

What is STE[+a]M?

The foundation of STE[+a]M is based on the use of both sides of the brain where convergent and divergent thinking are able to occur.



In order to be more “whole-brained” in their orientation, schools need to give equal weight to the arts, creativity, and the skills of imagination and synthesis. To foster a more whole-brained scholastic experience, teachers can use instruction techniques that connect with both sides of the brain. They can increase their classroom’s right-brain learning activities by incorporating more patterning, metaphors, analogies, role playing, visuals, and movement into their reading, calculation, and analytical activities.

Secretary of Education, Arne Duncan released a letter in August 2009 to School and Education Community Leaders reiterating that the arts are a core subject area and should be part of every child’s education. A narrow focus on STEM curriculum will crowd out other key curricular areas – including the arts, social studies, languages. A call for a balanced curriculum that educates the whole child brings about high achievement in all areas and offers the broadest preparation for citizenship, higher education and participation in a global economy and rapidly changing world should be the goal.

“We are moving from an economy and a society built on the logical, linear, computer like capabilities of the Information Age to an economy and a society built on the inventive, empathic, big-picture capabilities of what’s rising in its place, the Conceptual Age.” -*Daniel Pink, A Whole New Mind*

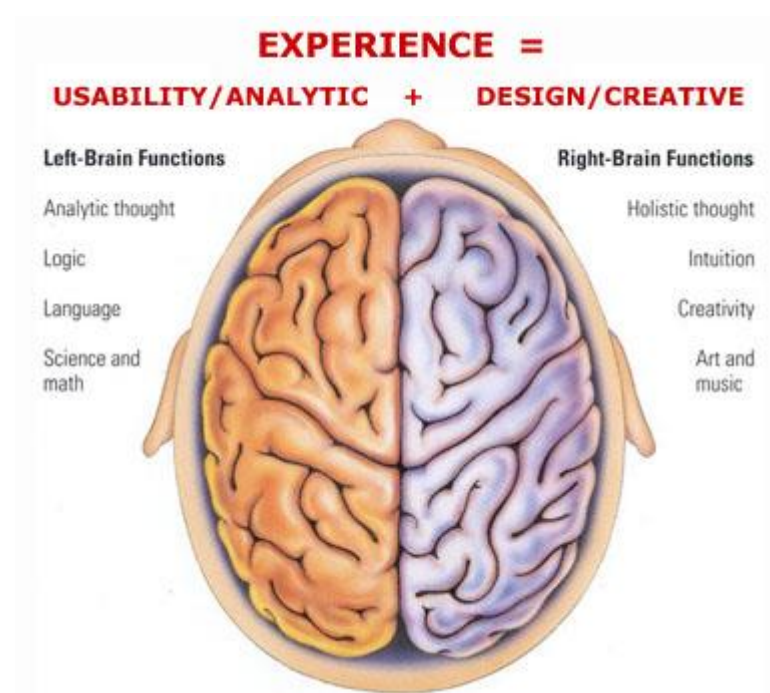
In the conceptual age, logical, linear, rule-based thinking skills will still be required, but they will no longer be sufficient. In order to succeed in the 21st century we must use both hemispheres of our brains and combine the logical, linear computations with creativity, and innovative thinking. A balanced curriculum that educates the whole child combines the arts and STEM and produces STEAM.

Innovation and creativity is America’s global competitive advantage. There is little doubt STEM education and STEM skills are an essential part of this country’s long term competitive edge, but STEM is missing a key set of creativity-related components that are equally critical to fostering a

competitive and innovative workforce, and those skills are summarized under the letter “A” for Arts as the foundation for “divergent thinking.”

Divergent thinking is the underpinning of STE[+a]M which is a thought process or method used to generate creative ideas by exploring many possible solutions. It is often used in conjunction with convergent thinking, which follows a particular set of logical steps to arrive at one “correct” solution. Divergent thinking typically occurs in a spontaneous, free-flowing manner, such that many ideas are generated in a random, unorganized fashion. Many possible solutions are explored in a short amount of time, and unexpected connections are drawn. Following divergent thinking, ideas and information are organized and structured using convergent thinking.

STEM Left Brain vs. [+a] Right Brain



It is important to dispel misconceptions about the left brain versus right brain question as those misconceptions have been wrongly used to justify a lot of theories about educational reform. It is often suggested that cognitive science supports the contention that our educational system is geared only to the rational (STEM), analytical left brain, at the expense of the creative ([+a] Arts), visual, imaginative right brain and that pupils are therefore not encouraged to “see the whole picture” and to use their brains as an integrated whole.

Our national focus on STEM education is grounded in a left brain approach that has excluded the Arts from enabling our students to have a well balanced approach to thinking. Hence, the movement of going from STEM to STE[+a]M is sound approach in approaching educational policy and new educational practices.

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