships, technology, distance learning and home-based learning all need to be explored as alternative organizational structures for educational institutions of the present and future.

Planning Schools

Though this information about the brain and learning spaces has been available since the early 70s, schools are continuing to build the same classrooms. In fact, the design of educational facilities has changed very little in almost 200 years. One-room schools literally came together and became the little red schoolhouse as towns grew. The Industrial Revolution of the mid-1800s brought "efficient" education, and the "factory model" became the major form for classrooms. In the following decades, facilities were developed with concerns for cost and efficiency and only occasionally driven by a desire to cooperate with educators. The model has remained the same, tweaked only by changes in building technology. What now must be tweaked is the learning space itself.

Establish what you believe to be the constraints for facility planning. How far away from the current norms are you willing to venture? What can be changed? What will be painful to change?

When you know where you are, you can better chart a course for change. While the move to the creation of brain supportive facilities is not difficult, it does require an understanding of commitment to something a little different.

Professionals who understand the difference between classrooms and brain compatible learning spaces can help with assessment, design, project definition, project management and construction.

Whether you are interested in designing new facilities or redesigning existing ones, good learning can be built into any building.



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